REPORT OF CO - PO ASSESSMENT AND ATTAINMENT OF FACULTY OF APPLIED SCIENCE

SUBMITTED
BY

DEPARTMENT OF APPLIED SCIENCE INVERTIES UNIVERSITY BAREILLY

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CO-PO ASSESSMENT & ATTAINMENT

1. INTRODUCTION

According to John Dewey, an American philosopher, psychologist and educational reformer, "Education is not preparation for life, education is life itself". Education is a form of teaching-learning-practicing in which the knowledge, skills and information are transferred from teachers to students. But the traditional system of education fails to measure the capability of the students. It only assesses the students learning by allowing them to reproduce the exact text presented in the text book as answer for questions. But the real need and demand of twenty first century learning system is the transition from Output Based Education to Outcome Based Education. Outcome Based Education (OBE) system is able to measure what the students are capable of doing. Indian education system has introduced the Outcome Based Education System through National Board of Accreditation (NBA). This is a model which not only gives much better technical knowledge to twenty first century Engineers, but also gives emphasis on the development of affective domain attributes which are needed in workplace, e.g. interpersonal skills, analytical skills, computer skills, organizational skills, leadership skills, self-confidence, creativity, strong work ethics, motivation, initiative, flexibility, adaptability and entrepreneurial skills. This report described the calculation of various science course (B.Sc.PCM, B.Sc. Honour Chemistry/Physics/Mathematics, B.Sc. ZBC, M.Sc Chemistry/Physics/Mathematics etc) delivery methods to attain OBE in science Program, presents assessment methods, attainment of course outcome (CO) and program outcome (PO).

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2. UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving student's sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

3. APPLIED SCIENCE DEPARTMENT VISION AND MISSION

APPLIED SCIENCE DEPARTMENT

Applied Science Department is proud of having well qualified and devoted teachers. The various departments that merge under this department, are of Mathematics, Chemistry, Physics and Humanities. Value oriented education plays a vital role in every human beings life and therefore the department is striving relentlessly to develop the Institute into a centre of excellence by imparting value education along with the technical and professional upliftment of its students. The department has well equipped Physics and Chemistry laboratories where students may perform experiments nicely. The students are given personal attention and care by monitoring their academic performance by conducting classes through peer guided self-study methodology, tutorial classes and regular counseling. Question banks comprising of questions of different types and levels, have been developed in all subjects for the use of students. Home assignments are assigned to the students regularly. The department also coordinates with the engineering departments so that it could cover the basics required in the study of engineering. The department also conducts the extra – curricular activities.

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VISION & MISSION OF THE DEPARTMENT

VISION

To educate undergraduate, post graduate, doctoral students in field of applied science, preparing sincere and socially responsible students to thrive and contribute to an ever-changing global society.

MISSION

To provide strong foundation to the students through basic courses and value added teaching in areas of technical field, innovation, personality development & competitive abilities and guide for their respective discipline.

To provide students with a flexible yet solid learning infrastructure through proactive and adaptive service systems.

To create and propagate knowledge and tools at the interfaces between areas of engineering, emerging trends of industries and other core areas of Applied Sciences and Humanities.

4. LEVELS OF OUTCOMES

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO)

4.1. Course Outcomes (COs)

Course Outcomes are the statements that declare what students should be able to do at the end of a course. POs are defined by Accreditation Agencies of the country, which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate"s potential to acquire competence to practice at the appropriate level. GAs

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form a set of individually assessable outcomes of the programme. For eg., a course such as science might have the following course outcomes set.

CO1 Recognize and classify different characteristics of light; such as reflection, refraction transmission and dispersion etc.

CO2 Understand the techniquesfor the demonstration of dual nature; particle and wave nature of light.

CO3 Apply the different experimental methods of light interference, diffraction and polarization phenomenon for the determination of light wavelength, film thickness, refractive index etc.

CO4 Analyse the behaviour of positive and negative crystals in view of ordinary and extraordinary rays.

CO5 Evaluate the specific rotation of optically active sugar solutions using saccharimeter.

CO6 Design and fabricate simple optical set-ups for obtaining coherent, extended sources, for interference.

4.2. Program Outcomes (POs)

POs are statements about the knowledge, skills and attitudes (attributes) the graduate of a formal engineering program should have. POs deal with the general aspect of graduation for a particular program, and the competencies and expertise a graduate will possess after completion of the program. These are broad and covers a wider area than of COs. 12 Program Outcomes, or Graduate Attributes for the sake of unity and quality assurance. We'll discuss each of them here. The Program Outcomes set by the institution must reflect on these

Science under graduates, graduate and doctorates will be able to

PO-1. Scientific knowledge: Apply the knowledge of mathematics, science, Scientific fundamentals, and scientific specialization to the solution of complex scientific problems.

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PO-2. Problem analysis: Identify, formulate, research literature, and analyze scientific problems to arrive at substantiated conclusions using first principles of mathematics, nature, and sciences.

PO-3. Design/development of solutions: Design solutions for complex scientific problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4. Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern scientific tools including prediction and modeling to complex activities with an understanding of the limitations.

PO-6. Scientific temper and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the practice.

PO-7. Environment and sustainability: Understand the impact of the professional scientific solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO-8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the work practice.

PO-9. Individual and team work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

PO-10. Communication: Communicate effectively with their community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

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PO-11. Project management and finance: Demonstrate knowledge and understanding of scientific and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

PO-12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

4.3. Program Specific Outcomes (PSOs)

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can be able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepares the grandaunts to achieve.

4.4. Program Educational Objectives (PEOs)

Program Educational Objectives (PEO) are statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve. PEO's are measured 4–5 years after graduation.

They are set in order to measure the effectiveness of the program, and to check whether it has prepared the students to deal with the real world, where they could apply and use the skills and knowledge they've learned to good use.

CO Attainment

- The assessments should be in alignment with the COs
- Question paper should be so set to assess all COs

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- The average marks obtained in assessments against items for each CO will indicate the CO attainment
- Instructors can set targets for each CO of his/her course
- Attainment gaps can therefore be identified
- Instructor can plan to reduce the attainment gaps or enhance attainment targets enhance attainment targets
- If the assessment is in alignment with COs, the performance of the students indicates the CO attainment

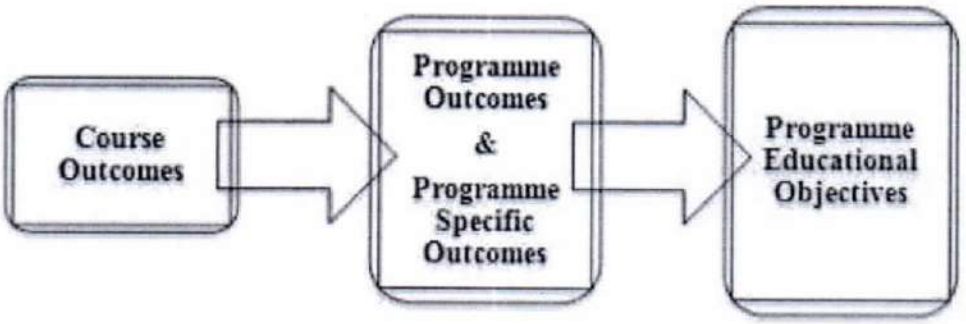

Figure 1: Relating the outcomes

Figure 1 shows the building block of CO-PO&PSOPEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO"s based on the relationship exist between them. But the PO"s is not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with anyone of PSO and PEO which are specified in the program. This is shown in figure 3 on next page.

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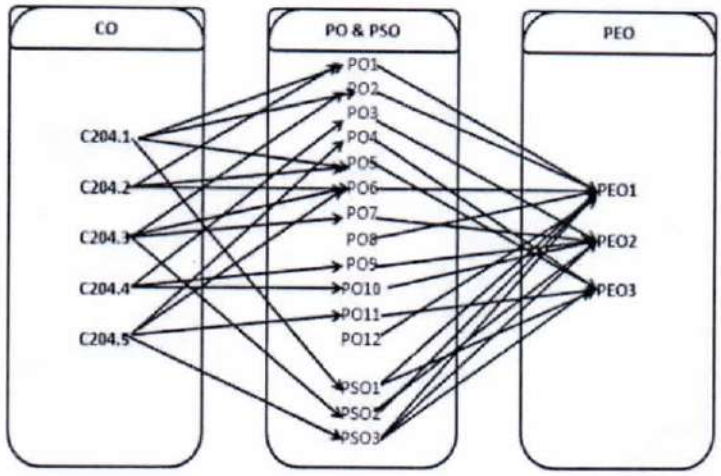

Figure 2: Relationship between CO, PO &PSO and PEO

4. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

Critical thinking is a skill that you are expected to develop as you progress through university. Critical thinking will become part of your research, your reading, your planning and reflection and of your academic writing. It involves a set of skills and an attitude of mind that you will need to cultivate and practise - it won't necessarily come easily or naturally! If you can develop critical thinking skills in relation to your subject, they will be valuable to you in many other aspects of life (including employment).

Bloom's taxonomy of thinking and learning illustrates forms of thinking, in ascending order of complexity, from lower-order thinking skills (LOTS) to higher-order thinking skills (HOTS). It begins with **remembering** and ends with **creating**.

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This is used by lecturers to set learning outcomes and assessment criteria for a course or module, you will often find these verbs in your module handbooks.

The knowledge about a subject alone, like having access to a range of information, or 'facts', is at the simplest or lowest level. So using only, or mostly, descriptive language in your writing, to communicate what you know about a topic is not likely to generate any marks.

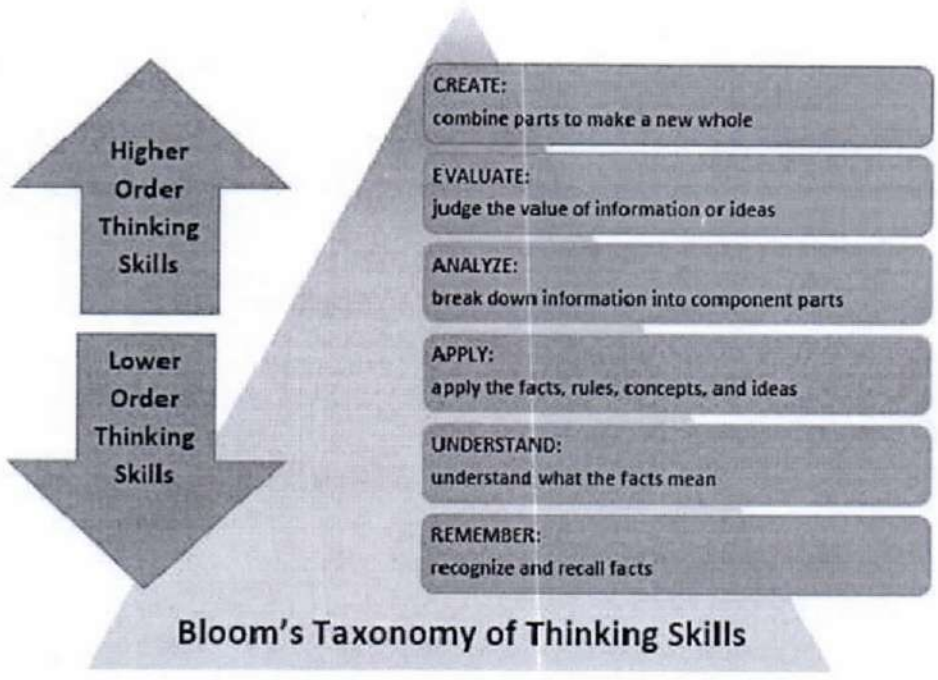

Figure 3: Bloom's Taxonomy

Higher and more complex levels include the ability to analyze, synthesise and evaluate information by comparing and contrasting different points of view, sets of information or experiences. This might involve recognising patterns of behaviour, for example, and using them to make predictions.

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By engaging with your sources, and the evidence that emerges, you are demonstrating that you have done some deep learning. This is what your markers are looking for in your writing. To do this, it is essential to read a range of quality academic sources when researching.

5. Mapping of CO with PO

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and „-". The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of „-" is no correlation between CO and PO.

Average value has to be taken for each CO. Average CO value is calculated by sum of value entered in each column is divided by number of CO mapped in each column (consider either 3, 2 or 1 entered and need not to consider „-" entered).

Each course outcome has been calculated from the topics which are assigned from each unit. To evaluate CO-PO matrix in micro-level calculation, Topic-wise, CO-PO mapping may be carried out.

6.1. Marks obtained by students

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6.2. CO Attainment:

6.3. PO- Attainment and CO-PO Matrix:

CO1 AT	2.400
CO2 AT	2.500
CO3 AT	2.300
CO4 AT	1.900
CO5 AT	2.000
CO6 AT	2.900

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3	1	3	2	2	2	2	2	2	1	2	2	3
CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	3	3	3	2	2	3	3	1	3	3	3
	15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
34.900	35.600	33.300	24.000	27.300	22.600	34.800	34.700	18.800	33.900	32.800	37.300
15	15	14	10	12	10	15	15	8	14	14	16
2.327	2.373	2.379	2.400	2.275	2.260	2.320	2.313	2.350	2.421	2.343	2.331

The various attainments of Courses of different Program are given in next section.(Sec-7)

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7 PO and CO Attainments

7.1 B.Sc. (PCM)

Program(Class): B.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BSR101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.265	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.184	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.082	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.918	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.122	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.429	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			32.653	32.490	30.408	22.143	25.816	21.204	32.469	32.551	17.245	30.959	30.347	34.653
			15	15	14	10	12	10	15	15	8	14	14	16
			2.177	2.166	2.172	2.214	2.151	2.120	2.165	2.170	2.156	2.211	2.168	2.166

Program(Class): B.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BPR102 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.918	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.857	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.796	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.612	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.490	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.735	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			28.776	29.327	27.531	20.224	22.633	18.735	28.653	28.714	15.306	27.714	27.163	30.510
			15	15	14	10	12	10	15	15	8	14	14	16
			1.918	1.955	1.966	2.022	1.886	1.873	1.910	1.914	1.913	1.980	1.940	1.907

Program(Class): B.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BPR101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.735	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.469	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.490	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.367	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.388	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.224	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			24.571	24.510	23.020	17.265	19.510	15.776	24.327	24.592	12.857	23.408	22.939	25.796
			15	15	14	10	12	10	15	15	8	14	14	16
			1.638	1.634	1.644	1.727	1.626	1.578	1.622	1.639	1.607	1.672	1.638	1.612

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Program(Class): B.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BPR101 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.735	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.469	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.490	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.367	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.388	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.224	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.571	24.510	23.020	17.265	19.510	15.776	24.327	24.592	12.857	23.408	22.939	25.796
15	15	14	10	12	10	15	15	8	14	14	16
1.638	**1.634**	**1.644**	**1.727**	**1.626**	**1.578**	**1.622**	**1.639**	**1.607**	**1.672**	**1.638**	**1.612**

Program(Class): B.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BMR101 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.347	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.000	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.898	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.612	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.347	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	1.020	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.878	25.633	23.735	15.857	20.408	15.367	24.429	24.776	14.837	24.204	23.082	26.429
15	15	14	10	12	10	15	15	8	14	14	16
1.659	**1.709**	**1.695**	**1.586**	**1.701**	**1.537**	**1.629**	**1.652**	**1.855**	**1.729**	**1.649**	**1.652**

7.2 BSc (ZBC)

Program(Class): B.Sc.(ZBC) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: ZYT101 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.357	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.286	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.452	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.548	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.262	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	0.929	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
19.310	19.619	18.167	12.476	16.000	13.214	19.405	19.476	10.762	17.690	18.143	20.690
15	15	14	10	12	10	15	15	8	14	14	16
1.287	**1.308**	**1.298**	**1.248**	**1.333**	**1.321**	**1.294**	**1.298**	**1.345**	**1.264**	**1.296**	**1.293**

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Program(Class): B.Sc.(ZBC) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: ZYT102 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.619	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.643	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.524	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.571	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.571	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	1.310	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			23.024	22.952	21.429	14.929	18.381	15.167	22.929	22.905	12.500	21.476	21.357	24.571
			15	15	14	10	12	10	15	15	8	14	14	16
			1.535	**1.530**	**1.531**	**1.493**	**1.532**	**1.517**	**1.529**	**1.527**	**1.563**	**1.534**	**1.526**	**1.536**

Program(Class): B.Sc.(ZBC) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BOT101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.833	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.643	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.690	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.452	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.238	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	0.952	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			21.405	22.119	20.429	13.833	17.619	13.762	21.262	21.452	12.500	20.595	20.024	22.905
			15	15	14	10	12	10	15	15	8	14	14	16
			1.427	**1.475**	**1.459**	**1.383**	**1.468**	**1.376**	**1.417**	**1.430**	**1.563**	**1.471**	**1.430**	**1.437**

Program(Class): B.Sc.(ZBC) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BOT102 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.238	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.119	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.548	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.262	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.095	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	0.690	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			16.643	17.429	15.881	11.095	14.167	11.571	16.952	17.071	9.476	15.690	15.857	18.071
			15	15	14	10	12	10	15	15	8	14	14	16
			1.110	**1.162**	**1.134**	**1.110**	**1.181**	**1.157**	**1.130**	**1.138**	**1.185**	**1.121**	**1.133**	**1.129**

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				Program(Class):	B.Sc.(ZBC)	Sem:	1	Session:	2020-21				
		CO-PO MATRIX		Subject Code:	BSR101	Subject(Course):				Deptt:	ASH		
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.857		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.524		CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.690		CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.429		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.310		CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	1.071		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				21.738	22.167	20.476	14.357	18.000	13.952	21.571	21.905	12.381	20.786	20.262	23.795
				15	15	14	10	12	10	15	15	8	14	14	16
				1.449	1.478	1.463	1.436	1.500	1.395	1.438	1.460	1.548	1.485	1.447	1.443

7.3 B.Sc. (Hons) Physics

				Program(Class):	B.Sc.-H (Phy)	Sem:	1	Session:	2020-21				
		CO-PO MATRIX		Subject Code:	BHM101	Subject(Course):				Deptt:	ASH		
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.083		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.083		CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.917		CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.750		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.417		CO5	3	1	1	2	2	2	3	3	0	2	2	
CO6 AT	2.625		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				29.708	30.708	28.792	20.458	23.417	19.250	29.542	29.542	16.375	28.792	28.125	31.625
				15	15	14	10	12	10	15	15	8	14	14	16
				1.981	2.047	2.057	2.046	1.951	1.925	1.969	1.969	2.047	2.057	2.009	1.977

				Program(Class):	B.Sc.-H (Phy)	Sem:	1	Session:	2020-21				
		CO-PO MATRIX		Subject Code:	BHM102	Subject(Course):				Deptt:	ASH		
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.292		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.292		CO2	2	3	3	0	0	1	2	1	2	3	2	
CO3 AT	2.208		CO3	1	3	2	2	2	2	2	2	1	2	2	
CO4 AT	1.917		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.125		CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.458		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				33.167	33.333	31.125	22.542	26.208	21.625	33.083	33.083	17.667	31.708	30.958	35.375
				15	15	14	10	12	10	15	15	8	14	14	16
				2.211	2.222	2.223	2.254	2.184	2.163	2.206	2.206	2.208	2.265	2.211	2.211

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Program(Class): B.Sc.-H (Phy) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHP101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.583	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.750	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.583	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.417	CO4	3	3	3	1	3	3	3	3	2	1	3	
CO5 AT	2.708	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
38.708	38.625	36.042	25.667	30.583	25.583	38.708	38.542	20.583	36.500	36.000	41.458
15	15	14	10	12	10	15	15	8	14	14	16
2.581	**2.575**	**2.574**	**2.567**	**2.549**	**2.558**	**2.581**	**2.569**	**2.573**	**2.607**	**2.571**	**2.591**

Program(Class): B.Sc.-H (Phy) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHP102 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.375	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.375	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.250	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.083	CO4	3	3	3	1	3	3	3	3	2	1	3	
CO5 AT	2.208	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.292	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
33.875	33.958	31.708	22.625	26.875	22.125	33.750	33.750	18.208	32.125	31.542	36.125
15	15	14	10	12	10	15	15	8	14	14	16
2.258	**2.264**	**2.265**	**2.263**	**2.240**	**2.213**	**2.250**	**2.250**	**2.276**	**2.295**	**2.253**	**2.258**

Program(Class): B.Sc.-H (Phy) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHC101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.667	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.625	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.625	CO3	1	3	2	2	2	2	2	2	1	2	2	
CO4 AT	2.375	CO4	3	3	3	1	3	3	3	3	2	1	3	
CO5 AT	2.625	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.417	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
38.125	38.083	35.458	25.458	30.458	25.083	38.083	38.125	20.375	36.000	35.458	40.708
15	15	14	10	12	10	15	15	8	14	14	16
2.542	**2.539**	**2.533**	**2.546**	**2.538**	**2.508**	**2.539**	**2.542**	**2.547**	**2.571**	**2.533**	**2.544**

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						Program(Class):	B.Sc.-H (Phy)	Sem:	1	Session:	2020-21				
			CO-PO MATRIX		Subject Code:	BHC102	Subject(Course):				Deptt:	ASH			
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.542		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.375		CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.375		CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.208		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.375		CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.292		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				35.375	35.208	32.833	23.667	28.333	23.083	35.208	35.375	18.917	33.333	32.833	37.583
				15	15	14	10	12	10	15	15	8	14	14	16
				2.358	2.347	2.345	2.367	2.361	2.308	2.347	2.358	2.365	2.381	2.345	2.349

7.4 B.Sc. (Hons) Chemistry

						Program(Class):	B.Sc.-H (Chem)	Sem:	1	Session:	2020-21				
			CO-PO MATRIX		Subject Code:	BHC101	Subject(Course):				Deptt:	ASH			
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.750		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.750		CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.750		CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.750		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	3.000		CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				41.250	40.750	38.000	27.250	33.000	27.500	41.250	41.250	21.750	38.250	38.250	44.000
				15	15	14	10	12	10	15	15	8	14	14	16
				2.750	2.717	2.714	2.725	2.750	2.750	2.750	2.750	2.719	2.732	2.732	2.750

						Program(Class):	B.Sc.-H (Chem)	Sem:	1	Session:	2020-21				
			CO-PO MATRIX		Subject Code:	BHC102	Subject(Course):				Deptt:	ASH			
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.750		CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.750		CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.500		CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.250		CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.000		CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	3.000		CO6	3	3	3	3	2	2	3	3	1	3	3	3
				15	15	14	10	12	10	15	15	8	14	14	16
				PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
				38.000	39.000	36.500	25.750	30.000	24.500	37.750	37.750	21.000	36.750	35.750	40.500
				15	15	14	10	12	10	15	15	8	14	14	16
				2.533	2.600	2.607	2.575	2.500	2.450	2.517	2.517	2.625	2.625	2.554	2.531

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Program(Class): B.Sc.-H (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHM101 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.750	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.250	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.000	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.000	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.250	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.250	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
22.250	21.250	20.250	15.750	17.250	13.250	21.500	22.000	11.250	21.250	20.250	22.750
15	15	14	10	12	10	15	15	8	14	14	16
1.483	**1.417**	**1.446**	**1.575**	**1.438**	**1.325**	**1.433**	**1.467**	**1.406**	**1.518**	**1.446**	**1.422**

Program(Class): B.Sc.-H (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHM102 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.000	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.250	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.000	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.750	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.000	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
31.250	31.500	29.500	21.250	24.250	20.500	31.250	31.000	16.500	30.000	29.250	33.500
15	15	14	10	12	10	15	15	8	14	14	16
2.083	**2.100**	**2.107**	**2.125**	**2.021**	**2.050**	**2.083**	**2.067**	**2.063**	**2.143**	**2.089**	**2.094**

Program(Class): B.Sc.-H (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.500	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.750	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.500	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.250	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.250	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
36.500	37.250	34.750	24.250	28.750	24.000	36.500	36.250	20.000	35.000	34.250	39.250
15	15	14	10	12	10	15	15	8	14	14	16
2.433	**2.483**	**2.482**	**2.425**	**2.396**	**2.400**	**2.433**	**2.417**	**2.500**	**2.500**	**2.446**	**2.433**

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					Program(Class):	B.Sc.-H (Chem)	Sem:	1	Session:	2020-21			
		CO-PO MATRIX			Subject Code:	BHP102	Subject(Course):			Deptt:	ASH		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.750	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.500	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.750	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.500	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.250	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			25.750	26.500	24.750	18.500	20.750	17.000	25.750	26.000	13.750	24.750	24.500	27.250
			15	15	14	10	12	10	15	15	8	14	14	16
			1.717	1.767	1.768	1.850	1.729	1.700	1.717	1.733	1.719	1.768	1.750	1.703

7.5 B.Sc. (Hons) Mathematics

					Program(Class):	B.Sc.-H (Math)	Sem:	1	Session:	2020-21			
		CO-PO MATRIX			Subject Code:	BHC101	Subject(Course):			Deptt:	ASH		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.667	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.625	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.625	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.375	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.625	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.417	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			38.125	38.083	35.458	25.458	30.458	25.083	38.083	38.125	20.375	36.000	35.458	40.708
			15	15	14	10	12	10	15	15	8	14	14	16
			2.542	2.539	2.533	2.546	2.538	2.508	2.539	2.542	2.547	2.571	2.533	2.544

					Program(Class):	B.Sc.-H (Math)	Sem:	1	Session:	2020-21			
		CO-PO MATRIX			Subject Code:	BHC102	Subject(Course):			Deptt:	ASH		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.542	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.375	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.375	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.208	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.375	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.292	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			35.375	35.208	32.833	23.667	28.333	23.083	35.208	35.375	18.917	33.333	32.833	37.583
			15	15	14	10	12	10	15	15	8	14	14	16
			2.358	2.347	2.345	2.367	2.361	2.308	2.347	2.358	2.365	2.381	2.345	2.349

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Program(Class): B.Sc.-H (Math) | Sem: 1 | Session: 2020-21

CO-PO MATRIX | Subject Code: BHM101 | Subject(Course): | Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.083	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.083	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.917	CO3	1	3	2	2	2	2	2	2	1	2	2	-
CO4 AT	1.750	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.417	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.625	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
29.708	30.708	28.792	20.458	23.417	19.250	29.542	29.542	16.375	28.792	28.125	31.625
15	15	14	10	12	10	15	15	8	14	14	16
1.981	**2.047**	**2.057**	**2.046**	**1.951**	**1.925**	**1.969**	**1.969**	**2.047**	**2.057**	**2.009**	**1.977**

Program(Class): B.Sc.-H (Math) | Sem: 1 | Session: 2020-21

CO-PO MATRIX | Subject Code: BHM102 | Subject(Course): | Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.292	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.292	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.208	CO3	1	3	2	2	2	2	2	2	1	2	2	-
CO4 AT	1.917	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.125	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.458	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
33.167	33.333	31.125	22.542	26.208	21.625	33.083	33.083	17.667	31.708	30.958	35.375
15	15	14	10	12	10	15	15	8	14	14	16
2.211	**2.222**	**2.223**	**2.254**	**2.184**	**2.163**	**2.206**	**2.206**	**2.208**	**2.265**	**2.211**	**2.211**

Program(Class): B.Sc.-H (Math) | Sem: 1 | Session: 2020-21

CO-PO MATRIX | Subject Code: BHP101 | Subject(Course): | Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.583	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.750	CO2	2	3	3	0	0	1	2	1	2	3	2	-
CO3 AT	2.583	CO3	1	3	2	2	2	2	2	2	1	2	2	-
CO4 AT	2.417	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.708	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.500	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
38.708	38.625	36.042	25.667	30.583	25.583	38.708	38.542	20.583	36.500	36.000	41.458
15	15	14	10	12	10	15	15	8	14	14	16
2.581	**2.575**	**2.574**	**2.567**	**2.549**	**2.558**	**2.581**	**2.569**	**2.573**	**2.607**	**2.571**	**2.591**

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Program(Class): B.Sc.-H (Math) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: BHP102 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.375	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.375	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.250	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.083	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.208	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.292	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
33.875	33.958	31.708	22.625	26.875	22.125	33.750	33.750	18.208	32.125	31.542	36.125
15	15	14	10	12	10	15	15	8	14	14	16
2.258	**2.264**	**2.265**	**2.263**	**2.240**	**2.213**	**2.250**	**2.250**	**2.276**	**2.295**	**2.253**	**2.258**

7.6 MSc. (Physics)

Program(Class): M.Sc. (Phy) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MPY101 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.111	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.000	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.889	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.778	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.222	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.333	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
31.222	30.444	28.556	21.222	24.556	20.222	31.000	31.111	16.000	29.333	28.778	33.000
15	15	14	10	12	10	15	15	8	14	14	16
2.081	**2.030**	**2.040**	**2.122**	**2.046**	**2.022**	**2.067**	**2.074**	**2.000**	**2.095**	**2.056**	**2.063**

Program(Class): M.Sc. (Phy) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MPY102 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.111	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.000	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.778	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.778	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.111	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.778	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
29.111	30.333	28.556	20.111	23.000	18.667	28.778	28.889	16.333	28.222	27.667	30.778
15	15	14	10	12	10	15	15	8	14	14	16
1.941	**2.022**	**2.040**	**2.011**	**1.917**	**1.867**	**1.919**	**1.926**	**2.042**	**2.016**	**1.976**	**1.9**

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Program(Class):	M.Sc. (Phy)	Sem:	1	Session:	2020-21
CO-PO MATRIX	Subject Code:	MPY103	Subject(Course):		Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.111	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.000	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.000	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.667	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.556	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.778	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
30.333	31.111	29.111	21.333	24.000	19.667	30.222	30.333	16.333	29.444	28.667	32.222
15	15	14	10	12	10	15	15	8	14	14	16
2.022	**2.074**	**2.079**	**2.133**	**2.000**	**1.967**	**2.015**	**2.022**	**2.042**	**2.103**	**2.048**	**2.014**

Program(Class):	M.Sc. (Phy)	Sem:	1	Session:	2020-21
CO-PO MATRIX	Subject Code:	MPY104	Subject(Course):		Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.625	CO1	3	1	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.500	CO2	2	3	0	0	0	1	2	1	2	3	2	3
CO3 AT	2.500	CO3	1	3	1	2	2	2	2	2	1	2	2	2
CO4 AT	2.250	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.750	CO5	3	1	1	1	2	2	3	3	0	2	2	3
CO6 AT	1.875	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	14	10	9	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
36.000	32.750	22.875	20.875	28.875	23.500	35.875	36.000	19.125	33.750	33.125	38.375
15	14	10	9	12	10	15	15	8	14	14	16
2.400	**2.339**	**2.288**	**2.319**	**2.406**	**2.350**	**2.392**	**2.400**	**2.391**	**2.411**	**2.366**	**2.3**

7.7 M.Sc. (Chemistry)

Program(Class):	M.Sc. (Chem)	Sem:	1	Session:	2020-21
CO-PO MATRIX	Subject Code:	MCH101	Subject(Course):		Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.400	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.500	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.300	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.900	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.000	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.900	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 A
34.900	35.600	33.300	24.000	27.300	22.600	34.800	34.700	18.800	33.900	32.800	37.300
15	15	14	10	12	10	15	15	8	14	14	16
2.327	**2.373**	**2.379**	**2.400**	**2.275**	**2.260**	**2.320**	**2.313**	**2.350**	**2.421**	**2.343**	**2.331**

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Program(Class): M.Sc. (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MCH102 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.900	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	3.000	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.800	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.600	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.600	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.600	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			40.900	41.400	38.600	27.000	32.500	26.800	40.800	40.700	22.400	38.900	38.200	43.800
			15	15	14	10	12	10	15	15	8	14	14	16
			2.727	**2.760**	**2.757**	**2.700**	**2.708**	**2.680**	**2.720**	**2.713**	**2.800**	**2.779**	**2.729**	**2.738**

Program(Class): M.Sc. (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MCH103 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.800	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.900	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.700	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.600	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.300	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.900	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			40.300	41.200	38.500	26.900	32.000	26.500	40.200	40.100	22.200	38.400	37.900	43.100
			15	15	14	10	12	10	15	15	8	14	14	16
			2.687	**2.747**	**2.750**	**2.690**	**2.667**	**2.650**	**2.680**	**2.673**	**2.775**	**2.743**	**2.707**	**2.694**

Program(Class): M.Sc. (Chem) Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MCH104 Subject(Course): Deptt: ASH

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	3.000	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.900	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.900	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.600	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	2.700	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.900	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16
			PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
			42.300	42.600	39.700	28.500	33.800	27.700	42.200	42.300	22.800	40.200	39.500	45.100
			15	15	14	10	12	10	15	15	8	14	14	16
			2.820	**2.840**	**2.836**	**2.850**	**2.817**	**2.770**	**2.813**	**2.820**	**2.850**	**2.871**	**2.821**	**2.819**

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7.8 M.Sc. (Mathematics)

Program(Class): M.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MMA105 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	1.600	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	1.600	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	1.400	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.400	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.200	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.400	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.400	24.800	23.400	17.000	19.000	15.800	24.200	24.200	13.000	23.400	23.000	25.800
15	15	14	10	12	10	15	15	8	14	14	16
1.627	**1.653**	**1.671**	**1.700**	**1.583**	**1.580**	**1.613**	**1.613**	**1.625**	**1.671**	**1.643**	**1.613**

Program(Class): M.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MMA104 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.600	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.600	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.600	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	2.400	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	3.000	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.400	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
39.000	38.200	35.600	26.000	31.000	25.800	39.000	39.000	20.200	36.400	36.000	41.600
15	15	14	10	12	10	15	15	8	14	14	16
2.600	**2.547**	**2.543**	**2.600**	**2.583**	**2.580**	**2.600**	**2.600**	**2.525**	**2.600**	**2.571**	**2.600**

Program(Class): M.Sc. Sem: 1 Session: 2020-21

CO-PO MATRIX Subject Code: MMA103 Subject(Course): Deptt: ASH

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1 AT	2.200	CO1	3	2	2	2	3	0	2	3	2	3	2	2
CO2 AT	2.400	CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3 AT	2.400	CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4 AT	1.800	CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5 AT	1.600	CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6 AT	2.800	CO6	3	3	3	3	2	2	3	3	1	3	3	3
			15	15	14	10	12	10	15	15	8	14	14	16

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
32.400	34.200	31.800	22.600	25.600	21.400	32.600	32.400	18.000	32.000	31.000	35.000
15	15	14	10	12	10	15	15	8	14	14	16
2.160	**2.280**	**2.271**	**2.260**	**2.133**	**2.140**	**2.173**	**2.160**	**2.250**	**2.286**	**2.214**	**2.188**

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								Program(Class):	M.Sc.		Sem:	1	Session:	2020-21										
				CO-PO MATRIX				Subject Code:	MMA102		Subject(Course):								Deptt:	ASH				
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12								
CO1 AT	1.600			CO1	3	2	2	2	3	0	2	3	2	3	2	2								
CO2 AT	1.400			CO2	2	3	3	0	0	1	2	1	2	3	2	3								
CO3 AT	1.200			CO3	1	3	2	2	2	2	2	2	1	2	2	2								
CO4 AT	1.000			CO4	3	3	3	1	3	3	3	3	2	1	3	3								
CO5 AT	0.800			CO5	3	1	1	2	2	2	3	3	0	2	2	3								
CO6 AT	2.000			CO6	3	3	3	3	2	2	3	3	1	3	3	3								
					15	15	14	10	12	10	15	15	8	14	14	16								
					PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT								
					20.200	20.800	19.600	14.200	15.800	12.400	19.800	20.000	11.200	20.000	19.000	21.200								
					15	15	14	10	12	10	15	15	8	14	14	16								
					1.347	1.387	1.400	1.420	1.317	1.240	1.320	1.333	1.400	1.429	1.357	1.325								

								Program(Class):	M.Sc.		Sem:	1	Session:	2020-21										
				CO-PO MATRIX				Subject Code:	MMA101		Subject(Course):								Deptt:	ASH				
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12								
CO1 AT	1.800			CO1	3	2	2	2	3	0	2	3	2	3	2	2								
CO2 AT	1.800			CO2	2	3	3	0	0	1	2	1	2	3	2	3								
CO3 AT	1.600			CO3	1	3	2	2	2	2	2	2	1	2	2	2								
CO4 AT	1.600			CO4	3	3	3	1	3	3	3	3	2	1	3	3								
CO5 AT	1.400			CO5	3	1	1	2	2	2	3	3	0	2	2	3								
CO6 AT	2.400			CO6	3	3	3	3	2	2	3	3	1	3	3	3								
					15	15	14	10	12	10	15	15	8	14	14	16								
					PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT								
					26.800	27.200	25.600	18.400	21.000	17.400	26.600	26.600	14.400	25.600	25.200	28.400								
					15	15	14	10	12	10	15	15	8	14	14	16								
					1.787	1.813	1.829	1.840	1.750	1.740	1.773	1.773	1.800	1.829	1.800	1.775								

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B.COM DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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7.		Levels of Outcomes

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. B.COM DEPARTMENT VISION AND MISSION

VISION

"To groom professionals in the field of Management & Commerce who will bring about a qualitative change to the society through their contributions and knowledge."

MISSION

"To be a world leader in business education, research, & helping to create a better knowledge society world around."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify, comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

To developability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM&LEARNING ENVIRONMENT

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning.To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurial capability

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the B.COM Departmentare taken into consideration to interact with various stake holders, and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Programme Outcome of B. Com Programme:

PO1.Management knowledge: Apply the knowledge of businesses, industries, Functions of management, entrepreneurship fundamentals and many more.

PO2.Problem analysis: Identify, formulate, research literature, and analyze complex managerial problems reaching substantiated conclusions using first principles of management i.e. Planning.

PO3. Design/development of solutions: Design solutions for complex business problems and design system approaches or processes that meet the specified needs with appropriate consideration for the social upliftment, and the cultural, and environmental considerations.

PO4. Environment and sustainability: Understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development of the companies as well as society as a whole.

PO5. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the management practice.

PO6. Value-based Development: To impart quality and need based education our objective is to sensitize the students to their changing roles in society through awareness raising activities.

PO7. Learners will be able to recognize features and roles of businessmen, entrepreneur managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making.

PO8. Learners will be able to prove proficiency with the ability to engage in competitive exams like CA, CS, ICWA and other courses.

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Departmentare used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

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STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	An ability to apply conceptual foundations of management to solve practical decision-making problems.
PSO2	An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.
PSO3	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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5. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs.

CO STATEMENTS:
Course: PRINCIPLES OF BUSINESS MANAGEMENT
Course Code: BCR 101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understand the concepts related to Business.
2. Demonstrate the roles, skills and functions of management.
3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.
4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
5. Be able to analyze organizational case situations in each of the four functions of management
6. This course makes the learner aware about the practices of a business management.

CO STATEMENTS:
Course: Professional Communication I
Course Code: BPC101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understand the process of communication and its effect on giving and receiving information.
2. Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar.
3. Apply effective communication skills in a variety of public and interpersonal settings.
4. To draft effective correspondence with brevity and clarity.
5. Demonstrate his verbal and nonverbal communication ability through presentations.
6. Become aware the numerous carrier opportunities within the fields of communication.

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CO STATEMENTS:

CoursePRINCIPLES OF ECONOMICS

Course Code: BCR 103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding the basic concepts of demand & supply.
CO2	To analyze the importance of production function.
CO3	To understand the different types of Market structures
CO4	Understand government functioning and its impact.
CO5	Understanding various forms of Government and its working.
CO6	Understanding role of International organizations and their role in world peace.

CO STATEMENTS:

Course: Book Keeping and Basic Accounting

Course Code: BCR104

On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understanding the basic concept of Accounting and its Functioning.
2. Recording the transactions and maintenance various Books.
3. Identifying the various Revenue and Expenditure items.
4. Knowledge of Accounting procedure of Joint venture and Consignment.
5. Evaluation of financial statement analysis.
6. Ability to apply the knowledge of subject in practical real life situations.

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CO STATEMENTS:
Course: Computer Fundamentals
Course Code: BCR 105
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To determine the importance of the computer techniques .
CO2	To understand the various function of operating system.
CO3	To get practices of different function of MS words
CO4	To determine the difference function and method of MS Excel.
CO5	To determine the difference function and method of MS power point
CO6	Apply the knowledge of subject practically in real life situations

6. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

7. Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

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Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate the POs.

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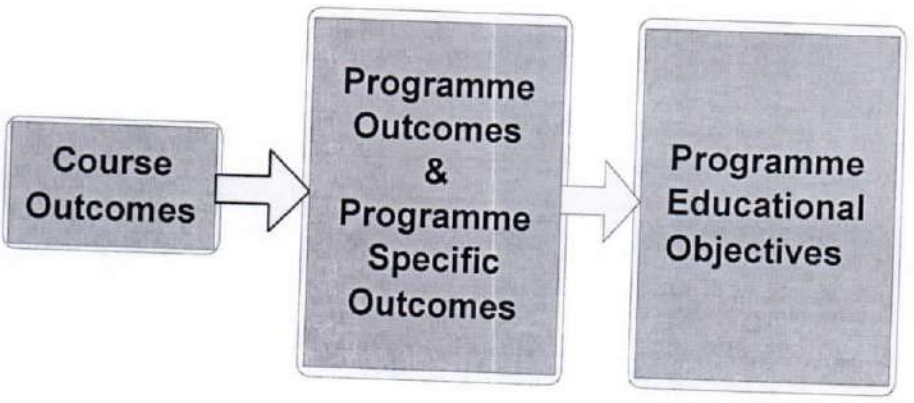
The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.



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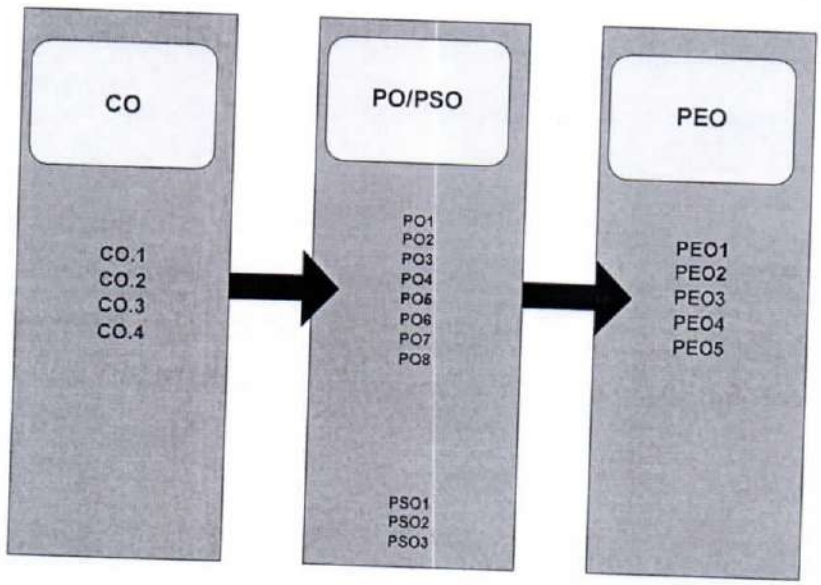
Above Figure shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.



Relationship between CO, PO &PSO and PEO

a. Process involved in CO-POMapping

After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course. Attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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B. Com(H) FM DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. BBA DEPARTMENT VISION AND MISSION

VISION

"To groom professionals in the field of Management & Commerce who will bring about a qualitative change to the society through their contributions and knowledge."

MISSION

"To be a world leader in business education, research, & helping to create a better knowledge society world around."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM & LEARNING ENVIRONMENT

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning. To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurial capability

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the B.Com(H) FM Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

PO1.Financial knowledge: Apply the knowledge of statistics, shares in businesses, industries, and many more.

PO2.Problem analysis: Identify, formulate, research literature, and analyze complex financial problems reaching substantiated conclusions using financial principles of management practices.

PO3. Design/development of solutions: Design solutions for complex business problems and design system approaches or processes that meet the specified needs with appropriate consideration for the social upliftment, and the cultural, and environmental considerations.

PO4. Economic Development: Understand the impact of the professional solutions in societal and Economic context, which will lead to a better growth and GDP of our country.

PO5. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the management practices as student will deal in monitory field.

PO6. Ethical Behaviour and Social Responsibility: Identify and analyze ethical conflicts and social responsibility issues involving different stakeholders. Develop viable alternatives and make effective decisions relating to business ethics and social responsibility.

PO7 . Project management: An ability to use skills and management principles to do work as a member and leader in a team, to manage projects and demonstrate capabilities in new venture creation

PO 8 Life-long learning : A recognition of the need for,Achieve higher levels of proficiency and self-actualization through pursuing lifelong learning

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

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STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	An ability to apply conceptual foundations of management to solve practical decision-making problems.
PSO2	An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.
PSO3	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

COURSE OUTCOME STATEMENT

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Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs.

CO STATEMENTS:
Course: : Indian Financial Market
Course Code: BFM 101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Enabling students to be conversant with the financial market in general and Stock market in particular
2. Enabling the student to understand the regulations and regulators who operate in the market
3. Enabling the student to identify the risks and rewards associated with investment
4. Understanding the difference between primary and secondary market
5. Enabling the students to identify the factors affecting the price of a stock
6. Enabling the student to understand the principles of investment

CO STATEMENTS:
Course: Business Organisation and Management
Course Code: BFM 102
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understand the basic concepts of business and management
2. Demonstrate the roles, skills and functions of management
3. Understand business environment scanning for effective decision making
4. Able to find out the importance of motivation, leadership and communication for effective decision making
5. Able to understand various functioning of organizations
6. Able to evaluate the functioning of organizations

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CO STATEMENTS:
Course: Business Law
Course Code: BFM 103
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Able to explain the basic concepts of law of contract and its formation
2. Able to understand function of law in formation of contract in various cases
3. Able to understand roles of law to identify void and voidable contract in business and the guidelines for Business Units
4. Able to interpret intra-individual, inter-personal roles of law related to business units/groups
5. Able to identify the components of change in Business law and its applications
6. Able to interpret Organizational happenings and their management in the light of business law

CO STATEMENTS:
Course: Computer fundametals
Course Code: BFM 104
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understanding the functioning of computer
2. To analyze various structures of input and output devices on the basis of their function
3. To understand how internet can be used in a secured manner and function of protocols
4. Understanding working of MS office
5. Able to handle operation systems
6. Able to understand and solve various problems on Ms Office

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CO STATEMENTS:

Course: English

Course Code: BFM 105

On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Enabling students to acquire necessary Communication skills to comprehend and communicate effectively.
2. Enabling strategies to organize ideas and express thoughts with acceptable accuracy.
3. Understanding the use of Grammar and Vocabulary in Speech and Writing.
4. Enabling students to draw inferences and predictions based on information in the text.
5. Encouraging activities so as to improve critical thinking power.
6. Understanding strategies to deliver effective presentation.

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5. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

6. Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the

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respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co- curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate the POs. The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepares the grandaunts to achieve.

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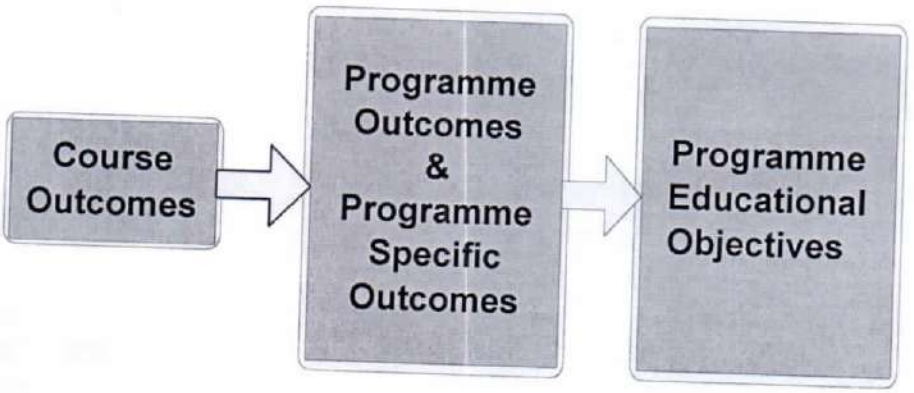

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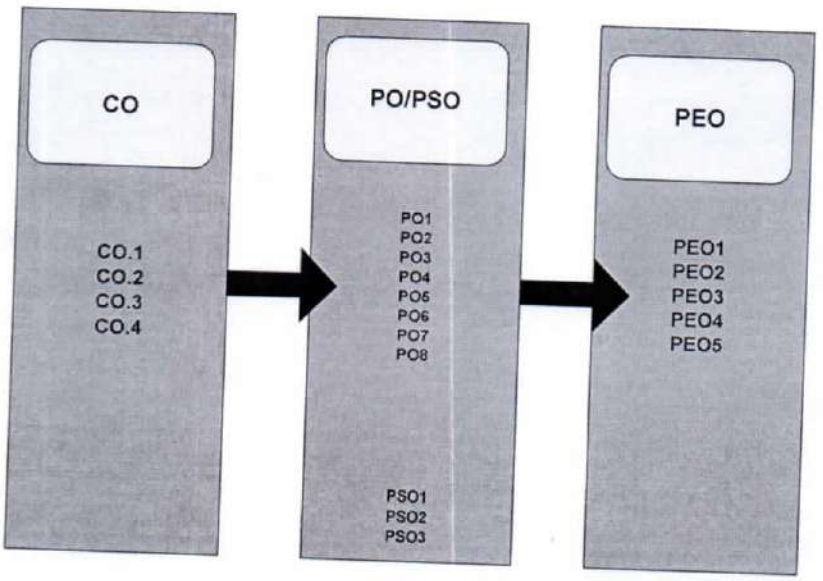
Above Figure shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.



Relationship between CO, PO &PSO and PEO

a. Process involved in CO-POMapping

After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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B.COM (H) DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. B.COM(H) DEPARTMENT VISION AND MISSION

VISION

"To groom professionals in the field of Management & Commerce who will bring about a qualitative change to the society through their contributions and knowledge."

MISSION

"To be a world leader in business education, research, & helping to create a better knowledge society world around."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM&LEARNING ENVIRONMENT

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning.To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurial capability

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the B.COM(H) Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Programme Outcome of B.Com. (Hons)Programme:
B.Com (Hons) programme has been designed to prepare graduates for attaining the following specific outcomes:

PO1. Academic excellence: Our primary objective is to enable every student to cope up with the latest developments in contemporary, national and global level through effective transaction of the curricular and co-curricular aspects.

PO2. Professional Excellence: Motivates molds and prepares the students for positions of leadership in business organizations at the local, national and international levels.

PO3. Students will learn relevant financial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

PO4. Holistic Development: Exposure to learners in the latest trends in relevant branches of knowledge, competence and creativity to face global challenges.

PO5. Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

PO6. Value-based Development: To impart quality and need based education our objective is to sensitize the students to their changing roles in society through awareness raising activities.

PO7. Learners will be able to recognize features and roles of businessmen, entrepreneur, managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making.

PO8. Learners will be able to prove proficiency with the ability to engage in competitive exams like CA, CS, ICWA and other courses.

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Departmentare used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

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STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	An ability to apply conceptual foundations of management to solve practical decision-making problems.
PSO2	An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.
PSO3	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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5. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs.

CO STATEMENTS:
Course: Business Organization and Management
Course Code: BCM 101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Develops managerial and business skills among the learners..
2. To understand various aspects of Planning and Decision Making.
3. To apply knowledge in elimination of wrong management practices.
4. To understand about Internal and External environment of business and inculcate entrepreneurial skills
5. To generate learning about various aspects of staffing, leading and controlling.
6. This course makes the learner aware about the practices of a business organization.

CO STATEMENTS:
Course: FINANCIAL ACCOUNTING
Course Code: BCM 102
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Knowledge about accounting & book-keeping and to Understand the process of recording financial transactions and preparing final accounts.
2. Understanding the importance of Accounting Standards & ICAI to know how to compute business income.
3. Developing the skills of recording transactions related to Hire purchase system and Branch Accounting.
4. Employ critical thinking skills to analyse financial data as well as the effects of differing financial accounting methods on the financial statements.
5. To understand the advanced issues in partnership accounts.

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6. Maintaining accounts in computerized environment using accounting software and ability to apply the knowledge of subject practically in real life situations

CO STATEMENTS:
CourseMicroeconomics I
Course Code: BCM 103
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding the basic concepts of demand & supply.
CO2	To analyse various social structures on the basis of caste, class etc.
CO3	To understand social evils and their elimination on the part of society.
CO4	Understand government functioning and its impact.
CO5	Understanding various forms of Government and its working.
CO6	Understanding role of International organizations and their role in world peace.

CO STATEMENTS:
Course: Business Laws
Course Code: BCM104
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Demonstrate an understanding of the Legal Environment of Business.
2. Apply basic legal knowledge to business transactions.
3. Acquire problem solving techniques and to be able to present coherent, concise legal argument.
4. Demonstrate understanding of legality and Statute of Frauds in contracts.
5. To identify the fundamental legal principles behind contractual agreement.
6. Ability to apply the knowledge of subject in practical real life situations.

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CO STATEMENTS:
Course: Computer Fundamentals
Course Code: BCM 105
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding*Microsoft office and their application*
CO2	Analyse *use of application software in business*
CO3	Assessing the*concepts*
CO4	*Develop a set of skills*
CO5	*Explain the prospect of the knowledge*
CO6	Apply the knowledge of subject practically in real life situations

6. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

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b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

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7. Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

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Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

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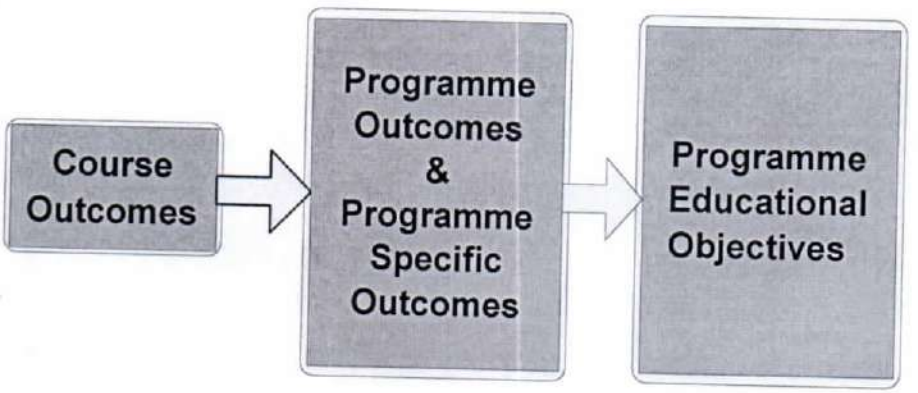

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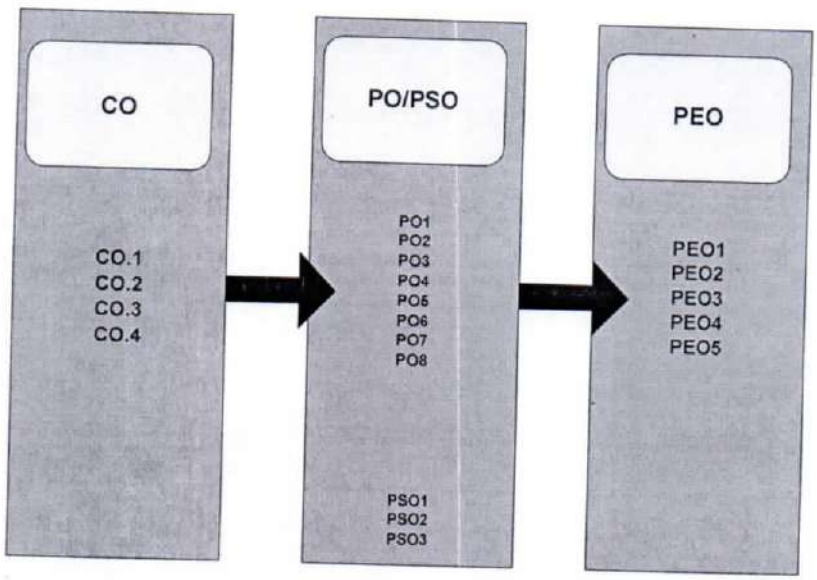

Relationship between CO, PO &PSO and PEO

a. Process involved in CO-POMapping

After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. BBA DEPARTMENT VISION AND MISSION

VISION

"To groom professionals in the field of Management & Commerce who will bring about a qualitative change to the society through their contributions and knowledge."

MISSION

"To be a world leader in business education, research, & helping to create a better knowledge society world around."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

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Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM & LEARNING ENVIRONMENT

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning. To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurial capability

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the BBA Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

PO1.Critical Thinking Skills: Demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyze and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.

PO2.Communication Skills: Students are able to conceptualize a complex issue into a coherent written statement and oral presentation.

PO3. Technology Skills: Students are competent in the uses of technology in modern organizational operations.

PO4. Entrepreneurship and Innovation: Students can demonstrate the fundamentals of creating and managing innovation, new business development, and high-growth potential entities.

PO5.Business Knowledge: Students can demonstrate technical competence in domestic and global business through the study of major disciplines within the fields of business.

PO6. Ethical Behaviour and Social Responsibility: Identify and analyze ethical conflicts and social responsibility issues involving different stakeholders. Develop viable alternatives and make effective decisions relating to business ethics and social responsibility.

PO7 . Project management: An ability to use skills and management principles to do work as a member and leader in a team, to manage projects and demonstrate capabilities in new venture creation

PO 8 Life-long learning : A recognition of the need for,Achieve higher levels of proficiency and self-actualization through pursuing lifelong learning.

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

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STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	An ability to apply conceptual foundations of management to solve practical decision-making problems.
PSO2	An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.
PSO3	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs.

CO STATEMENTS:
Course: Principles of Management
Course Code: BBA101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. To understand about the learning of Management and it's functioning
2. To understand various aspects of Planning and Decision Making.
3. To apply knowledge in elimination of wrong management practices
4. To understand about Internal and External environment of business
5. To evaluate different forms of organizations
6. To generate learning about various aspects of staffing, leading and controlling

CO STATEMENTS:
Course: Principles of Economics
Course Code: BBA102
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. To state economics principles and concepts.
2. To understand the economic theories and principles
3. To solve the problems based on economic theories and principles
4. To analyse the impact of economic theories and principles
5. To find out the relationship between economic variables
6. To explain the economic theories and its outcomes

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CO STATEMENTS:
Course: Business Mathematics
Course Code: BBA103
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Explain the concepts and use equations, formulae, and mathematical expressions and relationships in a variety of contexts.
2. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems
3. Analyze and demonstrate mathematical skills required in mathematically intensive areas in Economics and business.
4. Integrate concept in international business concepts with functioning of global trade.
5. To be able to analyze basic methods of integration.
6. To be able to solve Mathematical problems

CO STATEMENTS:
Course: ACCOUNTING AND FINANCIAL ANALYSIS
Course Code: BBA 104
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Knowledge about accounting & book-keeping
2. Understanding the process of recording financial transactions and preparing final accounts
3. Interpreting and analyzing financial statements
4. Able to prepare fund flow statement and cash flow statement
5. Understanding the importance of Accounting Standards & ICAI
6. Able to solve accounting problems

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CO STATEMENTS:
Course: Business Law
Course Code: BBA106
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Demonstrate an understanding of the Legal Environment of Business.
2. Apply basic legal knowledge to business transactions.
3. Identify contract remedies.
4. Acquire problem solving techniques and to be able to present coherent, concise legal argument.
5. Demonstrate understanding of legality and Statute of Frauds in contracts.
6. Demonstrate knowledge of basic court procedures.

CO STATEMENTS:
Course: Professional Communication I
Course Code: BPC 101
On successful completion of this course, students should be able to

COURSE OUTCOMES DESCRIPTION
1. Understand the process of communication and its effect on giving and receiving information.
2. Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar.
3. Apply effective communication skills in a variety of public and interpersonal settings.
4. To draft effective correspondence with brevity and clarity.
5. Demonstrate his verbal and nonverbal communication ability through presentations.
6. Become aware the numerous carrier opportunities within the fields of communication.

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5. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

6. Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

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Course Outcomes are the statements that declare what students should be able to do at the endof a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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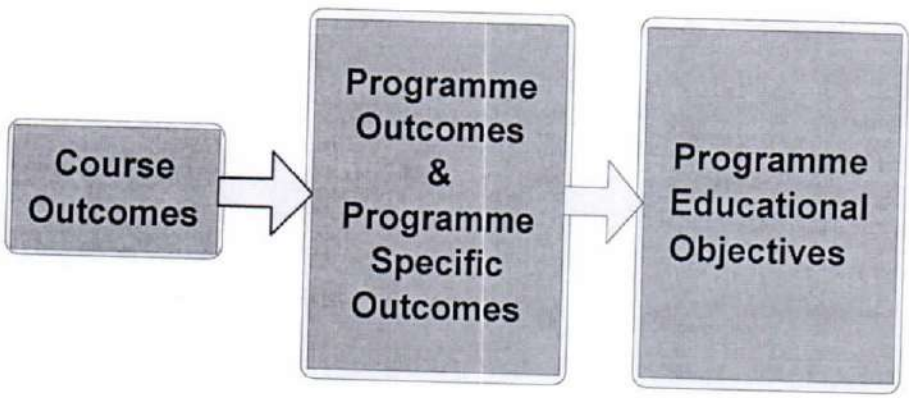
The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.



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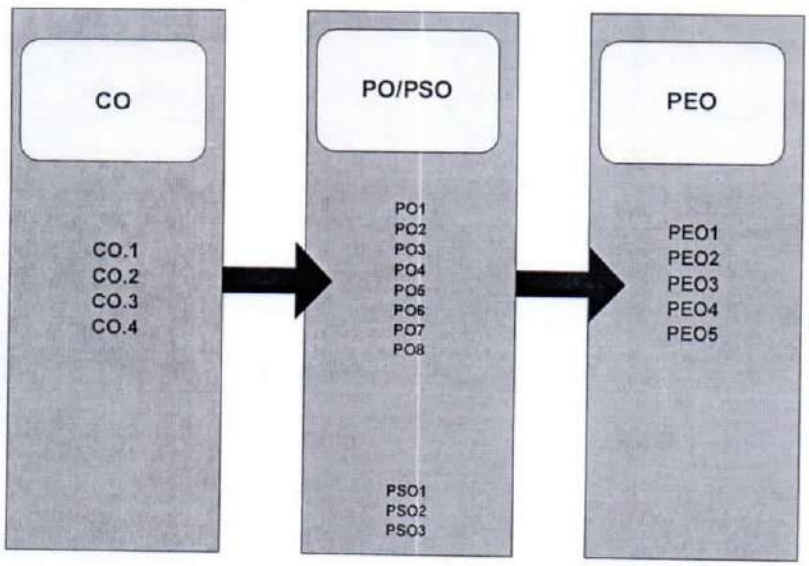
Above Figure shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.



Relationship between CO, PO &PSO and PEO

a. Process involved in CO-POMapping

After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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BCA DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. UNIVERSITY VISION AND MISSION

Vision

Keeping the growing and changing needs of Industry and society, we are devoted to growing surroundings so as to improve the highbrow and ethical requirements of our students. Our endeavor is to strive for the overall development of students, thereby enabling them to accept challenges. In tune with this our vision is

Mission

- To impart high quality professional training at the postgraduate and undergraduate level with an emphasis on basic principles of computer science and engineering
- To strengthen Academic Practices in terms of Curriculum, Pedagogy, Assessment and Faculty Competence
- Promote Research Culture among Students and Faculty through Projects and Consultancy.
- To strengthen the Industry-Academia interface that will help the graduates to emerge as leaders in academics or an inspiring revolutionary in entrepreneurship
- Focus on applied research to create next generation technologies.
- To make students Socially Responsible Citizen

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2. BCA DEPARTMENT VISION AND MISSION

VISION

To create the most conducive environment for quality academic and research oriented undergraduate and postgraduate education in computer science and engineering and prepare the students for a globalized technological society and orient them towards serving the society.To be among the nation's premier small research and teaching Computer Science departments

MISSION

- To be among the nation's premier small research and teaching Computer Application departments
- To impart moral and ethical values, and interpersonal skills to the students
- To achieve academic excellence by imparting in-depth knowledge to the students through effective pedagogies and hands on experience on latest tools and technologies
- To establish nationally and internationally recognized research centers and expose the students to broad research experience
- To pursue interdisciplinary research that will serve the needs of the entire global community
- To prepare students to be continuous learners in a connected world and imbibe professional skills and ethical responsibilities in them

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

Program Educational Objectives (PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurialcapability.

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the MBA Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Program Outcomes (POs)		
PO1	**Managerial knowledge**	An ability to apply knowledge of management
PO2	**Problem analysis**	An ability to analyze and interpret problems
PO3	**Interpersonal Skills**	An ability to Utilize interpersonal skills to lead/manage employees in an organizational setting,
PO4	**Critical thinking Skills**	An ability to demonstrate critical thinking skills.
PO5	**Conduct investigations of problems**	An ability to identify, formulate, comprehend, analyze, synthesis of the information to solve managerial problems and provide valid conclusions.
PO6	**Use of Modern tools**	An ability to use the contemporary techniques, skills and moderntools necessary for managerialdecision.
PO7	**Ethics**	Understand the ethical implication of business decision making and recognize ethical dilemmas.
PO8	**Individual and teamwork**	Exhibit the leadership capacity and teamwork skills for business decision making.
PO9	**Communication skill**	An ability to Demonstrate effective communication.
PO10	**Project management and finance**	An ability to use skills and management principles to do work as a member and leader in a team, tomanage projects and demonstrate capabilities in new venture creation.
PO11	**Holistic Development**	Ensuring holistic and sustainable development of students
PO12	**Life-long learning**	A recognition of the need for,Achieve higher levels of proficiency and self-actualization through pursuing lifelong learning.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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4.3 Program Specific Outcomes (PSO)

PSO1:An ability to apply conceptual foundations of management to solve practical decision-makingproblems.

PSO2: An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higherforms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learningprocesses.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previouslearned information.	defines,describes, identifies, knows, labels, lists,matches,names, outlines,recalls, recognizes,reproduces, selects, states	Reciteapolicy. Quotepricesfrom Memorytoa customer.Recite the safety rules.
Understanding: Comprehending Themeaning, translation, interpolation,and Interpretationof Instructionsand problems. State a Problemin one'sown words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewritethe Principlesoftest writing. Explain in one'sownwords Thestepsfor Performinga Complextask. Translatean Equationinto acomputer spreadsheet.

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Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learningthe classroom into novel situations in the workplace.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows,solves, uses	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a writtentest.
Analyzing: Separates material or conceptsinto component parts sothatits organizational structuremaybe understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishesidentifies, illustrates,infers, outlines,relates,selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognizelogical fallaciesin reasoning. Gathers information from a departmentand selects the required tasks fortraining.
Evaluating: MakeJudgmentsaboutthe value of ideas or materials.	appraises,compares,concludes, contrasts,criticizes,critiques, defends,describes, discriminates, evaluates, explains,interprets, justifies,relates, summarizes,supports	Select the most Effectivesolution. Hire the most qualified candidate. Explain andjustify a newbudget.

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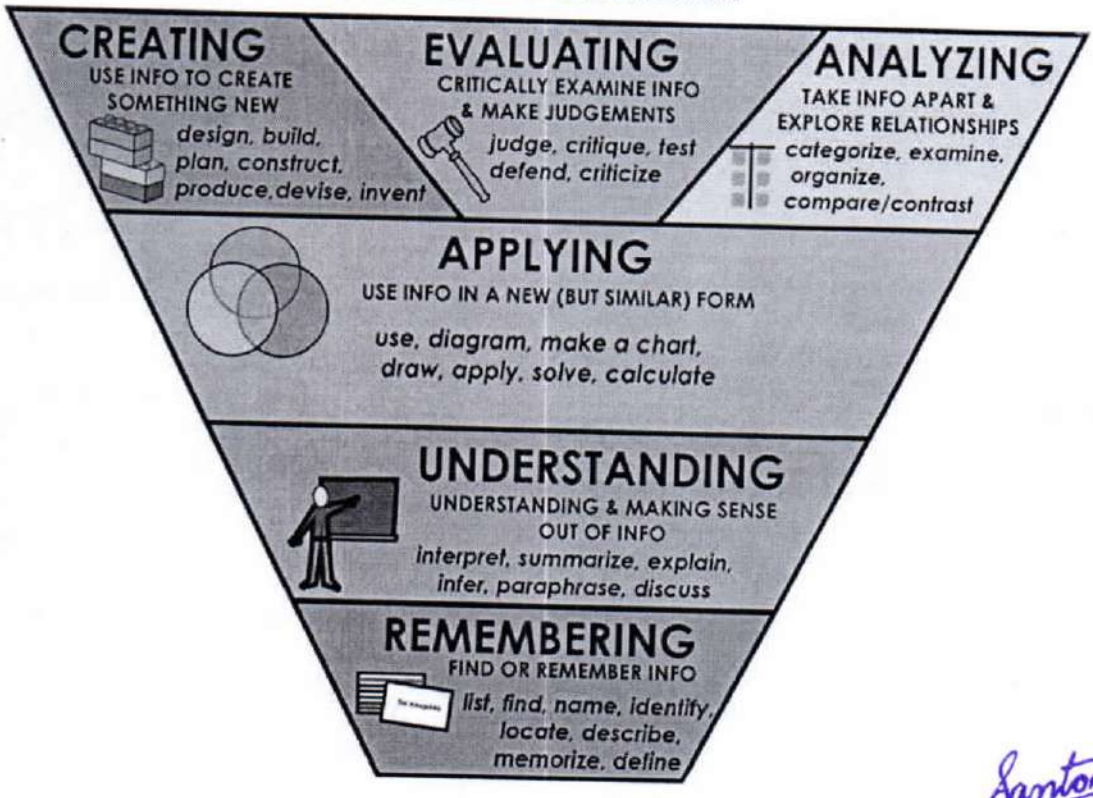
Creating: Builds a structureor Patternfrom diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

BLOOM'S TAXONOMY



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6. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

SAMPLE CO STATEMENTS:
Course: Environment and Ecology
Course Code: BCA 101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	. Identify the factors governing the environment and their impact.
CO2	Current Environmental Issues and solution to curb it
CO3	Initiatives taken by Government and Non-governmental Organizations (NGO)
CO4	. Judicious use of Conventional and Non-Conventional sources
CO5	Legal aspects pertaining to protection of environment.
CO6	Describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

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7. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"-"** indicates there is nocorrelation.

7.1 Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.

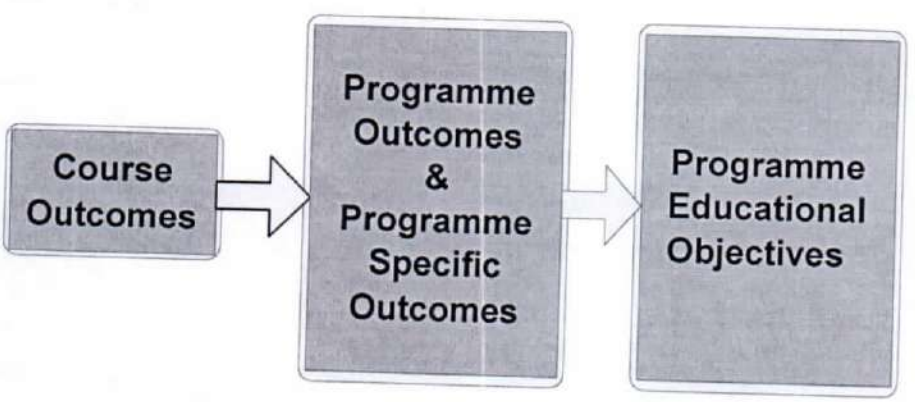

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

This is shown in figure 7.2.

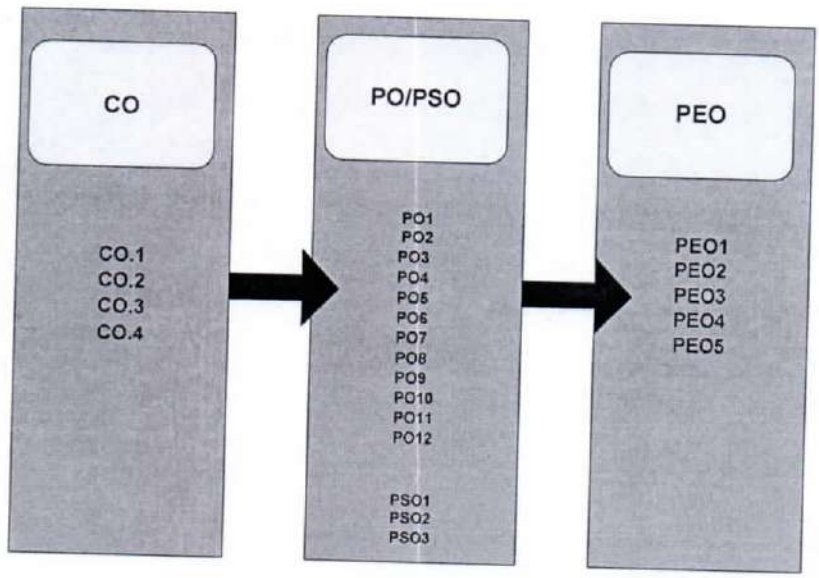

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-POMapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 SAMPLE CO-PO Mapping

Course: Strategic Management
Course Code: BCA 101
Environment and Ecology
Mapping of CO with PO

First two numeric digit indicates year of study and next two digits indicate branch number in the respective year of study. PC01 is the first course in second year. A sample course outcome statements and sample CO-PO matrix are given in Table 7.1

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '-'. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '-' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome MBA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment ofCOs/POs

Step-1:The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

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Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

8. COURSE OUTCOMES TO PO AND PSOMAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

SAMPLE COURSE-PO AND COURSE-PSO

MAPPING COURSE: Environment and Ecology

Course Code: BCA 101

Mapping of CO with PO

CO1 AT	2.52
CO2 AT	1.88
CO3 AT	2.34
CO4 AT	2.46
CO5 AT	2.46
CO6 AT	0.00

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**2**	**2**	**3**	**0**	**2**	**3**	2	3	2	2
CO2	2	3	3	0	0	1	2	1	2	3	2	3
CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	3	3	3	2	2	3	3	1	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
28.42	27.54	25.20	17.10	24.54	18.86	28.24	28.88	16.06	25.26	25.78	30.12
15.00	15.00	14.00	10.00	12.00	10.00	15.00	15.00	8.00	14.00	14.00	16.00
1.89	**1.84**	**1.80**	**1.71**	**2.05**	**1.89**	**1.88**	**1.93**	**2.01**	**1.80**	**1.84**	**1.88**

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PHARMACY DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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PHARMACY DEPARTMENT VISION AND MISSION

VISION

"The aim has been to specifically design the course to develop manpower, which meets the global requirement of skilled professionals in the rapidly growing need of pharmaceutical industries."

MISSION

"Invertis University Pharmacy Department promote excellence in pharmaceutical education and to prepare students to meet the challenges in the area of pharmaceutical industries, education, research, development and marketing."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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1. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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2. STATEMENTS OF PEOs, POs AND PSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

Program Educational Objectives (PEOs):

PEO 1 To produce pharmacy graduates with strong fundamental concepts and high technical competence in pharmaceutical sciences and technology, who shall be able to use these tools in pharmaceutical industry and/or institutes where ever necessary for success.

PEO 2 To provide students with a strong and well defined concepts in the various fields of pharmaceutical sciences viz., pharmaceutics, pharmaceutical chemistry, pharmacology and pharmacognosy according to the requirement of pharmaceutical industries, community and Hospital Pharmacy and also to develop a sense of teamwork and awareness amongst students towards the importance of interdisciplinary approach for developing competence in solving complex problems in the area of Pharmaceutical Sciences.

PEO 3 To promote the development of trained human resource in Pharmaceutical Sciences for dissemination of quality education with highly professional and ethical attitude, strong communication skills, effective skills to work in a team with a multidisciplinary approach.

PEO 4 To generate potential knowledge pools with interpersonal and collaborative skills to identify, assess and formulate problems and execute the solution in closely related pharmaceutical industries.

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PEO 5 To train the students to contribute towards health care system and counseling for prophylaxis and prevention of diseases.

PEO 6 To encourage the students to participate in life-long learning process for a highly productive career and to relate the concepts of Pharmaceutical Sciences towards serving the cause of the society

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4.2 PROGRAM OUTCOMES (POs):

PO1: Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.

PO2: Drug Aspects: Describe the synthesis, formulation, analysis and pharmacological aspects of drugs and pharmaceuticals.

PO3: Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO5: Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

PO6: Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO7: Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO8: Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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4.3 Program Specific Outcomes (PSO)

PSO1:An ability to apply conceptual foundations of management to solve practical decision-making problems.

PSO2: An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from Memory to a customer. Recite the safety rules.
Understanding: Comprehending The meaning, translation, interpolation, and Interpretation of Instructions and problems. State a Problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the Principles of test writing. Explain in one's own words The steps for Performing a Complex task. Translate an Equation into a computer spreadsheet.

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Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learning the classroom into novel situations in the workplace.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.
Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.
Evaluating: Make Judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports	Select the most Effective solution. Hire the most qualified candidate. Explain and justify a new budget.

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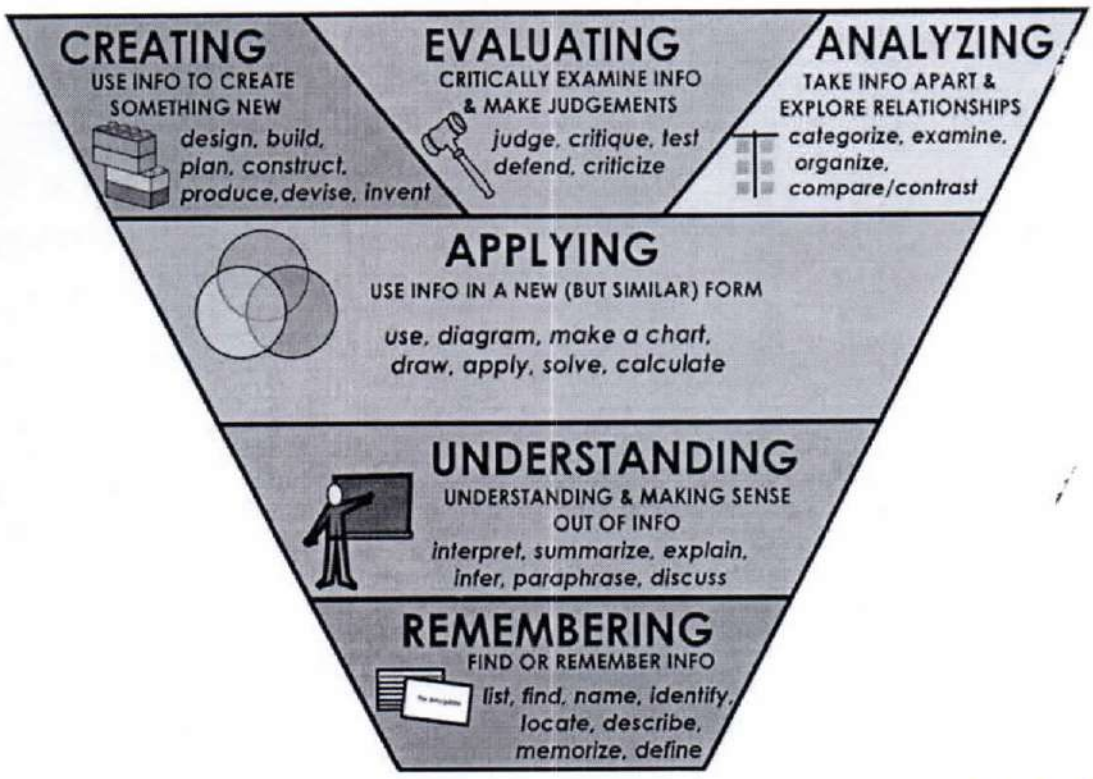
Creating: Builds a structure or Pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

BLOOM'S TAXONOMY



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3. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy

CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"-"** indicates there is nocorrelation.

7.1 Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

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After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate the POs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts to achieve.

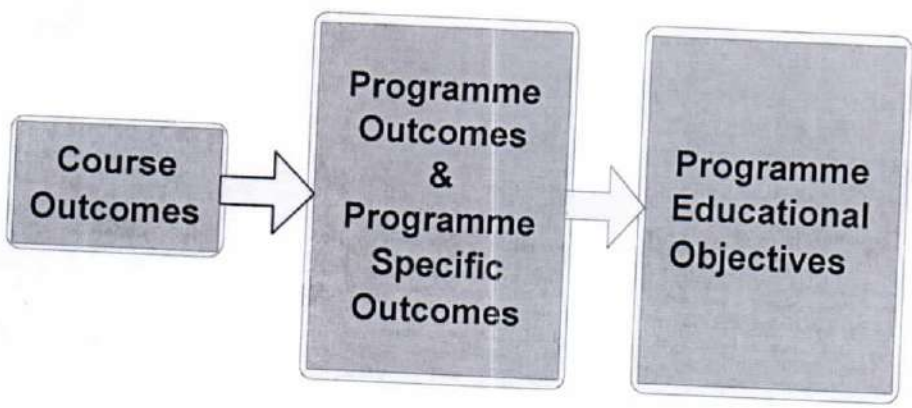

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

This is shown in figure 7.2.

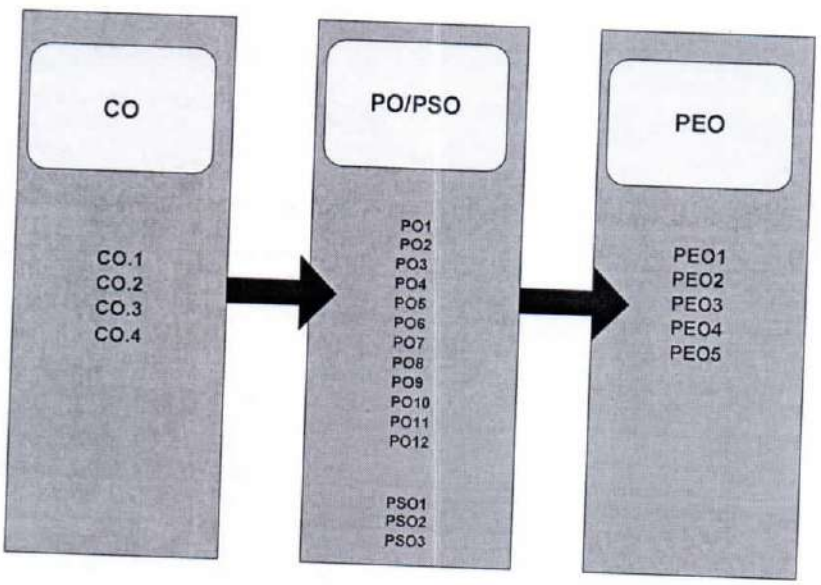

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course. attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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COURSE OUTCOMES TO PO AND PSO MAPPING

Mapping strength of a course to PO/ PSO can be obtained by taking the average of the CO-PO/ PSO mapping matrices of that course.

COURSE-PO AND COURSE-PSO

CO of Human Anatomy and Physiology I– Theory

1. Students would have studied about the gross morphology, structure and functions of cell, skeletal, muscular, cardiovascular system of the human body.
2. They would have understood the various homeostatic mechanisms and their imbalances.
3. Students would able to identify the different types of bones in human body.
4. Students would be able to identify the various tissues of different systems of human body.
5. Students would learn about the various experimental techniques related to physiology.
6. They would have learnt various techniques like blood group determination, blood pressure measurement, blood cells counting.

MAPPING COURSE: Human Anatomy and Physiology I– Theory
Course Code: BP101T
Mapping of CO with PO

CO1 AT	2.90
CO2 AT	2.83
CO3 AT	2.77
CO4 AT	2.44
CO5 AT	2.37
CO6 AT	2.56

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	0	0	2	0	0
CO2	3	2	2	2	0	2	1	1
CO3	3	2	1	1	0	1	1	0
CO4	3	2	2	0	0	0	0	0
CO5	3	2	2	1	1	1	1	1
CO6	3	3	0	2	3	2	2	2

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PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
47.60	34.29	20.94	15.92	10.05	21.72	13.09	10.32
18.00	13.00	8.00	6.00	4.00	8.00	5.00	4.00
2.64	**2.64**	**2.62**	**2.65**	**2.51**	**2.71**	**2.62**	**2.58**

COURSE-PO AND COURSE-PSO
MAPPING COURSE: Pharmaceutical Analysis I – Theory
Course Code: BP102T
Mapping of CO with PO

Course Name: Pharmaceutical analysis I

1. Learning this subject content will develop the ideas with the fundamental of analytical chemistry among the pupil.
2. It constructs the fundamental methodology to prepare different strength of solutions.
3. It facilitate the fellow pupil to predict the sources of mistakes and errors.
4. It helps to develop the fundamentals of volumetric analytical skills.
5. It peculates the basic knowledge in the principles of electrochemical analytical techniques
6. The student interpretation skills will be improve by the course content in terms of choice of analytical techniques to perform the estimation of different category drugs.

CO1 AT	2.89
CO2 AT	2.72
CO3 AT	2.63
CO4 AT	2.22
CO5 AT	2.34
CO6 AT	2.11

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**3**	**3**	**2**	**1**	**0**	**0**	**0**	**1**
CO2	2	2	1	0	0	1	2	1
CO3	1	3	2	2	2	2	2	2
CO4	3	1	3	0	3	1	3	3
CO5	3	3	2	2	2	2	3	3
CO6	2	3	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
34.64	43.13	31.43	19.16	20.82	19.10	26.49	26.66
14.00	15.00	13.00	8.00	9.00	7.00	11.00	11.00
2.47	**2.87**	**2.42**	**2.40**	**2.31**	**2.73**	**2.41**	**2.42**

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COURSE-PO AND COURSE-PSO
MAPPING COURSE: Pharmaceutics I – Theory
Course Code: BP103T
Mapping of CO with PO

1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms.

2. Know the history of profession of pharmacy.

3. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations.

4. Understand the professional way of handling the prescription.

5. Learning the basic techniques of formulation.
6. Learn about different dosage form

CO1 AT	2.60
CO2 AT	2.50
CO3 AT	2.20
CO4 AT	2.33
CO5 AT	2.40
CO6 AT	2.50

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**3**	**1**	**2**	**1**	**0**	**1**	**0**	**1**
CO2	2	2	1	0	0	1	2	1
CO3	1	3	2	2	2	0	2	2
CO4	3	2	3	0	3	2	3	3
CO5	3	2	2	2	2	2	3	3
CO6	2	0	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
34.19	23.66	31.39	19.30	21.19	19.56	26.09	26.19
14.00	10.00	13.00	8.00	9.00	7.00	11.00	11.00
2.44	**2.37**	**2.41**	**2.41**	**2.35**	**2.79**	**2.37**	**2.38**

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COURSE-PO AND COURSE-PSO
MAPPING COURSE: Pharmaceutical Inorganic Chemistry –Theory
Course Code: BP104T
Mapping of CO with PO

CO1 AT	2.90
CO2 AT	2.80
CO3 AT	2.79
CO4 AT	2.88
CO5 AT	2.44
CO6 AT	2.60

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	1	2	1	0	1	0	1
CO2	2	2	1	0	0	1	2	1
CO3	1	3	2	2	2	0	2	2
CO4	3	2	3	0	3	2	3	3
CO5	3	2	2	2	2	2	3	3
CO6	2	0	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
38.25	27.51	35.50	21.16	24.30	21.54	29.74	29.84
14.00	10.00	13.00	8.00	9.00	7.00	11.00	11.00
2.73	**2.75**	**2.73**	**2.65**	**2.70**	**3.08**	**2.70**	**2.71**

COURSE-PO AND COURSE-PSO
MAPPING COURSE: Communication skills – Theory
Course Code: BP105T
Mapping of CO with PO
Course Name: Communication skills

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation.
2. Communicate effectively (Verbal and Non Verbal).
3. Effectively manage the team as a team player.
4. Develop interview skills.
5. Develop Leadership qualities and essentials.
6. Communication Styles

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CO1 AT	2.89
CO2 AT	2.50
CO3 AT	2.80
CO4 AT	2.50
CO5 AT	2.65
CO6 AT	2.60

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	2	3	0	0	0	1
CO2	3	2	1	0	0	1	2	1
CO3	3	3	2	2	2	0	2	1
CO4	3	2	3	0	3	0	3	3
CO5	3	2	2	2	2	2	3	3
CO6	2	0	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
45.22	32.37	34.48	27.37	23.60	13.00	28.65	26.24
17.00	12.00	13.00	10.00	9.00	7.00	11.00	10.00
2.66	**2.70**	**2.65**	**2.74**	**2.62**	**1.86**	**2.60**	**2.62**

COURSE-PO AND COURSE-PSO
MAPPING COURSE: Remedial Biology/ Remedial Mathematics – Theory
Course Code: BP106RB/BP106RM
Mapping of CO with PO

Course Name: Remedial biology

1. The main aim of this course is to make aware the students to understand and learn about Cell biology (Basic Nature of Plant cell and Animal cell).
2. Classification System of both Plants & Animals.
3. Various tissue system and organ system in plant and animals.
4. Theory of evolution.
5. Anatomy and Physiology of plants and animals.
6. Classification and salient features of five kingdoms of life

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CO1 AT	2.69
CO2 AT	2.30
CO3 AT	2.60
CO4 AT	2.50
CO5 AT	2.67
CO6 AT	2.60

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**3**	**3**	**2**	**1**	**1**	**0**	**0**	**1**
CO2	3	2	1	0	0	1	2	1
CO3	3	3	2	2	2	1	2	1
CO4	3	2	3	0	3	0	3	3
CO5	3	2	2	2	2	2	3	3
CO6	2	0	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
43.48	30.81	33.52	21.03	25.93	15.44	27.91	25.70
17.00	12.00	13.00	8.00	10.00	7.00	11.00	10.00
2.56	**2.57**	**2.58**	**2.63**	**2.59**	**2.21**	**2.54**	**2.57**

COURSE-PO AND COURSE-PSO
MAPPING COURSE: Remedial Mathematics – Theory
Course Code: BP106RB/BP106RM
Mapping of CO with PO

CO1 AT	2.20
CO2 AT	2.30
CO3 AT	2.40
CO4 AT	2.55
CO5 AT	2.67
CO6 AT	2.60

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	2	2	2	0	0	1
CO2	2	1	1	1	0	1	2	1
CO3	2	3	2	2	2	1	2	1
CO4	2	2	3	0	3	0	3	3
CO5	2	2	2	2	2	2	3	3
CO6	2	0	3	3	2	2	1	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
31.64	24.34	32.29	24.64	27.39	15.24	27.66	25.16
13.00	10.00	13.00	10.00	11.00	7.00	11.00	10.00
2.43	**2.43**	**2.48**	**2.46**	**2.49**	**2.18**	**2.51**	**2.52**

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DEPARTMENT OF BIOTECHNOLOGY

CO - PO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

B. TECH BIOTECHNOLOGY

IST Semester

PROGRAM OUTCOMES (POs):

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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BBT102 - REMEDIAL BIOLOGY-I

COURSE OUTCOMES:

1. To give an overview of biomolecules and their significance
2. To give basic knowledge of Structure, biosynthesis and function of Macromolecules (Carbohydrates, Proteins and Lipids).
3. To have an overview of Microorganism: Origin of microbiology, Types of microbes, Classification of microbes.
4. To explain about the Introduction Genes & Genome
5. To explain the Bioinformatics, Biological databases (nucleotide and Protein Databases, Structure databases).
6. To explain the Human Health & Hygiene: Population and birth control, sexually transmitted diseases.

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DEPARTMENT
OF
AGRICULTURE

CO - PO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. AGRICULTURE DEPARTMENT
VISION AND MISSION

VISION

"To become a leading Agriculture program of choice in the Country by developing businesses, entrepreneurs, farms and societies."

MISSION

"Invertis University's Agriculture program provides an integrated set of learning opportunities for students in developing Knowledge, Management Skill, Leadership quality and Attitude for effectively managing the agriculture lands and farms through traditional information with modern technology and create value for the society."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The views from Educationist, Professional Bodies, Institutions, Industry experts and Board of Studies (BOS) on the draft are collected and incorporated to revise the draft version based on their inputs.

Step 3: The Department conducts information sessions with Industry expert and renowned members from institutions on the skills required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department drafted,

Step 4: The accepted views are analyzed, discussed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, AND PROGRAM OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career opportunities after the graduate program completion is to be achieved by the students.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and attitude that students acquire as they progress through the program. They are the statements that describe what the graduates of a specific agriculture program should be able to do after the completion of course.

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4. STATEMENTS OF PEOs, AND POs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student's capacity to acquire managerial knowledge and apply it professionally within realistic constraints across the industry and farm with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Agriculture management theory and practice for providing ability to identify, comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

To develop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solving complex managerial problems of agriculture field and farmers through multidisciplinary concepts.

PEO4- PROFESSIONALISM

To provide exposure and awareness on importance of skills for better career and holistic personality development as well as professional attitude to produce industry ready graduates having highest regard for Personal & Institutional Integrity, Social Responsibility, Teamwork and Continuous Learning about prevailing conditions for betterment of country's farmers livelihood.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurial capability.

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the Agriculture Department are taken into consideration to interact with various stake holders, and establish the PEO's

STEP 2: The Head of the Department and other Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with faculty and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES (POs):

Program Outcomes (POs)		
PO1	Basic knowledge	Agriculture scenario of India and world.
PO2	Component analysis	They will know the crops, weeds, insect and diseases.
PO3	Utilization of resources	The will learn different resources both natural and artificial and their rational utilization
PO4	Value addition	They will know seed to seed process i.e. production to marketing and value addition
PO5	Marketing Skills and Interpersonal Skills	They will learn marketing skill and commercial management of agricultural farms.
PO6	Use of Modern tools	They will gain knowledge both on agriculture enterprises and related enterprises
PO7	Ethics and Attitude Communication skill	They will have good communication skills and personality
PO8	Entrepreneurship	They will be eligible to start their own agricultural based business or industries

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the ICAR , and ICAR related institutions are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve, Previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from Memory to a customer. Recite the safety rules.
Understanding: Comprehending The meaning, translation, interpolation, and Interpretation of Instructions and problems. State a Problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the Principles of test writing. Explain in one's own words The steps for Performing a Complex task. Translate an Equation into a computer spreadsheet.
Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learning the classroom into novel situations in the workplace.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.
Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyses, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and

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Evaluating: Make Judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports	Select the most Effective solution. Hire the most qualified candidate. Explain and justify a new budget.
Creating: Builds a structure or Pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Integrates training from several sourses to solve a problem. Revise and process to improve the outcomes selects the required tasks for training.

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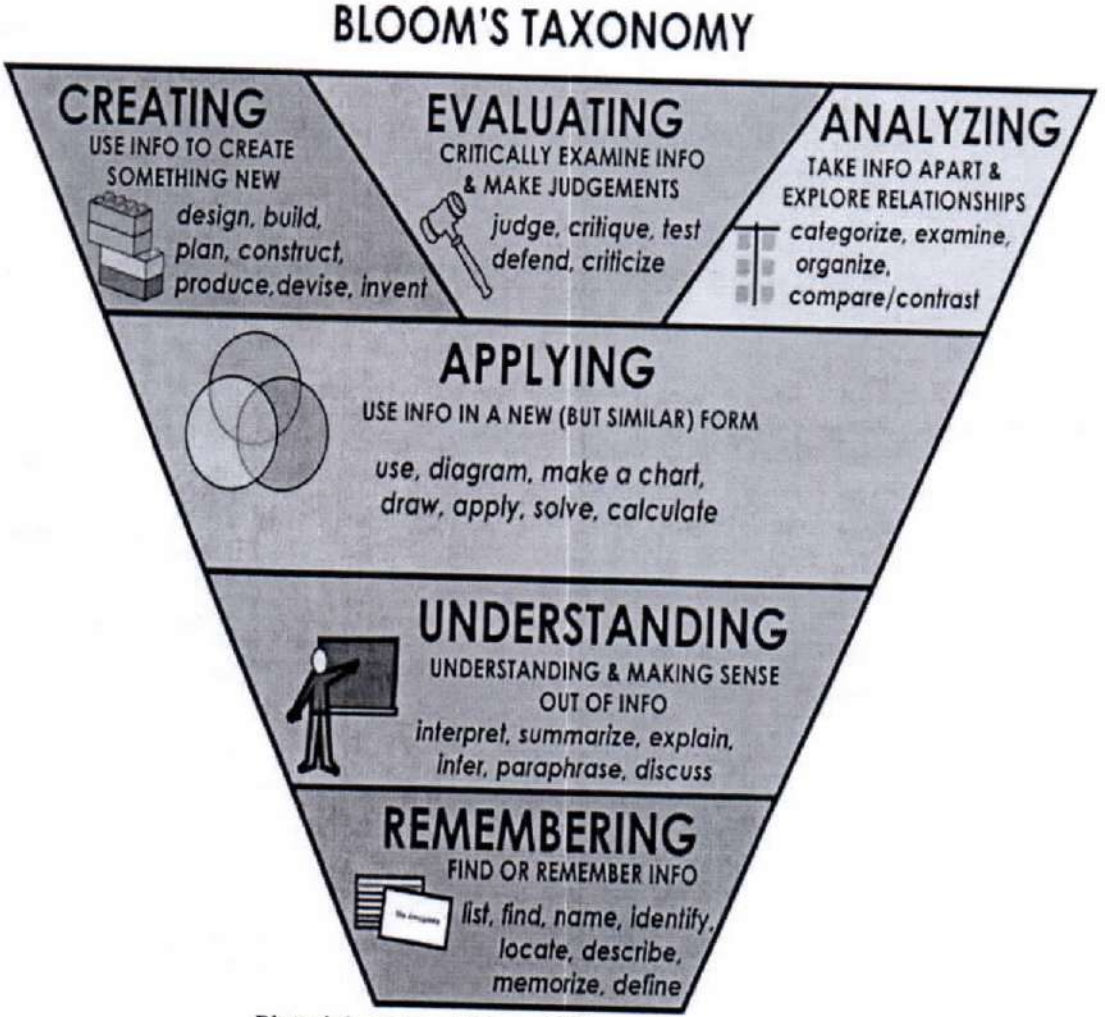

Pictorial representation of Blooms Taxonomy

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6. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

CO STATEMENTS:

Course: FUNDAMENTAL OF HORTICULTURE

Course Code: BAG 101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To get familiar with important horticulture trees
CO2	Preparation of quality planting material
CO3	Designing and shaping of trees
CO4	Learning about practices for cultivation of MAPs
CO5	Understand medicinal value of different plants
CO6	Understand methods of planting orchard

Course: FUNDAMENTALS OF PLANT BIOCHEMISTRY ANDBIOTECHNOLOGY

Course Code: BAG 102

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the core principles and topics of Biochemistry and their experimental basis
CO2	Understand the structures and functions of enzymes, proteins, carbohydrates, fats, process of metabolism.
CO3	Understand about the molecular basis of the action of genes and DNA.
CO4	To study the importance of carbohydrates
CO5	To Understand the chemistry of lipids, proteins, enzyme and its significance
CO6	To understand the transgenic and its importance in crop improvement

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Course: FUNDAMENTALS OF SOIL SCIENCE
Course Code: BAG 103
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand about soil its properties and linkage with crop production
CO2	Management of soils
CO3	Determination of different soil properties
CO4	Understand the elementary soil taxonomy, classification and soils of India
CO5	Understand the pedagogical and edaphological concept of soil
CO6	Understand soil microorganism and their role

Course: INTRODUCTION TO FORESTRY
Course Code: BAG 104
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the different types of plants and forest in nature or earth
CO2	Understand the methods for felling of trees and regeneration of crop.
CO3	Understand about the importance of protection and conservation of flora and fauna.
CO4	Understand the role of forest in global aspects.
CO5	Understand the basic concepts and the scope of forestry
CO6	Will be able to identify measure forest regions of India

Course: COMPREHENSION & COMMUNICATION SKILLS IN ENGLISH
Course Code: BAG 105
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To draft effective business correspondence with brevity and clarity.
CO2	Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.
CO3	Students will be able to communicate effectively orally and in writing.
CO4	To demonstrate his Verbal and non-verbal communication ability through presentations.
CO5	Will be able to produce words with right pronunciation
CO6	Students will increase their reading speed and comprehension of academic articles

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Course: FUNDAMENTALS OF AGRONOMY
Course Code: BAG 106
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Broad knowledge on different components of agriculture
CO2	Get acquainted with modern machines and agricultural tools
CO3	Managing inputs both monetary and non-monetary in a scientific manner
CO4	Learning about irrigation methods and its precise application
CO5	Preventing unproductive losses on and off the fields
CO6	Knowledge about Indian Agriculture and importance, present status, scope and future prospect.

Course: INTRODUCTORY BIOLOGY
Course Code: BAG 107
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the levels of organization and related functions in plants and animals.
CO2	Understand the characteristics and basic needs of living individuals and their environment
CO3	Understand about the growth and development of organisms.
CO4	The student will be able to explain the importance of biodiversity at the genetic, organism, community, and global scales.
CO5	The student will be able to design, conduct, analyze, and communicate (in writing and orally) biological research.
CO6	The student will be able to explain the process of organic evolution and its underlying principles and mechanisms.

Course: ELEMENTARY MATHEMATICS
Course Code: BAG 108
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Development of skills in different aspect of mathematical procedures.
CO2	Develop mathematical curiosity and use inductive and deductive reasoning when solving problems.
CO3	Solve the matrix equation Ax = b using row operations and matrix operations.
CO4	Be able to construct appropriate mathematical models to solve a variety of practical problems
CO5	Demonstrate the ability to understand and write mathematical proofs
CO6	Be able to use appropriate technologies to solve mathematical problems.

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Course: FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION
Course Code: BAG 109
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Learn different methods of agriculture technology transfer
CO2	Methods to be conducted on farm research
CO3	Bridging the gaps between farmers and researchers
CO4	Getting feedback to improvise the research activities.
CO5	Education; Extension Programme planning Meaning, Process, Principles and Steps in Programme Development.
CO6	Monitoring and evaluation – concept and definition, monitoring, and evaluation of Extension programmes, Transfer of Technology- Concept and models

Course: RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY
Course Code: BAG 110
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding rural scenario of the country.
CO2	Understanding traditional knowledge and its application
CO3	Understanding rural social structures
CO4	Understanding steps to elevate rural problems
CO5	Acquaint with characteristics of rural society, village institutions and social organizations. Select lay leaders and train them.
CO6	Assess personality types, leadership types and emotions of human beings iv. Create a training situation under village conditions

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7. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is no correlation.

7.1 Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual student's extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate the POs.

The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.
The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

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The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts to achieve.

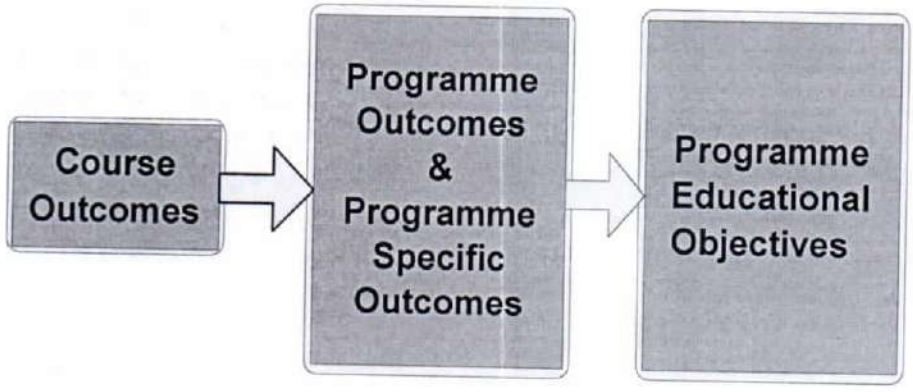

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

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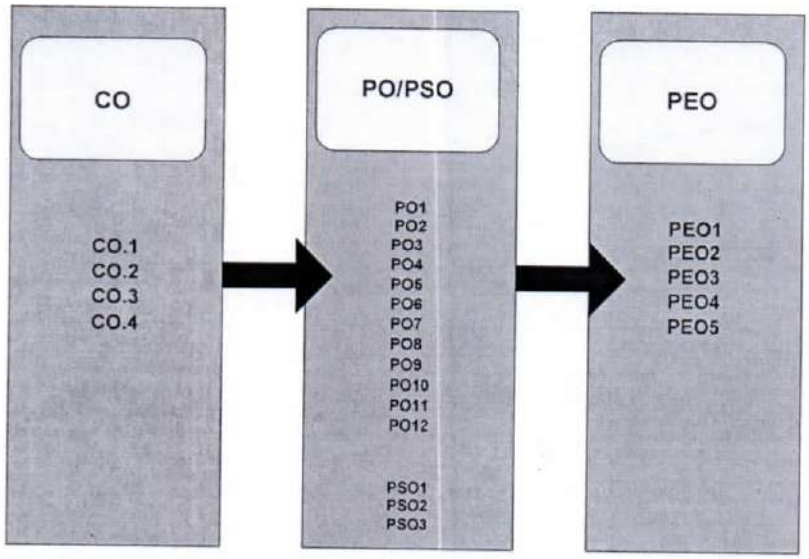

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course. attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

7.3 CO-PO Mapping

A sample course outcome statements and sample CO-PO matrix are given in Table 7.1
The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '0. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '0' is no correlation between CO and PO.

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Table 7.1: Sample CO-PO Matrix

Course Outcome MBA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment of COs/POs

Step-1: The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2: The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

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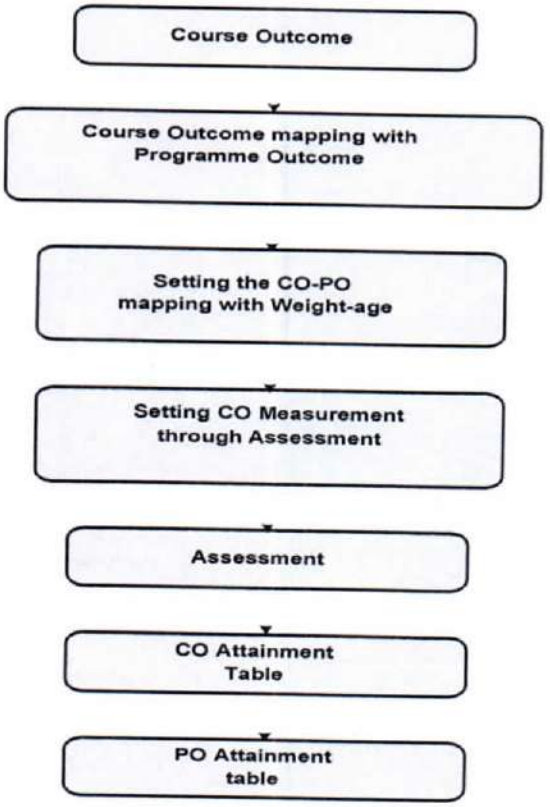
Validation of CO-PO mapping



The process of CO-PO mapping validation

Process of CO-PO Attainment

Step 1 : Obtain course outcome.
Step 2 : Mapping of course outcome with program outcome.

Step 3 : Setting weightage for CO assessment.
Step 4 : CO measurement through assessment.
Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct and indirect assessment methods.

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8. COURSE OUTCOMES TO PO MAPPING

Mapping strength of a course to PO can be obtained by taking the average of the CO-PO mapping matrices of that course.

Table 8.1: CO – PO ATTAINMENT
Course: FUNDAMENTAL OF HORTICULTURE
Course Code: BAG 101

CO1 AT	2.85
CO2 AT	2.72
CO3 AT	2.58
CO4 AT	2.61
CO5 AT	2.67
CO6 AT	2.65

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	3	3	3	3	3	1	2
CO2	1	3	3	3	3	3	0	3
CO3	1	2	3	2	3	2	0	3
CO4	3	2	3	2	2	3	0	3
CO5	3	3	3	3	2	3	0	3
CO6	2	1	2	1	3	3	0	2
	PO1 AT	**PO2 AT**	**PO3 AT**	**PO4 AT**	**PO5 AT**	**PO6 AT**	**PO7 AT**	**PO8 AT**
	32.15	37.76	45.60	37.76	42.97	45.67	2.85	42.75
	12.00	14.00	17.00	14.00	16.00	17.00	1.00	16.00
	2.68	**2.70**	**2.68**	**2.70**	**2.69**	**2.69**	**2.85**	**2.67**

Table 8.2: CO – PO ATTAINMENT
Course: FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY
Course Code: BAG 102

CO1 AT	2.85
CO2 AT	2.72
CO3 AT	2.58
CO4 AT	2.61
CO5 AT	2.67
CO6 AT	2.65

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	3	1	1	1	1	1
CO2	2	1	2	1	2	1	0	0
CO3	2	2	3	0	3	1	0	1

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CO4	0	0	0	1	0	0	0	0
CO5	0	0	1	3	0	0	0	0
CO6	2	0	2	0	3	1	0	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	21.18	10.64	29.29	16.19	23.47	10.59	2.82	13.00
	8.00	4.00	11.00	6.00	9.00	4.00	1.00	5.00
	2.65	**2.66**	**2.66**	**2.70**	**2.61**	**2.65**	**2.82**	**2.60**

Table 8.3: CO – PO ATTAINMENT
Course: FUNDAMENTALS OF SOIL SCIENCE
Course Code: BAG 103

CO1 AT	2.93
CO2 AT	2.80
CO3 AT	2.54
CO4 AT	2.50
CO5 AT	2.53
CO6 AT	2.46

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	0	2	0	3	2	1	2
CO2	2	0	2	0	3	2	0	3
CO3	2	0	3	0	3	1	0	3
CO4	3	1	2	0	3	1	0	1
CO5	2	1	3	0	2	0	0	1
CO6	1	1	1	1	3	1	0	0
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	31.56	7.49	34.14	2.46	44.75	18.96	2.93	26.92
	12.00	3.00	13.00	1.00	17.00	7.00	1.00	10.00
	2.63	**2.50**	**2.63**	**2.46**	**2.63**	**2.71**	**2.93**	**2.69**

Table 8.4: CO – PO ATTAINMENT
Course: INTRODUCTION TO FORESTRY
Course Code: BAG 104

CO1 AT	2.85
CO2 AT	2.72
CO3 AT	2.58
CO4 AT	2.61
CO5 AT	2.67
CO6 AT	2.65

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CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	1	2	0	3	2	1	2
CO2	1	2	2	0	0	1	1	1
CO3	1	3	2	0	3	0	1	1
CO4	3	0	1	1	2	1	0	1
CO5	2	1	2	2	1	2	1	1
CO6	3	0	1	1	3	1	0	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	35.02	18.84	26.95	10.64	32.41	18.92	10.81	18.93
	13.00	7.00	10.00	4.00	12.00	7.00	4.00	7.00
	2.69	**2.69**	**2.69**	**2.66**	**2.70**	**2.70**	**2.70**	**2.70**

Table 8.5: CO – PO ATTAINMENT
Course COMPREHENSION & COMMUNICATION SKILLS IN ENGLISH
Course Code: BAG 105

CO1 AT	2.78
CO2 AT	2.64
CO3 AT	2.53
CO4 AT	2.52
CO5 AT	2.45
CO6 AT	2.42

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	0	0	0	0	3	2	3	1
CO2	0	0	0	0	3	2	3	2
CO3	1	0	0	1	2	2	3	2
CO4	1	1	1	1	2	2	3	2
CO5	1	1	1	1	2	2	3	2
CO6	0	0	1	1	2	2	3	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	7.49	4.96	7.38	9.91	36.07	30.66	45.98	25.46
	3.00	2.00	3.00	4.00	14.00	12.00	18.00	10.00
	2.50	**2.48**	**2.46**	**2.48**	**2.58**	**2.55**	**2.55**	**2.55**

Table 8.6: CO – PO ATTAINMENT
Course: FUNDAMENTALS OF AGRONOMY
Course Code: BAG 106

CO1 AT	2.72
CO2 AT	2.58
CO3 AT	2.54
CO4 AT	2.52
CO5 AT	2.59
CO6 AT	2.57

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CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	1	1	1	1	1
CO2	1	2	1	2	2	2	1	2
CO3	0	1	1	2	2	2	1	2
CO4	1	2	1	1	1	2	0	2
CO5	0	2	2	1	2	2	0	1
CO6	2	2	1	1	1	2	0	2
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	18.41	28.52	18.13	20.66	23.25	28.34	7.84	25.75
	7.00	11.00	7.00	8.00	9.00	11.00	3.00	10.00
	2.63	**2.59**	**2.59**	**2.58**	**2.58**	**2.58**	**2.61**	**2.58**

Table 8.7: CO – PO ATTAINMENT
Course: INTRODUCTORY BIOLOGY
Course Code: BAG 107

CO1 AT	2.81
CO2 AT	2.89
CO3 AT	2.92
CO4 AT	2.95
CO5 AT	2.89
CO6 AT	2.92

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	0	0	0	2	0	1	1	1
CO2	2	2	0	2	0	0	0	0
CO3	2	1	0	2	0	0	0	0
CO4	0	1	2	0	0	0	0	0
CO5	1	2	1	0	1	2	2	2
CO6	0	1	0	0	0	0	0	0
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	14.51	20.35	8.78	17.24	2.89	8.59	8.59	8.59
	5.00	7.00	3.00	6.00	1.00	3.00	3.00	3.00
	2.90	**2.91**	**2.93**	**2.87**	**2.89**	**2.86**	**2.86**	**2.86**

Table 8.8: CO – PO ATTAINMENT
Course: ELEMENTARY MATHEMATICS
Course Code: BAG 108

CO1 AT	2.48
CO2 AT	2.08
CO3 AT	2.07
CO4 AT	2.08
CO5 AT	2.07
CO6 AT	2.07

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CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**1**
CO2	0	0	1	1	1	1	0	0
CO3	1	0	1	1	0	0	0	0
CO4	0	1	0	1	2	2	0	2
CO5	0	0	0	0	0	0	1	0
CO6	0	0	0	0	0	0	0	0
	PO1 AT	**PO2 AT**	**PO3 AT**	**PO4 AT**	**PO5 AT**	**PO6 AT**	**PO7 AT**	**PO8 AT**
	4.54	2.08	6.62	8.70	8.72	6.25	2.07	6.64
	2.00	1.00	3.00	4.00	4.00	3.00	1.00	3.00
	2.27	**2.08**	**2.21**	**2.18**	**2.18**	**2.08**	**2.07**	**2.21**

Table 8.9: CO – PO ATTAINMENT
Course: FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION
Course Code: BAG 109

CO1 AT	2.90
CO2 AT	2.95
CO3 AT	2.91
CO4 AT	2.93
CO5 AT	2.91
CO6 AT	2.95

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**0**	**0**	**0**	**1**	**1**	**1**	**2**	**1**
CO2	0	1	0	2	1	0	0	0
CO3	0	1	0	1	0	0	1	0
CO4	1	1	1	1	2	1	0	1
CO5	0	0	0	1	1	2	2	2
CO6	0	0	0	0	0	1	1	1
	PO1 AT	**PO2 AT**	**PO3 AT**	**PO4 AT**	**PO5 AT**	**PO6 AT**	**PO7 AT**	**PO8 AT**
	2.93	8.78	2.93	17.53	14.60	14.58	17.46	14.58
	1.00	3.00	1.00	6.00	5.00	5.00	6.00	5.00
	2.93	**2.93**	**2.93**	**2.92**	**2.92**	**2.92**	**2.91**	**2.92**

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Table 8.10: CO – PO ATTAINMENT
Course: RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY
Course Code: BAG 110

CO1 AT	2.89
CO2 AT	2.94
CO3 AT	2.92
CO4 AT	2.93
CO5 AT	2.89
CO6 AT	2.92

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**1**	**0**	**3**	**0**	**1**	**1**	**1**	**1**
CO2	2	2	2	0	0	1	0	0
CO3	2	2	2	0	0	2	0	0
CO4	1	0	1	0	0	1	0	0
CO5	0	0	1	1	0	0	2	0
CO6	0	0	1	1	1	2	3	1
	PO1 AT	**PO2 AT**	**PO3 AT**	**PO4 AT**	**PO5 AT**	**PO6 AT**	**PO7 AT**	**PO8 AT**
	17.52	11.71	29.09	5.80	5.80	20.42	17.41	5.80
	6.00	4.00	10.00	2.00	2.00	7.00	6.00	2.00
	2.92	**2.93**	**2.91**	**2.90**	**2.90**	**2.92**	**2.90**	**2.90**

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9. MAPPING OF COURSE WITH POs FOR BATCH:

Table 9.1: Program level CO-PO matrix

SEM 1st	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
FIRST YEAR	BAG101	2.68	2.70	2.68	2.70	2.69	2.69	2.85	2.67
	BAG102	2.65	2.66	2.66	2.70	2.61	2.65	2.82	2.60
	BAG103	2.63	2.50	2.63	2.46	2.63	2.71	2.93	2.69
	BAG104	2.69	2.69	2.69	2.66	2.70	2.70	2.70	2.70
	BAG105	2.50	2.48	2.46	2.48	2.58	2.55	2.55	2.55
	BAG106	2.63	2.59	2.59	2.58	2.58	2.58	2.61	2.58
	BAG107	2.90	2.91	2.93	2.87	2.89	2.86	2.86	2.86
	BAG108	2.27	2.08	2.21	2.18	2.18	2.08	2.07	2.21
	BAG109	2.93	2.93	2.93	2.92	2.92	2.92	2.91	2.92
	BAG110	2.92	2.93	2.91	2.90	2.90	2.92	2.90	2.90

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Invertis Institute of Engineering &Technology

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Invertis Village
Bareilly-Lucknow NH-24, Bareilly

DEPARTMENT OF CIVIL ENGINEERING

Vision of the Institute

To develop responsible citizens who would 'think global and act local' and become the change agents of society to meet the challenges of future.

Mission of the Institute

To impart high quality Engineering and Management education to the budding professionals and provide the ambience needed for developing requisite skills to make a mark of excellence in Education, Business and Industry.

Departmental Vision

To produce a new generation of Civil Engineers by providing state-of-the-art education in Civil Engineering recognized worldwide for excellence. This would be guided by extensive research in technology and management for industrial and social needs for sustainable development.

Departmental Mission

Our endeavour is to make the department the highest seat of learning, prepare Engineers equipped with strong conceptual Foundation coupled with practical insight meet global Business changes.

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Program Educational Objectives (PEOs)

PEO 1 Graduates will be able to analyze, design and propose a feasible solution to civil engineering problems by applying basic principles of mathematics, science and engineering.

PEO 2 Graduates will be inculcated with necessary professional skills, effective oral and written communication to be productive engineers.

PEO 3 Graduates will be able to work as a team in intra and interdisciplinary end over for development of new ideas and products to serve in contemporary societal contexts.

PEO 4 Graduates will be able to face challenges of the world economic order by incorporating expertise gained by faculty in consultancy work, for educating students, involving modern tools and techniques.

PEO 5 Graduates will achieve a high level of technical and managerial expertise to achieve excellence, outstanding leadership to succeed in positions in civil engineering profession with higher threshold start in employment background.

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PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clearinstructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Graduates will be able to apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO2: Graduates will be able to participate in critical thinking and problem solving of civil engineering field that requires analytical and design requirements.

PSO3: Graduates will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

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Second Year 3rd Semester

S.NO.	COURSE CODE	SUBJECT	PERIODS			CREDIT
			L	T	P	
THEORY						
1	BHU-301/ BHU-302	IndustrialPsychology /Industrial Sociology	2	0	0	2
2	BOE-031-038/ BAS-301	Science Based Open Elective/ Mathematics III	3	1	0	4
3	BCE-304	Strength Of Materials	3	1	0	4
4	BCE-301	Fluid Mechanics	3	1	0	4
5	BCE-302	Building Materials & Construction	4	0	0	4
6	BCE-303	Surveying	2	1	0	3
PRACTICAL/TRAINING/PROJECT						
7	BCE-351	Fluid Mechanics Lab	0	0	3	1
8	BCE-352	Building Materials Lab	0	0	3	1
9	BCE-353	Surveying Lab	0	0	3	1
10	BCE-354	Building Planning &Drawing Lab	0	0	3	1
11	GP-301	General Proficiency	-	-	-	1
TOTAL			**17**	**4**	**12**	**26**

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Third Year 5th Semester

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credits
						SESSIONAL EXAM.			E-SEM		
			L	T	P	CT	TA	TOTAL			
THEORY											
1	BCE-501	Geotechnical Engineering II	3	1	0	20	10	30	70	100	4
2	BCE-502	Structural Analysis I	3	1	0	20	10	30	70	100	4
3	BCE-503	Transportation Engineering I	3	1	0	20	10	30	70	100	4
4	BCE-504	Irrigation Engineering	3	1	0	20	10	30	70	100	3
5	BCE-505	Environmental Engineering I	2	1	0	10	5	15	35	50	3
6	BCE-506	Estimation Costing & Valuation	2	1	0	10	5	15	35	50	2
PRACTICAL/DESIGN/DRAWING											
7	BCE-551	Environmental Engineering Design Practice	0	0	2	-	-	10	15	25	1
8	BCE-552	Structural Analysis Lab	0	0	2	-	-	10	15	25	1
9	BCE-553	Geotechnical Engineering II Lab	0	0	2	-	-	10	15	25	1
10	BCE-554	Seminar	0	0	2	-	-	25	-	25	1
11	GP-501	General Proficiency	-	-	-	-	-	25	-	25	1
Total			16	6	8	100	50	230	395	625	25

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Fourth Year 7th Semester

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credits
						SESSIONAL EXAM.			E-SEM		
			L	T	P	CT	TA	TOTAL			
THEORY											
1	BCE-701	Steel Structures	3	1	0	20	10	30	70	100	4
2	BCE-702	Water Resource Engineering I	3	1	0	20	10	30	70	100	4
3	BCE-703	Environmental Impact Assessment	3	1	0	20	10	30	70	100	4
4	BCE: 704	Pre-stressed Concrete	3	1	0	20	10	30	70	100	4
5		CE ELECTIVE-III	3	1	0	20	10	30	70	100	4
PRACTICAL/DESIGN/DRAWING											
6	BCE-751	Industrial Training	0	0	0	-	-	25	-	25	1
7	BCE-752	Structural Engineering Lab	0	0	2	-	-	10	15	25	1
8	BCE-753	Project	0	0	4	-	-	15	35	50	2
9	GP-701	General Proficiency	-	-	-	-	-	25	-	25	1
Total			15	5	6	100	50	225	400	625	25

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DEPARTMENT OF CIVIL ENGINEERING

Syllabus of 3rd Semester

Second Year Third Semester

S.NO.	COURSE CODE	SUBJECT	PERIODS			CREDIT
			L	T	P	
THEORY						
1	BHU-301/ BHU-302	Industrial Psychology / Industrial Sociology	2	0	0	2
2	BOE-031-038/ BAS-301	Science Based Open Elective/ Mathematics III	3	1	0	4
3	BCE-304	Strength Of Materials	3	1	0	4
4	BCE-301	Fluid Mechanics	3	1	0	4
5	BCE-302	Building Materials & Construction	4	0	0	4
6	BCE-303	Surveying	2	1	0	3
PRACTICAL/TRAINING/PROJECT						
7	BCE-351	Fluid Mechanics Lab	0	0	3	1
8	BCE-352	Building Materials Lab	0	0	3	1
9	BCE-353	Surveying Lab	0	0	3	1
10	BCE-354	Building Planning &Drawing Lab	0	0	3	1
11	GP-301	General Proficiency	-	-	-	1
TOTAL			**17**	**4**	**12**	**26**

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Syllabus:

Theory

Paper Name: Industrial Psychology /Industrial Sociology
Paper Code: BHU-301/BHU-302
Total Contact Hours: 40
Credit: 4

Prerequisite: Any introductory course on managing industrial aspects.

Course Objective: The purpose of this course is to provide knowledge on how to manage .

BHU-301/401	Industrial Psychology	2 0 0	2 credits

Pre-requisites: None.

Course Objectives:

1. To introduce major topics and subspecialties including critical theory and research finding that have defined the field of I/O psychology
2. To increase the understanding of the complicated systems of individual and group psychological processes involved in the world of work
3. To connect the basic principles of I/O psychology to personnel and human resources management within the organization
4. Describe major topics and subspecialties including critical theory and research finding that have defined the field of I/O psychology
5. Describe the complicated systems of individual and group psychological processes involved in the world of work

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**2**	**3**	**2**	**3**	**1**	**3**	**1**	**2**	**2**	**3**
CO2	2	1	3	1	2	3	0	1	1	0	1	3
CO3	2	2	3	3	2	3	2	2	3	1	0	1
CO4	0	2	3	1	2	3	1	2	1	3	3	2
CO5	1	2	2	3	1	2	2	1	2	2	2	0
CO6	2	2	3	1	2	3	2	2	3	3	1	3

Course Contents:

BHU-301 INDUSTRIAL PSYCHOLOGY

MODULE-I

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Introduction – Objectives and scope of Industrial Psychology. The Industrial Psychologist. Scientific management and Human Relations School – Hawthorne Experiments.

MODULE-II

Individual in Workplace -Motivation and Job satisfaction, stress management. Organizational culture, Leadership & group dynamics.

MODULE -III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety. Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests. Performance Management - Training & Development.

Text books:

1. *Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.*
2. *Industrial psychology.S.N.chauhan, Sandeep Mittal,R.P.singh, Prateek Jain Pragati prakashan !st Ed*

Reference books:

1. *Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.*

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
21.22	23.84	34.52	25.54	23.64	36.52	17.71	23.72	25.26	24.34	19.21	25.65
10.00	11.00	16.00	12.00	11.00	17.00	8.00	11.00	11.00	11.00	9.00	12.00
2.12	**2.17**	**2.16**	**2.13**	**2.15**	**2.15**	**2.21**	**2.16**	**2.30**	**2.21**	**2.13**	**2.14**

Theory
Paper Name: Strength of Material
Paper Code: BCE 304
Total Contact Hours: 40
Credit: 4

Prerequisite: An introductory course on studies of different properties of Materials.

Course Objective: To provide knowledge regarding the different properties of material

BCE-304	STRENGTH OF MATERIALS	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To define the concept of stress and strain, principal stress and strain and application in various fields, temperature stress and strain, two dimensional stress system for various cases, mohr's circle
CO2	To classify direct and shear stress in beam due to transverse and axial loads, concept of pure bending, derive the bending equation, derive the torsion equation

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CO3	To determine the deflection of beam by macaulay's and moment area method, middle third and middle quarter rules, euler's theory for different end conditions,
CO4	To differentiate between thin and thick cylinders and spheres, radial, axial and circumferential stress in thick cylinders subjected to external and internal pressures, compound cylinders,
CO5	To detect the stress in rotating shaft and cylinders, hollow and solid circular shafts, deflection of helical and leaf springs, springs subjected to axial load and twisting moment.
CO6	To design the shafts subjected to combined torsion and bending, beams with large curvature, crane hook and circular rings.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	0	1	2	3	3	1	2	2	3
CO2	2	2	3	3	3	2	1	5	1	0	1	3
CO3	2	0	3	2	3	2	1	3	3	1	0	1
CO4	2	3	3	2	3	3	3	2	1	3	3	2
CO5	2	2	0	2	1	2	1	3	2	2	2	0
CO6	1	2	1	2	3	1	2	2	3	3	1	3

Course Content:

MODULE- I

Simple stresses and strains: Concept of stress and strain: principle of stress and strain diagram, Hooke's law, Young's modulus, Poisson ratio, stress at a point, stresses and strains in bars subjected to axial loading, Modulus of elasticity, stress produced in compound bars subjected to axial loading, Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.
Compound stresses and strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stress.
Stresses in Beams: Review of pure Bending. Direct and shear stresses in beams due to transverse and axial loads.
Deflection of Beams: Equation of elastic curve, cantilever and simply supported beams, Macaulay's method, area moment method.

MODULE- II

Columns and Struts: Combined bending and direct stress, middle third and middle quarter rules. Struts with different end conditions. Euler's theory and experimental results, Examples of columns in mechanical equipments and machines.
Thin cylinders & spheres: Hoop and axial stresses and strain. Volumetric strain.
Thick cylinders: Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, Compound cylinders. Stresses in rotating shaft and cylinders. Stresses due to interference fits.

MODULE- III

Torsion: Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsion rigidity, combined torsion and bending of circular shafts.
Helical and Leaf Springs: deflection of springs by energy method, helical springs under axial load and under axial twist (respectively for circular and square cross sections) axial load and twisting moment acting simultaneously both for open and closed coiled springs, laminated springs.
Curved Beams: Bending of beams with large initial curvature, position of neutral axis for rectangular, trapezoidal and circular cross sections, stress in crane hooks, stress in circular rings subjected to tension or compression

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Text books:

1. Pytel A H and Singer F L, "Strength of Materials", 4th Edition, Harper Collins, New Delhi (1987).
2. Beer P F and Johnston (Jr) E R, "Mechanics of Materials", SI Version, Tata McGraw Hill, India (2001).
3.Strength of Materials by S.Ramamurutham

Reference books:

1. Popov E P, "Engineering Mechanics of Solids", SI Version 2nd Edition, Prentice Hall of India, New Delhi (2003).
2. Timoshenko S P and Young D H, "Elements of Strength of Materials", 5th Edition, East West Press, New Delhi (1984).
3. Jindal U C, "Introduction to Strength of Materials", 3rd Edition, Galgotia Publishing Private Limited New Delhi (2001).

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
20.70	22.28	20.77	20.18	25.89	22.74	20.71	33.22	21.29	20.59	17.04	21.82
11.00	12.00	11.00	11.00	14.00	12.00	11.00	18.00	11.00	11.00	9.00	12.00
1.88	**1.86**	**1.89**	**1.83**	**1.85**	**1.89**	**1.88**	**1.85**	**1.94**	**1.87**	**1.89**	**1.82**

Theory

Paper Name: Fluid Mechanics
Paper Code: BCE-301
Total Contact Hours: 40
Credit: 4

Prerequisite: An introductory course on Fluid and its properties.

Course Objective: To provide knowledge regarding Fluid and its properties

BCE-301	FLUID MECHANICS	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To State the continuity, Bernoulli, momentum, Euler's Equations, condition of fluid masses, ,Buckingham's Pi theorem, Rheology and Physical properties of fluids, concept of manometers, pressure transducers, centre of pressure, buoyancy, boundary layer
CO2	To Interpret the separation of laminar sub layer, and its control, Stokes law,To classify subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows.
CO3	To compute the pressure on surfaces, application of Bernoulli's and momentum equation, calculation of turbulence power transmission through a pipe, three reservoir problems and

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	networks, to determine resistance to flow, minor losses, calculation of Drag and lift .
CO4	To differentiate between Steady and unsteady, uniform and non-uniform, laminar and turbulent, rotational and irrotational, compressible and incompressible flows, stream function and velocity potential, turbulent and laminar boundary layer.
CO5	To understand the significance of fluid and continuum ,important dimensionless numbers, Dimensional analysis and model studies, laminar flow through pipes, isotropic flow, stability of immersed and floating bodies, geometric, kinematics and dynamic similarity
CO6	To explain the principle of stability, concept of stream lines, circulation, source, sink, doublet and half body, Boundary layer thickness, mixing length and velocity distribution in turbulent flow, siphon, water hammer, turbulent flow and homogeneous turbulence.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	3	2	2	2	3	1	2	2	3
CO2	1	2	2	3	3	2	2	1	1	0	1	3
CO3	2	2	3	2	2	1	3	2	3	1	0	1
CO4	2	0	2	1	3	2	1	2	1	3	3	2
CO5	2	1	3	2	1	3	2	1	2	2	2	0
CO6	2	3	1	3	2	0	2	2	3	3	1	3

Course Contents:

MODULE 1

Introduction: Fluid and continuum, Physical properties of fluids, Rheology of fluids

Kinematics of Fluid flow: Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, continuity equation for 3D and 1D flows, circulation, stream function and velocity potential, source, sink, doublet and half-body.

Fluid Statics : Pressure-density-height relationship, manometers, pressure transducers, pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.

MODULE 2

Dynamics of Fluid Flow : Euler's Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturi meter and bend meter, Hot-wire anemometer and LDA, notches and weirs, momentum equation
and its application to pipe bends.

Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance, geometric, kinematics and dynamic similarity, model studies.

MODULE 3

Laminar and Turbulent Flow : Equation of motion for laminar flow through pipes, Stokes' law, transition from laminar to turbulent flow, turbulent flow, types of turbulent flow, isotropic, homogenous turbulence, scale

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and intensity of turbulence, measurement of turbulence, eddy viscosity, mixing length concept and velocity distribution in turbulent flow over smooth and rough surfaces, resistance to flow, minor losses, pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and networks

Boundary Layer Analysis : Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer, laminar sublayer, separation and its control, Drag and lift, drag on a sphere, a two dimensional cylinder, and an aerofoil, Magnus effect.

Text books:

1. Bansal R K, "A text book of Fluid mechanics and Hydraulic Machines", 8th Edition, Laxmi Publications (P) Ltd. New Delhi (2002).
2.Dr. Jagdish Lal/ Fluid Mechanics & Machines Prentice Hall of India Private Limited, New Delhi (1996).

Reference books:

1. Douglas J F, Gasionckw, and Swaffield J P, "Fluid Mechanics", 3rd Edition Addision Wesley Longman, Inc Pitman (1999).
2. Pao H F Richard, "Fluid Mechanics", John Wiley and Sons (1995).
3. Kumar D S, "Fluid Mechanics and Fluid Power Engineering", 6th Edition SK Kataria and Sons, Delhi (1998).
4. Fay J A, "Introduction to Fluid Mechanics", Prentice Hall of India Private Limited, New Delhi (1996).

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
19.23	17.19	21.35	24.38	22.61	18.03	20.97	18.98	20.10	19.11	15.96	20.53
11.00	10.00	12.00	14.00	13.00	10.00	12.00	11.00	11.00	11.00	9.00	12.00
1.75	**1.72**	**1.78**	**1.74**	**1.74**	**1.80**	**1.75**	**1.73**	**1.83**	**1.74**	**1.77**	**1.71**

Theory

Paper Name: Building Material and Construction
Paper Code: BCE-302
Total Contact Hours: 40
Credit: 4

Prerequisite: An introductory course on construction materials and their properties.

Course Objective: Study of different construction materials

BCE-302	BUILDING MATERIAL AND CONSTRUTION	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To define the fundamental properties of material, principles of cold working, terminology, construction principle, building maintenance, ingredients definitions.

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CO2	To classify the material and their performances, classification of clay bricks, lime, timber, composition and type of element in material, types of thermal and sound insulating material.
CO3	To determine properties of material like stone, brick, gypsum, lime, mortar, puzzolona, timber, asphalt, bitumen, tar. Requirement of good material, methods for layout, damp proofing, different plastering types: pointing, distempering, colour washing, painting.
CO4	To compare different types of ventilation, windows, door, comparison of desirable and undesirable properties, Discussion on reinforcing steel mechanical and physical properties chemical composition.
CO5	To judge method of using alumimium and lead, analysis of Vertical circulation means staircases ramp design , construction detailing of lintels, chajja, analysing Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.
CO6	Explain of bituminous material, preservation of stones, specification in construction, flooring material, Cavity wall hollow block and Waffle slab construction, specification in construction.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**2**	**3**	**1**	**0**	**1**	**2**	**3**	**3**	**1**	**2**	**2**	**3**
CO2	2	2	3	3	3	2	1	5	1	0	1	3
CO3	2	0	3	2	3	2	1	3	3	1	0	1
CO4	2	3	3	2	3	3	3	2	1	3	3	2
CO5	2	2	0	2	1	2	1	3	2	2	2	0
CO6	1	2	1	2	3	1	2	2	3	3	1	3

Course Content:

MODULE- I

Classification of materials, materials and their performance, economics of the building materials.

Stones, Requirement of good building stone, characteristics of stones and their testing. Common building stones. Preservation of stones.

Bricks: Manufacture of clay bricks, and their classification. Properties of clay bricks and their testing. Problems of efflorescence & lime bursting in bricks & tiles.

Gypsum: properties of gypsum plaster, building products of gypsum and their uses.

Lime: Manufacture of lime, classifications of limes, and properties of lime.

Mortars: Introduction,Composition,Types and Functions

Puzzolona: Natural and Artificial fly ash, Surkhi (burnt clay puzzolona), rice husk and ash puzzolona, properties and specifications for use in construction.

Timber: Classification and identification of timber, Fundamental Engineering properties. Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.

Asphalt, Bitumen and Tar: Terminology, specifications and uses, bituminous materials.

MODULE- II

Chemistry of Plastics manufacturing process, classification, advantages of plastics, Mechanical properties and their use in construction.

Paints varnishes and distempers, Common constituents, types and desirable properties, Cement pa[illegible]

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Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel mechanical and physical properties chemical composition. Brief discussion on properties and uses of Aluminium and lead.

Glass: Ingredients, properties types and use in construction.

Insulating Materials: Thermal and sound insulating material desirable properties and type.

MODULE- III

Components of building area considerations, Construction Principle and Methods for layout, Damp proofing ant termite treatment, Vertical circulation means staircases ramp design and construction.

Different types of floors, and flooring materials (Ground floor and upper floors).

Bricks and stone masonry construction,. Cavity wall hollow block and Waffle slab construction.

Doors, Windows and Ventilations its types & Construction details, type of roofs& its details, lintels &chajja.

Plastering different types, pointing, Distempering, Colour washing, Painting etc.

Principles & Methods of building maintenance.

Text books:

1. B.C. Punmia: A Text Book of Building Construction, Laxmi Publications, Delhi.

2.S.C.Rangwala, Engineering materials- Charotar Publications.

3.S.C.Rangwala, Building constructions- Charotar publications

Reference books:

1.O.H. Koenisberger: "Manual of tropical housing and building" Orient Longman

2. S.P. Arora at al., "A Text Book of Building Construction - Dhanpat Rai & Sons,

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
20.70	22.28	20.77	20.18	25.89	22.74	20.71	33.22	21.29	20.59	17.04	21.82
11.00	12.00	11.00	11.00	14.00	12.00	11.00	18.00	11.00	11.00	9.00	12.00
1.88	**1.86**	**1.89**	**1.83**	**1.85**	**1.89**	**1.88**	**1.85**	**1.94**	**1.87**	**1.89**	**1.82**

Theory

Paper Name: Surveying

Paper Code: BCE-303

Total Contact Hours: 40

Credit: 4

Prerequisite: An introductory course on surveying and its principle.

Course Objective: To provide knowledge regarding surveying, its different types and various techniques of surveying

BCE- 303	**Surveying**	**4 Credits**

CO1	To define surveying, levelling and contouring, Importance of surveying for engineers, Basic terms used in surveying and levelling, Definition, Principles of stadia systems, subtends bar and tangential methods
CO2	To understand Reference meridians, bearing and azimuths, magnetic declination, compass traversing, Introduction to vertical curves, Theory and methods of setting out simple circular

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	curves, transition curves- types and their characteristics,
CO3	To calculate Bearings, elevations, traversing, area, Earthwork, apply equations of various transition curves, triangulation field work, calculation of volume of earth work
CO4	To differentiate plane tabling and geodetic surveying, Fore bearing and back bearing, surveying and levelling, traversing and triangulation
CO5	To Compare Plane surveying and geodetic surveying, Evaluate bearing of traverse if area affected by local attraction, Evaluate latitude and departure to remove closing error.
CO6	To Justify the measure differences in elevation, create the drawing of given area by radiation, intersection, resection method, Justify given area by two point problem and three point problem

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3	2	3	0	1	1	2	2	3
CO2	2	3	2	0	1	2	3	2	1	0	1	3
CO3	1	2	0	2	3	1	3	2	3	1	0	1
CO4	2	2	1	3	2	1	2	3	1	3	3	2
CO5	1	2	1	3	2	1	2	0	2	2	2	0
CO6	2	2	0	3	1	3	2	3	3	3	1	3

Course Content:

MODULE- I

Importance of surveying to engineers, plane and geodetic surveying, principles of surveying, classification of surveys

Principles of different methods and their accuracies, measurement by tape, Reference meridians, bearing and azimuths, magnetic declination, compass, Vernier theodolite, temporary adjustments, measurements of horizontal angle, modern trends- EDM, electronic theodolites and Electronic Total Station.

Methods of determining elevations, Direct levelling- basic terms and definitions, principle, booking and reduction of field notes, curvature and refraction, automatic levels, Contouring- methods and uses

Definition, Principles of stadia systems, subtense bar and tangential methods

MODULE- II

Elements of simple circular curves, theory and methods of setting out simple circular curves, transition curves- types and their characteristics, ideal transition curve, equations of various transition curves, Introduction to vertical curves

Principles of traversing by compass and theodolite, computations of traverse coordinates, Principles and classification of triangulation systems, strength of figures, satellite stations, intervisibility of stations, triangulation field work

MODULE- III

Plane table surveying, Principles, Accessories of Plane table, orientation, Procedure of setting up Plane table over a station, Methods of plane tabling, special methods of resection, Procedure of Plane table traversing & advantages and disadvantages of Plane table surveying

Text books:

1.H. Kanitkar: Surveying & Levelling

2.S K Duggal: Surveying Vol 1 & 2, TMH

3.Dr.B.C.Punamia, Surveying & Levelling vol-1& vol II, Laxmi publications

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Reference books:

1.R Subramanian, Surveying & Levelling, Oxford University Press

2.C Venkatramaih: Surveying, University Press

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.93	30.43	11.57	33.09	25.56	26.10	28.02	26.14	26.94	26.22	21.18	28.47
11.00	13.00	5.00	14.00	11.00	11.00	12.00	11.00	11.00	11.00	9.00	12.00
2.36	**2.34**	**2.31**	**2.36**	**2.32**	**2.37**	**2.34**	**2.38**	**2.45**	**2.38**	**2.35**	**2.37**

DEPARTMENT OF CIVIL ENGINEERING

Syllabus of 5th Semester

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S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credits
						SESSIONAL EXAM.			E-SEM		
			L	T	P	CT	TA	TOTAL			
THEORY											
1	BCE-501	Geotechnical Engineering II	3	1	0	20	10	30	70	100	4
2	BCE-502	Structural Analysis I	3	1	0	20	10	30	70	100	4
3	BCE-503	Transportation Engineering I	3	1	0	20	10	30	70	100	4
4	BCE-504	Irrigation Engineering	3	1	0	20	10	30	70	100	3
5	BCE-505	Environmental Engineering I	2	1	0	10	5	15	35	50	3
6	BCE-506	Estimation Costing & Valuation	2	1	0	10	5	15	35	50	2
PRACTICAL/DESIGN/DRAWING											
7	BCE-551	Environmental Engineering Design Practice	0	0	2	-	-	10	15	25	1
8	BCE-552	Structural Analysis Lab	0	0	2	-	-	10	15	25	1
9	BCE-553	Geotechnical Engineering II Lab	0	0	2	-	-	10	15	25	1
10	BCE-554	Seminar	0	0	2	-	-	25	-	25	1
11	GP-501	General Proficiency	-	-	-	-	-	25	-	25	1
Total			16	6	8	100	50	230	395	625	25

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Theory

Paper Name: Geotechnical Engineering II
Paper Code: BCE-501
Total Contact Hours: 40
Credit: 4

Prerequisite: An introductory study on site selection and site foundation

Course Objective: Study of soil investigation and methods of checking the quality of soil

BCE-501	GEOTECHNICAL ENGINEERING	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To learn Scope and objective methods of exploration and boring. sampling representative and undisturbed sampling , sampling techniques split spoon sampler, thin tube sampler.
CO2	To perform Stationary piston sampler Penetration tests (SPT and SCPT) Data interpretation (strength parameters and liquefaction potential) selection of foundation based on soil condition.
CO3	To get familiar with location and depth of foundation, Bearing capacity of shallow foundation on homogeneous deposits Terzaghi's formula and BIS formula factors affecting bearing capacity
CO4	To understand allowable bearing pressure, settlement components of settlement, determination of settlement of foundations on granular and clay deposits, allowable settlements, methods of minimizing settlement ,differential settlement.
CO5	To determine Types of foundation, contact pressure distribution below footings and raft Isolated and combined footings type proportioning, mat foundation types use proportioning
CO6	To understand Plastic equilibrium in soils, active and passive states, Rankine's theory,cohesionless and cohesive soil,coloumb's wedge theory, condition for critical failure plane,earth pressure on retaining walls , graphical methods, pressure on the wall due to line load, stability of retaining walls

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	0	3	1	3	3	1	2	2	3
CO2	2	3	2	3	1	2	2	1	1	0	1	3
CO3	1	0	1	3	1	3	0	3	3	1	0	1
CO4	0	3	0	3	2	2	3	3	1	3	3	2
CO5	3	2	2	1	3	3	1	0	2	2	2	0
CO6	3	3	2	3	1	0	2	1	3	3	1	3

Course Content:

MODULE I

SITE INVESTIGATION AND SELECTION OF FOUNDATION

Scope and objective methods of exploration and boring. sampling representative and undisturbed sampling. sampling techniques split spoon sampler, thin tube sampler, stationary piston sampler Penetration tests (SPT

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and SCPT) Data interpretation (strength parameters and liquefaction potential) selection of foundation based on soil condition.

FOUNDATION

Introduction location and depth of foundation, Bearing capacity of shallow foundation on homogeneous deposits Terzaghi's formula and BIS formula factors affecting bearing capacity, allowable bearing pressure, settlement components of settlement, determination of settlement of foundations on granular and clay deposits, allowable settlements, methods of minimizing settlement ,differential settlement.

MODULE II

FOOTINGS AND RAFTS

Types of foundation, contact pressure distribution below footings and raft Isolated and combined footings type proportioning, mat foundation types use proportioning.

PILES

Types of piles and their function, factors influencing the selection of pile carrying capacity of single pile in granular and cohesive soil , static formula dynamic formulae engineering news and Hiley's) capacity from in situ tests (SPT and SCPT), negative skin friction

MODULE III

RETAINING WALLS

Plastic equilibrium in soils, active and passive states, Rankine's theory,cohesionless and cohesive soil,coloumb's wedge theory, condition for critical failure plane,earth pressure on retaining walls of simple configurations, graphical methods (Rebhann and Culmann) ,pressure on the wall due to line load, stability of retaining walls.

Text Books

1. Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", UBS Publishers Distribution Ltd, 1999.

2. Gopal Ranjan Rao, A.S.R.,"Basic and Applied Soil Mechanics", Wiley Eastern Ltd., 2003.

References

1. Das, B.M., "Principles of Foundation Engineering, 5th Edition, Thomson Books, 2003.

2. Kaniraj, S.R., "Design Aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill Publishing Company Ltd., 2002.

3. Bowles, J.E., "Foundation Analysis and Design", McGraw-Hill, 1999

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.24	26.56	20.28	26.72	22.48	22.68	22.56	22.76	23.36	22.40	18.48	24.56

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12.00	13.00	10.00	13.00	11.00	11.00	11.00	11.00	11.00	11.00	9.00	12.00
2.02	**2.04**	**2.03**	**2.06**	**2.04**	**2.06**	**2.05**	**2.07**	**2.12**	**2.04**	**2.05**	**2.05**

Theory

Paper Name: Structural Analysis I
Paper Code: BCE-502
Total Contact Hours: 40
Credit: 4

Prerequisite: An introductory subject on Structure study

BCE-502	**STRUCTURAL ANALYSIS-I**	**3-1-0**	**4 Credits**

COURSE OUTCOMES:

CO1	To define the structures, unsymmetrical bending, arches, influence lines, degree of freedom, st[illegible] and kinematic indeterminacy, eddy's theorem.
CO2	To classify the structures, rolling loads, various arches used to take loads of structures.
CO3	To determine shear force and bending moment by ILD, to implement Muller breuslau principal to determinate structure, implement ILD for three and two hinged arch, implementation of conjugate beam method to structures.
CO4	To analyse compound and complex trusses, arch subjected to udl and point load, structure by maxwell's reciprocal theorem, bett's theorem, castigliano's theorem and unit load method.
CO5	To detect stress and deflection subjected to unsymmetrical bending, location of shear centre for channel and I section, stresses in beams of small and large initial curvatures.
CO6	To design the structures by various methods.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**2**	**3**	**3**	**0**	**3**	**3**	**3**	**3**	**1**	**2**	**2**	**3**
CO2	2	1	2	3	0	2	2	1	1	0	1	3
CO3	1	0	1	2	1	3	1	3	3	1	0	1
CO4	0	3	3	3	2	2	3	3	1	3	3	2
CO5	3	2	2	1	3	0	1	1	2	2	2	0
CO6	2	3	3	3	1	1	2	2	3	3	1	3

MODULE I

Classification of Structures, stress resultants, degrees of freedom per node, static and Kinematic determinacy.Classification of Pin jointed determinate trusses, analysis of determinate plane and space trusses (compound and complex).

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Rolling loads, influence lines for beams and trusses, Absolute maximum bending moment, Muller-Breslau's principal & its application for determinate structures

MODULE II

Analysis of Arches, Linear arch, Eddy's theorem, three hinged parabolic arch, spandrel braced arch, moving load & influence lines.

Strain Energy of deformable systems, Maxwell's reciprocal &Betti's theorem, Castigliano's first theorem, unit load & Conjugate beam methods.

MODULE III

Unsymmetrical bending, location of neutral axis, computation of stresses and deflection, Shear Centre its location for common structural section.

Bending of curved bars in plane of bending, stresses in bars of small & large initial curvatures.

Text Books:

1. *Vazirani&Ratwani et al ," Analysis of Structures " , Khanna Publishers*
2. *S.SBhavikatti,''Structural Analysis II'' Vikash publishing house*

References:

1. *Hibbler ," Structural Analysis ", Pearson Education*
2. *T S Thandavmorthy ," Analysis of Structures ", Oxford University Press*
3. *Wilbur and Norris, "Elementary Structural Analysis", Tata McGraw Hill.*
4. *Reddy, C.S., "Basic Structural Analysis", Tata McGraw Hill.*
5. *Jain, O.P. and Jain, B.K., "Theory & Analysis of Structures ". Vol. I & II Nem Chand.*
7. *Coates, R.C., Coutie, M.G. & Kong, F.K., "Structural Analysis", English Language Book Society & Nelson, 1980*

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
15.96	19.52	22.56	19.20	16.04	17.32	19.28	20.68	18.48	17.84	14.56	19.28
10.00	12.00	14.00	12.00	10.00	11.00	12.00	13.00	11.00	11.00	9.00	12.00
1.60	**1.63**	**1.61**	**1.60**	**1.60**	**1.57**	**1.61**	**1.59**	**1.68**	**1.62**	**1.62**	**1.61**

Theory

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Paper Name: Transportation Engineering I
Paper Code: BCE-503
Total Contact Hours: 40
Credit: 4

Prerequisite:An industrial approach to study about complete transportation

Course Objective: To study various mode of transportation, history of transportation, etc

BCE-503	TRANSPORTION ENGINEERING	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To define Modes of Transportation, History of road development, Road types and pattern Air craft characteristics, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan.
CO2	To classify the Types of Pavements traffic control devices, signs, signals types of airports, layout of airports , wind-rose diagram,.
CO3	To determine WBM, Surface dressing, bituminous carpeting, Bituminous Bound Macadam and Asphaltic Concrete, Cement Concrete road construction Traffic characteristic, volume studies, estimation of runway length & correction
CO4	To compare different type Design factors, Design of Flexible Pavement by CBR method (IRC: 37-2001), Cross sectional elements, camber, shoulder, sight distance, horizontal curves.
CO5	To judge method Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design. (IRC: 58 – 2002) , Intersection at grade and grade separated intersections, design of rotary intersection.
CO6	Explanation of super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves, Design of rigid pavement

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**3**	**0**	**3**	**1**	**3**	**3**	**1**	**2**	**2**	**3**
CO2	2	3	2	3	1	2	2	1	1	0	1	3
CO3	0	2	1	3	3	3	0	2	3	1	0	1
CO4	2	3	0	3	0	2	3	3	1	3	3	2
CO5	3	0	2	1	3	3	1	0	2	2	2	0
CO6	3	3	2	3	0	0	2	2	3	3	1	3

MODULE I

Introduction: Role of Transportation, Modes of Transportation, History of road development, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan, Road types and pattern.

Geometric Design: Cross sectional elements, camber, shoulder, sight distance, horizontal curves, super

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elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves.

MODULE II

Traffic Engineering: Traffic characteristic, volume studies, speed study, capacity, density, traffic control devices, signs, signals, design of signals, Island, Intersection at grade and grade separated intersections, design of rotary intersection.

Design of Highway Pavement: Types of Pavements, Design factors, Design of Flexible Pavement by CBR method (IRC: 37-2001), Design of rigid pavement, Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design. (IRC: 58 – 2002).

MODULE III

Road Construction Methods: WBM, Surface dressing, bituminous carpeting, Bituminous Bound Macadam and Asphaltic Concrete, Cement Concrete road construction.

Airport Engineering: Air craft characteristics, types of airports, layout of airports, airport planning & design, runway orientation, wind-rose diagram, estimation of runway length & correction.

Text Books:

1. Highway Engineering by S. K. Khanna &C.E.G.Justo.

2. Airport Planning & Design by S. K. Khanna, M. G. Arora & S. S. Jain.

References:

1. Transportation Engineering by L. R. Kadiyali.

2. Highway Engineering by S. K. Sharma

3. Principles of Transportation Engineering by P. Chakraborty & A. Das.

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
28.68	28.84	22.00	28.96	22.00	24.36	24.28	24.36	25.44	24.40	19.88	26.52
13.00	13.00	10.00	13.00	10.00	11.00	11.00	11.00	11.00	11.00	9.00	12.00
2.21	**2.22**	**2.20**	**2.23**	**2.20**	**2.21**	**2.21**	**2.21**	**2.31**	**2.22**	**2.21**	**2.21**

Theory

Paper Name: Irrigation Engineering
Paper Code: BCE-504
Total

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Contact Hours: 40
Credit: 4

Prerequisite: An approach to study the necessity of irrigation

Course Objective: To provide information regarding necessity of irrigation, advantages, disadvantages

BCE-504	IRRIGATION ENGINEERING	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To define the necessity of irrigation in India , State Kennedy's and lacey's theory , khosla's theory ,Describe canal loses , preliminary section ,water logging ,soil moisture- irrigation relation- ship , irrigation efficiency List types of barrages,Advantages and economics of lining
CO2	To classify the canals , dam ,weirs , barrages , various forces on gravity dam ,various types of lining, various types of spillway, CD works , surface and sub surface drainage , causes and control of water logging, seepage control in earth dams , type of fall
CO3	To determine the canal loses ,draw garrets diagram ,design of irrigation canal, cross section of irrigation canal , draw the well labelled diagram of lining of canal, design of weirs & barrages , draw the layout of diversion head work , mode of failure of structural ability of dams
CO4	Differentiate weirs and barrages, compare high and low gravity dam., compare earth and rockfill dams , different components of diversion of head works
CO5	Test the causes of failure of dams , test the typical cross section , check the validity of all the theories , to judge suitable type to suit a particular condition for CD work
CO6	Concept of Khosla's method of independent variable, reclamation of water logged and saline soils & saline and alkaline land, combination of forces of design.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**1**	**2**	**3**	**0**	**3**	**3**	**0**	**3**	**1**	**2**	**2**	**3**
CO2	2	3	2	3	1	2	2	2	1	0	1	3
CO3	1	1	1	2	2	3	3	3	3	1	0	1
CO4	0	3	0	3	2	2	3	3	1	3	3	2
CO5	3	2	2	1	3	3	1	0	2	2	2	0
CO6	3	3	2	3	1	0	2	1	3	3	1	3

MODULE I

Introduction: Necessity of Irrigation in India, Advantages and disadvantages of Irrigation, Techniques of water distribution in firms. Quality of irrigation water, crops and crop season, Consumptive use, Irrigation requirements, Estimation of consumptive use of water by climatic approaches, Irrigation efficiencies, Soil moisture-irrigation relationship

Canal Irrigation: Classification of canals, Canal losses, Alignment of canals. Design of Irrigation Canals: Design of stable channels using Kennedy's and Lacey's theory, Garret's diagram, Cross section of irrigation

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canals, Lining of Irrigation Canals: Advantages and economics of lining, various types of lining, Design of lined canals

MODULE II

Types of Cross-Drainage Works: Types of CD works, Selection of a suitable type to suite a particular condition, Design consideration for CD works, Canal Falls:
Necessity, Proper location, Types, Design and detailing of one type of fall; Weirs and Barrages: Weirs and Barrages, Types of weirs and barrages, Layout of a diversion head work, Introduction of different components of a diversion head works, Design of weirs and barrages: Bligh's creep theory, design of weir using Bligh's theory, Lane's weighted creep theory, Khosla's theory, Khosla's method of independent variables, exit gradient

MODULE III

Dams: Typical cross section, Various forces acting on gravity dam, Combination of forces for design, modes of failure and criteria for structural stability, High and low gravity dam, Design of high dam, Typical section of low gravity dam, Earth and Rock fill Dams: Types, Causes of failure, Preliminary section of an earth dam, Preliminary section of an earth dam, Seepage control in earth dams

Spillways: Descriptive study of various types of spillways; Reclamation of Water Logged and Saline Soils: Causes and control of water logging. Reclamation of saline and alkaline land, Surface and Sub-surface drainage.

Text Books:

1. *S. K. Garg, Irrigation Engineering and hydraulics structures, Khanna Publishers, 16th Edition.*
2. *B. Singh, Irrigation Engineering, Nem Chand and Sons, Roorkee.*

References:

1. *Varshney &Gupta, Theory and Design of Irrigation Structures, Nem Chand and Bros, Roorkee.*
2. *I. E. Hook, Irrigation Engineering, John Wiley and Sons, New York.*
3. *J. D. Zimmerman, Irrigation, John Wiley and Sons, New York.*

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
21.72	30.28	21.88	25.68	26.20	28.44	23.52	25.92	24.64	23.68	19.60	25.92
10.00	14.00	10.00	12.00	12.00	13.00	11.00	12.00	11.00	11.00	9.00	12.00
2.17	**2.16**	**2.19**	**2.14**	**2.18**	**2.19**	**2.14**	**2.16**	**2.24**	**2.15**	**2.18**	**2.16**

Theory

Paper Name: Environmental Engineering I
Paper Code: BCE-505
Total
Contact

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Hours: 40
Credit: 4

BCE-505	ENVIRONMENTAL ENGG 1	3-0-0-3	4 Credits

COURSE OUTCOMES:

CO1	Define water demand in domestic use Define composition an structure of atmosphere, sources of pollutants Discuss classification of pollutants and their effects, air quality, monitoring and standards Define water supply, plumbing systems, water connections, hot water installation and industrial water supply
CO2	Classify various types of conduits , capacity and sizes including economical sizes of rising main. Classify the kinds of water sources and their characteristics
CO3	Estimate the waste water flows and variation in waste water flows Estimation of storm water by different formulas Calculation of sound power level, sound intensity level and sound pressure level Calculate the units of measurements of different levels of noise
CO4	Focus on collection and estimation of storm water Focus on capacity of distribution reservoirs and equivalent pipe method of pipe network analysis rural water supply distribution system
CO5	Detect flow in full and partially full sewers Judge the basic concepts of community noise, transportation noise and industrial noise;acceptable outdoor and indoor noise level, effects of noise, and control measures
CO6	Method of distribution, pressure and gravity distribution systemts,concept of service and balancing and reservoirs. Design of sewers

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	0	3	1	3	3	1	2	2	3
CO2	2	3	2	1	1	2	2	1	1	0	1	3
CO3	0	0	3	3	3	2	0	2	3	1	0	1
CO4	3	3	0	2	2	2	3	3	1	3	3	2
CO5	2	2	2	3	3	3	1	0	2	2	2	0
CO6	3	3	2	3	1	0	2	2	3	3	1	3

MODULE I

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.

Sources of water: Kinds of water sources and their characteristics, collection of surface and ground water; quality of surface and ground waters; factors governing the selection of a source of water supply.

MODULE II

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control; water hammer and its control measures.

Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, concept

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of service and balancing reservoirs, capacity of distribution reservoirs and equivalent pipe method of pipe network analysis; rural water supply distribution system. Water supply, plumbing systems in buildings and houses: water connections, different cocks and pipe fittings, hot water installation. Institutional and industrial water supply

MODULE III

Wastewater collection: Systems of sanitation and wastewater collection, estimation of wastewater flows and variations in wastewater flows.

Storm water: Collection and estimation of storm water by different formulae.

Flow in sewers: Flow in full and partially full sewers and design of sewers; types of sewers, materials and construction of sewers, joints and sewer appurtenances, layout and construction of sewer lines.

Air pollution: Composition and structure of atmosphere; units of measurement, sources of pollutants, classification of pollutants and their effects, air quality monitoring and standards. Noise pollution: Definition of decibel, sound power level, sound intensity level and sound pressure level; measurement of noise level; basic concept of community noise, transportation noise and industrial noise; acceptable outdoor and indoor noise levels; effects of noise and control measures.

Text books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering

2. Metcalf and Eddy Inc.: Wastewater Engineering

3. Garg: Water Supply Engineering (Environmental Engineering Vol. – I)

4. Garg: Sewage Disposal and Air Pollution Engineering (EnvironmentalEngineering Vol. – II).

References:

1. Manual on Water Supply and Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi

2. Manual on Sewerage and Sewage Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi

3. Steel and McGhee: Water Supply and Sewerage

4. Fair and Geyer: Water Supply and Wastewater Disposal

5. Arceivala: Wastewater Treatment for Pollution Control

6. Hammer and Hammer Jr.: Water and Wastewater Technology

7. Raju: Water Supply and Wastewater Engineering

8. Sincero and Sincero: Environmental Engineering: A Design Approach

9. Pandey and Carney: Environmental Engineering

10. Rao: Textbook of Environmental Engineering

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11. Davis and Cornwell: Introduction to Environmental Engineering

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.28	29.68	27.04	27.40	29.36	22.28	25.16	25.20	26.12	25.52	20.56	27.36
11.00	13.00	12.00	12.00	13.00	10.00	11.00	11.00	11.00	11.00	9.00	12.00
2.30	**2.28**	**2.25**	**2.28**	**2.26**	**2.23**	**2.29**	**2.29**	**2.37**	**2.32**	**2.28**	**2.28**

Theory

Paper Name: Estimation Costing and Evaluation
Paper Code: BCE-506
Total Contact Hours: 40
Credit: 4

Prerequisite: TO understand the knowledge of evaluation of building

BCE-506	ESTIMATION COSTING & VALUATION	2-1-0	2 Credits

COURSE OUTCOMES:

CO1	To State the Importance of estimation, To define Standard Terminology, List Factors affecting the values of property, different types of estimates, Items of work for estimates, describe various Methods of Estimation and valuations, units and measurement of items.
CO2	To classify general and detailed specifications, Interpretation of non-scheduled items and cost indices for building material and labour, Measurement and standard measurement book, Cash and cash book
CO3	To prepare a Detailed estimates of a single roomed and a two roomed single storey residential building with diagram, Estimates of Steel Framed Industrial Building and mechanized construction, estimation for highways /irrigation/ airways projects.
CO4	To outline the Organization set up for various works departments, Duties and responsibilities of officers, Administrative, Technical and Financial approvals, System of P.W. accounts,Stores, Issue of stores, Material at site account,. Release of payments.
CO5	To evaluate of material and other cost through analysis of rates (market rates, PW.D. Schedule rates), Analysis of Equipment costs and productivity.
CO6	To understand the principle of Analysis of rates, Resource planning, Temporary advance, years purchase, capitalized value and depreciation. Standard rent, free hold and lease hold propriety, Mortgage and easement, Defect Liability considerations

Mapping of course outcomes with programs outcomes

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	0	2	3	1	2	1	3	3	1	2	2	3
CO2	2	3	2	0	1	3	2	1	1	0	1	3
CO3	1	0	1	3	1	2	0	3	3	1	0	1
CO4	0	3	0	3	2	2	3	2	1	3	3	2
CO5	2	3	2	1	3	3	1	0	2	2	2	0
CO6	3	2	2	3	1	0	2	1	3	3	1	3

MODULE I

Estimation Fundamentals

Importance of estimation, different types of estimates, general and detailed specifications. Methods of Estimation: Items of work for estimates, units and measurement of items.

Detailed Estimation of Buildings and Analysis of Rates

Detailed estimates of a single roomed and a two roomed single storey residential building. Estimates of Steel Framed Industrial Building:, Analysis of rates, material and other cost considerations. Resource planning through analysis of rates, market rates, PW.D. Schedule rates, non scheduled items and cost indices for building material and labour.

MODULE II

Establishments, Organization Structures and Standard Work Procedures

Organization set up for various works departments. Duties and responsibilities of officers. Administrative, Technical and Financial approvals, System of P.W. accounts, Cash and cash book, Temporary advance, Stores, Issue of stores, Material at site account, Measurement and standard measurement book. Release of payments. Defect Liability considerations.

Valuation of Assets

Standard Terminology, Factors affecting the values of property. Methods of valuation, years purchase, capitalized value and depreciation. Standard rent, free hold and lease hold propriety, Mortgage and easement.

MODULE III

Estimation for Mechanized Construction and Infrastructure Projects 07(L)

Estimation for mechanized construction including slip forming pumped concreting. Equipment costs and productivity analysis. Estimation of highways /irrigation/ airways projects including cross drainage structures.

Text Books:

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1.B.N. Dutta "Estimating & Costing in Civil Engineering," UBS Publishers & Distributors Pvt. Ltd. New Delhi.

References:

1. *Chakraborty M., "Estimating costing and valuation in Civil Engg., Principle and applications (Authors Publication, Kolkata)*

Frederick E. Gould."Managing the Construction Process Estimating, Scheduling and Project Control",

Pearson Education

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
18.08	29.00	22.44	24.68	22.16	24.24	24.68	22.32	25.68	24.68	20.00	27.12
8.00	13.00	10.00	11.00	10.00	11.00	11.00	10.00	11.00	11.00	9.00	12.00
2.26	**2.23**	**2.24**	**2.24**	**2.22**	**2.20**	**2.24**	**2.23**	**2.33**	**2.24**	**2.22**	**2.26**

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DEPARTMENT OF CIVIL ENGINEERING

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credits
						SESSIONAL EXAM.			E-SEM		
			L	T	P	CT	TA	TOTAL			
THEORY											
1	BCE-701	Steel Structures	3	1	0	20	10	30	70	100	4
2	BCE-702	Water Resource Engineering I	3	1	0	20	10	30	70	100	4
3	BCE-703	Environmental Impact Assessment	3	1	0	20	10	30	70	100	4
4	BCE:704	Pre-stressed Concrete	3	1	0	20	10	30	70	100	4
5		CE ELECTIVE-III	3	1	0	20	10	30	70	100	4
PRACTICAL/DESIGN/DRAWING											
6	BCE-751	Industrial Training	0	0	0	-	-	25	-	25	1
7	BCE-752	Structural Engineering Lab	0	0	2	-	-	10	15	25	1
8	BCE-753	Project	0	0	4	-	-	15	35	50	2
9	GP-701	General Proficiency	-	-	-	-	-	25	-	25	1
Total			15	5	6	100	50	225	400	625	25

CE ELECTIVE-III

BCE:031 Bridge Engineering
BCE:032 Environmental Geotechnology
BCE:033 Finite Element Methods
BCE: 034 Industrial Pollution Control Env.Audit

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Theory

Paper Name: Steel Structure
Paper Code: BCE-701
Total Contact Hours: 40
Credit: 4

BCE-701	STEEL STRUCTURES	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To define the rolled steel sections, riveted, bolted and welded connections, permissible and working stress in steel, stress-strain curve for mild steel.
CO2	To classify loads subjected to steel structures, classify the patterns used to join two members, classify strength of joint based on type of failure, classify the weld.
CO3	To determine shearing, bearing and tearing strength of joint design of welded joints, effective length and slenderness ratio of compression members, efficiency of joints.
CO4	To analyse tension and compression members subjected to axial loads, analysis of joints based on type of pattern used.
CO5	To detect net and gross sectional areas of tension member, web crippling and web buckling for beams.
CO6	To design joints, slabs and grillage footings, design laterally supported and unsupported beams, lacings for compression members, design roof trusses.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	0	2	1	3	1	0	2	3	1	2	2	3
CO2	1	3	1	3	1	2	3	0	1	0	1	3
CO3	2	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	2	1	2	2	2	2	0
CO6	3	1	2	21	0	0	2	1	3	3	1	3

MODULE I

Introduction to rolled steel sections, loads, factor of safety, permissible and working stresses.

Riveted and welded connections, strength, efficiency and design of joints.

Compression members- Effective length, Slenderness ratio, Strength of Compression members, Design of Struts, Columns, Built-up Columns, Design of eccentrically loaded columns.

MODULE II

Tension members – Net and Gross sectional areas, Strength of members and their design.

Design of slab and Gusset bases, Design of Grillage footing.

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MODULE III

Beams – web crippling and web buckling, design of laterally supported beam, design of laterally unsupported beam, Purlins.

Design of Industrial Buildings – Detailed design of roof trusses.

Text Books

1. IS : 800 – 1984.

2. Design of Steel Structures by A. S. Arya & J. L. Ajmani, Nem Chand & Bros., Roorkee.

References

1. Design of Steel Structures by S. K. Duggal, Tata Mc-Graw-Hill Publishing Company.

2. Design of Steel Structures by Gaylord & Gaylord.

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
21.02	22.77	20.80	71.25	20.30	16.46	24.93	22.18	23.86	22.75	18.50	25.00
10.00	11.00	10.00	33.00	10.00	8.00	12.00	11.00	11.00	11.00	9.00	12.00
2.10	**2.07**	**2.08**	**2.16**	**2.03**	**2.06**	**2.08**	**2.02**	**2.17**	**2.07**	**2.06**	**2.08**

Theory

Paper Name: Water Resources Engineering I
Paper Code: BCE-702
Total Contact Hours: 40
Credit: 4

Prerequisite:

BCE- 702	**Water Resource Engineering-1**	**4 Credits**

COURSE OUTCOMES:

CO1	To define, precipitation, evapo-transpiration, infiltration, Runoff, various components of hydrological cycle that affects the movement of water in earth, Natural and artificial harbours. '"'

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CO2	To understand discharge formula, characteristics of runoff, Unit and S- hydrograph, duration curve. Physical processes in the context of flood hydrology, including the hydrological cycle in general, rainfall loss and groundwater transport mechanisms.
CO3	To apply a range of common techniques, such as flood frequency analysis, regional methods to estimate design peak flows and prediction to estimate flood hydrographs.
CO4	To measure losses, Pan Evaporation and Pan coefficient, W and ϕ indices, water storage behaviour and analysis to estimate the yield of a small rural water supply system
CO5	To evaluate a number of methods for determining peak flows and flood hydrographs for urban and rural areas, including flood frequency analysis, the regional method and runoff routing methods.
CO6	To create engineering design problems in the context of the conceptual design of a small urban drainage system by applying the deterministic rational method to estimate peaks flow in urban areas and comparing various urban drainage design options.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	0	3	1	0	1	1	2	1	2	2	3
CO2	3	2	1	0	1	2	3	0	1	0	1	3
CO3	1	0	1	1	3	2	0	3	3	1	0	1
CO4	1	3	2	2	2	2	3	1	1	3	3	2
CO5	3	2	3	2	3	3	1	3	2	2	2	0
CO6	2	3	2	3	0	0	2	2	3	3	1	3

MODULE I

Precipitation its Measurement, analysis and losses: Hydrologic cycle, catchment area and watershed, Rainfall and its characteristics, Rain gauges, Non-Recording and Recording type, average rainfall over a catchments, Evapo-transpiration, Pan evaporation, pan coefficient

Infiltration W -Index and φ - Index;

MODULE II

Hydrographs: Discharge formulae, characteristics of a Run off hydrograph, Unit hydrograph, S-hydrograph, Instantaneous hydrograph, synthetic Unit hydrograph, Duration Curve, Mass Flow hydrograph, Stream gauging, Flow rating curve, use of current meters for velocity measurement, Dye-dilution method of discharge measurement

MODULE III

Flood Control: Flood flows, Frequency studies, Statistical analysis for flood prediction, Method of flood control, Flood routing, Reservoir routing and Channel routing, River training work

Dock and Harbours: Natural and artificial Harbours, Selection of site, study of winds, tides and wave actions, Accretion and denudation, Principle of construction of Breakwaters, Quays and jetties, Wet and Floating Docks.

Text Books

1. K. C. Patra, Hydrology & Water Resources Engg., Narosa Publishing House, New Delhi, 2nd Edition.

2. K. Subramanya, Engineering Hydrology, Tata McGraw Hill, 2nd Edition.

References:

1. R. Srinivasan, Harbour, Dock and Tunnel Engineering.

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2. *V. T. Chow, Hand book of Applied Hydrology, McGraw-Hill Publishing Company, New York.*

3. *R. K. Linsely, M. A. Kohlar, J. L. H. Pauluhus, Hydrology for Engineers, Tata McGraw Hill, New Delhi.*

4. *R. S. Varshany, Engineering Hydrology, Nem Chand and Brothers, Roorkee.*

5. *E. M. Wilson, Engineering Hydrology, Macmillan, ELBS, London.*

6. *Water resources Engg. By Wurbs and James, John wiley India*

7. *Water Resources Engg. By R. K. Linsley, McGraw Hill*

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
26.43	22.47	26.61	20.51	19.99	21.89	21.87	24.75	25.81	24.77	19.77	26.17
12.00	10.00	12.00	9.00	9.00	10.00	10.00	11.00	11.00	11.00	9.00	12.00
2.20	**2.25**	**2.22**	**2.28**	**2.22**	**2.19**	**2.19**	**2.25**	**2.35**	**2.25**	**2.20**	**2.18**

Theory

Paper Name: Environmental Impact Assessment
Paper Code: BCE-703
Total Contact Hours: 40
Credit: 4

BCE-703	**EIA**	**3-1-0**	**4 Credits**

COURSE OUTCOMES:

CO1	Define strategic EIA Define rapid and comprehensive EIA
CO2	Classify EIA at project; regional and policy levels Classify economic valuation method cost benefit analysis expert system and gis application
CO3	
CO4	Focus on screening and scoping criteria Focus on EIA in specialized areas like environmental health impact assessment Differentiate EIA report and EIS
CO5	Post project monitoring
CO6	EIA Methodologies

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	0	2	2	3	0	1	0	1	3
CO3	0	1	1	1	3	2	2	1	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	1	3	3	3	2	0	2	2	2	0

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CO6	2	1	2	3	1	1	2	1	3	3	1	3

MODULE I

Evolution of EIA : EIA at project; Regional and policy levels; Strategic EIA; EIA process; Screening and scoping criteria; Rapid and comprehensive EIA; Specialized areas like environmental health impact assessment

MODULE II

Environmental risk analysis; Economic valuation methods; Cost-benefit analysis; Expert system and GIS applications; Uncertainties; Practical applications of EIA; EI methodologies; Baseline data collection; Prediction and assessment of impacts on physical, biological and socio-economic environment

MODULE III

Environmental management plan; Post project monitoring, EIA report and EIS; Review process. Case studies on project, regional and sectoral EIA; Legislative and environmental clearance procedures in India and other countries, Siting criteria; CRZ; Public participation; Resettlement and rehabilitation.

Text Books::

1. B. M. Noble, Introduction to Environmental Impact Assessment: A Guide to Principles and Practice. Oxford University Press, USA, 2005.

2. J. Glasson, Introduction to Environmental Impact Assesment: Principles, and Procedures, Process, Practice and Prospects (The Natural and Built Environment Series), Routledge; 3rdedition, 2005.

References:

1. P. Morris, Methods of Environmental Impact Assessment (The Natural and Built Environment Series), Spon Press, USA, 2ndedition, 2001.

2. R. K. Jain, L. V. Urban, G. S., Stacey, Harold, E. Balbach, Environmental Assessment, McGraw-Hill Professional; 2 edition, 2001.

3. B. B. Marriott, Environmental Impact Assessment: A Practical Guide, McGraw-Hill Professional, 1 edition, 1997.

4. D. P. Lawrence, Environmental Impact Assessment: Practical Solutions to Recurrent Problems, Wiley-Interscience; 1stedition, 2003.

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.04	27.26	22.84	25.60	25.55	25.38	29.89	13.76	26.53	25.45	20.62	27.22
11.00	12.00	10.00	11.00	11.00	11.00	13.00	6.00	11.00	11.00	9.00	12.00
2.28	**2.27**	**2.28**	**2.33**	**2.32**	**2.31**	**2.30**	**2.29**	**2.41**	**2.31**	**2.29**	**2.27**

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Theory

Paper Name: Pre-Stressed Concrete
Paper Code: BCE-704
Total Contact Hours: 40
Credit: 4

BCE-704	PRE-STRESSED CONCRETE	3-1-0	4 Credits

COURSE OUTCOMES:

CO1	To learn concrete and their properties; losses of pre-stress, design of simply supported beams basic assumptions.
CO2	To determine Stress in concrete and steel due to load and pre-stress, pressure line and internal resisting couple, kern distance, cracking moment, limit state design as per IS code, partial pre-stressing; Shear and principal stresses in homogenous elastic beams,
CO3	To perform design of reinforcements for shear and torsion
CO4	To understand Stress distribution in end block—Magnel's method, Guyen's method, Rowe's method, IS code method; Design of pipes and tanks, railway sleepers, electric posts, composite construction.
CO5	To determine Beam deflection short term and long term deflections
CO6	To understand Design of continuous beam-Principles of design of prismatic continuous beams of two and three equal, unequal spans, with variable moments of inertia.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

MODULE I

Historical developments, Basic concepts, types, different systems, Materials-Steel, concreteand their properties; losses of pre-stress, design of simply supported beams basic assumptions,

Stress in concrete and steel due to load and pre-stress, pressure line and internal resisting couple, kern distance, cracking moment, general approach for service load design, graphical methods, Lin's method, limit state design as per IS code, partial pre-stressing; Shear and principal stresses in homogenous elastic beams,

MODULE II

Design of reinforcements for shear and torsion Stress distribution in end block—Magnel's method, Guyen's method, Rowe's method, IS code method; Design of pipes and tanks, railway sleepers, electric posts,

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composite construction.

MODULE III

Beam deflection- short term and long term deflections; Design of continuous beam-Principles of design of prismatic continuous beams of two and three equal, unequal spans, with variable moments of inertia. Cap cables. Jaeques Muller's theorem.

Text Books:

1. *Y. Guyen, Prestressed concrete Vo1-I and II, John Wiley & Sons, New York, 1960.*
2. *T. Y. Lin and H. Burns, Design of pre-stressed concrete structures, Ned- John Wiley & Sons, New York, 1982.*

References:

1. *E. W. Bennet, Prestressed concrete: Theory and design, Chapman and Hall, London, 1962.*
2. *N. Krishnaraju, Prestressed concrete, Tata McGraw Hill, New Delhi, 2004.*
3. *S. K. Mallik & A. P. Gupta, Prestressed concrete, Oxford and IBH, New Delhi, 1982*

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
22.92	24.89	25.30	27.32	19.55	21.15	25.28	17.42	25.23	23.54	18.59	25.23
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.08	**2.07**	**2.11**	**2.10**	**2.17**	**2.12**	**2.11**	**2.18**	**2.29**	**2.14**	**2.07**	**2.10**

Theory

Paper Name: Industrial Pollution Control & Industrial Audit
Paper Code: BCE-034
Total Contact Hours: 40
Credit: 4

BCE-034	**INDUSTRIAL POLLUTION CONTROL & ENVIRONMENTAL AUDIT**	**3-1-0**	**4 Credits**

COURSE OUTCOMES:

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CO1	To define Industrial wastes & their sources: concepts and management aspects; Noise & radiation: generation, control and management. Recent trends in industrial waste management, cradle to grave concept, life cycle analysis, Environmental audit: definitions and concepts,
CO2	To classify the Types solid, liquid, gaseous, noise & radiation emissions., Hazardous wastes:
CO3	To determine various waste water streams, Control and removal of specific pollutants in industrial wastewaters, e.g., oil and grease, Recent trends in industrial waste management, cradle to grave concept, life cycle analysis, clean technologies; Case studies of various industries,
CO4	To compare different environmental audit versus accounts audit,compliance audit, relevant methodologies, various pollution regulations,
CO5	To judge Control and removal of specific pollutants in industrial wastewaters, e.g., oil and grease
CO6	Explanation ISO 14000.

Mapping of course outcomes with programs outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**2**	**3**	**3**	**1**	**0**	**1**	**1**	**2**	**1**	**2**	**2**	**3**
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

MODULE I

Industrial wastes & their sources: various industrial processes, sources and types of wastes- solid, liquid, gaseous, noise &radiation emissions. Sources for industrial water usages and various industrial processes requiring water use and water quality. processes responsible for deterioration in water quality, various waste water streams, Control and removal of specific pollutants in industrial wastewaters, e.g., oil and grease

MODULE II

Control of gaseous emissions: hood and ducts, tall stacks, particulate and gaseous pollutant control; Solid waste generation and disposal management; Hazardous wastes: definitions, concepts and management aspects; Noise & radiation: generation, control and management.

Recent trends in industrial waste management, cradle to grave concept, life cycle analysis, clean technologies; Case studies of various industries, e.g., dairy, fertilizer, distillery, sugar, pulp and paper, iron and steel, metal plating, thermal power plants, etc.

MODULE III

Environmental audit: definitions and concepts, environmental audit versus accounts audit, compliance audit, relevant methodologies, various pollution regulations, Introduction to ISO and ISO 14000.

Text books:

1. *Wastewater Engineering: Treatment & Re□use. Metcalf & Eddy, Tata Mc Graw□Hill.*
2. *Industrial Pollution Prevention Handbook. Shen, T.T., Springer□Verlag, Berlin.*

References:

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1.Industrial Wastewater Management Handbook, Azad, Hardom Singh, Editor□in□Chief, McGraw Hill, New York.

2. WastewaterReuse and Recycling Technology□Pollution Technology Review□72, Culp, Gordan, George Wasner, Robert Williams and Mark , V.Hughes Jr., Noyes Data Corporation, New Jerse

3.The Treatment of Industrial wastes. Edmund, B. Besselieve P.E., McGraw Hill, New York.

4.Industrial Pollution Control \Issues and Techniques. Nancy, J. Sell, Van Nostrand Reinhold Co, NY.

5.Environmental Engineering. Pandey, G.N. and Corney, G.C., Tata McGraw Hill, New Delhi

6.Environment (protection) Act□ 1986. Any authorized & recent publication on Government Acts.

Table: Direct attainment of CO-PO

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
26.89	29.10	29.19	31.51	21.35	23.91	28.93	19.23	27.77	26.68	21.66	29.36
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.44	**2.43**	**2.43**	**2.42**	**2.37**	**2.39**	**2.41**	**2.40**	**2.52**	**2.43**	**2.41**	**2.45**

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DEPARTMENT OF COMPUTER APPLICATION
B.Sc C.S (H)

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

INDEX		
1		UNIVERSITY VISION AND MISSION
2		DEPARTMENT VISION AND MISSION
3		PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES, PROGRAMSPECIFIC OUTCOMES DEFINITION
4		STATEMENT OF PROGRAM EDUCATIONALOBJECTIVES, PROGRAM OUTCOMES, PROGRAM SPECIFICOUTCOMES
	4.1	Program Educational Objectives
	4.2	Program Outcomes
	4.3	Program Specific Outcomes
5		BLOOMS TAXONOMY
6		COURSE OUTCOME STATEMENTS
7		COURSE OUTCOME TO PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES MAPPING FOR ALL THE COURSES
	7.1	Levels of Outcomes
	7.2	Process involved in CO-PO Mapping
	7.3	Sample CO-PO and CO-PSOMapping
	7.4	Identification of curricular gap
8	8.1	COURSE OUTCOMES TO PROGRAM OUTCOMES/ PROGRAM SPECIFIC OUTCOMES MAPPING
	8.2	CO Attainment Calculation of a Course
9		ASSESSMENT PROCESS FOR OVERALL PO AND PSO ATTAINMENT
	9.1	PO and PSO attainment

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. DEPARTMENT OF COMPUTER APPLICATION
VISION AND MISSION

VISION

"To create the most conducive environment for quality academic and research oriented undergraduate and postgraduate education in computer application and prepare the students for a globalized technological society and orient them towards serving the society. To be among the nation's premier small research and teaching Computer Science departments."

MISSION

- To be among the nation's premier small research and teaching Computer Application departments
- To impart moral and ethical values, and interpersonal skills to the students
- To achieve academic excellence by imparting in-depth knowledge to the students through effective pedagogies and hands on experience on latest tools and technologies
- To establish nationally and internationally recognized research centers and expose the students to broad research experience
- To pursue interdisciplinary research that will serve the needs of the entire global community
- To prepare students to be continuous learners in a connected world and imbibe professional skills and ethical responsibilities in them

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1-PROFESSIONAL DEVELOPMENT
Graduates are prepared to be employed in IT industries by providing expected domain knowledge.

PEO2-CORE PROFICIENCY
Graduates are provided with practical training, hands-on and project experience to meet the industrial needs.

PEO3- TECHNICAL ACCOMPLISHMENTS
Graduates are motivated in career and entrepreneurial skill development to become global leaders

PEO4- PROFESSIONALISM
Graduates are trained to demonstrate creativity, develop innovative ideas and. to work in teams to accomplish a common goal.

PEO5- LEARNING ENVIRONMENT
Graduates are addressed with social issues and guided to operate problems with solutions

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the BSC Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- ❖ Inputs are also obtained from alumni and other stakeholders.
- ❖ Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Program Outcomes (POs)		
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design / development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society	Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environmentand sustainability	Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
PO10	Communication	Communicate effectively on complex engineering activities with the engineeringcommunity and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance	Demonstrate knowledge and understanding of theengineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.manage projects in multi-disciplinary environments
PO12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadestcontext of technological change.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	Professionally trained in the areas of programming, multimedia, animation, web designing, and networking and to acquire knowledge in various domains based electives.
PSO2	students to communicate effectively and to improve their competency skills to solve real time problems.
PSO3	The ability to employ modern computer languages and applications for their successful career, to create platforms to become an entrepreneur and a relish for higher studies.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higherforms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learningprocesses.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previouslearned information.	defines,describes, identifies, knows, labels, lists,matches,names, outlines,recalls, recognizes,reproduces, selects, states	Reciteapolicy. Quotepricesfrom Memorytoa customer.Recite the safety rules.
Understanding: Comprehending Themeaning, translation, interpolation,and Interpretationof Instructionsand problems. State a Problemin one'sown words.	comprehends,converts, defends,distinguishes, estimates,explains, extends,generalizes, gives an example, infers, interprets,paraphrases, predicts,rewrites, summarizes, translates	Rewritethe Principlesoftest writing. Explain in one'sownwords Thestepsfor Performinga Complextask. Translatean Equationinto acomputer spreadsheet.

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Applying: Use a concept in a new situationor unprompted use of an abstraction.Applies what was learningthe classroom into novel situations in the workplace.	applies,changes, computes,constructs,demonstrates, discovers,manipulates, modifies, operates, predicts, prepares,produces, relates, shows,solves, uses	Use a manual to calculatean employee'svacation time. Apply laws of statisticsto evaluatethe reliability of a writtentest.
Analyzing: Separates material or conceptsinto component parts sothatits organizational structuremaybe understood. Distinguishes betweenfacts and inferences.	analyses,breaksdown, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishesidentifies, illustrates,infers, outlines,relates,selects, separates	Troubleshoota piece ofequipment by using logical deduction. Recognizelogical fallaciesin reasoning. Gathers information from a departmentand selects the required tasks fortraining.
Evaluating: MakeJudgmentsaboutthe value of ideas or materials.	appraises,compares,concludes, contrasts,criticizes,critiques, defends,describes, discriminates, evaluates, explains,interprets, justifies,relates, summarizes,supports	Select the most Effectivesolution. Hire the most qualified candidate. Explain andjustify a newbudget.

Creating: Buildsa structureorPatternfromdiverseelements.Put parts togetherto form a whole,with emphasis oncreating a newmeaningorstructure.	categorizes,combines,compiles,composes,creates, devises, designs,explains,generates,modifies,organizes,plans,rearranges,reconstructs,relates,reorganizes,revises,rewrites,summariz	Integrates training from several sourses to solve a problem. Revise and process to improve the outcomes

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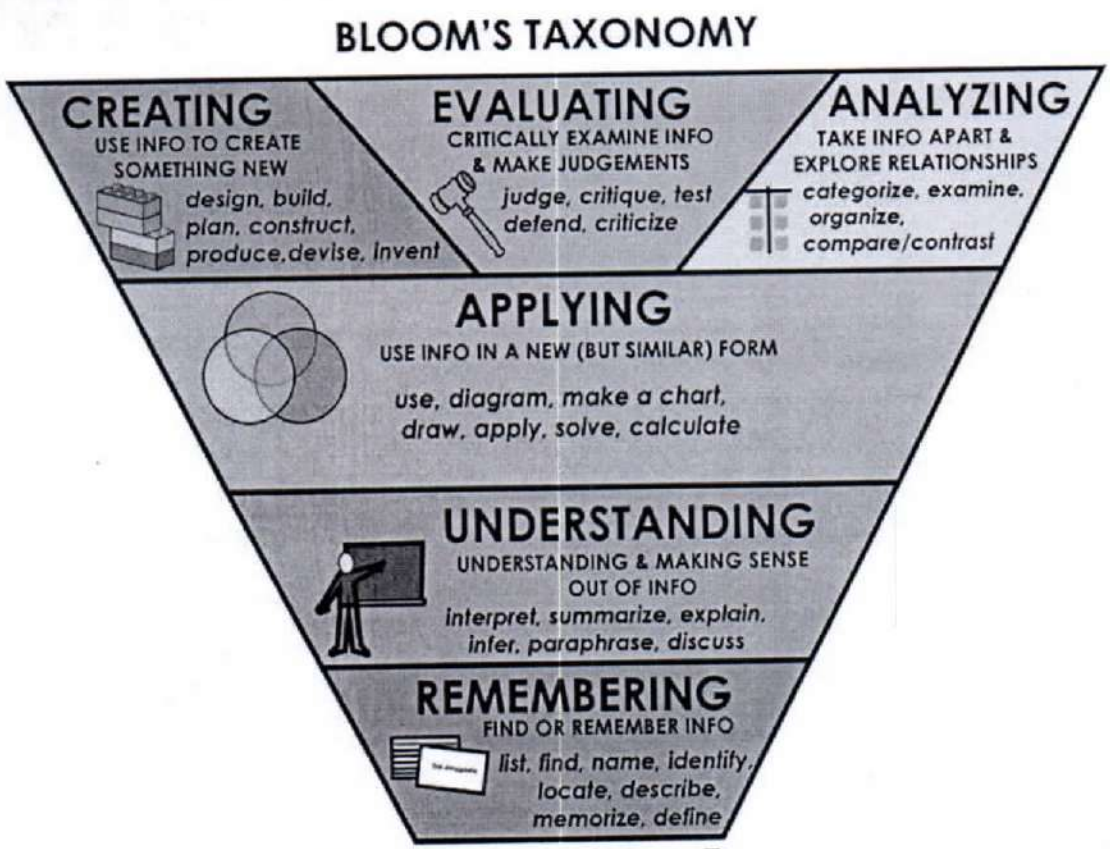
	es,tells, writes	



Pictorial representation of Blooms Taxonomy

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6. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

CO STATEMENTS:

Course: Computer Fundamentals

Course Code: CSH-101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Bridge the fundamental concepts of computers with the present level of knowledge of the students.
CO2	To understand binary, Octal, Hexadecimal and their Arithmetic
CO3	To understand the main components of an OS & their functions
CO4	Students will create documents that demonstrate proficiency in the use of word processing
CO5	Students will create documents that demonstrate proficiency in the use of Spreadsheets,
CO6	Students will create documents that demonstrate proficiency in the use of presentation applications.

CO STATEMENTS:

Course: Programming Using C

Course Code: CSH102

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding the concept and recognize the basic terminology used in computer programming.
CO2	Write, Compile and Debug programs in C language and use different data types for writing the programs.
CO3	Design programs connecting decision structures, loops and functions.
CO4	Understand normal and abnormal combustion phenomena in SI and CI engines
CO5	Understand the dynamic behavior of memory by the use of pointers.
CO6	Use different data structures and create / manipulate basic data files and developing applications for real world problems.

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CO STATEMENTS:

Course: Digital Electronics and Applications

Course Code: CSH 103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Differentiate between analog and digital circuits as well as electrical and electronics.
CO2	Perform number system conversion.
CO3	Find solution of binary arithmetic problem and understand Boolean algebra.
CO4	Implement any given Boolean expression using MUX, Decoder as well as Logic Gates.
CO5	Discrimination among various kind of memory devices with their need.
CO6	To devlop shills to build and troubleshoot digital circuits.

CO STATEMENTS:

Course: Professional Communication I

Course Code: BPC101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the process of communication and its effect on giving and receiving information.
CO2	Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar.
CO3	Apply effective communication skills in a variety of public and interpersonal settings *s.*
CO4	To draft effective correspondence with brevity and clarity.
CO5	Demonstrate his verbal and nonverbal communication ability through presentations.
CO6	Become aware the numerous carrier opportunities within the fields of communication.

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7. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

7.1 Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.

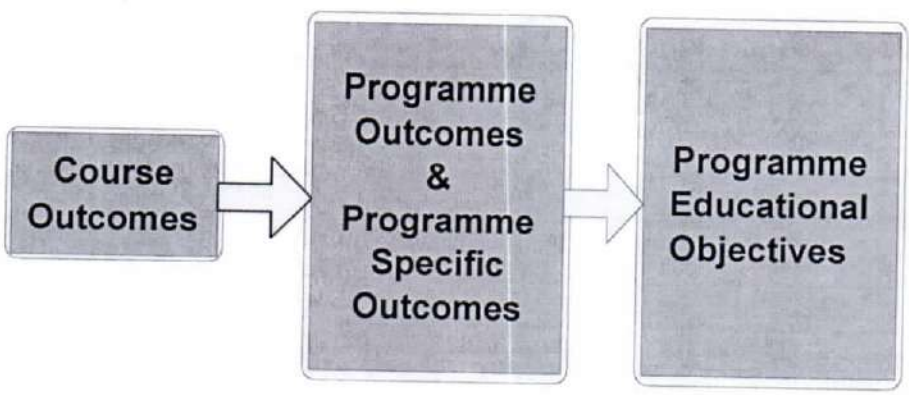

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

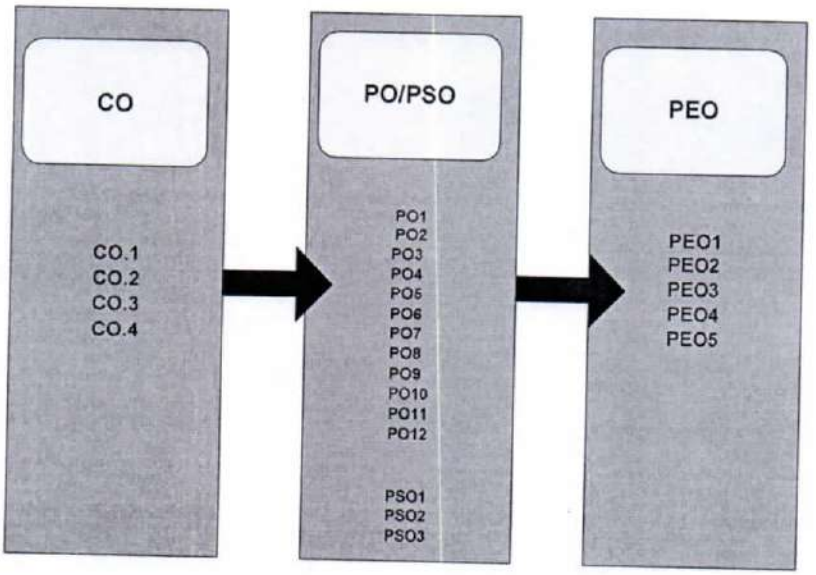

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-POMapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 CO-PO Mapping

A sample course outcome statements and sample CO-PO matrix are given in Table 7.1

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '0. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '0' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome CSH101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment ofCOs/POs

Step-1:The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

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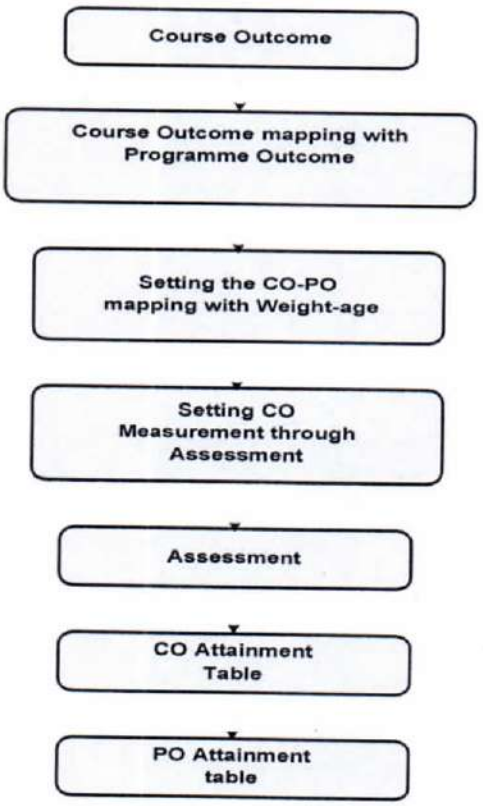
Validation of CO-PO mapping



The process of CO-PO mapping validation

Process of CO-PO Attainment

Step 1 : Obtain courseoutcome.

Step 2 : Mapping of course outcome with programoutcome.

Step 3 : Setting weightage for CO assessment.

Step 4 : COmeasurement throughassessment.

Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct andindirect assessmentmethods.

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8. COURSE OUTCOMES TO PO MAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

Table 8.1: CO – PO ATTAINMENT
Course: Computer Fundamentals
Course Code: CSH101

CO1 AT	2.93
CO2 AT	2.73
CO3 AT	2.83
CO4 AT	2.79
CO5 AT	2.11
CO6 AT	2.56

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	2	3	2	3	2	3
CO2	0	1	1	0	0	1	0	1	2	0	1	1
CO3	3	3	3	3	2	2	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	3	2	3	3	3
CO5	0	1	0	2	0	1	1	0	0	1	0	0
CO6	1	0	1	0	1	0	0	1	0	0	0	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	28.20	30.48	30.93	29.85	25.37	24.72	24.81	28.11	25.39	27.75	25.44	30.93
	10.00	11.00	11.00	11.00	9.00	9.00	9.00	10.00	9.00	10.00	9.00	11.00
	2.82	**2.77**	**2.81**	**2.71**	**2.82**	**2.75**	**2.76**	**2.81**	**2.82**	**2.77**	**2.83**	**2.81**

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Table 8.2: CO – PO ATTAINMENT
Course: Programming using C
Course Code: CSH 102

CO1 AT	2.99
CO2 AT	2.83
CO3 AT	2.93
CO4 AT	2.94
CO5 AT	2.61
CO6 AT	2.96

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**2**	**2**	**3**	**0**	**2**	**3**	2	3	2	2
CO2	2	3	3	1	0	1	1	1	2	3	2	3
CO3	1	3	2	1	2	2	1	1	1	2	2	2
CO4	2	1	3	1	0	1	1	2	2	1	2	1
CO5	2	1	2	2	2	2	3	3	2	2	2	3
CO6	2	2	1	2	2	2	3	2	1	3	3	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	34.57	34.72	37.32	25.82	25.96	22.77	31.39	34.35	28.62	40.35	37.48	39.98
	12.00	12.00	13.00	9.00	9.00	8.00	11.00	12.00	10.00	14.00	13.00	14.00
	2.88	**2.89**	**2.87**	**2.87**	**2.88**	**2.85**	**2.85**	**2.86**	**2.86**	**2.88**	**2.88**	**2.86**

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Table 8.3: CO – PO ATTAINMENT
Course: Digital Electronics and Applications
Course Code: CSH103

CO1 AT	2.97
CO2 AT	2.89
CO3 AT	2.98
CO4 AT	2.93
CO5 AT	2.70
CO6 AT	2.95

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	2	2	3	1	3	2
CO2	2	1	2	0	2	3	2	3	1	3	3	3
CO3	1	3	2	3	0	0	1	2	3	2	2	2
CO4	2	1	0	3	3	3	3	0	3	1	3	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3
CO6	1	0	2	0	0	0	0	3	2	3	1	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	34.58	31.76	31.67	31.76	31.58	31.51	31.59	37.51	43.52	37.47	43.38	37.48
	12.00	11.00	11.00	11.00	11.00	11.00	11.00	13.00	15.00	13.00	15.00	13.00
	2.88	**2.89**	**2.88**	**2.89**	**2.87**	**2.86**	**2.87**	**2.89**	**2.90**	**2.88**	**2.89**	**2.88**

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Table 8.4: CO – PO ATTAINMENT
Course: Communication Skills
Course Code: BPC101

CO1 AT	2.75
CO2 AT	2.48
CO3 AT	2.83
CO4 AT	2.78
CO5 AT	2.06
CO6 AT	2.68

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	2	3	2	3	2	3
CO2	0	1	3	1	0	1	0	1	3	0	1	1
CO3	3	3	3	3	3	2	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	3	2	3	3	3
CO5	0	1	0	2	0	1	1	0	0	1	0	0
CO6	3	3	2	2	2	3	2	1	1	0	1	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	33.14	37.67	37.89	37.05	30.46	34.84	29.76	27.42	29.67	27.15	27.50	35.62
	12.00	14.00	14.00	14.00	11.00	13.00	11.00	10.00	11.00	10.00	10.00	13.00
	2.76	**2.69**	**2.71**	**2.65**	**2.77**	**2.68**	**2.71**	**2.74**	**2.70**	**2.72**	**2.75**	**2.74**

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DEPARTMENT OF BIOTECHNOLOGY

CO - PO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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B.Sc. BIOTECHNOLOGY

Ist Semester

PROGRAM OUTCOMES (POs):

PO1	Ability to apply the **fundamentals** of **mathematics, science and engineering** for biotechnological processes.
PO2	Ability to **well design a specific problem or appropriate protocol** based on review of literature or biological data so that it can be solved or reach the conclusions in the areas of Biotechnology such as bioprocess engineering, plant biotechnology, medical biotechnology, biophysics, molecular biology and environmental biotechnology.
PO3	Ability to design a system, a component or biological process within the umbrella of realistic constraints such as economic, environmental, societal, health and safety, manufacturability and sustainability.
PO4	Ready to carry out research and solve complex problems by utilizing sophisticated biotechnology tools such as NMR spectroscopy, microarray technology, crystallography, flowcytometry, next generation sequencing in different fields of biotechnology resulting in patents, journal publications and product development.
PO5	Ability to use the **conceptualized biotechnology solutions** towards the sustainable development and focus on the **environmental sustainability** such as preventing the loss of biodiversity due to Desertification and Deforestation, use of white biotechnology, Bioremediation, Biofuels, Biosensors, Biocatalyst, Biomining and other technologies to prevent continuous degradation of the environment and making its more sustainable to ideal environment.
PO6	Knowledge on different aspects of **ethics** related to biotechnology areas such as genetically modified species, patenting human biological materials, organ transplantation, diagnosis of genetic defects, and use of genetically engineered crops and uses this knowledge very professionally and legally so that it will be not hurt the moral code of the society.
PO7	Ability to **tackle** the issues effectively either as a member and/or in a heterogeneous work environment or should be able to work in **interdisplinary areas** of biotechnology to manage the project financially and effectively with their limitations.
PO8	Attend good **writing skills** (such as abstract, summary, project report) or **oral presentation** and contribute better in interdisplinary areas of biotechnology or in the society at large and to develop habit of lifelong learning with the **technological changes**.

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COURSE OUTCOMES TO PO AND PSOMAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

MAPPING COURSE

BST 101 - Chemistry I

Course Outcome:-

1. Understand various types of chemical reactions
2. Analyze different chemicals and their usage in day to day life and in industries and other sectors
3Identify various bonds that exist in a molecule or a compound
4. Understand the concept of orbitals and sharing of electrons
5. Evaluate the role of kinetic theory of gases
6. Understand the concept of vander walls forces and weak bonds

CO-PO Mapping:-

BST 101	Chemistry	**3-1-0**	**4 Credits**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	1	1	1	0	0	0	0
CO2	2	1	1	1	1	1	0	0
CO3	3	2	2	2	2	1	0	0
CO4	3	3	2	2	2	2	0	0
CO5	3	3	1	2	2	2	1	1
CO6	3	2	2	2	2	2	1	1

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CO ATTAINMENT:-

CO1 AT	2.84
CO2 AT	2.78
CO3 AT	2.69
CO4 AT	2.58
CO5 AT	2.55
CO6 AT	2.67

CO-PO MATRIX:-

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
39.87	31.73	24.04	26.60	23.76	21.07	5.22	5.22
15.00	12.00	9.00	10.00	9.00	8.00	2.00	2.00
2.66	**2.64**	**2.67**	**2.66**	**2.64**	**2.63**	**2.61**	**2.61**

BST 102: Introduction to Biotechnology

Course Outcome:-

1. Understand various applications of Biotechnology
2. Analyze various biomolecules and their significance, structure and function
3.Identify different types of microbes and their importance
4. Understand the concept of databases used in sequence alignment
5. Knowledge of Genes and their impact
6. To understand the biodiversity analysis tools

CO-PO Mapping:-

BST 102	**Introduction to Biotechnology**	**3-1-0**	**4 Credits**

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	1	1	1	1	0	0
CO2	2	1	1	1	1	1	0	0
CO3	2	2	2	1	1	1	0	0
CO4	2	2	2	2	1	1	1	1
CO5	3	3	2	2	1	1	1	1
CO6	3	3	3	2	2	2	2	1

CO ATTAINMENT:-

CO1 AT	2.62
CO2 AT	2.55
CO3 AT	2.53
CO4 AT	2.50
CO5 AT	2.53
CO6 AT	2.57

CO-PO MATRIX:-

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
35.70	33.15	28.00	22.90	17.87	17.87	10.17	7.60
14.00	13.00	11.00	9.00	7.00	7.00	4.00	3.00
2.55	**2.55**	**2.55**	**2.54**	**2.55**	**2.55**	**2.54**	**2.53**

BST 103 Cell Biology

Course Outcome:-

1. Understand various applications of Biotechnology
2. Analyze various biomolecules and their significance, structure and function
3.Identify different types of microbes and their importance
4. Understand the concept of cell and signaling mechanism

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5. Knowledge of Genes, genetic disabilities and apoptosis cell pathways and regulators.
6. To focus around 'Cell Biology at work' with emphasis on key techniques currently used in the study of cells.

CP-PO Mapping:-

BST 103	Cell Biology	3-1-0	4 Credits

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	1	1	0	0
CO2	2	2	1	1	1	1	0	0
CO3	2	2	2	1	1	0	0	0
CO4	2	2	1	1	1	1	0	0
CO5	3	2	1	1	1	1	1	1
CO6	3	2	2	2	1	1	1	1

CO ATTAINMENT:-

CO1 AT	2.64
CO2 AT	2.52
CO3 AT	2.51
CO4 AT	2.54
CO5 AT	2.52
CO6 AT	2.55

CO-PO MATRIX:-

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
35.64	27.93	20.34	17.84	15.28	12.78	5.07	5.07
14.00	11.00	8.00	7.00	6.00	5.00	2.00	2.00
2.55	**2.54**	**2.54**	**2.55**	**2.55**	**2.56**	**2.54**	**2.54**

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BST104 Elementary Math I

Course Outcome:-

1. Understand various applications of mathematical concepts.
2. Derivation of polynomial and trigonometric functions.
3.Identify different types of Integration as inverse process of differentiation
4. Understand the area under simple curves
5. Analysis of differential equation.
6. To provide the knowledge pertaining to basic methodology of mathematics.

CP-PO Mapping:-

BST 104	**Elementary Math I**	**3-1-0**	**4 Credits**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	0	0	0	0	0	0	0
CO2	1	0	0	0	0	0	0	0
CO3	1	0	0	0	0	0	0	0
CO4	1	1	1	1	1	0	0	0
CO5	2	1	1	1	1	1	1	1
CO6	2	2	1	1	1	1	1	1

CO ATTAINMENT:-

CO1 AT	2.51
CO2 AT	2.55
CO3 AT	2.06
CO4 AT	2.04
CO5 AT	2.06
CO6 AT	2.07

CO-PO MATRIX:-

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
17.43	8.25	6.18	6.18	6.18	4.13	4.13	4.13
8.00	4.00	3.00	3.00	3.00	2.00	2.00	2.00
2.18	**2.06**	**2.06**	**2.06**	**2.06**	**2.07**	**2.07**	**2.07**

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BST 105 Remedial Biology I

Course Outcome:-

1. Identify the Diversity of living organisms, their structure and function
2. Systematic and binomial System of nomenclature
3. Cell: Structure and Function Cell: Cell theory; Prokaryotic and eukaryotic cell
4. Plant Physiology and different activities performed by the plants
5. Adolescence and drug / alcohol abuse, Basic concepts of immunology.
6. To explain the metabolic pathways in plants.

CO-PO Mapping:-

BST 105	REMEDIAL BIOLOGY I	3-1-0	4 Credits

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	0	0	0	0	0	0	0
CO2	1	0	0	0	0	0	0	0
CO3	1	0	0	0	0	0	0	0
CO4	1	0	0	0	0	0	0	0
CO5	2	1	0	0	0	0	0	0
CO6	2	2	1	1	1	1	0	0

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BST106 Computer Fundamentals

Course Outcome:-

1. Understand various applications of computing
2. Idea about MS Word and excel.
3. Identify different types of Basic Gates used in computers.
4. Database system concepts, Data models schema and instance
5. Working on Query and use of database
6. To apply the knowledge of fundamental tools for research and development

CO-PO Mapping:-

BST 106	COMPUTER FUNDAMENTAL	3-1-0	4 Credits

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	0	1	0	0
CO2	2	1	0	0	0	1	0	0
CO3	1	0	0	0	0	0	0	0
CO4	1	0	0	0	0	0	0	0
CO5	2	1	0	0	0	1	1	1
CO6	3	2	2	1		2	2	2

CO ATTAINMENT:-

CO1 AT	2.66
CO2 AT	2.61
CO3 AT	3.00
CO4 AT	3.00
CO5 AT	2.66
CO6 AT	2.64

CO-PO MATRIX:-

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
30.51	27.87	22.21	16.57	11.30	16.57	11.30	8.30
11.00	10.00	8.00	6.00	4.00	6.00	4.00	3.00
2.77	**2.79**	**2.78**	**2.76**	**2.82**	**2.76**	**2.82**	**2.77**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERINGSCHEME OF INSTRUCTION AND DETAILED SYLLABUS OF B.TECH. PROGRAM IN COMPUTER SCIENCE AND ENGINEERING.

INVERTIS INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE ANDENGINEERING

VISION AND MISSION OF THE INSTITUTE

VISION:

To develop responsible citizens who would 'think global and act local' and become the change agents of society to meet the challenges of future.

MISSION:

M1	Providing learner centric Teaching learning process in excellent infrastructure for making the graduates industry ready with social ethics.
M2	To impart high quality Engineering and Management education
M3	budding professionals and provide the ambience needed for developing requisite skills.
M4	Provide world class platform for research and innovation.
M5	Promote intellectual and skilled human capital generating employment and entrepreneurship

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VISION AND MISSION OF THE DEPARTMENT

VISION-

To be renowned itself as a reputed organization in engineering education. Creating knowledge of fundamental principles and innovation technologies through research within the core areas of computer science and also in inter- disciplinary topics.

MISSION-

M1	Develop the road map for student for IT Industry.
M2	To empower the students with the required skills to solve the complex technological problems of modern society and also provide them with a framework for promoting collaboration and multidisciplinary activities.
M3	To impart high quality professional training at the postgraduate and undergraduate level with an emphasis on basic principles of computer science and engineering.
M4	Train the students according current scenario.
M5	Teach student for latest languages in computer science

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PROGRAM EDUCATIONAL OBJECTIVES (PEO):

PEO1	Technical Expertise: Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO2	Successful Career: Deliver professional services with updated technologies in computer science-based career.
PEO3	Soft Skills: Develop leadership skills and incorporate ethics, team work with time management in the profession.
PEO4	Communication: effective communication
PEO5	Life Long Learning: Conduct research among computing professional as per market needs.

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PROGRAM OUTCOMES(PO): At the end of the program the student will be able to:

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Mapping of PEO & PO

Program Educational Objective(s)	Program Outcome(s)	
PEO1	Technical Expertise: Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.	1,2,4,7,8,10
PEO2	Successful Career: Deliver professional services with updated technologies in computer science-based career.	3,5,6,11
PEO3	Soft Skills: Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.	3,9
PEO4	Communication: effective communication	10
PEO5	Life Long Learning: Conduct research among computing professional as per market needs.	12

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SCHEME OF INSTRUCTION

B.Tech.(Computer Science and Engineering)

Course Structure

B. Tech YEAR II, SEMESTER III

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME					SUBJEC TOTAL	Credit
						SESSIONAL EXAM.				END SEM		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BHU-302/BHU-301	Industrial Sociology / Industrial Psychology	2	1	0	10	5		15	35	50	2
2	BAS-301	Mathematics-III	3	1	0	20	10		30	70	100	4
3	BCS-301	Data Structures	3	1	0	20	10		30	70	100	4
4	BCS-302	Discrete Structures	3	1	0	20	10		30	70	100	4
5	BCS-303	Digital Logic Design	3	1	0	20	10		30	70	100	4
6	BCS-304	IT Infrastructure and its Management	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7s	BCS-351	Data structures Lab	0	0	2	-	-		10	15	25	1
8	BCS-353	Digital Logic Design Lab	0	0	2	-	-		10	15	25	1
9	BCS-354	IT Infrastructure Lab	0	0	2	-	-		10	15	25	1
10	GP-301	General Proficiency	-	-	-	-	-		50	-	50	1
		TOTAL	17	6	6				245	430	675	26

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B.Tech. YEAR III, SEMESTER V

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME					SUBJECT TOTAL	Credit
						SESSIONAL EXAM.				END SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BCS-501	Theory of Computation	3	1	0	20	10		30	70	100	4
2	BCS-502	Data Base Management System	3	1	0	20	10		30	70	100	4
3	BCS-503	Java Programming	3	1	0	20	10		30	70	100	4
4	BCS-504	Software Engineering	3	1	0	20	10		30	70	100	4
5	BCS-051-054	CS Elective-I	3	1	0	20	10		30	70	100	4
6	BOE-501-504	Open Elective-1	2	1	0	10	5		15	35	50	2
PRACTICALS AND PROJECTS												
7	BCS- 552	DBMS Lab	0	0	2	-	-		10	15	25	1
8	BCS-553	Java Programming Lab	0	0	2	-	-		10	15	25	1
9	BCS-554	Software Engineering Lab	0	0	2	-	-		10	15	25	1
10	GP-501	General Proficiency	-	-	-	-	-		50	-	50	1
		TOTAL	17	6	6				245	430	675	26

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B.Tech. YEAR IV, SEMESTER VII

S. No.	Course Code	SUBJECTs	HOURS			EVALUATION SCHEME					SUBJECT TOTAL	Credit
						SESSIONAL EXAM.				END SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BCS-701	Advanced Computer Architecture	3	1	0	20	10		30	70	100	4
2	BCS-702	Artificial Intelligence and Expert Systems	3	1	0	20	10		30	70	100	4
3	BCS-703	Data Warehouse and Data Mining	3	1	0	20	10		30	70	100	4
4	BCS-704	Distributed Systems	3	1	0	20	10		30	70	100	4
5		CS Elective-IV	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BCS-751	Industrial Training Viva-Voce	0	0	2	-	-		25		25	1
8	BCS-752	Artificial Intelligence Lab	0	0	2	-	-		10	15	25	1
9	BCS-753	Project	0	0	4	-	-		25	25	50	2
10	BCS-754	Seminar	0	0	2	-	-		25	-	25	1
11	GP-701	General Proficiency	-	-	-	-	-		25	-	25	1
		TOTAL	17	6	6				260	390	650	26

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List of Electives

YEAR III, SEMESTER V

OPEN ELECTIVE-I

BOE-501 Total Quality Management
BOE-502 Human Computer Interaction
BOE-503 Entrepreneurship Development
BOE-504 Non-Conventional Energy Resource
BOE-505 Operational Research

CS ELECTIVE-I

BCS-051 Principles of Programming Language
BCS-052 Fuzzy logic
BCS-053 Multimedia Systems
BCS-054 Soft Computing
BCS-055 Cloud Architecture

YEAR IV, SEMESTER VII

CS ELECTIVE-IV

BCS-071 Embedded and Real Time Systems
BCS-072 Data Compression
BCS-073 Neural Networks
BCS-074 OS for Smart Devices (Android)
BCS-075 Client Server Computing

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STUDY AND EVALUATION SCHEME

B.Tech. in Computer Science and Engineering
YEAR II, SEMESTER III

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME					SUBJECT TOTAL	Credit
						SESSIONAL EXAM.				END SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BHU-302/BHU-301	Industrial Sociology / Industrial Psychology	2	1	0	10	5		15	35	50	2
2	BAS-301	Mathematics-III	3	1	0	20	10		30	70	100	4
3	BCS-301	Data Structures	3	1	0	20	10		30	70	100	4
4	BCS-302	Discrete Structures	3	1	0	20	10		30	70	100	4
5	BCS-303	Digital Logic Design	3	1	0	20	10		30	70	100	4
6	BCS-304	IT Infrastructure and its Management	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BCS-351	Data structures Lab	0	0	2	-	-		10	15	25	1
8	BCS-353	Digital Logic Design Lab	0	0	2	-	-		10	15	25	1
9	BCS-354	IT Infrastructure Lab	0	0	2	-	-		10	15	25	1
10	GP-301	General Proficiency	-	-	-	-	-		50	-	50	1
		TOTAL	17	6	6				245	430	675	26

L-Lecture, **T**- Tutorial ,**P**- Practical , **CT** – Cumulative Test ,**TA** –Teacher Assessment , **AT** – Attendance ,**E-Sem** – End Semester Marks



BHU-301	Industrial Psychology	L T P 2 1 0	3 Credits

Pre-requisites: None

Course Objectives:

CO1	To introduce major topics and subspecialties including critical theory and research finding that have defined the field of I/O psychology.
CO2	To increase the understanding of the complicated systems of individual and group psychological processes involved in the world of work
CO3	To connect the basic principles of I/O psychology to personnel and human resources management within the organization
CO4	Describe major topics and subspecialties including critical theory and research finding that have defined the field of I/O psychology
CO5	Describe the complicated systems of individual and group psychological processes involved in the world of work

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	1	3	1	1	1	2	1	1	1	1
CO-2	3	1	2	2	2	1	1	1	2	2	1	1
CO-3	2	1	1	2	3	2	2	2	1	1	2	1
CO-4	3	3	2	2	1	2	2	1	2	2	1	2
CO-5	2	1	2	1	3	1	1	2	1	1	1	1

Detailed Syllabus

MODULE-I

Introduction – Objectives and scope of Industrial Psychology, The Industrial Psychologist, Scientific management and Human Relations School – Hawthorne Experiments.

MODULE-II

Individual in Workplace -Motivation and Job satisfaction, stress management, Organizational culture, Leadership & group dynamics.

MODULE -III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety, Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests, Performance Management - Training & Development.

Text Books:

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1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y: McGraw Hill.
2. Industrial psychology.S.N.chauhan, Sandeep Mittal,R.P.singh, Prateek Jain Pragati prakashan !st Ed

Reference Books :

3. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.

COURSE OUTCOMES:

CO1	Aware about the field of I/O psychology.
CO2	Student can easily understand the complicated systems of individual and group psychological processes involved in the world of work
CO3	Psychology prepare for industry.
CO4	Able to find the research area in the field of psychology
CO5	Able to describe the complicated systems of individual and group psychological processes involved in the world of work

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1.85	2.78	0.93	2.78	0.93	0.93	0.93	1.85	0.93	0.93	0.93	0.93
CO2	2.71	0.90	1.80	1.80	1.80	0.90	0.90	0.90	1.80	1.80	0.90	0.90
CO3	1.59	0.79	0.79	1.59	2.38	1.59	1.59	1.59	0.79	0.79	1.59	0.79
CO4	2.18	2.18	1.46	1.46	0.73	1.46	1.46	0.73	1.46	1.46	0.73	1.46
CO5	1.85	0.93	1.85	0.93	2.78	0.93	0.93	1.85	0.93	0.93	0.93	0.93
avarage	2.04	1.52	1.37	1.71	1.72	1.16	1.16	1.38	1.18	1.18	1.01	1.00
percentage	82%	49%	55%	38%	82%	38%	33%	33%	33%	50%	27%	27%

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BAS-301	Mathematics-III	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To understand the method of solving algebraic, transcendental equations.
CO2	To determine the approximate value of the derivative & definite integral for a given data using numerical techniques.
CO3	Able to expand the given periodic function defined in the given range in terms of sine and cosine multiple of terms as a Fourier series.
CO4	Able to extreme the functional using integration technique.
CO5	To know how root finding techniques can be used to solve practical engineering problems.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	1	1	1	1	1	2	1	1	1	1
CO-2	1	1	1	2	2	2	1	1	2	2	1	1
CO-3	2	1	1	2	2	2	3	2	1	1	2	1
CO-4	2	3	3	3	1	2	2	1	2	2	1	2
CO-5	2	1	2	1	3	2	1	2	1	1	1	1

Detailed Syllabus

MODULE-I

Function of Complex variable: Analytic function, C-R equations, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic function, Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals.

MODULE-II

Statistical Techniques-I: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non –linear and multiple regression analysis, Probability theory.

Statistical Techniques-II: Binomial, Poisson and Normal distributions, Sampling theory (small and large), Tests of significations: Chi-square test, t-test, Analysis of variance (one way) , Application to engineering, medicine, agriculture etc.

Time series and forecasting (moving and semi-averages), Statistical quality control methods, Control charts, , R, p, np, and c charts.

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MODULE-III

Numerical Techniques-I: Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation , Lagrange's and Newton's divided difference formula for unequal intervals.

Numerical Techniques-II: Solution of system of linear equations, Gauss- Seidal method, Crout method. Numerical differentiation, Numerical integration , Trapezoidal , Simpson's one third and three-eight rules, Solution of ordinary differential (first order, second order and simultaneous) equations by Euler's, Picard's and forth-order Runge- Kutta methods.

Text Books:

1. Jain, Iyenger& Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi , 2003.

2. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.

3. E. Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.

4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.

5. Devi Prasad, An introduction to Numerical Analysis, Narosa Publication house, New Delhi 2006.

6. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House, 2002.

Reference Books :

1. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd., 2000

2. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning

COURSE OUTCOMES:

CO1	Apply the Set theory and Relation concepts
CO2	Apply the Functions and define the recursive functions.
CO3	Apply Laplace transform to different applications
CO4	Apply Inverse Laplace transform to different applications.
CO5	Identify the permutations and combinations.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1.98	2.96	0.99	0.99	0.99	0.99	0.99	1.98	0.99	0.99	0.99	0.99
CO2	0.97	0.97	0.97	1.94	1.94	1.94	0.97	0.97	1.94	1.94	0.97	0.97
CO3	1.83	0.91	0.91	1.83	1.83	1.83	2.74	1.83	0.91	0.91	1.83	0.91
CO4	0.98	1.48	1.48	1.48	0.49	0.98	0.98	0.49	0.98	0.98	0.49	0.98
CO5	1.52	0.76	1.52	0.76	2.28	1.52	0.76	1.52	0.76	0.76	0.76	0.76
avarage	1.46	1.42	1.17	1.40	1.51	1.45	1.29	1.36	1.12	1.12	1.11	0.92
percentage	82%	49%	55%	38%	82%	38%	33%	33%	33%	50%	27%	27%

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BCS-301	Data Structures	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	Introduce the concept of data structures through ADT including List, Stack, Queues
CO2	To understand various data structures and operation performed on them and the concepts of algorithm writing and efficiency analysis .
CO3	To design and implement various data structure algorithms.
CO4	Able to analyze algorithms and determine their time complexity
CO5	To introduce various techniques for representation of the data in the real world.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	2	1	1	1	1	1
CO-2	3	1	2	2	3	1	2	1	3	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	2	2
CO-4	3	2	2	1	3	2	2	1	1	2	1	1
CO-5	3	1	1	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Time and space complexity of algorithms. Asymptotic notations, Abstract data types.

Elementary data structures: Arrays, ordered lists, representation of arrays, singly linked lists, doubly linked lists, stacks, queues, deques, generalized lists, polynomial arithmetic, sparse matrices, equivalence relations, infix, postfix and prefix arithmetic expression conversion and evaluations, recursion, tower of Hanoi problem, Garbage collection and compaction.

MODULE-II

Graphs: Representation, traversal, connected components, spanning trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm, shortest path and transitive closure, topological sort, activity network.

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Trees: Binary trees, traversal, threaded binary tree, set representation and operations, decision tree, B-Tree, Huffman coding.

MODULE-III

Searching : Sequential search, Binary Search, Comparison and Analysis

Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort..

Hashing: Hash Function, Collision Resolution Strategies

Text books and References:

1. Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication
3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill
4. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education
5. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
6. G A V Pai, "Data Structures and Algorithms", TMH

COURSE OUTCOMES:

CO1	Able to define the concepts of data structure, data type and study different types of data structures such as array, stack , queues, linked list, trees and graph.
CO2	Able to understand various data structures and operation performed on them and the concepts of algorithm writing and efficiency analysis .
CO3	Able apply and implement various data structure such as stacks, queues, trees and graphs to solve various computing problems using algorithms and C-programming language.
CO4	Able to analyze algorithms and determine their time complexity
CO5	Able differentiate the various data structures on the basis of efficiency of different operations being performed.

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Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.37	2.37	1.58	0.79	2.37	1.58	1.58	0.79	0.79	0.79	0.79	0.79
CO2	2.44	0.81	1.63	1.63	2.44	0.81	1.63	0.81	2.44	1.63	0.81	0.81
CO3	2.35	0.78	1.57	1.57	2.35	1.57	1.57	1.57	0.78	1.57	1.57	1.57
CO4	2.63	1.76	1.76	0.88	2.63	1.76	1.76	0.88	0.88	1.76	0.88	0.88
CO5	2.57	0.86	0.86	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average of CO	2.47	1.32	1.48	1.14	2.47	1.31	1.48	0.98	1.15	1.49	0.98	0.98
Percentage Of AVG CO	82%	44%	49%	38%	82%	44%	49%	33%	38%	50%	33%	33%

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BCS-302	Discrete Structures	L T P 3 1 0	4 Credits

Pre-requisites: High school Mathematics

Course Objectives:

CO1	To develop logical thinking and its application to computer science (to emphasize the importance of proving statements correctly.
CO2	To Have substantial experience to comprehend formal logical arguments.
CO3	To express mathematical properties formally via the formal language of propositional logic and predicate logic.
CO4	To understand basic mathematical objects such as sets, functions, and relations and will also be able to verify simple mathematical properties that these objects possess.
CO5	The subject enhances one's ability to reason and ability to present a coherent and mathematically accurate argument.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	3	2	1	1	1	1	1
CO-2	3	2	1	2	3	1	1	1	2	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	2	1	1	2	1	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Set Theory: Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets.**Relations:** Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations.

Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.Natural Numbers: Introduction, Mathematical Induction, Proof Methods,Proof by contradiction.**Algebraic Structures:** Definition, Groups, Subgroups and order, Cyclic Groups, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields.

MODULE-II

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Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram. **Lattices:** Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice. **Boolean Algebra:** Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.

Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference.

Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.

MODULE-III

Trees : Definition, Binary tree, Binary tree traversal, Binary search tree. **Graphs:** Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring, Recurrence Relation, Method of solving recurrences.

Text Books:-

1. Koshy, Discrete Structures, Elsevier Pub. 2008

Reference Book:-

1. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 6/e, McGraw-Hill, 2006.

2.B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, 5/e,PrenticeHall, 2004.

3. E.R. Scheinerman, Mathematics: A Discrete Introduction, Brooks/Cole, 2000.

4. R.P. Grimaldi, Discrete and Combinatorial Mathematics, 5/e, Addison Wesley, 2004.

5. Jean Paul Trembley, R Manohar, Discrete Mathematical Structures with Application to Computer Science, McGraw-Hill, Inc. New York, NY, 1975.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Be able to construct simple mathematical proofs and possess the ability to verify them.
CO2	Have substantial experience to comprehend formal logical arguments.
CO3	Be skillful in expressing mathematical properties formally via the formal language of propositional logic and predicate logic.
CO4	Be able to specify and manipulate basic mathematical objects such as sets, functions and relations and will also be able to verify simple mathematical properties that these objects possess.
CO5	Gain experience in using various techniques of mathematical induction (weak, strong and structural induction) to prove simple mathematical properties of a variety of discrete structures.

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Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.37	2.37	1.58	0.79	2.37	2.37	1.58	0.79	0.79	0.79	0.79	0.79
CO2	2.44	1.63	0.81	1.63	2.44	0.81	0.81	0.81	1.63	1.63	0.81	0.81
CO3	2.35	0.78	1.57	1.57	2.35	1.57	1.57	1.57	0.78	1.57	0.78	0.78
CO4	2.63	1.76	1.76	0.88	2.63	0.88	1.76	0.88	0.88	1.76	0.88	0.88
CO5	2.57	0.86	1.72	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average of CO	2.47	1.48	1.49	1.14	2.47	1.30	1.31	0.98	0.99	1.49	0.82	0.82
Percentage of Avg CO	82%	49%	50%	38%	82%	43%	44%	33%	33%	50%	27%	27%

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BCS-303	Digital Logic Design	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	Understand the concepts of various components.
CO2	Understand concepts that underpin the disciplines of analog and digital electronic logic circuits.
CO3	Understand various Number systems and Boolean algebra, the Boolean expression using Boolean algebra and design it using logic gates.
CO4	Understand Design and implementation of combinational circuits
CO5	Understand Design and develop sequential circuits.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	2	1	1	1	1	1
CO-2	3	2	2	2	3	1	1	1	2	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	1	1	1	2	1	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Digital system and binary numbers: Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes. Floating point representation Gate-level minimization: The map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method).

MODULE-II

Combinational Logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers

Synchronous Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure. Registers and counters: Shift registers, ripple counter, synchronous counter, other counters.

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MODULE-III

Memory and programmable logic: RAM, ROM, PLA, PAL.
Design at the register transfer level: ASMs, design example, design with multiplexers.
Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race free state assignment, hazards.

Text Book:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education

Reference Books :

1. Introduction to Digital Logic Design, JP Hayes, PHI.

2. The Art of Digital Design: An Introduction to Top-Down Design, Franklin P. Prosser, PHI.

COURSE OUTCOMES:

CO1	Understand the concepts of various components to design stable analog circuits.
CO2	Represent numbers and perform arithmetic operations.
CO3	Minimize the Boolean expression using Boolean algebra and design it using logic gates.
CO4	Analyze and design combinational circuit.
CO5	Design and develop sequential circuits.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.37	2.37	1.58	0.79	2.37	1.58	1.58	0.79	0.79	0.79	0.79	0.79
CO2	2.44	1.63	1.63	1.63	2.44	0.81	0.81	0.81	1.63	1.63	0.81	0.81
CO3	2.35	0.78	1.57	1.57	2.35	1.57	1.57	1.57	0.78	1.57	0.78	0.78
CO4	2.63	1.76	1.76	0.88	2.63	0.88	0.88	0.88	0.88	1.76	0.88	0.88
CO5	2.57	0.86	1.72	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average CO	2.47	1.48	1.65	1.14	2.47	1.14	1.14	0.98	0.99	1.49	0.82	0.82
Percentage OF Avg CO	82%	49%	55%	38%	82%	38%	33%	33%	33%	50%	27%	27%

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BCS-304	IT Infrastructure and its Management	L T P 3 1 0	4 Credits

Pre-requisites: None

CO1	To understand underlying principles of IT infrastructure and management services.
CO2	To undersatnd IT systems, service delivery and service support process for providing a quality service.
CO3	To understand the basics of storage management
CO4	To study policies for security management and mitigate security related risks in the organization
CO5	To understand the IT and cyber ethics and study cyber forensics law and cyber crimes.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	3	0	1	1	0	2	0	1
CO-2	3	0	2	0	2	2	1	0	0	0	3	1
CO-3	3	0	2	0	3	0	2	3	0	0	0	1
CO-4	3	0	2	0	2	0	1	1	0	2	0	1
CO-5	3	0	2	0	3	1	1	0	0	0	2	1

Detailed Syllabus

MODULE-I

INTRODUCTION: Information Technology, Computer Hardware, Computer Software, Network and Internet, Computing Resources,
IT INFRASTRUCTURE: Design Issues, Requirements, IT System Management Process, Service Management Process, Information System Design, IT Infrastructure Library
SERVICE DELIVERY PROCESS: Service Delivery Process, Service Level Management, Financial Management, Service Management, Capacity Management, Availability Management

MODULE-II

SERVICE SUPPORT PROCESS: Service Support Process, Configuration Management, Incident Management, Problem Management, Change Management, Release Management

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STORAGE MANAGEMENT: Backup & Storage, Archive & Retrieve, Disaster Recovery, Space Management, Database & Application Protection, Bare Machine Recovery, Data Retention

MODULE-III

SECURITY MANAGEMENT: Security, Computer and internet Security, Physical Security, Identity Management, Access Management. Intrusion Detection, Security Information Management

IT ETHICS: Introduction to Cyber Ethics, Intellectual Property, Privacy and Law, Computer Forensics, Ethics and Internet, Cyber Crimes

EMERGING TRENDS in IT: Electronics Commerce, Electronic Data Interchange, GSM, Bluetooth, Infrared.

Text Book:

Phalguni Gupta, Surya Prakash, UmaraniJayaraman, IT Infrastructure and its Management, Tata Mcgraw Hill, Publication

COURSE OUTCOMES:

CO1	To describe basic IT infrastructure, storage management, security measures, cyber ethics, computer forensics, cyber laws and electronic commerce.
CO2	To summarize the design requirements for IT systems, service delivery and service support process for providing a quality service.
CO3	To relate various service delivery and service support process for development of a quality product.
CO4	To focus on various storage and security schemes to provide availability and safety of IT system.
CO5	To test the data collected at any cyber crime scene and organize it to find out the sequence of events responsible for present situation using computer forensic schemes.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.63	2.63	1.75	1.75	2.63	0.00	0.88	0.88	0.00	1.75	0.00	0.88
CO2	2.42	0.00	1.61	0.00	1.61	1.61	0.81	0.00	0.00	0.00	2.42	0.81
CO3	2.37	0.00	1.58	0.00	2.37	0.00	1.58	2.37	0.00	0.00	0.00	0.79
CO4	2.36	0.00	1.57	0.00	1.57	0.00	0.79	0.79	0.00	1.57	0.00	0.79
CO5	2.47	0.00	1.65	0.00	2.47	0.82	0.82	0.00	0.00	0.00	1.65	0.82
Average CO	2.45	2.63	1.63	1.75	2.13	1.22	0.97	1.34	0.00	1.66	2.04	0.82
Average CO %	82%	88%	54%	58%	71%	41%	32%	45%	0%	55%	68%	27%

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STUDY AND EVALUATION SCHEME

B.Tech. in Computer Science and Engineering
YEAR III, SEMESTER V

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME					SUBJECT TOTAL	Credit
						SESSIONAL EXAM.				END SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BCS-501	Theory of Computation	3	1	0	20	10		30	70	100	4
2	BCS-502	Data Base Management System	3	1	0	20	10		30	70	100	4
3	BCS-503	Java Programming	3	1	0	20	10		30	70	100	4
4	BCS-504	Software Engineering	3	1	0	20	10		30	70	100	4
5	BCS-051-054	CS Elective-I	3	1	0	20	10		30	70	100	4
6	BOE-501-504	Open Elective-1	2	1	0	10	5		15	35	50	2
PRACTICALS AND PROJECTS												
7	BCS- 552	DBMS Lab	0	0	2	-	-		10	15	25	1
8	BCS-553	Java Programming Lab	0	0	2	-	-		10	15	25	1
9	BCS-554	Software Engineering Lab	0	0	2	-	-		10	15	25	1
10	GP-501	General Proficiency	-	-	-	-	-		50	-	50	1
		TOTAL	17	6	6				245	430	675	26

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BCS-501	THEORY OF COMPUTATION	L T P 3 1 0	4Credits

Pre-requisites: Basics of Discrete Mathematics- Sets and Relations,

Course Objectives:

CO1	To learn fundamentals of Regular and Context Free Grammars and Languages
CO2	To understand the relation between Regular Language and Finite Automata and machines.
CO3	To learn how to design Automata's and machines as Acceptors, Verifiers and Translators.
CO4	To understand the relation between Contexts free Languages, PDA and TM.
CO5	To learn how to design PDA as acceptor and TM as Calculators.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	3	1	1	1	2	2	3	1	0	1
CO-2	3	3	0	0	2	0	1	1	0	0	0	0
CO-3	2	2	1	2	3	1	2	2	2	1	1	1
CO-4	3	0	2	0	1	0	1	0	0	0	0	1
CO-5	2	1	3	0	3	0	1	1	1	0	1	0

Detailed Syllabus

MODULE-I

Finite Automata and Regular Expressions: Finite State Systems, Basic Definitions NonDeterministic finite automata (NDFA), Deterministic finite automata (DFA), Equivalence of DFA and NDFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa, Arden's Theorem. Introduction to Machines: Concept of basic Machine, Properties and limitations of FSM.Moore and mealy Machines, Equivalence of Moore and Mealy machines.

MODULE-II

Properties of Regular Sets: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm. Grammars: Definition, Context

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free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

MODULE-III

Pushdown Automata: Introduction to Pushdown Machines, Acceptance of PDA, PDA to CFG and CFG to PDA, Application of Pushdown Machines Turing Machines: Deterministic and Non-Deterministic Turing Machines, Design of T.M,Halting problem of T.M., PCP Problem. Chomsky Hierarchies: Chomsky hierarchies of grammars, unrestricted grammars, Context sensitive languages, Relation between languages of classes. Computability: Basic concepts, Primitive Recursive Functions.

Text Book:

1. Introduction to automata theory, language & computations- Hopcroaft&O.D.Ullman, R Mothwani, 2001, Addison Wesley

Reference Books:

1. Theory of Computer Science (Automata, Languages and computation): K.L.P.Mishra & N.Chandrasekaran, 2000, PHI.

2. Introduction to formal Languages & Automata-Peter Linz, 2001, Narosa.

CO1	Students will be able to define the mathematical principles behind theoretical computer science.
CO2	Students will be able to identify the different computational problems and their associated complexity.
CO3	Students will be able to differentiate and give examples for the different types of automata like finite automata, push down automata, linear bounded automata and Turing machine.
CO4	To apply the techniques of designing grammars and recognizers for several programming languages.
CO5	Students will be able to correlate the different types of automata to real world applications.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	1.00	3.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00	0.00	1.00
CO2	3.00	3.00	0.00	0.00	2.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00
CO3	2.00	2.00	1.00	2.00	3.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
CO4	1.50	0.00	1.00	0.00	0.50	0.00	0.50	0.00	0.00	0.00	0.00	0.50
CO5	1.33	0.67	2.00	0.00	2.00	0.00	0.67	0.67	0.67	0.00	0.67	0.00
Average CO	1.97	1.67	1.75	1.50	1.70	1.00	1.23	1.42	1.89	1.00	0.83	0.83
Percentage of Average CO %	66%	56%	58%	50%	57%	33%	41%	47%	63%	33%	28%	28%

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BCS-502	DATA BASE MANAGEMENT SYSTEMS	L T P 3 1 0	4Credits

Pre-requisites: None

Course Objectives:

CO1	To describe a sound introduction to the discipline of database management systems.
CO2	To give a good formal foundation on the relational model of data and usage of Relational Algebra.
CO3	To introduce the concepts of basic SQL as a universal Database language.
CO4	To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.
CO5	To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	3	1	1	1	2	2	3	1	0	1
CO-2	3	3	0	0	2	0	1	1	0	0	0	0
CO-3	2	2	1	2	3	1	2	2	2	1	1	1
CO-4	3	0	2	0	1	0	1	0	0	0	0	1
CO-5	2	1	3	0	3	0	1	1	1	0	1	0

Detailed Syllabus

MODULE-I

Introduction: An overview of database management system, database system Vs file system, Database system concept and architecture, data model schema and instances, data independence and database language and interfaces, data definitions language, DML, Overall Database Structure.

Data Modeling:

ER Data model, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationship of higher degree.

Relational data model concepts, integrity constraints, entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

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MODULE-II

ntroduction on SQL: Characteristics of SQL, advantage of SQL. SQl data type and literals, Types of SQL commands, SQL operators, Tables, views and indexes, Insert, update and delete operations, Queries and sub queries Aggregate functions, Joins, Unions, Intersection, Minus, Cursors, Triggers.

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

MODULE-III

Transaction Processing Concept: Transaction system, Testing of serializability, serializability of schedules, Types of serializability, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Concurrency Control Techniques: Concurrency control, Locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction, case study of Oracle.

Text Books:-

1. Date C J, " An Introduction to Database Systems", Addision Wesley
2. Korth, Silbertz, Sudarshan," Database Concepts", McGraw Hill

Reference Books:-

1. Elmasri, Navathe, " Fudamentals of Database Systems", Addision Wesley
2. O'Neil, Databases, Elsevier Pub.
3. Leon &Leon,"Database Management Systems", Vikas Publishing House
4. Bipin C. Desai, " An Introduction to Database Systems", Gagotia Publications
5. Majumdar& Bhattacharya, "Database Management System", TMH

Course Outcomes: After the completion of the course the student will be able to:

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CO1	Understand the role of a database management system in an Organization.
CO2	Understand basic database concepts, including the structure andOperation of the relational data model.
CO3	. Construct simple and moderately advanced database queries usingStructured Query Language (SQL).
CO4	Understand and successfully apply logical database design Principles, including E-R diagrams and database normalization.
CO5	Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	1.00	3.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00	0.00	1.00
CO2	3.00	3.00	0.00	0.00	2.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00
CO3	2.00	2.00	1.00	2.00	3.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
CO4	1.00	0.00	0.67	0.00	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.33
CO5	2.00	1.00	3.00	0.00	3.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00
Avg of CO	2.00	1.75	1.92	1.50	1.87	1.00	1.27	1.50	2.00	1.00	1.00	0.78
AVg percentage Of CO	67%	58%	64%	50%	62%	33%	42%	50%	67%	33%	33%	26%

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BCS-503	JAVA PROGRAMMING	L T P 3 1 0	4 credits

Pre-requisites: Computer Fundamentals & Principle of Computer Programming, Programming Concepts of C and C++

Course Objectives:

CO1	To understand object-oriented concepts
CO2	To learn the basic concept of JAVA language.
CO3	To learn how to design GUI applications.
CO4	To understand the concept of JDBC
CO5	To learn to build applications in JAVA language

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	2	3	1	1	1	0	0	0	1
CO-2	3	2	2	0	2	2	1	0	1	1	2	1
CO-3	3	0	2	0	3	1	0	2	0	0	0	1
CO-4	3	2	3	3	3	0	1	1	0	2	1	1
CO-5	3	2	2	0	3	1	0	0	0	3	3	1

Detailed Syllabus

MODULE-I

The Java Language: History and evolution of Java, Java's Lineage, The Creation of Java, Java's Magic Code; The Byte Code, The Java's Class File Format, The java's Buzzwords,The Evolution of Java. Object Orientation concepts; Class, Object and its significance. Environment variable. Data Types, Variables and Array: Strongly typed Language, Primitive type, Non Primitive type, Wrapper classes, Scope & lifetime of the variables, Type Conversion and casting, Automatic Type promotions, Operators: Arithmetic operator, The Bitwise operator, Relational operator, Assignment operator, The ? Operator, Operator precedence. Control Statements: Selection Statement, Iteration Statement, Jump Statement. **Introducing classes:** Class Fundamentals, Object & Object reference ,Object Life time & Garbage Collection, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods, Nested , Inner Class &Anonymous Classes, Abstract Class & Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, Dealing with Static Members, Mark and sweep principle (Garbage collection) , Finalize() Method, Native Method. Use of "this "reference, Use of Modifiers with Classes & Methods, Command line arguments. **Inheritance:** Use and Benefits of

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Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods. Role of Constructors. Overloading concept & Overriding Super Class Methods.Use of "super".Polymorphism in inheritance. Type Compatibility and Conversion Implementing interfaces. **Package:** Organizing Classes and Interfaces in Packages. Package as Access Protection Defining Package CLASSPATH Setting for Packages. Making JAR Files for Library Packages Import and Static Import Naming Convention For Packages **Exception Handling:** The Idea behind Exception ,Exceptions & Errors Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, Inbuilt and User Defined Exceptions, Checked and Un-Checked Exceptions, **Thread:** Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads.

Module II

Array &String : Defining an Array, Initializing & Accessing Array, Multi–Dimensional Array, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String Tokenizing a String, Creating Strings using StringBuffer. **Java Utilities (java.util Package) Java IO:** Streams and the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel Serializing **Applet:** Applet & Application, Applet Architecture, Parameters to Applet, Embedding Applets in Web page, Applet Security Policies. **Event Handling:** Event-Driven Programming in Java, EventHandling Process, Event-Handling Mechanism, The Delegation Model of Event Handling, Event Classes, Event Sources, Event Listeners, Adapter Classes as Helper Classes in Event Handling, Anonymous Inner classes a Short –cut to Event Handling, Avoiding Deadlocks in GUI Code, Event Types &Classes. **GUI Programming (Java AWT):** Components and Containers: Basics of Components, Using Containers, Layout Managers, AWT Components, Adding a Menu to Window, Extending GUI Features Using Swing Components.

MODULE-III

Software development using Java: JavaBeans: What is Java Bean, Advantages of Bean, Introspection, Persistence, the Java Bean API, A Bean Example, Jar file specification, Introducing Swings: The Origin of swings, swings is built on AWT, Two swings key features, Swings package & event Handling. Database Programming using JDBC: Introduction to JDBC, JDBC Drivers & Architecture Servlets: Architecture of Servlets Technology, Life Cycle of Servlets, Javax.Servlet package.

Text Book:

1. Herbert Schieldt, "The Complete Reference: Java" Seventh Edition, TMH.

Reference

Books:

1. Herbert Schieldt" Java Programming Cook Book" McGraw Hill.

2. Core Java™ 2 Volume I - Fundamentals, Seventh Edition Prentice Hall PTR

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3. Core Java™ 2 Volume II - Fundamentals, Seventh Edition Prentice Hall PTR

CO1	Design the process of interaction between Objects and System w.r.t. Object Oriented Paradigm.
CO2	Acquire a basic knowledge of Object Orientation with different properties as well as different features of Java, threads
CO3	Analyze basic programming concepts in Java with different object related issues and various string handling functions as well as basic I/O operations
CO4	Discuss basic Code Reusability concept w.r.t. Inheritance, Package and Interface
CO5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1.56	1.56	1.56	1.04	1.56	0.52	0.52	0.52	0.00	0.00	0.00	0.52
CO2	1.72	1.15	1.15	0.00	1.15	1.15	0.57	0.00	0.57	0.57	1.15	0.57
CO3	1.73	0.00	1.15	0.00	1.73	0.58	0.00	1.15	0.00	0.00	0.00	0.58
CO4	2.21	1.47	2.21	2.21	2.21	0.00	0.74	0.74	0.00	1.47	0.74	0.74
CO5	2.28	1.52	1.52	0.00	2.28	0.76	0.00	0.00	0.00	2.28	2.28	0.76
Avg of CO	1.90	1.43	1.52	1.63	1.79	0.75	0.61	0.80	0.57	1.44	1.39	0.63
Avg Per of CO	63%	48%	51%	54%	60%	25%	20%	27%	19%	48%	46%	21%

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BCS-504	SOFTWARE ENGINEERING	L T P 3 1 0	4Credits

Pre-requisites: Basic computer knowledge

Course Objectives:

CO1	to apply engineering and computer science concepts in the development and maintenance of reliable, usable, and dependable software
CO2	To understand the nature of software development and software life cycle process models, agile software development.
CO3	To learn concepts and principles in parallel with the software development life cycle.
CO4	To know basics of testing and understanding concept of software quality assurance and software configuration management process.
CO5	To understand project scheduling concept and risk management associated to various type of projects.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	1	2	2	3	2	2
CO2	2	3	2	3	2	1	2	1	2	3	3	2
CO3	3	2	2	2	3	1	3	2	1	1	2	2
CO4	3	2	3	3	1	3	1	2	3	2	2	1
CO5	2	2	2	1	2	2	3	3	1	0	1	2

Detailed Syllabus

MODULE-I

Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, and Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Model. Software Requirement Specifications (SRS) Requirement Engineering Process: Elicitation, Analysis, Documentation and Review, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards

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for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

MODULE-II

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design:

Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion

Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and

Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, cyclomatic Complexity Measures: Control Flow Graphs.

Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and BottomUp Testing Strategies: Test Drivers and Test Stubs, White Box Testing, Black Box Testing, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

MODULE-III

Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Paraeters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

Text Books:-

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1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

Reference Books:-

1. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
2. PankajJalote, Software Engineering, Wiley
3. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.

Course Outcomes: After the completion of the course the student will be able to:

CO1	To understand basic concept of software engineering, different phases to make a software & study them in detail, project management concepts & their metrics, design models & its principles
CO2	Discuss requirement engineering and its models (Information, functional, behavioural), different testing techniques for different projects
CO3	Implement Software life cycle models
CO4	Compare different types of models
CO5	Calculation of staffing for a particular project, its cost & schedule

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.66	2.66	1.77	1.77	2.66	1.77	0.89	1.77	1.77	2.66	1.77	1.77
CO2	1.70	2.56	1.70	2.56	1.70	0.85	1.70	0.85	1.70	2.56	2.56	1.70
CO3	2.64	1.76	1.76	1.76	2.64	0.88	2.64	1.76	0.88	0.88	1.76	1.76
CO4	2.67	1.78	2.67	2.67	0.89	2.67	0.89	1.78	2.67	1.78	1.78	0.89
CO5	1.66	1.66	1.66	0.83	1.66	1.66	2.49	2.49	0.83	0.00	0.83	1.66
Average CO	2.27	2.08	1.91	1.92	1.91	1.57	1.72	1.73	1.57	1.97	1.74	1.56
Average CO%	76%	69%	64%	64%	64%	52%	57%	58%	52%	66%	58%	52%

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BOE-501	Total Quality Management	L T P 2 1 0	2 Credits

Pre-requisites: None

Course Objectives:

CO1	Aware about the total quality management concept.
CO2	Control Quality in the critical activities of an organization by bringing together resources, equipment, people and procedures.
CO3	Learn to construction and analysis of R charts
CO4	Learn to construction and analysis of C charts.
CO5	To calculate reliability, building reliability in the product

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	1	1	1	1	1	1
CO-2	3	2	2	2	3	1	1	1	2	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	1	1	1	0	1	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE 1

Quality Concepts:
Evolution of Quality Control, concept change, TQM Modern concept, Quality concept in design, Review of design, Evolution of proto type.

Control on Purchased Product
Procurement of various products, evaluation of supplies, capacity verification, Development of sources, procurement procedure.

Manufacturing Quality
Methods and techniques for manufacture, inspection and control of product, quality in sales and services, guarantee, analysis of claims.

MODUEL II

Quality Management
Organization structure and design, quality function, decentralization, designing and fitting, organization for different type products and company, economics of quality value and contribution, quality cost, optimizing quality cost, seduction program.

Control Charts
Theory of control charts, measurement range, construction and analysis of R charts, process capability study, use of control charts.

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Attributes of Control Chart
Defects, construction and analysis of charts, improvement by control chart, variable sample size, construction and analysis of C charts.

MODUEL III

Defects diagnosis and prevention defect study, identification and analysis of defects, correcting measure, factors affecting reliability, MTTF, calculation of reliability, building reliability in the product, evaluation of reliability, interpretation of test results, reliability control, maintainability, zero defects, quality circle. ,ISO-9000 and its concept of Quality Management,ISO 9000 series, Taguchi method, JIT in some details. 7

Text Books:

1. *Lt. Gen. H. Lal, "Total Quality Management", Eastern Limited, 1990.*
2. *Greg Bounds, "Beyond Total Quality Management", McGraw Hill, 1994.*
3. *Menon, H.G, "TQM in New Product manufacturing", McGraw Hill 1992.*

Course Outcomes: After the completion of the course the student will be able to:

CO1	To realize the importance of significance of quality
CO2	Manage quality improvement teams
CO3	Identify requirements of quality improvement programs
CO4	To have exposure to challenges in Quality Improvement Programs
CO5	To have a good understanding of the concept of Quality

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.45	2.45	1.63	0.82	2.45	1.63	0.82	0.82	0.82	0.82	0.82	0.82
CO2	2.08	1.39	1.39	1.39	2.08	0.69	0.69	0.69	1.39	1.39	0.69	0.69
CO3	2.54	0.85	1.69	1.69	2.54	1.69	1.69	1.69	0.85	1.69	0.85	0.85
CO4	2.72	1.81	1.81	0.91	2.72	0.91	0.91	0.91	0.91	0.00	0.91	0.91
CO5	2.76	0.92	1.84	0.92	2.76	0.92	0.92	0.92	0.92	1.84	0.92	0.92
Average CO	2.51	1.48	1.67	1.14	2.51	1.17	1.01	1.01	0.98	1.43	0.84	0.84
Percentage Of Avg CO	84%	49%	56%	38%	84%	39%	34%	34%	33%	48%	28%	28%

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BCS-051	Principles of Programming Language	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To introduce the major programming paradigms, and the principles and techniques involved in design and implementation of modern programming languages
CO2	To introduce notations to describe syntax and semantics of programming languages.
CO3	To analyze and explain behavior of simple programs in imperative languages using concepts such as binding, scope, control structures, subprograms and parameter passing mechanisms.
CO4	To introduce the concepts of ADT and object oriented programming for large scale software development.
CO5	To introduce the concepts of concurrency control and exception handling

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	0	3	0	1	0	0	0	0	0
CO-2	3	0	2	0	2	0	1	0	0	0	0	0
CO-3	2	0	2	0	3	1	0	0	1	0	0	0
CO-4	2	3	2	1	2	1	0	0	0	1	0	0
CO-5	3	0	2	1	3	0	1	0	0	0	1	1

Detailed Syllabus

MODULE-I

Introduction: Evolution of language designs, Evaluation criteria, Programming environments, Issues in language translation- Syntactic and semantic rules of a Programming language, Stages in Translation. Characteristics of a good programming language, Programming language translators- compiler & interpreters. Programming Languages: Introduction to Procedural, non-procedural, structured, functional and object oriented programming language, Comparison of C & C++ programming languages.

MODULE-II

Data Type: Declarations, Assignment & initialization, Elementary data types- integer, floating point and fixed point real numbers, character, Boolean, Other numeric data types. Character string, User defined- Enumeration and subrange, Array- one and two dimensional,

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Records- multilevel and variant, Pointer and reference types. Names, Variables, Concept of binding and types, Type checking, Strong typing, Type compatibility, sequence control with expressions, Conditional statements, Loops.

MODULE-III

Subprograms: Fundamental of subprograms, Scope and life time of variable, Static and dynamic scope, Design issues of subprogram, Local referencing environment, Parameter passing methods, Overloaded subprograms, Generic subprograms, Coroutines. Abstract data types- Abstraction and encapsulation

Text Books:

1. Programming languages Design & implementation by T.W.Pratt, 1996, PHI.
2. Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH.

Reference Books :

1. Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia Publications
2. Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.
3. Programming Languages–Principles and Pradigms Allen Tucker , Robert Noonan 2002, T.M.H

Course Outcomes: After the completion of the course the student will be able to:

CO1	Knowledge of, and ability to use, language features used in current programming languages.
CO2	Aware about the basics concept of programming language
CO3	An ability to program in different language paradigms and evaluate their relative benefits.
CO4	An understanding of the key concepts in the implementation of common features of programming languages
CO5	Understand the basics concept of object oriented programming

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.89	2.89	1.92	0.00	2.89	0.00	0.96	0.00	0.00	0.00	0.00	0.00
CO2	2.80	0.00	1.86	0.00	1.86	0.00	0.93	0.00	0.00	0.00	0.00	0.00
CO3	1.85	0.00	1.85	0.00	2.77	0.92	0.00	0.00	0.92	0.00	0.00	0.00
CO4	1.77	2.66	1.77	0.89	1.77	0.89	0.00	0.00	0.00	0.89	0.00	0.00
CO5	2.82	0.00	1.88	0.94	2.82	0.00	0.94	0.00	0.00	0.00	0.94	0.94
Average CO	2.42	2.77	1.86	0.91	2.42	0.91	0.94	0.00	0.92	0.89	0.94	0.94
Average CO %	81%	92%	62%	30%	81%	30%	31%	0%	31%	30%	31%	31%

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BCS-053	Multimedia Systems	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To learn and understand technical aspect of Multimedia Systems.
CO2	To understand the standards available for different audio, video and text applications
CO3	To Design and develop various Multimedia Systems applicable in real time.
CO4	To learn various multimedia authoring systems
CO5	To understand various networking aspects used for multimedia applications.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	2	3	1	1	1	0	0	0	1
CO-2	3	2	2	0	2	2	1	0	1	1	3	1
CO-3	3	0	2	0	3	1	0	2	0	0	0	1
CO-4	3	2	3	3	3	0	1	1	0	2	1	1
CO-5	3	2	2	0	3	1	0	0	0	3	2	1

Detailed Syllabus

MODULE I

Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products Stages of Multimedia Projects, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.

MODULE II

Data Compression Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher, Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

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MODULE III

Speech Compression & Synthesis Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression. Images Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services.

Text Books:

1. *Tay Vaughan "Multimedia, Making IT Work" Osborne McGraw Hill.*
2. *Buford "Multimedia Systems" Addison Wesley.*
3. *Agrawal & Tiwari "Multimedia Systems" Excel.*
4. *Mark Nelson "Data Compression Book" BPB.*
5. *David Hillman "Multimedia technology and Applications" Galgotia Publications.*
6. *Rosch "Multimedia Bible" Sams Publishing.*
7. *Sleinreitz "Multimedia System" Addison Wesley.*

8. *James E Skuman "Multimedia in Action" Vikas.*

Course Outcomes: After the completion of the course the student will be able to:

CO1	Developed understanding of technical aspect of Multimedia Systems.
CO2	Understand various file formats for audio, video and text media.
CO3	Develop various Multimedia Systems applicable in real time.
CO4	Design interactive multimedia software.
CO5	Apply various networking protocols for multimedia applications.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.78	2.78	2.78	1.85	2.78	0.93	0.93	0.93	0.00	0.00	0.00	0.93
CO2	2.56	1.70	1.70	0.00	1.70	1.70	0.85	0.00	0.85	0.85	2.56	0.85
CO3	2.74	0.00	1.83	0.00	2.74	0.91	0.00	1.83	0.00	0.00	0.00	0.91
CO4	2.70	1.80	2.70	2.70	2.70	0.00	0.90	0.90	0.00	1.80	0.90	0.90
CO5	2.70	1.80	1.80	0.00	2.70	0.90	0.00	0.00	0.00	2.70	1.80	0.90
Average CO	2.70	2.02	2.16	2.28	2.53	1.11	0.89	1.22	0.85	1.79	1.75	0.90
Percentage of avg CO	90%	67%	72%	76%	84%	37%	30%	41%	28%	60%	58%	30%

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STUDY AND EVALUATION SCHEME

B.Tech. in Computer Science and Engineering
YEAR IV, SEMESTER VII

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME					SUBJECT TOTAL	Credit
						SESSIONAL EXAM.				END SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BCS-701	Advanced Computer Architecture	3	1	0	20	10		30	70	100	4
2	BCS-702	Artificial Intelligence and Expert Systems	3	1	0	20	10		30	70	100	4
3	BCS-703	Data Warehouse and Data Mining	3	1	0	20	10		30	70	100	4
4	BCS-704	Distributed Systems	3	1	0	20	10		30	70	100	4
5		CS Elective-IV	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BCS-751	Industrial Training Viva-Voce	0	0	2	-	-		25		25	1
8	BCS-752	Artificial Intelligence Lab	0	0	2	-	-		10	15	25	1
9	BCS-753	Project	0	0	4	-	-		25	25	50	2
10	BCS-754	Seminar	0	0	2	-	-		25	-	25	1
11	GP-701	General Proficiency	-	-	-	-	-		25	-	25	1
		TOTAL	17	6	6				260	390	650	26

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BCS-701	Advanced Computer Architecture	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To make students know about the Parallelism concepts
CO2	To give the students an elaborate idea about the high-performance memory systems
CO3	To introduce the advanced processor architectures to the students
CO4	To make the students know about the importance of multiprocessor and multi computers and different programming models
CO5	To study and develop pipelining concepts, performance and speedup calculations and pipeline design

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	1	1	1	1	1	1
CO-2	3	2	2	2	3	1	1	1	2	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	1	1	1	1	1	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Introduction and performance :Evolution of computer Architecture, Architectural classification schemes and parallel computing models, conditions of parallelism, program flow mechanisms, performance evaluation and speedup performance laws, RISC and CISC processors, VLIW architecture

MODULE-II

Pipelining : Instruction level parallelism, principles of linear and nonlinear pipelining Techniques, Hazards, Instruction and arithmetic pipeline design, super scalar and super pipeline design.

Memory hierarchy technology: Cache memory organizations and performance issues; multilevel caches, Virtual memory technology and memory management.

MODULE-III

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SIMD processor: SIMD array processor, Interconnection networks , SIMD matrix multiplication algorithm, vector processor architecture and instruction types.
MIMD multiprocessor: shared and distributed memory architectures, cache coherence and Synchronization.

Text Books:

1. Kai Hwang, "Advanced Computer Architecture," McGraw-Hill.
2. Hwang and Briggs, "Computer Architecture and Parallel Processing," McGraw Hill.

Reference Books:

1. Pipelined and Parallel processor design by Michael J. Fiynn – 1995, Narosa.
2. Computer Architecture A quantitative approach 3rd edition John L. Hennessy &

David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

Course Outcomes: After the completion of the course the student will be able to:

CO1	Demonstrate concepts of parallelism in hardware/software.
CO2	Discuss memory organization and mapping techniques
CO3	Describe architectural features of advanced processors.
CO4	Interpret performance of different pipelined processors.
CO5	Explain interconnection networks and parallel architectures

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO2	2.61	1.74	1.74	1.74	2.61	0.87	0.87	0.87	1.74	1.74	0.87	0.87
CO3	2.28	0.76	1.52	1.52	2.28	1.52	1.52	1.52	0.76	1.52	0.76	0.76
CO4	2.83	1.89	1.89	0.94	2.83	0.94	0.94	0.94	0.94	0.94	0.94	0.94
CO5	2.57	0.86	1.72	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average CO	2.49	1.48	1.66	1.16	2.49	1.13	0.98	0.98	1.00	1.33	0.83	0.83
Percentage Of avg CO	83%	49%	55%	39%	83%	38%	33%	33%	33%	44%	28%	28%

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BCS-702	Artificial Intelligence and Expert Systems	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To learn about the knowledge of intelligent agents
CO2	To understand the role of knowledge representation techniques such as propositional and predicate logic in AI.
CO3	understand Bayesian network and fuzzy logic in case of uncertainty.
CO4	To understand HMM model
CO5	To learn about machine learning

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	1	1	1	1	1	1
CO-2	3	3	2	2	3	2	1	1	1	2	2	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	1	1	1	0	2	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Introduction: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha – Beta pruning.

MODULE-II

Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic,Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

MODULE-III

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Machine Learning: Supervised and unsupervised learning, Decision trees, Statistical learning models, learning with complete data - Naive Bayes models, Learning with hidden data –EM algorithm, Reinforcement learning, Expert systems architecture. Generalities about expert systems. Conceptual infrastructure of expert systems.

Text Books:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", PearsonEducation.

2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill

Reference Books:

1. E Charniak and D McDermott, "Introduction to Artificial Intelligence", PearsonEducation.

2. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India.

Course Outcomes: After the completion of the course the student will be able to:

CO1	To apply the knowledge of intelligent agents and the heuristic search techniques.
CO2	To analyze the role of knowledge representation techniques such as propositional and predicate logic in AI.
CO3	To apply the Bayesian network and fuzzy logic in case of uncertainty.
CO4	To analyze different types of planning and learning techniques.
CO5	Evaluate the role game playing, expert system and swarm intelligent system in AI.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.17	2.17	1.44	0.72	2.17	1.44	0.72	0.72	0.72	0.72	0.72	0.72
CO2	2.61	2.61	1.74	1.74	2.61	1.74	0.87	0.87	0.87	1.74	1.74	0.87
CO3	2.28	0.76	1.52	1.52	2.28	1.52	1.52	1.52	0.76	1.52	0.76	0.76
CO4	2.83	1.89	1.89	0.94	2.83	0.94	0.94	0.94	0.94	0.00	1.89	0.94
CO5	2.57	0.86	1.72	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average of CO	2.49	1.66	1.66	1.16	2.49	1.30	0.98	0.98	0.83	1.42	1.19	0.83
Percentage of avg CO	83%	55%	55%	39%	83%	43%	33%	33%	28%	47%	40%	28%

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BCS-703	Data Warehouse and Mining	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To learn a]basic concept of Data warehousing.
CO2	To learn various models of data warehousing
CO3	To understand the concept of data mining
CO4	To understand the concept of Data Compression. Statistical measures in large Databases
CO5	To understand Classification & Prediction

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	3	2	1	1	1	1	1	1
CO-2	3	2	2	2	3	1	1	1	2	2	1	1
CO-3	3	1	2	2	3	2	2	2	1	2	1	1
CO-4	3	2	2	1	3	1	1	1	1	0	1	1
CO-5	3	1	2	1	3	1	1	1	1	2	1	1

Detailed Syllabus

MODULE-I

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, 3 Tier Architecture, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Testing Data Warehouse

MODULE-II

Data Mining: Overview, Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression. Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, Mining Single-Dimensional Boolean Association rules from Transactional Databases, Apriori-Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

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MODULE-III

.Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon, Grid Based Methods- STING, CLIQUE, Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

Text Books:

1. Alex Berson, Stephen Smith, "Data Warehousing, Data Mining & OLAP" TMH Publication.
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier

Reference Books:

1. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems, Pearson Education
2. Mallach, "Data Warehousing System", McGraw –Hill

3. M.H. Dunham," Data Mining: Introductory and Advanced Topics" Pearson Education

Course Outcomes: After the completion of the course the student will be able to:

CO1	Analyse the basic functions of data warehouse and data mining.
CO2	Design data warehouse with dimensional modelling and apply different operations.
CO3	Analyze appropriate data mining algorithms to solve real world problems
CO4	Evaluate different data mining techniques like classification, prediction.
CO5	Analyze and Evaluate the clustering and association rule mining with complex data types and web mining.

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.17	2.17	1.44	0.72	2.17	1.44	0.72	0.72	0.72	0.72	0.72	0.72
CO2	2.61	1.74	1.74	1.74	2.61	0.87	0.87	0.87	1.74	1.74	0.87	0.87
CO3	2.28	0.76	1.52	1.52	2.28	1.52	1.52	1.52	0.76	1.52	0.76	0.76
CO4	2.83	1.89	1.89	0.94	2.83	0.94	0.94	0.94	0.94	0.00	0.94	0.94
CO5	2.57	0.86	1.72	0.86	2.57	0.86	0.86	0.86	0.86	1.72	0.86	0.86
Average CO	2.49	1.48	1.66	1.16	2.49	1.13	0.98	0.98	1.00	1.42	0.83	0.83
Percentage Of Avg CO	83%	49%	55%	39%	83%	38%	33%	33%	33%	47%	28%	28%

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BCS-704	Distributed Systems	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To introduce fundamental principles of distributed systems, technical challenges and key design issues.
CO2	To impart knowledge of the distributed computing models, algorithms and the design of distributed system
CO3	To understand the concept of deadlock
CO4	To understand the Mechanism for building distributed file systems
CO5	To understand the concept of distributed transaction.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	3	2	1	3	2	1	2	1
CO-2	3	2	2	3	0	3	2	0	2	2	2	3
CO-3	2	1	3	0	1	3	2	2	1	0	2	2
CO-4	2	1	1	3	2	1	1	2	1	3	0	0
CO-5	3	0	1	2	2	1	2	1	0	1	2	2

Detailed Syllabus

MODULE-I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models. **Theoretical Foundation for Distributed System**: Limitation of Distributed system, absence of global clock, shared memory, Lamport'sLogicalclock, Vectors clocks.
Concepts in Message Passing Systems: causal order, total order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.
Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

MODULE-II

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

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Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.

MODULE-III

Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recovery in Concurrent systems, obtaining consistent Checkpoints, Recovery in Distributed Database Systems.

Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

Text Books:

1. Singhal&Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education

Reference Books:

1. Tenanuanbaum, Steen," Distributed Systems", PHI
2. Gerald Tel, "Distributed Algorithms", Cambridge University Press.

Course Outcomes: After the completion of the course the student will be able to:

CO1	illustrate the mechanisms of inter process communication in distributed system
CO2	apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system
CO3	compare the concurrency control mechanisms in distributed transactional environment
CO4	outline the need for mutual exclusion and election algorithms in distributed systems
CO5	Can apply the concept of distributed transaction

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Table: Direct attainment of CO-PO

CO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1	3.00	3.00	2.00	2.00	3.00	2.00	1.00	3.00	2.00	1.00	2.00	1.00
CO 2	3.00	2.00	2.00	3.00	0.00	3.00	2.00	0.00	2.00	2.00	2.00	3.00
CO 3	2.00	1.00	3.00	0.00	1.00	3.00	2.00	2.00	1.00	0.00	2.00	2.00
CO 4	2.00	1.00	1.00	3.00	2.00	1.00	1.00	2.00	1.00	3.00	0.00	0.00
CO 5	3.00	0.00	1.00	2.00	2.00	1.00	2.00	1.00	0.00	1.00	2.00	2.00
Avg. CO	2.60	1.75	1.80	2.50	2.00	2.00	1.60	2.00	1.50	1.75	2.00	2.00
Ag. CO %	87%	58%	60%	83%	67%	67%	53%	67%	50%	58%	67%	67%

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BCS-074	ANDROID OPERATING SYSTEM	L T P 3 1 0	4 Credits

Pre-requisites: None

Course Objectives:

CO1	To introduce Android platform and its architecture.
CO2	To learn activity creation and Android UI designing.
CO3	To be familiarized with Intent, Broadcast receivers and Internet services.
CO4	To integrate multimedia, camera and Location based services in Android Application.
CO5	To explore Mobile security issues.

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	0	2	0	0	0	0	0	0	0
CO-2	3	3	2	1	2	0	1	1	0	1	0	0
CO-3	3	3	2	0	3	1	0	0	1	1	0	0
CO-4	3	3	2	1	2	0	0	0	1	1	0	0
CO-5	3	3	2	0	3	1	1	0	1	1	0	0

Detailed Syllabus

MODULE 1

About Android , Smart phones future, **Preparing the environment-** Installing the SDK , Creating Android Emulator , Installing Eclipse , Installing Android Development Tools , Choosing which Android version to use **Android Architecture-** Android Stack, Android applications structure

MODULE 2

UI Architecture-Application context , Intents ,Activity life cycle , Supporting multiple screen sizes **User Interface Widgets-** Text controls , Button controls ,Toggle buttons , Images **Notifications and Toasts-** Parameters on Intents ,Pending intents ,Status bar notifications ,Toast notifications **Menus-** Localization, Options menu , Context menu **Dialogues-** Alert dialog , Custom dialog , Dialog as Activity

MODULE 3

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Lists-Using string arrays, Creating lists, Custom lists **Location and Maps-** Google map. Using GPS to find current location **Working of Data Storages-**Shared preferences ,Preferences activity ,Files access , SQLite database **Network Communication-**Web Services , HTTP Client , XML and JSON **Services-**Service lifecycle, Foreground service **Publishing the App-**Preparing for publishing ,Signing and preparing the graphics ,Publishing to the Android Market.

Text Books:

1. Bill Philips & Brian Hardy, Android Programming: The Big Nerd Ranch Guide
2. Greg Nudelman, Android Design Patterns: Interaction Design Solutions for Developers
3. Ian G. Clifton, Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps
4. Ed Burnette, Hello, Android: Introducing Google's Mobile Development Platform (Pragmatic Programmers).

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe Android platform, Architecture and features.
CO2	Design User Interface and develop activity for Android App.
CO3	Use Intent , Broadcast receivers and Internet services in Android App.
CO4	Use multimedia, camera and Location based services in Android App.
CO5	Discuss various security issues in Android platform

Table: Direct attainment of CO-PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.95	2.95	1.97	0.00	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO2	2.72	2.72	1.82	0.91	1.82	0.00	0.91	0.91	0.00	0.91	0.00	0.00
CO3	2.67	2.67	1.78	0.00	2.67	0.89	0.00	0.00	0.89	0.89	0.00	0.00
CO4	2.26	2.26	1.51	0.75	1.51	0.00	0.00	0.00	0.75	0.75	0.00	0.00
CO5	1.98	1.98	1.32	0.00	1.98	0.66	0.66	0.00	0.66	0.66	0.00	0.00
Average CO	2.52	2.52	1.68	0.83	1.99	0.78	0.78	0.91	0.77	0.80	0.00	0.00
Average CO %	84%	84%	56%	28%	66%	26%	26%	30%	26%	27%	0%	0%

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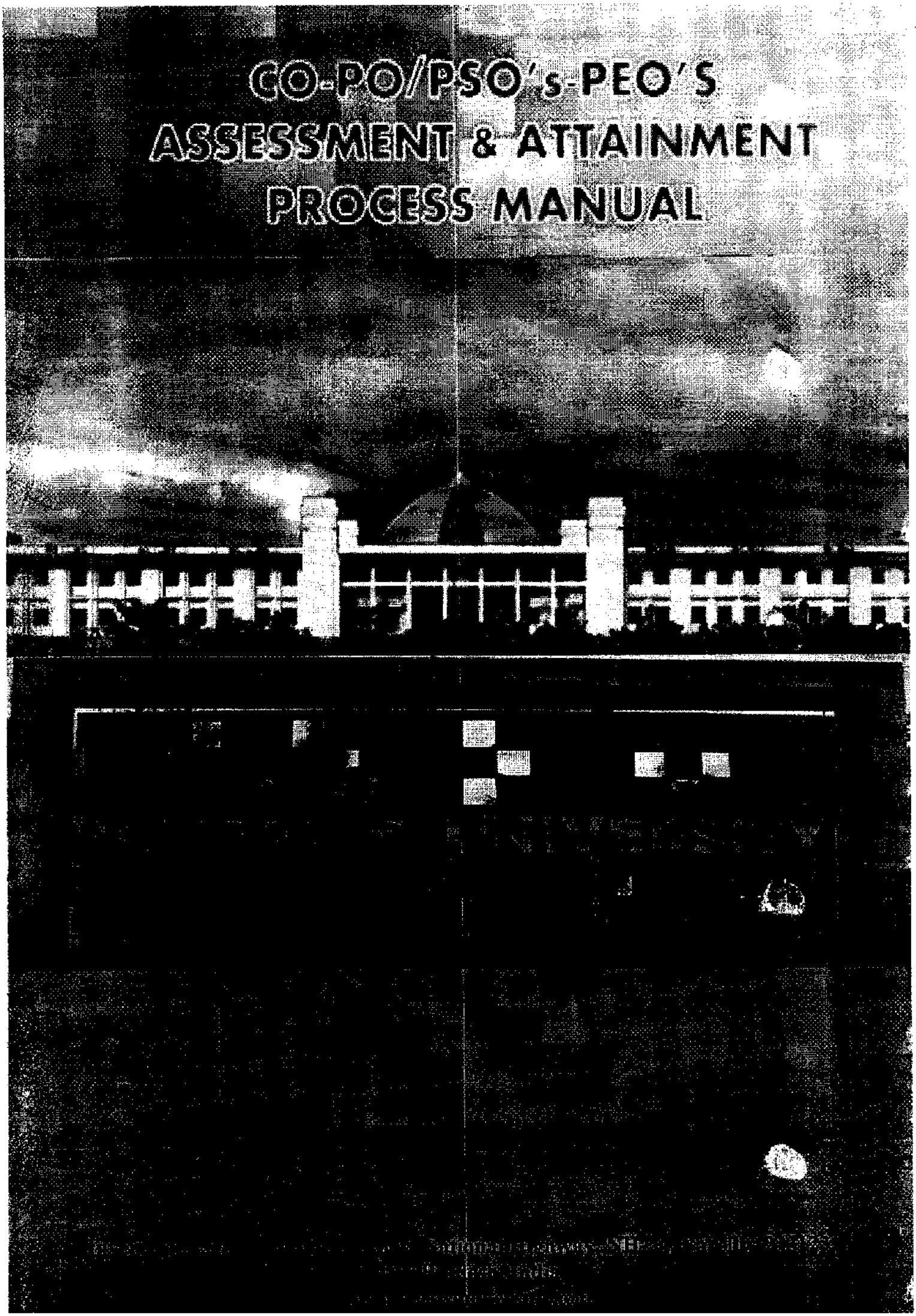
CO-PO/PSO's-PEO'S ASSESSMENT & ATTAINMENT PROCESS MANUAL



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INSTITUTE VISION AND MISSION

VISION

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class training to the promising Engineers.

MISSION

- To nurture high level of Decency, Dignity and Discipline in students to attain high intellectual abilities.
- To produce employable students at National and International levelsby effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes

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2. DEPARTMENT VISION AND MISSION

VISION

To provide the students excellent education for developing them into high class electronics engineers so that they could meet the challenges of modern industry and blossom into extra-ordinary entrepreneurs.

MISSION

- ✓ To create learning, development and testing environment to meet ever challenging needs of electronic industry.
- ✓ To become a global partner in training human resources in the fields of chip design, instrumentation and networking.
- ✓ To be highly competent in various fields of Electronics and Communication engineering through the best breed laboratory facilities.
- ✓ To associate with internationally reputed Institutions for academic excellence and collaborative research.

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the Institute is taken as the basis.

Step 2: The Department conducts brain-storming sessions with the faculty on the skill-set required by the local and global employers, Industry Advances in Technology and R & D, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Parents, Professional Bodies, Industry representatives and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

The process for defining department vision and mission are illustrated in the flow chart Figure 2.1.

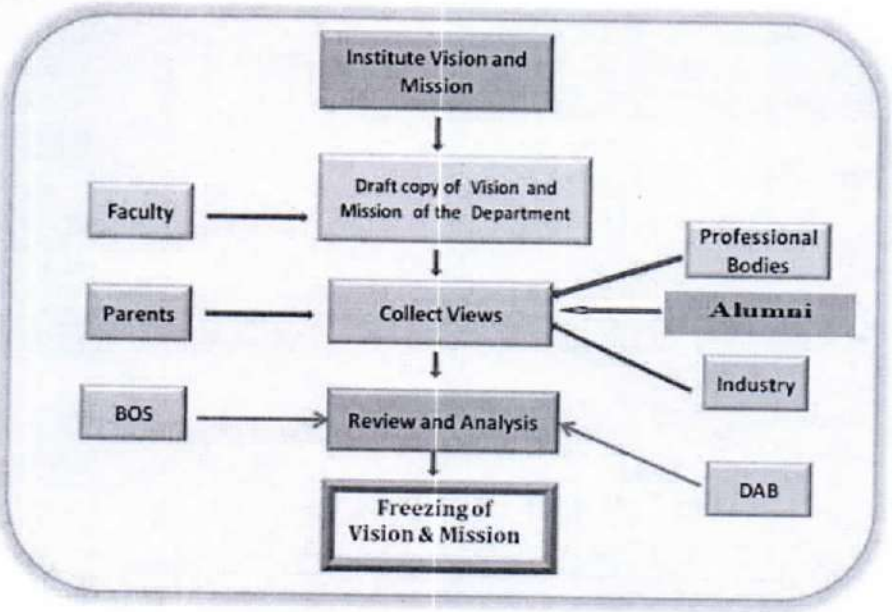

Figure 2.1 Process for defining Vision and Mission of the Department

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3.PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do.

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4. STATEMENTS OF PEOs, POs AND PSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1

Analyze, plan and apply the acquired knowledge in basic sciences and mathematics in solving the problems with technical, economic, environmental and social contexts.

PEO2

Design and build modern communication systems as per the requirements stated.

PEO3

Design, build and test analog & digital electronic systems.

PEO4

Work in a team using technical knowledge, tools and environments to achieve project objectives.

PEO5

Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the Institute & Department are taken into consideration to interact with various stake holders, and establish the PEO's

STEP 2: The Head of the Department, Program Coordinator and other Senior Faculty prepares the draft version of PEOs and POs.

STEP 3: The draft version is discussed with stakeholders and their views are collected by the Program co-coordinator

STEP 4: The Program Assessment Committee reviews and analyzes the PEOs and Pos and submits its Recommendations to the Departmental advisory Board.

STEP 5: The Departmental advisory Board deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOG for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council who are drawn from various academic institutions, R&D organizations and industry.

- Inputs are also obtained from alumni and other stake holders.
- Besides, a skill in demand analysis is carried out periodically to identify the core areas in the ECE domain that are consistent with industry needs.
- Thus, the PEOs are established, checked for consistency with the mission statement of the department.

The process steps followed for establishing the PEO's for B.Tech. (ECE) program are illustrated in the flow chart Figure 4.1.

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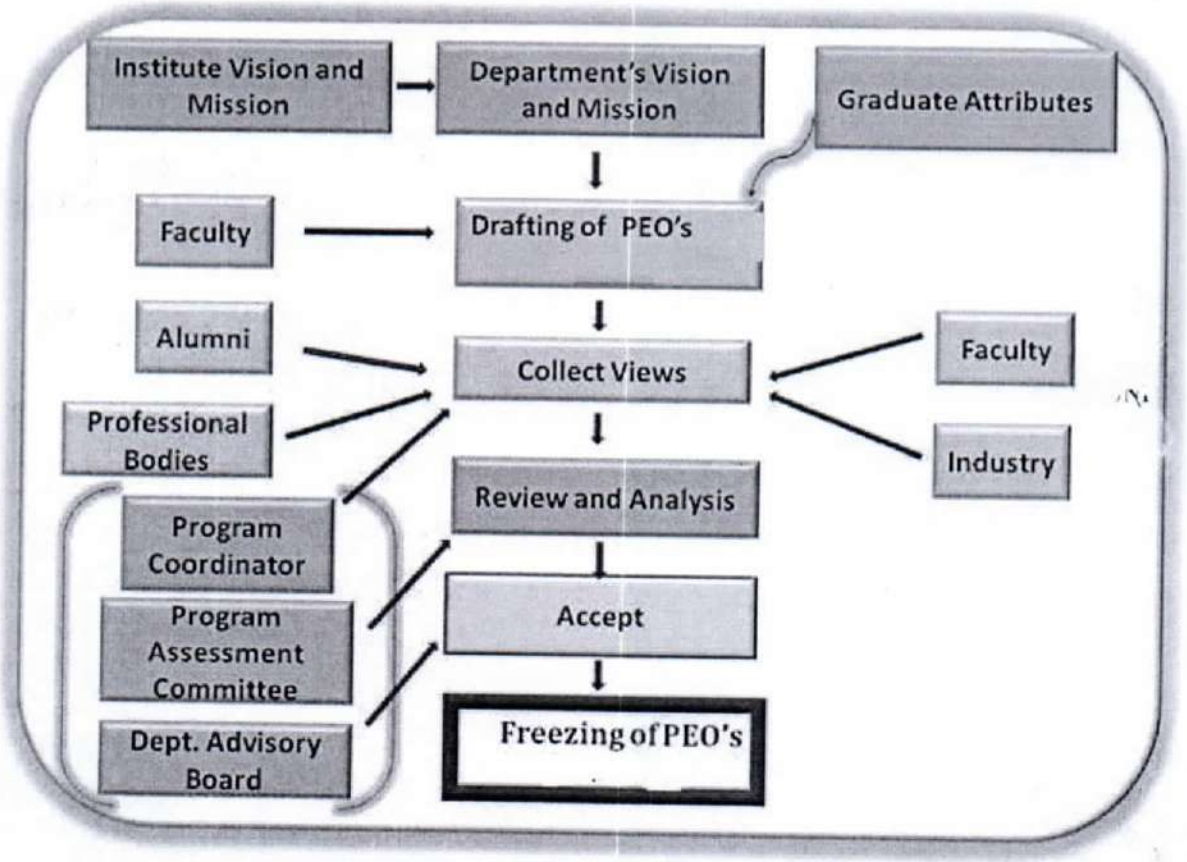

Figure 4.1: Process to Define PEO's of the Department

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4.2 PROGRAM OUTCOMES (POs):

PO1	Apply basic science and mathematics to analyze complex engineering problems.
PO2	Employ necessary techniques, hardware and software tools for engineering applications.
PO3	Synthesize solutions for existing problems within practical constraints.
PO4	Gather requirement specifications, design and test electronic systems.
PO5	Communicate effectively in diverse groups and exhibit leadership qualities.
PO6	Understand and practice professional ethics.
PO7	Exhibit responsibility in professional, ethical, legal, security and social issues
PO8	Work in a team using technical skills, common tools and environments to achieve the objective of the project.
PO9	Apply management principles to manage projects in multidisciplinary environment
PO10	Pursue life-long learning as a means of enhancing knowledge and skills for continuous professional advancement.

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The POs are published and disseminated

The Program Outcomes are published and disseminated as follows

Table 4.1: PO publishing and dissemination

How Published	Where Published	How Disseminated
Incorporating in booklet given in orientation, syllabus book, course files and lab manuals	• Orientation booklet • Syllabus books • Course files and lab manuals • Laboratories in the departments	• Distribution and explanation to students on orientation day • Discussed during Orientation Day • Discussed during student Counseling • Distributed along with Syllabus books, course files and lab manuals
Flexis	• Class rooms/ Laboratories • Office of the department • Department Notice boards • Staff Rooms	• Self-reading by students, parents and alumni
Digital Media	• Institute Website ✓ www.invertisuniversity.ac.in	• Available for Self-reading in public domain

The Process for Establishing the PO"s

The POs are established through the following process steps:

The Vision, Mission PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POs.

Step 1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs.

Step 2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

Step 3: The Program Assessment Committee analyze and express its opinion ... the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

Step 4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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However, the views expressed by them were in line with the graduate attributes defined by NBA.



Fig . 4.2 Process to Define Program Outcomes of the Department

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs):

The graduates of the department will attain:

PSO1: The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning.

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM'S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from memory to a customer. Recite the safety rules.
Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the principles of test writing. Explain in one's own words the steps for performing a complex task. Translate an equation into a computer spreadsheet.
Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's Vacation time. Apply laws of statistics to evaluate the eligibility of a written test.
Analyzing: Separates material or concepts into component parts so that its	analyzes, breaks down, compares, contrasts, diagrams, deconstructs,	Troubleshoot a piece of equipment by using logical deduction.

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organizational structure may be understood. Distinguishes between facts and inferences.	differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates	Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.
Evaluating: Make judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.	Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.
Creating: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training From several sources to solve a problem. Revises and process to Improve the outcome.

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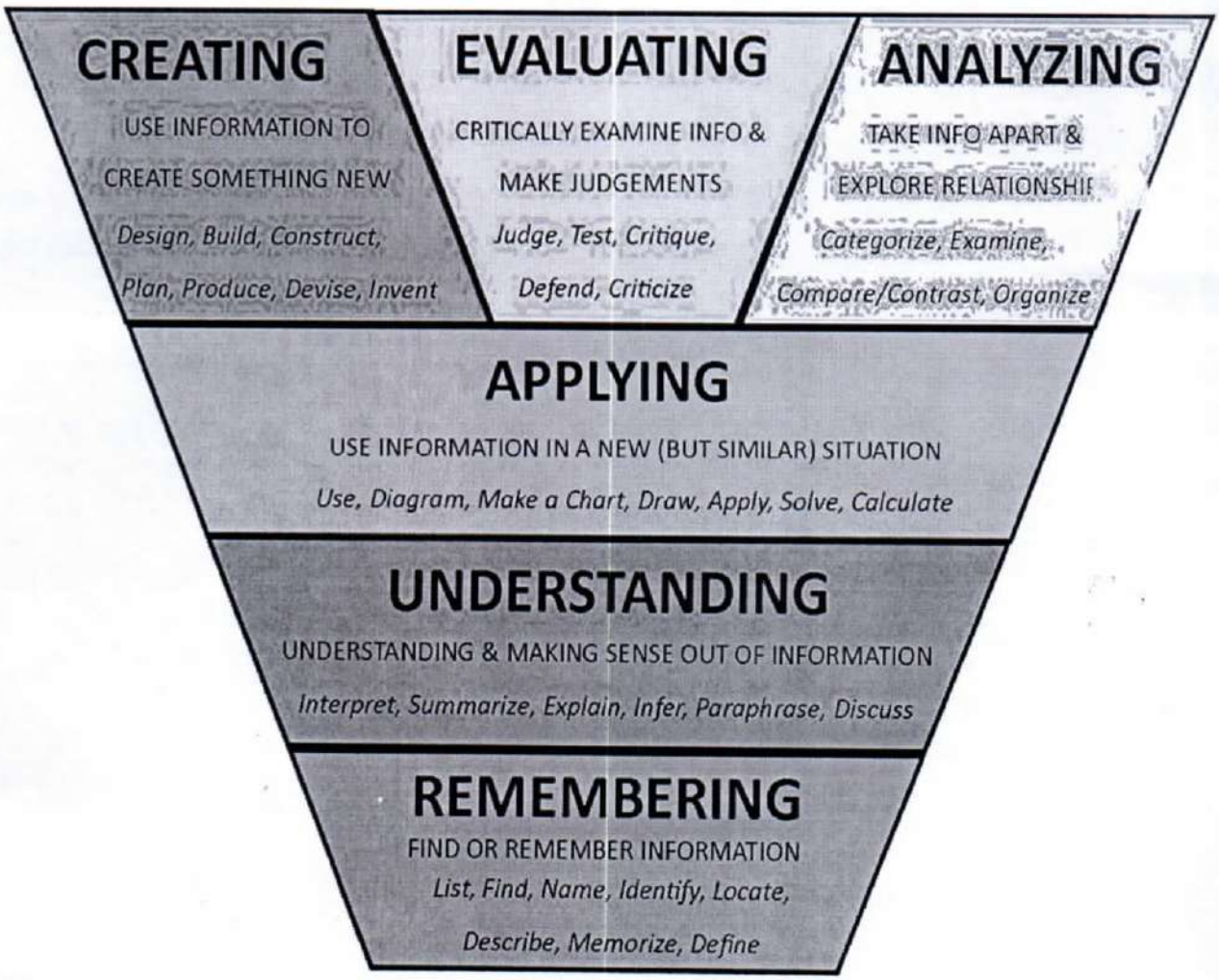

Figure 5.1 Pictorial representation of Blooms Taxonomy

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6. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

SAMPLE CO STATEMENTS:

Course: FUNDAMENTALS OF ELECTRONIC DEVICES

Course Code: BEC-301

On successful completion of this course, students should be able to

Table 6.1: Sample CO statements

CO	COURSE OUTCOMES DESCRIPTION
CO1	Understand and Analyze the different types of diodes, operation and its characteristics
CO2	Design and analyze the DC bias circuitry of BJT and FET
CO3	Design biasing circuits using diodes and transistors
CO4	To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices

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7. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

- **"1"** – Slight (Low) Correlation
- **"2"** – Moderate (Medium) Correlation
- **"3"** – Substantial (High) Correlation
- **"-"** indicates there is no correlation.

7.1 Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course. POs are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the programme. The NBA laid down the graduate attributes relating to programme outcomes and is to be derived by program.

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The Program outcomes reflect the ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of graduation. The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society. These outcomes also enable the graduate to pursue higher studies and engage in R&D for a successful professional career.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepares the grandaunts to achieve.

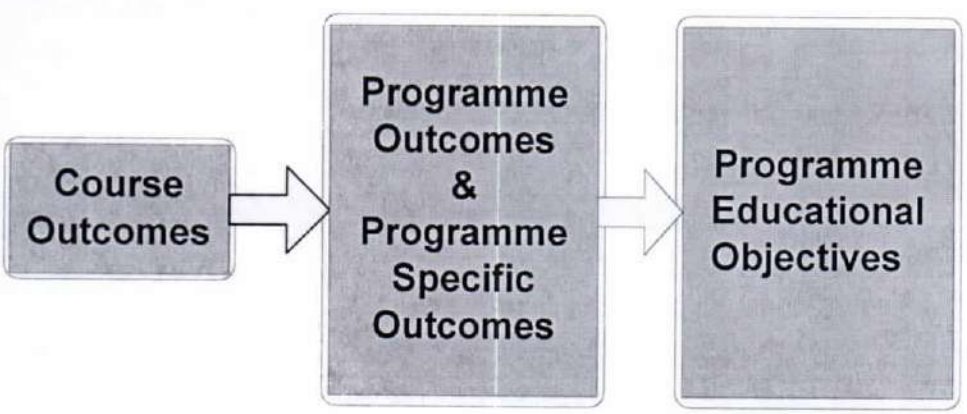

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program. This is shown in figure 7.2.

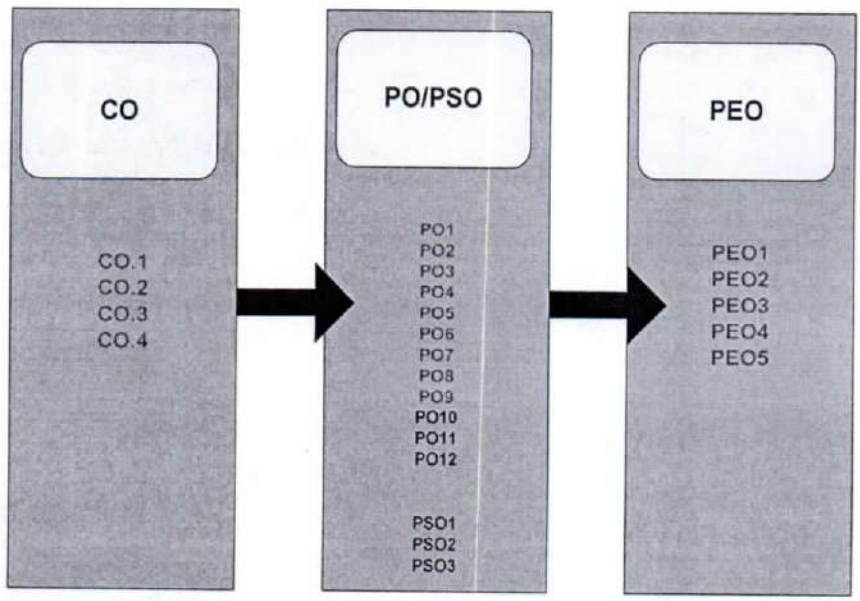

Figure 7.2: Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate COs for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behavior that students will acquire through the course.

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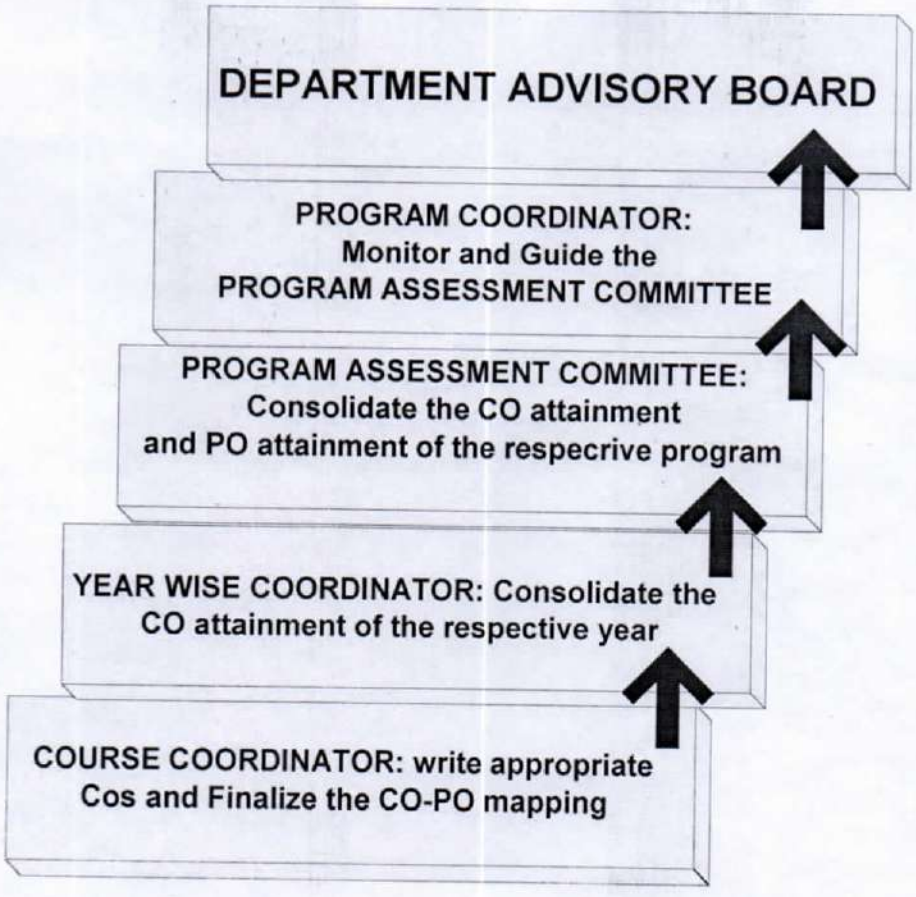

Figure 7.3: Hierarchy of faculty involvement

After writing the CO statements, CO will be mapped with PO of the department. If the department is having more than one section in a year or the same course is available for more than one program of the same institute in a semester, the subject expert will be nominated as course coordinator of the corresponding course. The role of the course coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the eighth semester. The Program coordinator has to evaluate the PO

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attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Department Advisory Board (DAB).

7.3 SAMPLE CO-PO AND CO-PSO MAPPING:

Course: FUNDAMENTALS OF ELECTRONIC DEVICES

Course Code: BEC-301

Mapping of CO with PO

First alphabet (B) indicates the degree (B.Tech.) and next two alphabet (EC) indicate the branch of the student. The remaining number 301 indicates first course in third semester. A sample course outcome statements and sample CO-PO matrix are given in Table 7.1 based on CO statements given in table 6.1.

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '-'. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '-' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	H									
CO2		H	H							
CO3			H	H						
CO4				H	S				M	M

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Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3									
CO2		3	3							
CO3			3	3						
CO4				3	1				2	2
Average CO(FED)	3	3	3	3	1				2	2

Course Outcome FED(BEC-301)	PSO1	PSO2	PSO3
CO1	3		
CO2		3	
CO3			3
CO4	3		3
Average CO(FED)	3	3	3

7.4 Process used to identify the curricular gaps to the attainment of COs/POs

The process used to identify the curricular gaps to the attainment of COs/POs is given in figure 7.3 and is explained as below:

Step-1:

The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:

The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:

The year wise coordinators who are the members of the PAC would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4:

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The PAC would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to DAB.

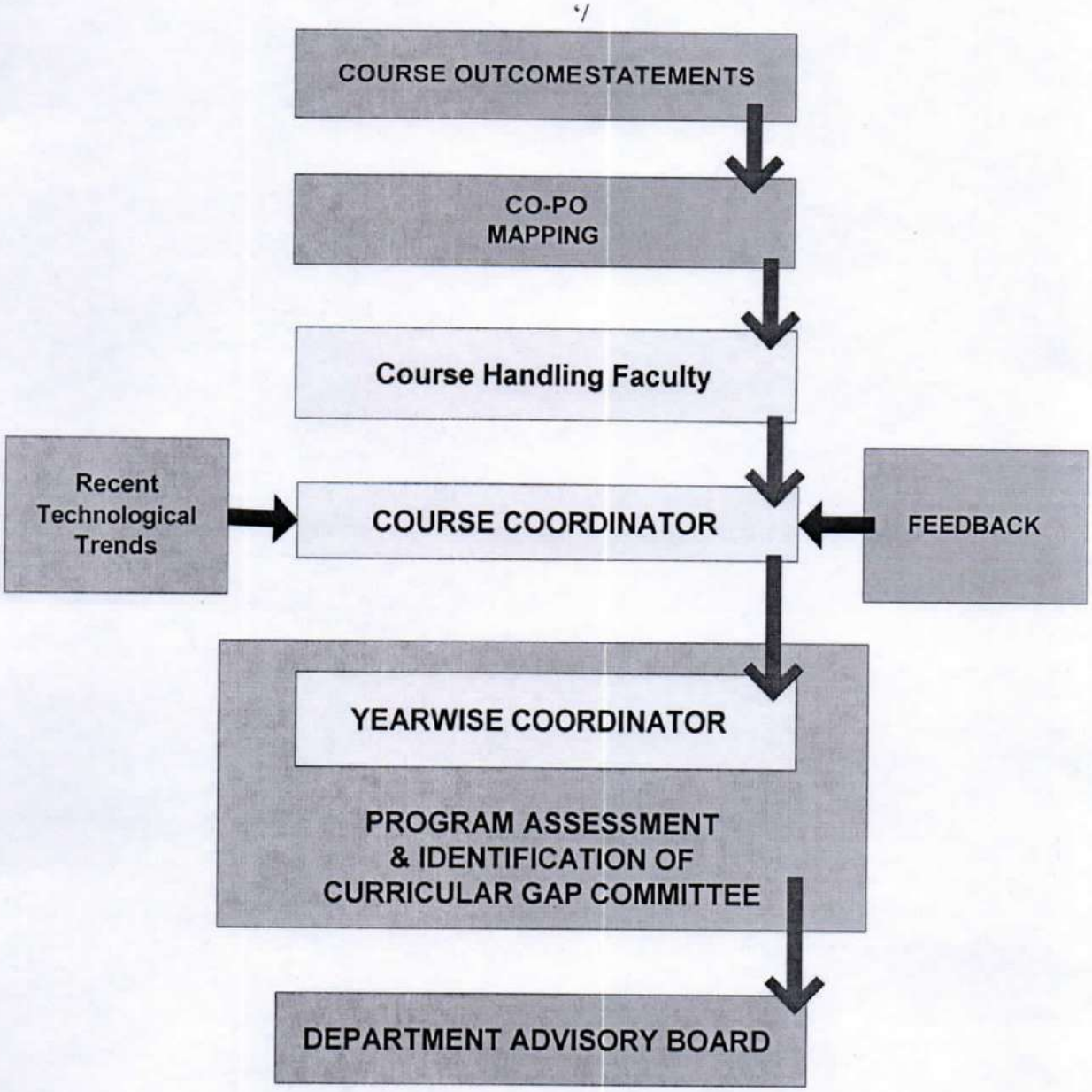

Figure 7.3: Identification of curricular gap

Program Assessment Committee after getting prior approval from DAB about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, in plant training, online quiz, etc.

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8. COURSE OUTCOMES TO PO AND PSO MAPPING

Mapping strength of a course to PO/ PSO can be obtained by taking the average of the CO-PO/ PSO mapping matrices of that course.

SAMPLE COURSE-PO AND COURSE-PSO MAPPING

Course: FUNDAMENTALS OF ELECTRONIC DEVICES

Course Code: BEC-301

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Average CO(FED)	3	3	3	3	2				2	2

Course Outcome FED(BEC-301)	PSO1	PSO2	PSO3
Average CO(FED)	3	3	3

Program level CO-PO matrix for all the courses including first year courses will be done by the program coordinator and a sample is given in figure 8.1.

MAPPING OF COURSE WITH PO's and PSO's FOR BATCH: 2016-2020

YR/SEM	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
FIRST YEAR	BAS-103	3.0	3.0	1.5	2.0	-	-	-	-	-	-	2.0	-	-
	BAS-102	3.0	3.0	-	2.0	-	-	-	-	-	-	3.0	-	-
	BEE-101	3.0	2.2	2.3	-	-	-	-	2.0	2.0	-	3.0	2.0	-
	BEC101	2.0	2.0	3.0	-	-	-	-	-	2.0	2.0	1.0	-	-
	BAS-101	3.0	2.0	2.0	2.7	1.0	2.0	2.0	-	2.0		1.0	2.0	-
	BME-101	-	-	-	-	-	2.3	-	3.0	3.0	3.0	-	2.0	3.0
	BME-151	3.0	3.0	1.0	3.0	1.0	-	-			3.0	3.0	-	-
	BAS-152	2.5	2.5	1.5	1.0	1.0	1.0	-	-	-	-	2.0	1.0	-

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	BEE-151	3.0	2.0	-	3.0	-	-	3.0	-	2.5	3.0	-	-	-
	BAS-151	-	-	-	2.0		2.0	2.0	3.0	3.0	3.0	-	-	-
	GP-101	2.8	2.0	-	2.7	-	-	3.0	-	2.7	3.0	2.0	-	-
II YEAR I SEMESTER	BHU-301/401	3.0	3.0	-	2.0	-	-	-	-	-	-		-	-
	BHU-302/402	1.0	2.0	1.8	1.0	1.3	-	-	-	-	-	2.0	-	-
	BEC-304	1.8	1.0			-	-	-	-	-	-	2.0	-	-
	BEC-301	1.8	1.0	1.5	1.5	-	1.0	-	-	-	-	2.0	-	-
	BEC-302	2.8	2.7	2.3	-	-	-	-	-	-	-	3.0	-	-
	BEE-302/BEC-303	2.5	1.8	-	1.7	1.0	-	-	-	-	-	3.0	-	-
	BEC-351	2.6	2.7	1.2	-	1.0	-	-	-	-	-	3.0	-	-
	BEC-352/BEE-351	2.7	2.0	-	1.8	1.0	-	-	-	-	-	3.0	-	-
	BEE-352/BEC-353	1.8	1.0	1.5	1.5	-	1.0	-	-	-	-	2.0	-	-
II YEAR II SEMESTER	BHU-301/401	1.8	1.8	1.7	-	1.8	-	-	-	-	-	2.0	-	-
	BOE31-38/BOE41-48/BAS301/401	1.8	1.8	1.2	1.2	-	-	-	-	-	-	3.0	-	-
	BCS-405	2.7	2.2		2.7	-	-	-	-	-	2.5	3.0	-	-
	BEC-401	1.8	1.8	1.0	1.0	-	-	-	-	-	-	-	3.0	3.0
	BEC-402	2.7	1.0	1.0	-	1.0	-	-	-	-	-	3.0	-	-
	BEC-403	2.3	2.6	2.0	-	-	-	-	-	-	-	1.0	-	-
	BCS-455	1.7	1.0	1.8	2.0	2.0	-	-	-	-	-	1.0	-	-
	BEC-453	1.5	1.8	1.5	1.5	-	-	-	-	-	-	2.0	-	-
	BEC-456	2.7	1.0	1.0	-	1.0	-	-	-	-	-	3.0	2.7	1.0
III YEAR I SEMESTER	BHU-501	3.0	3.0	2.7	-	-	-	-	-	-	-	3.0	-	-
	BEC-501	3.0	3.0	3.0	2.4	-	-	-	-	-	-	3.0	-	-
	BIC-501	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	3.0	-	-
	BEC-502	3.0	2.9	2.7	2.7	-	-	-	2.5	-	2.8	1.0	-	-
	BEE-503	3.0	3.0	2.9	2.7	3.0	-		2.5	-	2.8	1.0	-	-
	BEC-504	3.0	2.8	2.8	2.4	-	-	-	2.5	-	2.7	2.0	-	-
	BIC-551	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	-	-
	BEC-552	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	-	-
	BEC-554	3.0	3.0	2.7	-	-	-	-	-	-	-	3.0	-	-

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III YEAR II SEMESTER	BHU-601	3.0	2.5	2.0	2.5	2.0		2.0	-	-	3.0	3.0	-	-
	BEC-601	3.0	3.0	3.0	2.0	2.0	-	-	-	-	-	3.0	-	-
	BEC-602	2.5	2.8	2.3	2.8		-	-	-	-	-	3.0	-	-
	BEC-603	-	-	-	-	-	3.0	-	3.0		2.7	-	3.0	3.0
	BEC-604	3.0	3.0	3.0	3.0	3.0	-	2.0	-	-	2.8	-	3.0	3.0
	BEC-651	3.0	3.0	2.7	3.0	-	-	-	-	-	3.0	3.0	-	-
	BEC-652	-	-	-	-	-	-	-	2.5		2.7	3.0	-	-
	BEC-653	3.0	2.8	2.8	2.4	-	-	-	-	-	-	3.0	-	-
IV YEAR ISEMESTER	BEC-701	2.8	2.8	2.6	2.6	2.0	-	3.0	-	-	2.7	3.0	-	-
	BEC-702	2.2	2.0	3.0	2.5	2.0	-	-	-	-	-	3.0	-	-
	BEC-703	2.7	2.5	2.5	2.5	3.0	-	-	-	-	-	1.0	-	-
	BEC-751	2.7	3.0	2.5	3.0	-	-	-	2.0	3.0	2.7	-	3.0	3.0
	BEC-752	2.6	2.2	2.3	3.0	2.0	-	-	-	-	2.0	3.0	-	-
	BEC-753	3.0	2.3	2.5	2.5	2.0	-	-	-	2.0	2.0	2.0	-	-
	BEC-754	-	-	-	-	-	-	-	2.5	-	2.7	-	2.0	3.0
IV YEAR II SEMESTER	BEC-801	3.0	2.7	3.0	2.5	2.0	-	-	-	2.0	2.0	3.0	-	-
	BEC-802	3.0	3.0	3.0	3.0	-	-	-	-	2.5	2.5	3.0	-	-
	BOE-081	3.0	3.0	2.0	3.0	2.0	3.0	1.0	-	2.0	2.0	3.0	-	-
	BEC-083	3.0	3.0	-	-	-	-	-	-	-	2.0	-	2.0	2.0
	BEC-851	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	3.0	3.0
	BEC-853	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	3.0	3.0
AVERAGE		2.6	2.4	2.3	2.4	2.0	2.0	2.3	2.5	2.4	2.6	2.5	2.4	2.7

Figure 8.1: Program level CO-PO matrix

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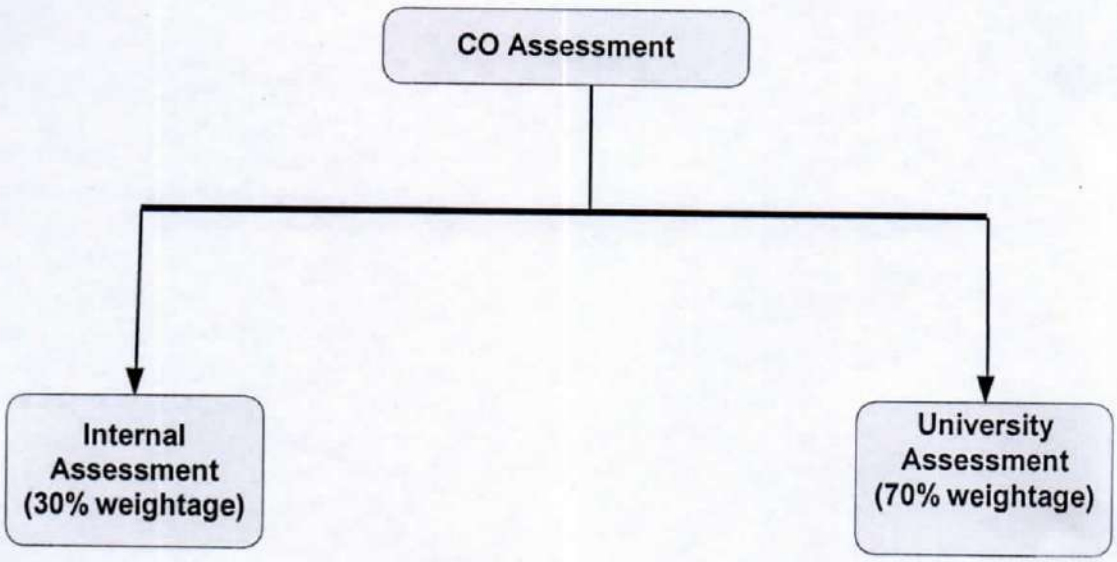
9. ASSESSMENT PROCESS

9.1 Assessment Process for CO Attainment:

For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

(i) CO Assessment Rubrics:



Course Outcome is evaluated based on the performance of students in internal assessments and in university examination of a course. Internal assessment contributes 30% and university assessment contributes 70% to the total attainment of a CO.

(ii) CO Assessment Tools:

The description of Assessment tools used for the evaluation of program outcomes is given in Table 9.1. The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed in table 9.2.

In each course, the level of attainment of each CO is compared with the predefined targets, if is not the course coordinator takes necessary steps for the improvement to reach the target. With the help of CO against PO/PSO mapping, the PO/PSO attainment is calculated by the programme coordinator.

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Table 9.1: Mapping of assessment tools to POs/PSOs with frequency

Mode of assessment	Assessment Tool	Description	Evaluation of course Outcomes	Related POs/PSOs	Frequency of Assessment
Direct	Theory Internal Examinations	Two written examinations are conducted and its average marks are considered.	The questions in the internal examinations and assignment sheets are mapped against COs of respective course. The questions for two internal examinations and Assignments are framed in such a way to cover all course outcomes	PO 1 to PO 10	Two per Semester
Direct	Assignments	Two assignments are given for each course for continuous assessment. Average marks are considered.	The final attainment for each CO under direct assessment is calculated by taking from average of the CO attainments Internal Examinations and Assignments.	PO 1 to PO 10	continuous
Direct	Day to day evaluation	The day to day evaluation is considered.	The final attainment for each CO is calculated by taking average of the %	PO 1 to PO 10	Continuous
Direct	Internal Practical Examination	Internal examination is conducted in lab course.	Evaluation attainment from day to day and Internal Lab Examination.	PO 1 to PO 10	One per Semester
Direct	Industry Oriented Mini-Project	To test student's concepts in design, creative thinking and independent analysis. Two project reviews are conducted	Two Internal project reviews are conducted and average of these two review assessments are considered.	PO 1 to PO 10	One project review in VII Semester
Direct	Major Project	To test student's concepts in design, creative thinking and independent analysis. Three Project reviews are conducted	Continuous assessment is carried by the project review committee. First review emphasizes on Literature survey and problem identification, second review on Design methodology and the third review on validation of the model and documentation. The external examiner assessment is considered as another assessment tool for project work. Final CO attainment is calculated from these two assessments.	PO 1 to PO 10	Three project reviews in Final Semester.
Indirect	Alumni Survey	This survey gives the opinion of the student on the attainment of course outcomes.	At the end of the programme Alumni survey is collected from Alumni an Considered for the PO attainment under Indirect assessment.	PO 1 to PO 10	At the end of each course
Indirect	Graduate Exit Survey	This survey gives the opinion of the graduate on the attainment of Programme outcomes.	At the end of the programme graduate exit survey is collected from the graduates and considered for the PO attainment under indirect assessment.	PO 1 to PO 10	At the end of program

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(iii) Quality/Relevance of Assessment Process:

Theory:

Internal Mid Tests: Internal tests serve to encourage students to keep up with course content covered in class. Two written examinations are conducted and its average marks are considered. For theory subjects, during a semester there shall be 2-unit test examinations. Each test consists of three sections, where first section is for short answers and remaining two is of long answer type with a total duration of 1 hour 30 minutes. The first mid-term examination shall be conducted first half units of the syllabus, the second mid-term examination shall be conducted on remaining half units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate. The questions in the internal examinations and assignment sheets are mapped against COs of respective course. The questions for two internal examinations and Assignments are framed in such a way to cover all Course Outcomes.

The questions are framed in such a way that it should satisfy Bloom's Taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels by the department.

University examination: These end-semester examinations are of 3-hour duration and cover the entire syllabus of the course. It would generally

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satisfy all course outcomes for a particular course. The COs are evaluated based on the set attainment levels.

Practical Subjects:

Daily Performance: Lab courses provide students first-hand experience with course concepts and the opportunity to explore methods used in their discipline. All the students are expected to be regular and learn the practical aspects of the subject and develop the necessary skills to become professionals. In order to facilitate interaction among the students and to develop team spirit, the students are expected to carry out experiments in groups. Performance assessment is based on the ability of the student to actively participate in the successful conduct of prescribed practical work and draw appropriate conclusions. The student submits a record of practical work performed in each lab session.

For practical subjects there shall be a continuous evaluation during a semester for 10 sessional marks and 15 end semester examination marks. Out of the 10 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 05 marks and internal practical examination shall be evaluated for 05 marks conducted by the laboratory teacher concerned.

University examination: The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the University.

These end-semester examinations are of 3- hour duration and cover the entire syllabus of the course. It would generally satisfy all course outcomes for a particular course. The COs are evaluated based on the set attainment levels.

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Design/ Drawing: For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 10 marks for internal evaluation (05 marks for day-to-day work and 05 marks for internal tests) and 70 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

Mini-Project:

There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III-year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV- y e a r I I Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

Assessment Tool	
Internal Assessment	Presentation
	Viva-voce
	Report

Presentation: The content, quality of the presentation and communication skill is assessed by the evaluation committee.

Viva-voce: At the end of the presentation, the assessment panel and the student audience ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.

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Report: A bona fide report on seminar is submitted at the end of the semester. This report shall include, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references must be given toward the end of the report. A students' ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

Major Project:

Major Project is intended to be a challenge to the intellectual and innovative abilities of students. It gives students the opportunity to synthesize and apply the knowledge and analytical skills learned in the different disciplines.

Out of a total of 200 marks for the project work, 50 marks shall be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of her project. Project will enable student to think innovatively on the development of components, products, processes or technologies in the field of Electronics and Communication. Students are expected to

- Perform an in-depth study of the topic assigned in light of the preliminary report prepared in the seventh semester.
- Review and finalize the approach to the problem.
- Prepare a detailed action plan for conducting the investigation, including team work.
- Perform detailed analysis/ modelling/ simulation/ design/ problem

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solving/ experiment as needed.

- Develop a final product/ process, perform testing, arrive at results & conclusions and suggest future directions.
- Prepare a paper for Conference presentation/ publication, if possible.
- Prepare a report in the standard format for being evaluated by the Internal project Review Committee.

Assessment tools used to evaluate project work are:

Assessment Tool		Evaluator
Internal Assessment	Seminar on project	Internal project Review Committee
External Assessment	Final Report	University
	Presentation and Viva - Voce	University

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Process for assessing the quality of Projects:

The Internal project Review Committee and the project guide together will analyze the nature of the project and make sure that the work is environment friendly, ensures safety, ethics and cost effective. The projects are classified into different streams and their relevance to PO's and PSO's are identified to ensure its quality.

(iv) Attainment Levels:

Course outcomes of all courses are assessed with the help of above-mentioned assessment tools and attainment level is evaluated based on set attainment rubrics as per table 9.2. If the average attainment of a particular course for two consecutive years is greater than 70% of the maximum attainment value (i.e. 70% of 3 = 2.1), then for that particular course the current rubrics for attainment must be changed to analyze continuous improvement.

Table 9.2. Attainment Levels of COs

Assessment Methods	Attainment Levels	
Internal Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

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University Assessment	**Level 1**	60% of students scoring more than 40% marks in university examination.
	Level 2	70% of students scoring more than 40% marks in university examination.
	Level 3	75% of students scoring more than 40% marks in university examination.

9.2 Validation of CO-PO mapping

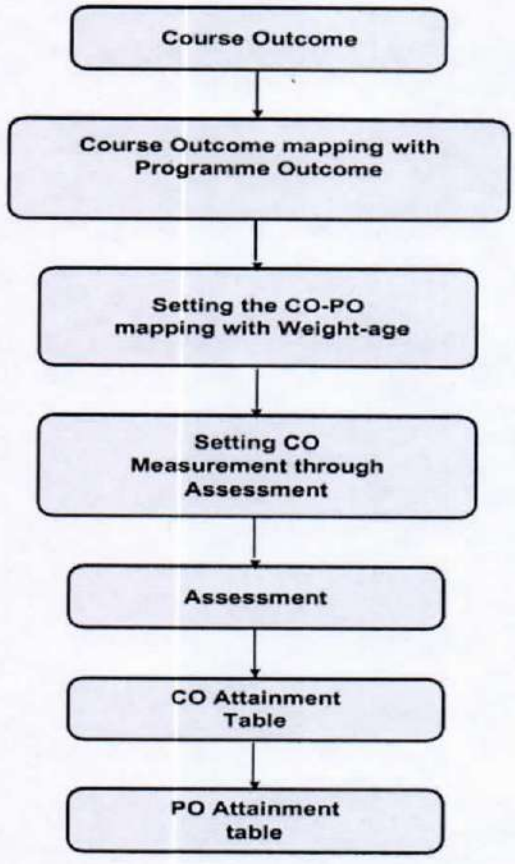

Figure 9.1: The process of CO-PO mapping validation

The process of CO-PO mapping validation is given in figure 9.1 and is explained as below:

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Step 1 : Obtain course outcome.

Step 2 : Mapping of course outcome with program outcome.

Step 3 : Setting weightage for CO assessment.

Step 4 : CO measurement through assessment.

Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct and indirect assessment methods.

Assessment and Attainment methods

Assessment is one or more processes which is carried out by the institution, that identify, collect and prepare data to evaluate the achievement of course outcomes and program outcomes. Attainment is the action or fact of achieving a standard result towards accomplishment of desired goals. Primarily attainment is the standard of academic attainment as observed by test and/or examination result. Assessment methods are categorized into two as direct method and indirect method to access CO's and PO's. The direct methods display the student's knowledge and skills from their performance in the continuous internal assessment tests, semester examinations and supporting activities such as seminars, assignments, case study, group discussion, online quiz, mini project etc., These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning. The indirect method done through surveys and interviews; it asks the stakeholders to reflect their views on student's learning. The institute assesses opinions or thoughts about graduate's knowledge or skills by different stakeholders.

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CO assessment methods are employed

- Direct assessment method and indirect assessment method are considered for 70% and 30% weightages respectively.

- Internal test assessment and end semester examination assessment are considered with the weightage of 30% and 70% respectively for the direct assessment of CO.

9.3 Procedure for Attainment of Program Outcomes

At the end of the each programme, the PO/PSO assessment is done from the CO attainment of all curriculum components. As per NBA guidelines, program can appropriately define the attainment level. The attainment level may be set by the particular program or commonly by the institution. The attainment can be made as best the choice by the institution or the program by analyzing the students' knowledge. This can be achieved by using different supporting activities. This attainment is mainly for the purpose of making an esteemed engineer with good analytical, practical and theoretical knowledge about the program by attaining the PEO's and PSO's of the program and the institution. For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

Attainment Level 1: 60% of students score more than 40% marks out of the maximum relevant marks. Attainment Level 2: 70% of students score more than 40% marks out of the maximum relevant marks. Attainment Level 3: 75% of students score more than 40% marks out of the maximum relevant marks.

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Assessment Methods	Attainment Levels	
Internal Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

Assessment Methods	Attainment Levels	
University (External) Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

9.4 CO Attainment Calculation of a Course:

Overall CO attainment of a course must be prepared as shown below

Mapping of Course outcome with Program Outcomes

CO-PO MATRIX FOR **FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)**

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3									
CO2		3	3							
CO3			3	3						
CO4				3	2				2	2

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CO-PO attainment of the course FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2.834									
CO2		2.834	2.834							
CO3			2.834	2.834						
CO4				2.834	1.89				1.89	1.89
Average CO(FED)	2.834	2.834	2.834	2.834	1.89				1.89	1.89

Figure 9.2. Direct attainment of CO-PO of FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Internal attainment of each COs of FED(BEC-301) is the average of attainments obtained using various internal assessment tools. University exam covers the entire syllabus of a course and hence it is useful to measure the attainment of all COs related to a course. The total attainment is the sum of 30% of internal attainment and 70% of university attainment.

- **Internal Attainment is the average of attainments obtained using various internal assessment tools.**
- **Total Attainment =30% internal attainment + 70% university attainment**

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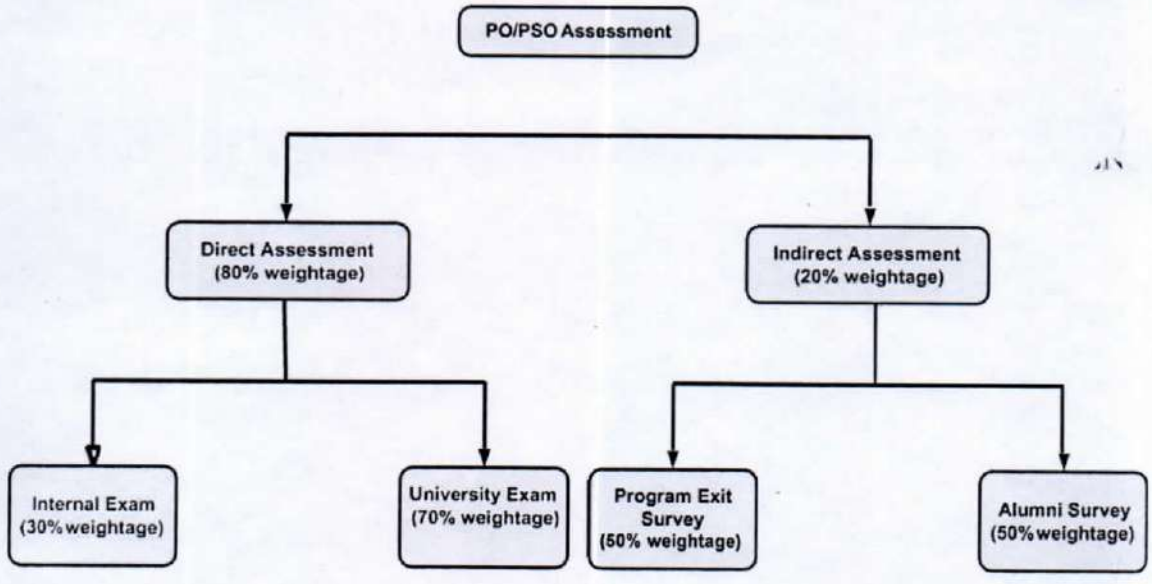
10. ASSESSMENT PROCESS FOR OVERALL PO AND PSO ATTAINMENT

10.1 PO and PSO Assessment Process



PO/PSO assessment is done by giving 70% weightage to direct assessment and 30% weightage to indirect assessment. Direct assessment is based on CO attainment, where 70% weightage is given to attainment through university exam and 30% weightage is given to attainment through internal assessments. Indirect assessment is done through Graduate exit survey and alumni survey where Graduate exit survey and alumni survey is given a weightage of 50% each.

10.2 PO and PSO Assessment Tools

The various direct and indirect assessment tools used to evaluate POs & PSOs and the frequency with which the assessment processes are carried out are listed in table 10.1.

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Table 10.1 Assessment tools used for evaluation of PO and PSO attainment

PO, PSO ASSESSMENT TOOLS					
		Course Type	**Assessment Tools**		**Minimum Frequency**
Direct (70% weightage)	**CO Assessment**	**Theory**	Internal Evaluation	Internal mid Tests	Twice per course
				Assignments	Twice per course
			University Exam		Once per course
		Practical	Internal Evaluation	Daily	Every lab
				Internal Lab exam	Once per course
			University Exam		Once per
		English Communication Skills	Internal Evaluation	Group Discussion	Once per course
				Presentation Skill	Once per course.
				Writing skill	Once p[illegible] course
			University Exam		Once per course
		Mini project	Internal Evaluation - Reviews		One per course
			University Viva voce		Once per course
		Mini project	Internal Evaluation - Reviews		One per course
			University Viva voce		Once per course

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		Major Project	seminars	Twice per course
			External Viva voce	Once per
			Report	Once per
Indirect **30%** **Weightage**	**Surveys**	Graduate Exit Survey		At the end of the Program
		Alumni Survey		Once per year

10.3 Quality / relevance of assessment tools and processes:

(I) Direct Assessment Tools and Process:

Direct assessment tools described in section 9.1 are used for the direct assessment of POs and PSOs. Initially, the attainment of each course outcome is determined using internal as well as external (university exam) assessment as described in section 7.2. Each PO attainment of corresponding to a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also determined.

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10.4 Direct Attainment

Figure 10.1 shows the direct assessment of POs of FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301) as a sample.

Mapping of Course outcome with Program Outcomes

CO-PO MATRIX FOR **FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)**

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3									
CO2		3	3							
CO3			3	3						
CO4				3	2				2	2

CO ATTAINMENT			
CO	IA-1	IA-2 (In Percentage)	AVERAGE OF CORRESPONDING
C0-1	84		84
CO-2	84		84
CO-3		82	82
CO-4		82	82
C0-5		82	82
		ATTAINMENT PERCENTAGE	82.8
INTERNAL ATTAINMENT VALUE			3
UNIVERSITY/EXTERNAL ATTAINMENT VALUE			3
OVERALL DIRECT CO ATTAINMENT			3
INDIRECT CO ATTAINMENT			2.17
OVERALL CO ATTAINMENT			2.834

CO-PO attainment of the course FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2.834									
CO2		2.834	2.834							
CO3			2.834	2.834						

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CO4				2.834	1.89				1.89	1.89
Average CO(FED)	2.834	2.834	2.834	2.834	1.89				1.89	1.89

Figure 10.1. Direct attainment of CO-PO of FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Average of direct attainments of PO_i obtained for all Courses:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Direct Attainment	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}

Direct Attainment D_i = Average of direct attainments of PO_i obtained for all Courses.

YR/SEM	SUBJECT NAME	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
FIRST YEAR	MATHEMATICS-II	BAS 203	3.0	3.0	1.5	2.0	-	-	-	-	-	-	2.0		
	MATHEMATICS – I	BAS 103	3.0	3.0	-	2.0	-	-	-	-	-	-	3.0		
	ENGINEERING PHYSICS	BAS 101	3.0	2.2	2.3	-	-	-	-	2.0	2.0	-	3.0	2.0	
	ENGINEERING PHYSICS/ ENGINEERING CHEMISTRY LAB	BAS 151/152	2.0	2.0	3.0	-	-	-	-	-	2.0	2.0	1.0		
	ENGINEERING CHEMISTRY	BAS 102	3.0	2.0	2.0	2.7	1.0	2.0	2.0	-	2.0		1.0	2.0	
	ENGLISH	BHU 201	-	-	-	-	-	2.3	-	3.0	3.0	3.0		2.0	3.0
	ENGINEERING DRAWING	BCE 251	3.0	3.0	1.0	3.0	1.0	-	-	-	-	3.0	3.0		
	ENGINEERING WORKSHOP	BME 251	2.5	2.5	1.5	1.0	1.0	1.0	-	-	-	-	2.0	1.0	
	COMPUTER PROGRAMMING	BCS 201	2.8	2.0	-	2.7	-	-	3.0	-	2.7	3.0	2.0		
III YEAR I SEMESTER	PRINCIPLE COMMUNICATIONS	BEC 502	3.0	3.0	2.67		-	-	-	-	-	-	3.0		
	ANALOG SIGNAL PROCESSING	BEC-022	3.0	3.0	3	2.4	-	-	-	-	-	-	3.0		
	ANTENNAS & WAVE PROPAGATION	BEC-501	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	3.0		
	INTEGRATED CIRCUIT	BEC603	3.0	2.9	2.7	2.7		-	-	2.5	-	2.8	1.0		
	CONTROL SYSTEMS ENGINEERING	BIC 501	3.0	3.0	2.9	2.7	3.0	-	-	2.5	-	2.8	1.0		
	MICROWAVE ENGINEERING	BEC-604	3.0	2.8	2.8	2.4		-	-	2.5	-	2.7	2.0		
	INTEGRATED CIRCUIT LAB	BEC-653	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0		
	MICROWAVE LAB	BEC 651	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0		
III YEAR II SEMESTER	DIGITAL COMMUNICATIONS	BEC 601	3.0	2.5	2.0	2.5	2.0	-	2.0	-	-	3.0	3.0		
	DIGITAL SIGNAL PROCESSING LAB	BEC-652	3.0	3.0	3	2.0	2.0	-	-	-	-	-	3.0		
	DIGITAL SIGNAL PROCESSING	BEC 602	2.5	2.75	2.25	2.8		-	-	-	-	-	3.0		
	INDUSTRIAL MANAGEMENT	BHU601	-	-	-	-	-	3.0	-	3.0	-	2.67		3.0	3.0
	MENAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	BHU 501	3.0	3.0	3.0	3.0	3.0	-	2.0	-	-	2.8		3.0	3.0

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	MICROPROCESSOR	BEC504	3.0	3.0	2.67	3.0	-	-	-	-	-	3.0	3.0		
	MICROPROCESSOR LAB	BEC-554	-	-	-	-	-	-	-	2.5	-	2.67	3.0		
	POWER ELECTRONIC	BEE-503	3.0	2.8	2.8	2.4	-	-	-	-	-	-	3.0		
IV YEAR ISEMESTER	WIRELESS AND MOBILE COMMUNICATIONS	BEC801	2.8	2.8	2.6	2.6	2.0	-	3.0	-	-	2.7	3.0		
	DATA COMMUNICATION NETWORKS	BEC702	2.2	2.0	3.0	2.5	2.0	-	-	-	-	-	3.0		
	Digital System Design using VHDL	BEC-081	2.7	2.5	2.5	2.5	3.0	-	-	-	-	-	1.0		
	RELIABILITY OF ELECTRONICS SYSTEMS	BEC-082	2.7	3.0	2.5	3.0	-	-	-	2.0	3.0	2.7		3.0	3.0
	SATELLITE COMMUNICATION	BEC 071	2.6	2.2	2.3	3.0	2.0	-	-	-	-	2.0	3.0		
	OPTICAL COMMUNICATION	BEC 701	3.0	2.3	2.5	2.5	2.0	-	-	-	2.0	2.0	2.0		
	Optical Fiber Communication (Lab)	BEC-752	-	-	-	-	-	-	-	2.5	-	2.7		2.0	3.0
	VLSI DESIGN	BEC-751	3.0	3.0	3.0	3.0	2.5	-	-	2.7	-	2.7	3.0		
IV YEAR II SEMESTER	ELECTRONIC SWITCHING	BEC-802	3.0	2.7	3.0	2.5	2.0	-	-	-	2.0	2.0	3.0		
	EC-073 OPTICAL NETWORKS	BEC-073	3.0	3.0	3.0	3.0	-	-	-	-	2.5	2.5	3.0		
	INTRODUCTION TO RADAR SYSTEM	BEC-083	3.0	3.0	2.0	3.0	2.0	3.0	1.0	-	2.0	2.0	3.0		
	QUALTI MANAGEMENT	BEC-072	3.0	3.0	-	-	-	-	-	-	-	2.0		2.0	2.0
	MAJOR PROJECT	BEC 851	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-		3.0	3.0
	INDUSTRY ORIENTED MINI PROJECT	BEC 853	3.0	3.0	3.0	3.0	3.0	-	-	-	-	3.0		2.0	3.0
		AVERAGE	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.9
		% AVERAGE (AVERAGE *100/3)	96.08	91.38	85.9	87.5	77	75.5	72.2	83.8	77.2	86.9	83.9	77.8	96.3
		% AVERAGE (AVERAGE *100/3) ROUND TWO DECIMAL PLACES	96.08	91.4	85.9	88	77	75.5	72.2	84	77	86.9	84	77.8	96.3

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	PSO2	PSO3
Direct Attainment	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.9

10.5 Indirect Assessment Tools and Process:

Indirect assessment is done through program exit survey, alumni survey and employer survey where program exit survey and employer survey are given a weightage of 25% each and alumni survey is given a weightage of 50%.

1. Graduate Exit Survey:

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An exit survey is conducted for students who have graduated out of the department for that year. Relevant questionnaire in exit survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with questionnaire is given in section (b).

(i) Questionnaire Format

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. Very Good 3. Good 2.Average 1.Poor

S.No	Criteria	Rating
1	Opinion about UG programme in ECE at INVERTIS UNIVERSITY, BAREILLY.	
2	Ability acquired to apply knowledge of Mathematics, Science and Engineering in real time.	
3	Competence developed to analyse and interpret data and design complex computing system or process specific needs.	
4	Skill gained to apply modern engineering tools and techniques for engineering practice.	
5	Responsibility level acquired to develop engineering solutions for sustainable development, ethically and economically.	
6	Leadership qualities and team spirit inculcated through various student development programmes.	
7	Zeal to engage in, to resolve contemporary issues and acquire lifelong learning.	
8	Overall rating for INVERTIS UNIVERSITY, BAREILLY	

(ii) Relation of POs and PSOs with questionnaire

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Questions	Q3	Q3	Q3, Q4	Q4, Q5	Q5	Q6, Q9	Q6	Q6	Q7	Q7

PSOs	PSO1	PSO2	PSO3
Questions	Q3	Q5, Q6, Q8	Q6, Q7

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(iii) Evaluation Process

The questionnaire consists of 8 questions which is relevant for assessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These survey results are tabulated and the average values corresponding to each PO and PSO are determined.

2. Alumni Survey:

Feedback is taken from alumni. Relevant questionnaire in alumni survey form to evaluate attainment of POs and PSOs is given in section (i) and relation of POs & PSOs with questionnaire is given in section (ii).

(i) Questionnaire Format

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. Very Good 3. Good 2.Average 1. Poor

S. No	Criteria	Rating
1	Extent of curriculum meeting the industry needs.	
2	Your ability to apply knowledge and design electronic system or process to meet desired specifications and needs.	
3	Benefit from value added certifications, workshops and training programmes conducted during your course.	
4	Your ability to use techniques, skills and modern engineering tools necessary for engineering practice.	
5	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities.	
6	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
7	Competence to function on multidisciplinary teams	
8	Skills attained to create, select and apply appropriate techniques, resources and modern engineering and IT tools.	
9	Extent of Ethical, social and environmental values inculcated, helping you to relate Electronics and Communication engineering issues with societal needs.	

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(ii) Relation of POs and PSOs with questionnaire:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Questions	Q3	Q3,Q5	Q3	Q5	Q5	Q5,Q10	Q8,Q10	Q10	Q8	Q6

PSOs	PSO1	PSO2	PSO3
Questions	Q3,Q4,Q5	Q5,Q7,Q10	Q6,Q8,Q9,Q10

(iii) Evaluation Process

The questionnaire consists of 9 questions which is relevant for assessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

10.6 Indirect Attainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Graduate Exit Survey	Attainment values of Graduate Exit Survey									
Alumni Survey	Attainment values of Alumni Survey									
Overall Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}

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Indirect Attainment I_i= 50% attainment of Graduate Exit survey +

50% attainment of Alumni survey

10.7 Overall PO and PSO attainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Direct Attainment	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}
Indirect Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}
Overall Attainment	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	O_{10}

Overall Attainment of PO_i; $O_i = 70\%$ of $D_i + 30\%$ of I_i

where D_i – Direct Attainment of each PO
I_i – Indirect Attainment of each PO

Similarly PSO attainment is also evaluated.

POs	PSO1	PSO2	PSO3
Direct Attainment	D_1	D_2	D_3
Indirect Attainment	I_1	I_2	I_3
Overall Attainment	O_1	O_2	O_3

Overall Attainment of PSO_i; $O_i = 70\%$ of $D_i + 30\%$ of I_i

where D_i – Direct Attainment of each PSO
I_i – Indirect Attainment of each PSO

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11 ASSESSMENT PROCESS OF THE ATTAINMENT OF PROGRAMME EDUCATIONAL OBJECTIVES

11.1 The Administrative System ensuring the Attainment of the PEO"s

The following administrative setup is put in place to ensure the attainment of PEOs

- Program Coordinator
- Program Assessment Committee
- Department Advisory Board

Program Coordinator:

- ❖ Interacts and maintains liaison with key stake holders, students, faculty, Department, Head, and Employer.
- ❖ Monitor and reviews the activities of each year in program (II, III,IV) independently with course coordinators.
- ❖ Schedules program work plan in accordance with specifications of PEOs and Pos.
- ❖ Oversees daily operation and coordinates activities of program with appropriate policies, procedures and specifications given by HOD.
- ❖ Coordinates and supervise the faculty teaching the particular course in the module.
- ❖ Responsible for assessment of the course objectives and outcomes.
- ❖ Recommend and facilitate workshops, faculty development programs, meetings or conferences to meet the course outcomes.
- ❖ Analyzes results of Particular course and recommends the Program coordinator and/or Head of the Department to take appropriate action.

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- Liaise with students, faculty, program coordinator and Head of the Department to determine priorities and policies.

Program Assessment Committee:

- Program assessment committee consists of program coordinator and faculty representatives
- Chaired by program Coordinator, the committee monitors the attainment of PO and PEOs
- Evaluates program effectiveness and proposes necessary changes
- Prepares periodic reports records on program activities, progress, status or to other special reports for management of key stake holders
- Motivates the faculty and students towards attending workshops, developing projects, working models, paper publications and research
- Interact with students, faculty, program coordinators, Module Coordinator and outside/Community agencies (through their representation) in facilitating PEO's
- PAC meets at least once in 6 months to review the program and submits report of Department Advisory Board.

Department Advisory Board:

The Departmental Advisory Board (DAB) has been formed with the objective of remaining up to date with the latest requirements of the industry and incorporating necessary components in the curriculum as much as possible.

The DAB is enriched with members from eminent institutions as well as senior members of faculty who periodically monitor the departmental

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activities and suggest improvements of the program.

It is highest decision-making body at the department level.

- ❖ DAB chaired by HOD, receives the report of the PAC and monitors the progress of the program
- ❖ DAB on current and future issues related to programs
- ❖ Develops and recommends new or revised program goals and objectives
- ❖ DAB meets at least once in a year to review the programs

List of Committees and their Contribution for ensuring the achievement of PEO's

S.NO	Committee Name	Name of the Faculty members	Functions	PEO"s
1	Industry Institute Interaction & Industrial Visits committee	Mr. Arun Gangwar Dr. Sourabh Pathak	To schedule and conduct regular visits to industries in the vicinity and other states	PEO-2 PEO-3
2	Project Review Committee	Mr. Mon Prakash Upadhyay Dr. Ankur Rai Mr. Pankaj Tripathi Ms. Manjari Sharma	To allot projects to the group of students regularly monitor the progress and evaluate the quality of projects	PEO-2
3	Technical Fests organizing committee	Ms. Manjari Sharma Ms. Purnima Pal	To conduct various technical events on emerging trends from time to time	PEO-2 PEO-4
4	Guest Lectures organizing Committee	Dr. Ankur Rai Mr. Pankaj Tripathi	To contact various reputed persons from R&D and Industries for arranging guest lecturers for the benefit of the students and faculty	PEO-2 PEO-3
5	Technical Skills enhancement Training Committee	Mr. Arun Gangwar Dr. Sourabh Pathak	To train and prepare the students for placement	PEO-1 PEO-2 PEO-4 PEO-5

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6	Student Mentoring Committee	Mr. Mon Prakash Upadhyay Dr. Ankur Rai	To solve problems faced by the students	PEO-1 PEO-2 PEO-3 PEO-4
7	Consultancy and R&D Advisory Committee	Mr. Mon Prakash Upadhyay Dr. Ankur Rai Dr. Sourabh Pathak	To guide and motivate faculty to apply various funded projects	PEO-3
8	Class Review Committee	Class teachers Course instructors	To monitor the progress of class work, syllabus coverage from time to time. To plan remedial classes for slow learners	PEO-1 PEO-2
9	Department Library Committee	Ms. Purnima Pal	To monitor and update the library text books, maintaining the group, mini and major project Reports	PEO-1 PEO-4
10	Placements Co-ordination committee	Ms. Manjari Sharma Ms. Purnima Pal	To design and update the curriculum which meet the current needs of the industry. Conducting the CRT classes, monitoring the students eligibility criteria	PEO-1 PEO-2 PEO-4 PEO-5
11	Alumni Affairs	Mr. Debanjan Roy Dr. Sourabh Pathak	To contact and oversee the Alumni affairs like conducting special lectures by Alumni recruited in Industry	PEO-1 PEO-2 PEO-4

11.2 Tools and processes used in achievement of the PEOs

This describes the assessment process that periodically documents and demonstrates the degree to which the programme educational objectives are attained. also include information on:

a) A listing and description of the assessment processes used to gather the data upon which the evaluation of each programme educational objective is based. Examples of data collection processes may include, but are not limited to, employer surveys, graduate surveys, focus groups, industrial advisory committee meetings, or other processes that are relevant and appropriate to theprogramme.

b) The frequency with which these assessment processes are carried out.

The curriculum is designed by taking into consideration various components

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prescribed by AICTE. All courses that are included under each of the following components enlisted below contribute to the achievement of PEOs. The course instruction, marks secured by the students in these components indicate the level of achievement of the PEOs. In addition, Graduate Exit survey, Alumni survey, Industrial advisory committee meetings, gainfully engaged/ Placements of students also contribute to the attainment of PEOs.

Table 11.1: Assessment Tools for PEOs

Type of Assessment Tool	Assessment Tool	Assessment criteria	Data collection frequency	Responsible entity	Indicators for Attainment of PEO
Direct	Results	Internal, External examination	Once in a semester	Examination Cell	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Placement Record	Number of students Placed	Once every year	Placement cell	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Higher Education	Number of students opted for higher education	Once every year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
Indirect	Graduate Exit survey	Level of achievement	Once every Year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Alumni Survey	Level of achievement	Once every Year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5

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11.3 The attainment of the PEOs

The Expected Level of Attainment for each of the Program Educational Objectives

Table 11.2: Levels of Attainment for each PEO

PEO	Level of Attainment
Value >=70%	Excellent
Value > = 60 and value < 70%	Very good
Value > = 50 and value < 60	Good
Value >= 40 and value < 50	Satisfactory
Value < 40	Not Satisfactory

PEO Evaluation Processes and an Analysis

For the purpose of assessing the levels of achievement of PEO's, certain weightages are given for various tools as indicated below.

Table 11.3: PEO Evaluation Criteria

S. No.	Name of the Evaluation Criterion	Weightages in %
Direct Assessment (70%)		
1.	Direct Evaluation of Program Outcomes (POs) of the concerned PEO	70
2.	Placements	15
3.	Higher Studies	5
Indirect Assessment (30%)		
4.	Graduate Exit Survey	10
5.	Alumni Survey	10
Total		100

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CO-PO attainment of the course FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Table: Direct attainment of CO-PO of FUNDAMENTALS OF ELECTRONIC DEVICES (BEC-301)

Course Outcome FED(BEC-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2.834									
CO2		2.834	2.834							
CO3			2.834	2.834						
CO4				2.834	1.89				1.89	1.89
Average CO(FED)	2.834	2.834	2.834	2.834	1.89				1.89	1.89
Average CO(FED) (%)	94.4	94.4	94.4	94.4	63				63	63

Average of direct attainments of PO_i obtained for all Courses

POs	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO 10	PS O1	PSO 2	PSO 3
Direct Attainment	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.9
(%) Direct Attainment	96.08	91.4	85.9	88	77	75.5	72.2	84	77	86.9	84	77.8	96.3

Direct Evaluation of Program Outcomes (POs) of the concerned PEO

Mapping of Program Outcomes (POs) of the concerned PEOs is shown in table 11.4.

Table 11.4 Mapping of Program Outcomes (POs) of the concerned PEOs

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	X				
PO2		X	X		
PO3			X		
PO4		X	X		
PO5		X	X		
PO6				X	X
PO7				X	
PO8				X	X

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PO9				X	
PO10				X	

Mapping of Program Outcomes (POs) of the concerned PEOs by using average of direct attainments of PO_i obtained for all Courses (2016-2020) is shown in table 11.5.

Table 11.4 Mapping of Program Outcomes (POs) of the concerned PEOs

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	90.96				
PO2		89.41	89.41		
PO3			85.61		
PO4		88	88		
PO5		77	77		
PO6				75.5	75.5
PO7				72.2	
PO8				84	84
PO9				77	
PO10				86.9	
AVG	**90.96**	**84.57**	**85.00**	**79.63**	**80.33**
AVG(PEOs) (%)	**84.1**				

% AVERAGE ACHIEVEMENT O F PEOs = 84.1%

Program Outcomes of the concerned PEO (%)	**90.96**	**84.57**	**85.00**	**79.63**	**80.33**

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Table 11.5: Attainment of PEO's

S.no	Name of the Evaluation Criterion	PEO-1	PEO-2	PEO-3	PEO-4	PEO-5
1.	Program Outcomes of the concerned PEO (60%)	57.6	52.8	51.3	47.7	48.1
2.	Placements/ Higher Studies (20%)	15.5	15.5	15.5	15.5	15.5
3.	Graduate Exit Survey (10%)	9.8	9.7	9.6	9.5	9.8
4.	Alumni Survey (10%)	9.7	9.6	9.5	9.7	9.6
Total		**92.6**	**87.6**	**85.9**	**82.4**	**83**

11.4 Process of Redefining the PEOs

Outcome based education system was adopted by NBA in the beginning of 2011 and various departments of the college have started orienting their programmes accordingly. The initial drafts were presented to various stake holders and made suitable modifications and thus, the process of redefining has taken place and the second draft of PEOs was formulated. There were some modifications suggested by NBA from time to time as reflected in their website and further redefining was carried out.

As a regular academic activity, the college has always been involving the key stake holders in collecting information and suggestions with regard of curriculum development and curriculum revision. This practice was being followed even before the introduction of outcome-based accreditation process by NBA. Based on the information collected the objectives of the program are defined, refined and are inscribed in the form of PEO's.

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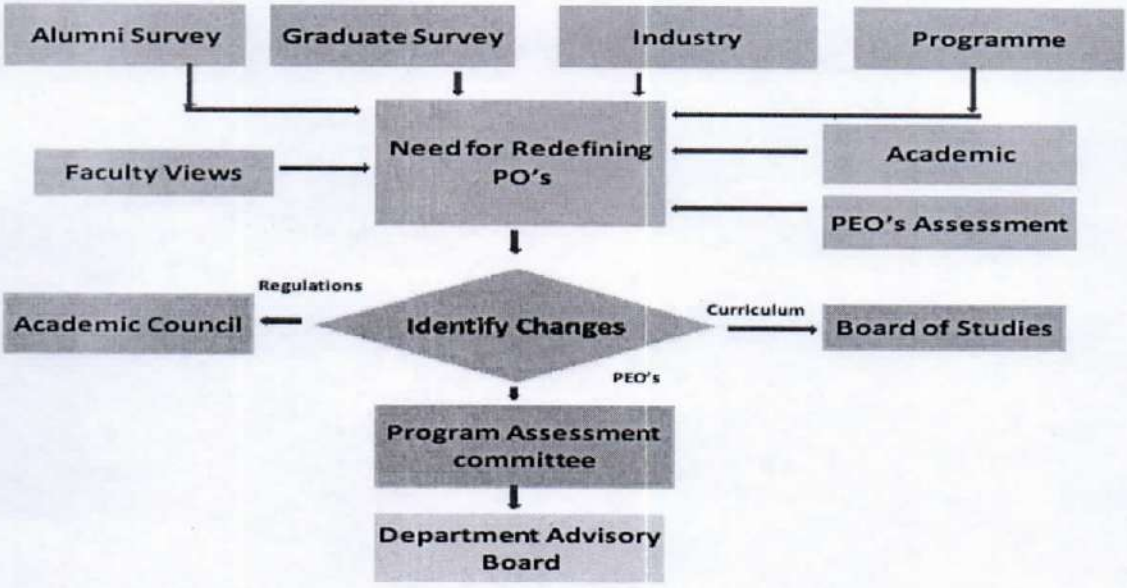

Figure 11.1: Flow chart for redefining PEO's

The following process is followed to redefine the PEOs as and when required.

- The process is initiated by Department Advisory Board during PEOs assessment and attainment process.
- To redefine, the existing PEOs assessment data is gathered through direct and indirect assessment methods.
- To improve the program performance, the collected data is analyzed to identify the need for redefining PEOs.
- Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like BOS, Academic Council and Program Assessment Committee involve appropriate actions.

In addition to the above, the following inputs are also taken into account in the process of redefining PEO's:

1. The level of attainment of PEO's defined earlier.
2. Suggestions/ experiences of experts from sister colleges and various organizations.
3. The information gathered during Accreditation awareness programs.

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ANNEXURE

A. B.Tech COURSE LIST

YR/SEM	SUBJECT NAME	Course Code
FIRST YEAR	MATHEMATICS-II	BAS 203
	MATHEMATICS – I	BAS 103
	ENGINEERING PHYSICS	BAS 101
	ENGINEERING PHYSICS/ ENGINEERING CHEMISTRY LAB	BAS 151/152
	ENGINEERING CHEMISTRY	BAS 102
	ENGLISH	BHU 201
	ENGINEERING DRAWING	BCE 251
	ENGINEERING WORKSHOP	BME 251
	COMPUTER PROGRAMMING	BCS 201
III YEAR I SEMESTER	PRINCIPLE COMMUNICATIONS	BEC 502
	ANALOG SIGNAL PROCESSING	BEC-022
	ANTENNAS & WAVE PROPAGATION	BEC-501
	INTEGRATED CIRCUIT	BEC603
	CONTROL SYSTEMS ENGINEERING	BIC 501
	MICROWAVE ENGINEERING	BEC-604
	INTEGRATED CIRCUIT LAB	BEC-653
	MICROWAVE LAB	BEC 651
III YEAR II SEMESTER	DIGITAL COMMUNICATIONS	BEC 601
	DIGITAL SIGNAL PROCESSING LAB	BEC-652
	DIGITAL SIGNAL PROCESSING	BEC 602
	INDUSTRIAL MANAGEMENT	BHU601
	MENAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	BHU 501
	MICROPROCESSOR	BEC504
	MICROPROCESSOR LAB	BEC-554
	POWER ELECTRONIC	BEE-503

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IV YEAR ISEMESTER	WIRELESS AND MOBILE COMMUNICATIONS	BEC801
	DATA COMMUNICATION NETWORKS	BEC702
	DIGITAL SYSTEM DESIGN USING VHDL	BEC-081
	RELIABILITY OF ELECTRONICS SYSTEMS	BEC-082
	SATELLITE COMMUNICATION	BEC 071
	OPTICAL COMMUNICATION	BEC 701
	OPTICAL FIBER COMMUNICATION (LAB)	BEC-752
	VLSI DESIGN	BEC-751
IV YEAR II SEMESTER	ELECTRONIC SWITCHING	BEC-802
	OPTICAL NETWORKS	BEC-073
	INTRODUCTION TO RADAR SYSTEM	BEC-083
	QUALTI MANAGEMENT	BEC-072
	MAJOR PROJECT	BEC 851
	INDUSTRY ORIENTED MINI PROJECT	BEC 853

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B. GRADUATE EXIT SURVEY FORM

Invertis University, Bareilly

Department of Electronics & Communications Engineering

Graduate Exit Survey

Academic Year:

Name (in Full): Roll No: Mail-id:

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5. Excellent 4. Very Good 3. Good 2. Average 1. Poor

S.No	Criteria	Rating
1	Opinion about UG programme in ECE at INVERTIS UNIVERSITY, BAREILLY.	
2	Overall Rating for attainment of your PEOs & POs.	
3	Ability acquired to apply knowledge of Mathematics, Science and Engineering in real time.	
4	Competence developed to analyze and interpret data and design complex electronic system or process specific needs.	
5	Skill gained to apply modern engineering tools and techniques for engineering practice.	
6	Responsibility level acquired to develop engineering solutions for sustainable development, ethically and economically.	
7	Leadership qualities and team spirit inculcated through various student development programmes.	
8	Zeal to engage in, to resolve contemporary issues and acquire lifelong learning.	
9	Benefit from INVERTIS UNIVERSITY, BAREILLY	

Signature

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C. ALUMNI SURVEY FORM

Invertis University, Bareilly

Department of Electronics & Communications Engineering

Alumni Survey Form **Academic Year:**

Name		
Specialization and Period of Graduation :		
Address for Communication:		
City:	State:	Pin code
Employment details:		Email:
Company and Designation:		

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5. Excellent **4. Very Good** **3. Good** **2. Average** **1. Poor**

S.No	Criteria	Rating
1	Overall Rating for attainment of your PEOs & Pos.	
2	Extent of curriculum meeting the industry needs.	
3	Your ability to apply knowledge and design computing system or process to meet desired specifications and needs.	
4	Benefit from value added certifications, workshops and training programmes conducted during your course.	
5	Your ability to use techniques, skills and modern engineering tools necessary for engineering practice in your organization.	
6	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities in your career/higher education.	
7	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
8	Competence to function on multidisciplinary teams in your job.	
9	Benefit from skills attained to create, select and apply appropriate techniques, resources and modern engineering and IT tools to show professional efficiency.	
10	Extent of Ethical, social and environmental values inculcated, helping you to relate computer engineering issues with societal needs.	

Suggestions for Improvement:

_____

_____

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EDUCATION DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. EDUCATION DEPARTMENT VISION AND MISSION

VISION

"To groom professionals in the field of Education who will bring about a qualitative change to the society through their contributions."

MISSION

"Invertis University B.Sc.B.Ed./ B.El.Ed. programs provide stimulate academic diligence, critical thinking and innovation for students Knowledge, Skill and Attitude for effectively managing modern Organization and create value for the world."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

Program Educational Objectives (PEOs):

PEO1-PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurialcapability.

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the Education Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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PROGRAM OUTCOMES(POs): B.SC.B.Ed.

Program Outcomes (POs)		
PO1	**Educational knowledge**	Develop a conceptual understanding of the fundamental physical principles described above.
PO2	**Problem analysis**	Identify the relationship between the conceptual description of nature and its mathematical expression.
PO3	**Interpersonal Skills**	Examine the mathematical description of these principles that can be used to develop devices, structures, and technologies that are useful for mankind.
PO4	**Critical thinking Skills**	Use the mathematical description of these principles to develop problem solving skills that will benefit your future career.
PO5	**Conduct investigations of problems**	Students should be able to design, conduct, record, analyze, and explain the results of chemical experiments.
PO6	**Use of Modern tools**	Students should be able to use and/or identify methods by which to solve chemical problems.
PO7	**Ethics**	Develop understanding about teaching, pedagogy, school management and community involvement.
PO8	**Individual and teamwork**	Exhibit the leadership capacity and teamwork skills for decision making.
PO9	**Communication skill**	An ability to Demonstrate effective communication.
PO10	**Subject specification**	Make use of subject specific pedagogical knowledge and skills.
PO11	**Holistic Development**	Practice skills and approaches for enhancing understanding of subject matter knowledge to be taught in secondary schools.
PO12	**Life-long learning**	Build skills and abilities of communication, reflection, art, aesthetics, theatre, self expression and ICT.

PROGRAM OUTCOMES(POs): B.El.Ed.

Program Outcomes (POs)		
PO1	**Educational knowledge**	Apply core teaching skills in elementary classes.

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PO2	**Problem analysis**	Execute educational theories and principles in a classroom setting of Elementary Level
PO3	**Interpersonal Skills**	Develop understandings in teaching competencies and transfer it into practice at the elementary Level class room
PO4	**Critical thinking Skills**	Reproduce effective educational performance using research skills, information and Technological Competencies at the elementary level Teaching
PO5	**Conduct investigations of problems**	Demonstrate effective communication (One Foreign Language too) and behavioural Skills to support and enhance educational effectiveness in and outside and inside the elementary classroom
PO6	**Use of Modern tools**	Generate positive perspectives and skills that enhances educational leadership in education
PO7	**Ethics**	Develop understanding about teaching, pedagogy, school management and community involvement.
PO8	**Individual and teamwork**	Recognize ethical considerations and values relevant to teaching learning processes.
PO9	**Communication skill**	An ability to Demonstrate effective communication.
PO10	**Subject specification**	Recognize ethical considerations and values relevant to teaching learning processes.
PO11	**Holistic Development**	Comprehend their content knowledge for their own higher education and for elementary classroom setting
PO12	**Life-long learning**	Execute and reflect learning and development throughout their career.

PROGRAM OUTCOMES(POs): B.A.B.Ed.

Program Outcomes (POs)		
PO1	**Educational knowledge**	Understand basic concepts and ideas of educational theory.
PO2	**Problem analysis**	Build understanding and perspective on the nature of the learner, diversity and learning.
PO3	**Interpersonal Skills**	Discuss the role of the systems of governance and structural – functional provisions that support school education.
PO4	**Critical thinking Skills**	design teaching strategies.
PO5	**Conduct investigations of problems**	identify school need and requirements.

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PO6	**Use of Modern tools**	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.
PO7	**Ethics**	Develop understanding about teaching, pedagogy, school management and community involvement.
PO8	**Individual and teamwork**	Develop understanding about teaching, pedagogy, school management and community involvement.
PO9	**Communication skill**	An ability to Demonstrate effective communication.
PO10	**Subject specification**	Make use of subject specific pedagogical knowledge and skills.
PO11	**Holistic Development**	Practice skills and approaches for enhancing understanding of subject matter knowledge to be taught in secondary schools.
PO12	**Life-long learning**	Build skills and abilities of communication, reflection, art, aesthetics, theatre, self expression and ICT.

The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

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STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

4.3 Program Specific Outcomes (PSO)

PSO1: Build understanding and perspective on the nature of the learner, diversity and learning.

PSO2: Comprehend the role of the systems of governance and structural – functional provisions that support school education.

PSO3: Develop understanding about teaching, pedagogy, school management and community involvement.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higherforms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learningprocesses.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve	defines,describes, identifies, knows, labels,	Reciteapolicy. Quotepricesfrom

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Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learningthe classroom into novel situations in the workplace.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows,solves, uses	Use a manual to calcula an employee's vacation time. Apply laws of statistics to evaluate the reliability of a writtentest.
Previouslearned information.	lists,matches,names, outlines,recalls, recognizes,reproduces, selects, states	Memorytoa customer.Recite the safety rules.
Understanding: Comprehending Themeaning, translation, interpolation,and Interpretationof Instructionsand problems. State a Problemin one'sown words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewritethe Principlesoftest writing. Explain in one'sownwords Thestepsfor Performinga Complextask. Translatean Equationinto acomputer spreadsheet.

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Analyzing: Separates material or conceptsinto component parts sothatits organizational structuremaybe understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishesidentifies, illustrates,infers, outlines,relates,selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognizelogical fallaciesin reasoning. Gathers information from a departmentand selects the required tasks fortraining.
Evaluating: MakeJudgmentsaboutthe value of ideas or materials.	appraises,compares,concludes, contrasts,criticizes,critiques, defends,describes, discriminates, evaluates, explains,interprets, justifies,relates, summarizes,supports	Select the most Effectivesolution. Hire the most qualified candidate. Explain andjustify a newbudget.

Creating: Builds a structureor Patternfrom diverse elements. Put parts together to form a whole, with emphasis on creating a new	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises,	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several

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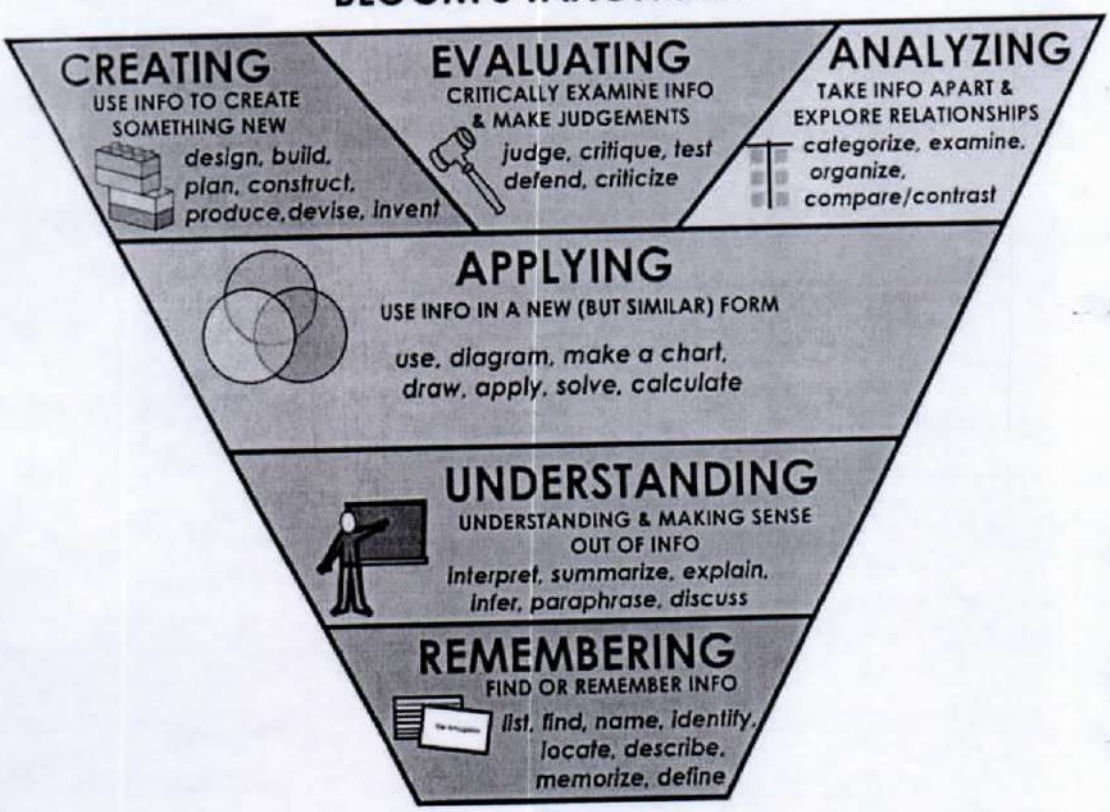
meaning or structure.	rewrites, tells, writes	summarizes,	sources to solve a problem. Revises and process to improve the outcome.

BLOOM'S TAXONOMY



6. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

SAMPLE CO STATEMENTS:
Course: MATRIX THEORY AND GEOMETRY

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Course Code: BEB107

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe about Matrix and Geometry.
CO2	To understand the concept of determinant and its properties.
CO3	To draw the tracing of curve.
CO4	To compare between matrices and determinant.
CO5	To evaluate the Eigen values and Eigen vectors.
CO6	To design Three dimensional systems of co-ordinates.

SAMPLE CO STATEMENTS:
COURSE: STATICS AND DYNAMICS
Course Code: BEB307

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand various concept of work, force and Gravity.
CO2	Analyze the Radial and Transverse and Tangential and normal velocity and acceleration.
CO3	Identify the difference between Simple Harmonic motion and Motion under other laws.
CO4	Understand the Kepler's laws of Motion.
CO5	Evaluate the Virtual work.
CO6	Solve the centre of gravity concept.

SAMPLE CO STATEMENTS:
Course: PROBABILITY AND STATISTICS
Course Code: BEB502

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand various Laws of Probability.

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CO2	Analyze the Different methods of estimation.
CO3	Identify the difference between various measurements.
CO4	Understand the standard deviation.
CO5	Evaluate bay's theorem.
CO6	Analyze & Solve the inclusive and exclusive data.

SAMPLE CO STATEMENTS:
COURSE: PEDAGOGY OF MATHEMATICS
Course Code: BED504

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To understand meaning, nature and scope of mathematics
CO2	To develop an insight into aims and objectives of teaching school mathematics
CO3	To understand approaches and strategies in teaching and learning of mathematics.
CO4	To understand the characteristics of Mathematical language and its role in Science
CO5	To state specific objectives in behavioral terms.
CO6	To diagnose basic causes for difficulties in learning mathematics.

SAMPLE CO STATEMENTS:
COURSE: CORE MATHEMATICS
Course Code: BELED105

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe about Number system.
CO2	To understand the concept of tesselation.
CO3	To draw the different types of chart and diagram.
CO4	To compare between Primary and secondary data.
CO5	To evaluate the tax.

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CO6	To design the various kind of charts through data.

SAMPLE CO STATEMENTS:
COURSE: MATHEMATICS-II
Course Code: BELED323

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe about the Sets.
CO2	To understand the concept of vectors multiplication.
CO3	To draw the different types of vector resultant diagram.
CO4	To compare between scalar and vector quantity.
CO5	To evaluate AND OR and NOT gate.
CO6	To design the various kind of circuit and tables.

SAMPLE CO STATEMENTS:
Course: EDUCATIONAL TECHNOLOGY
Course Code: BED103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the computer software and software system.
CO2	To summarize the concept of computer and its types of generation.
CO3	To compare Communication technology and information technology.
CO4	To use ICT in classroom.
CO5	To explain types of educational technology and its function.
CO6	To define the educational technology and its hardware and software approaches.

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On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the computer system.
CO2	To summarize the concept of computer.
CO3	To compare utility and system softwares.
CO4	To use ICT in education.
CO5	To explain educational technology and its function.
CO6	To define the educational technology.

SAMPLE CO STATEMENTS:
Course: Development of Education System in India
Course Code: :BED301

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the development of educational system in India in historical perspective.
CO2	To explain the salient features of Indian Education, ancient, medieval and modern periods.
CO3	To explain the implications of recommendations made by the various Committees and Commissions for educational (General and Special) developments in India.
CO4	To compare the issues and challenges of present and past day education system.
CO5	To criticize the important quality related issues which need to be taken into account revision/ development of new education policy.
CO6	To design the adequate knowledge of the recommendations of various commissions and committees on Indian Education.

SAMPLE CO STATEMENTS:
Course: PUBLIC ECONOMICS
Course Code: BAB504

On successful completion of this course, students should be able to

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	COURSE OUTCOMES DESCRIPTION
CO1	To describe the concept of economics
CO2	To understand the concept of taxation
CO3	To apply the Wagners law of increasing state activities
CO4	To examine the rational for public policy
CO5	To plan Budget
CO6	To create new economic system

SAMPLE CO STATEMENTS:
Course: Educational Technology
Course Code: :BED103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the Educational Technology.
CO2	To discuss the hardware and software approaches.
CO3	To make a chart of different types of educational technology and its function.
CO4	To categorize the different approaches of software
CO5	Students can test the dale cone of experience practically.
CO6	To design application.

SAMPLE CO STATEMENTS:
Course: Contemporary India
Course Code: :BELED301

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the contribution of various school of philosophy and great educational thinkers to the field of education.
CO2	To explain the major issues in Cotemporary India

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CO3	To apply the different teaching methods and discipline in educational process.
CO4	To analyse the contribution of philosophy to education.
CO5	To evaluate different political issues.
CO6	To create new teaching skills among learners

SAMPLE CO STATEMENTS:
Course: Mechanics and Thermodynamics
Course Code: BEB108

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the moment of inertia.
CO2	To summarize the concept of thermodynamics.
CO3	To compare different laws of thermodynamics.
CO4	To use mass spring system.
CO5	To explain simple pendulum.
CO6	To define the applications of first law of thermodynamics.

SAMPLE CO STATEMENTS:
Course: Basic Electronics and Circuit Fundamentals
Course Code: BEB308

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the p-n junction diode.
CO2	To summarize the concept of current conduction.
CO3	To compare intrinsic and extrinsic semiconductors.

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CO4	To use the diode.
CO5	To explain the AC bridges.
CO6	To define the BJT.

SAMPLE CO STATEMENTS:
Course: QUANTUM MECHANICS
Course Code: BEB503

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the wave –particle duality.
CO2	To summarize the concept of heisenbergs uncertainity principle.
CO3	To compare the nature of wave and particle.
CO4	To use schrodingers equation.
CO5	To explain the Barrier penetration problem.
CO6	To define the applications of schrodingers equation.

SAMPLE CO STATEMENTS:
Course: POLITICAL THEORY
Course Code: BAB102

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To define different theories of sovereignty: Monistic Theory, Philosophical Theory, and Pluralistic Theory.
CO2	To summarise complete knowledge of origin of State, Rights, Liberty, Equality, Justice and Sovereignty
CO3	To make a chart of the basic theories of Sovereignty.
CO4	To compare the relationship of Political science with the other disciplines.

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CO5	To judge their Rights and Duties for progress of society and state.
CO6	To build the relation between liberty and equality, right and duties.

SAMPLE CO STATEMENTS:
Course: POLITICAL THOUGHT
Course Code: BAB302

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To identify main current of Indian political thought with fundamental social and political problems of society for the solutions of these problems.
CO2	To understand the concept of political thoughts
CO3	To apply their political obligation for the progress of society and state.
CO4	To analyze the theory of punishment and differentiate between the different forms of punishment.
CO5	To test the knowledge of Natural Law and Natural Rights.
CO6	To design the moral values and argue on the ethical theory of Utilitarianism.

SAMPLE CO STATEMENTS:
Course: POLITICAL SCIENCE I
Course Code: BELED329

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	

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	To Define Concept of political science.
CO2	To Explain human rights and duties.
CO3	To Make charts on Historical and evolutionary theory.
CO4	To compare the Human rights and duties .
CO5	To evaluate Liberty and equality.
CO6	To build the Knowledge about state and other associations.

SAMPLE CO STATEMENTS:
Course: General principles of sociology
Course Code: BAB103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the basic concepts of sociology and socialization..
CO2	To understand the concept of Sociology.
CO3	To solve the problem of socialization, social groups and social institutions.
CO4	To categorize the family, marriage and kinship.
CO5	To critisize different social group and stratification.
CO6	To create the social groups.

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SAMPLE CO STATEMENTS:
Course: Sociological aspects of education
Course Code: BAB302

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To define concept and process of social organization, social stratification and institution.
CO2	To discuss the signification of the education in our society.
CO3	To categorize the issues of equality, excellence and inequalities in education.
CO4	To compare the Sociology of Education and Educational Sociology.
CO5	To evaluate the importance of educational sociology in our society and its background.
CO6	To construct the knowledge about concept of sociological aspect of education.

SAMPLE CO STATEMENTS:
Course: Health education and yoga
Course Code: BED303

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To discuss the benefits and activities of Meditation, Stress management and physical fitness.
CO2	To explain the various dimensions and determinants of health.
CO3	To make a chart of importance of Physical Education
CO4	To organise the school health Programme
CO5	To judge the procedure for health related fitness evaluation.
CO6	To construct the knowledge about the concept of holistic health education.

SAMPLE CO STATEMENTS:
Course: School planning and management
Course Code: BELED304

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On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To define school planning and management
CO2	To discuss induction tanning and teachers support program
CO3	To Make a chart on school building.
CO4	To compare the work of teaching and non-teaching staff..
CO5	To judge the psychological needs of children.
CO6	To build the school plan.

SAMPLE CO STATEMENTS:
Course: PEDAGOGY OF SOCIAL SCIENCE-I
Course Code: BED502

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe objectives of teaching.
CO2	To explain models of teaching.
CO3	To apply teaching aids in teaching in class room.
CO4	To analyse students record
CO5	To evaluate teaching techniques
CO6	To construct the knowledge about teaching the subject.

SAMPLE CO STATEMENTS:
Course: DEVELOPMENT OF EDUCATION SYSTEM IN INDIA
Course Code: BED301

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe the development of educational system in India in historicalperspective.
CO2	To explain the salient features of Indian Education, ancient, medieval and modernperiods.

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CO3	To explain the implications of recommendations made by the various Committees and Commissions for educational (General and Special) developments inIndia.
CO4	To compare the issues and challenges of present and past day educationsystem.
CO5	To criticize the important quality related issues which need to be taken into account revision/ development of new education policy.
CO6	To design the adequate knowledge of the recommendations of various commissions and committees on IndianEducation.

SAMPLE CO STATEMENTS:
Course: PEDAGOGY OF SOCIAL SCIENCE-I
Course Code: BED502

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To describe objectives of teaching.
CO2	To explain models of teaching.
CO3	To apply teaching aids in teaching in class room.
CO4	To analyse students record
CO5	To evaluate teaching techniques
CO6	To construct the knowledge about teaching the subject.

SAMPLE CO STATEMENT . +S:
Course: HUMEN GROWTH AND DEVELOPMENT
Course Code: BELED101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	To identify growth and development;
CO2	To understand the theories of socio-emotional, cognitive and language development and draws educational implications
CO3	To discuss the child –rearing techniques and play pattern of pre school children

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CO4	Make a chart on Growth and Development
CO5	They can test intelligence by different techniques.
CO6	They can plan activities related to the children's with special needs.

7. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"-"** indicates there is nocorrelation.

7.1 Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective

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year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding an practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.

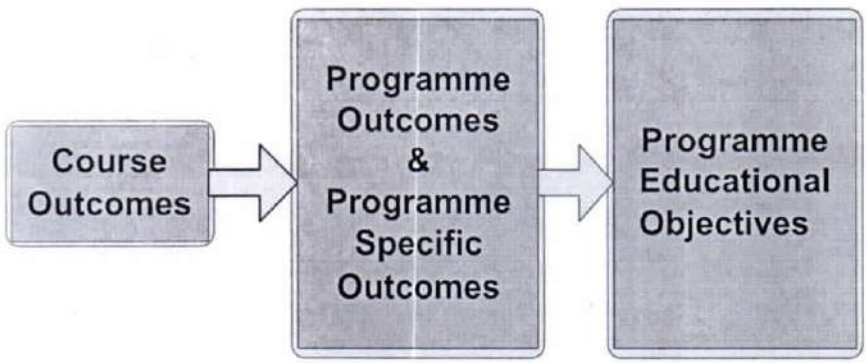

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

This is shown in figure 7.2.

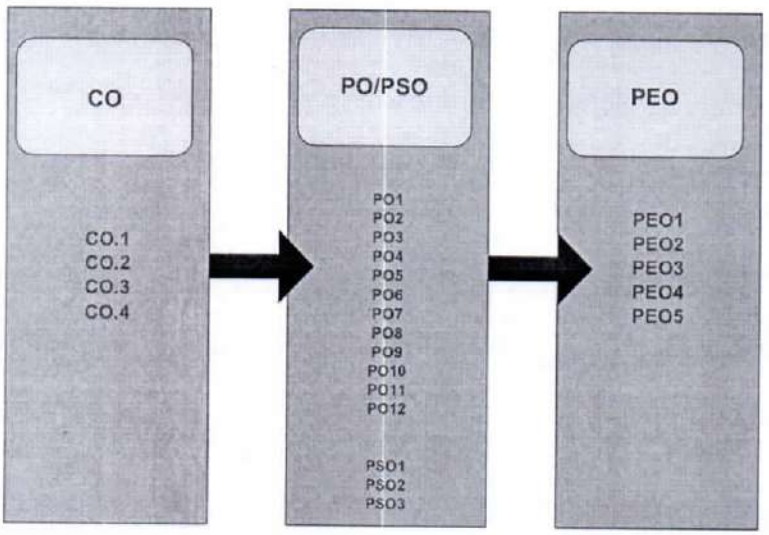

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-POMapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 SAMPLE CO-PO Mapping

Course: MATRIX THEORY AND GEOMETRY
Course Code: BEB107
Mapping of CO with PO

First two numeric digit indicates year of study and next two digits indicate branch number in the respective year of study. PC01 is the first course in second year. A sample course outcome statements and sample CO-PO matrix are given in Table 7.1

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '-'. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '-' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome MBA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment ofCOs/POs

Step-1:The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

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Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

8. COURSE OUTCOMES TO PO AND PSO MAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: MATRIX THEORY AND GEOMETRY
Course Code: BEB107
Mapping of CO with PO

CO1 AT	2.92
CO2 AT	2.92
CO3 AT	2.65
CO4 AT	2.77
CO5 AT	2.81
CO6 AT	2.85

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	1	1	1	1	1	1	1	1
CO2	3	2	3	1	1	1	1	1	1	1	1	1
CO3	1	1	2	2	3	1	1	1	1	1	1	3
CO4	1	2	3	2	1	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	1	1	1	1	1
CO6	1	2	3	1	3	1	1	1	1	1	1	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.69	28.38	39.58	22.35	27.92	16.92	16.92	16.92	16.92	16.92	16.92	27.92
9.00	10.00	14.00	8.00	10.00	6.00	6.00	6.00	6.00	6.00	6.00	10.00
2.85	**2.84**	**2.83**	**2.79**	**2.79**	**2.82**	**2.82**	**2.82**	**2.82**	**2.82**	**2.82**	**2.79**

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: STATICS AND DYNAMICS
Course Code: BEB307
Mapping of CO with PO

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CO1 AT	2.95
CO2 AT	2.86
CO3 AT	2.59
CO4 AT	2.76
CO5 AT	2.65
CO6 AT	2.70

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	1	1	1	1	1	1	1
CO2	3	2	1	1	1	1	1	1	1	1	1	1
CO3	1	1	2	2	3	1	1	1	1	1	1	3
CO4	1	2	2	2	1	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	1	1	1	1	1
CO6	1	2	1	1	3	1	1	1	1	1	1	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.19	27.78	21.86	21.86	27.11	16.51	16.51	16.51	16.51	16.51	16.51	27.11
9.00	10.00	8.00	8.00	10.00	6.00	6.00	6.00	6.00	6.00	6.00	10.00
2.80	**2.78**	**2.73**	**2.73**	**2.71**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.71**

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: PROBABILITY AND STATISTICS
Course Code: BEB502
Mapping of CO with PO

CO1 AT	2.90
CO2 AT	2.90
CO3 AT	2.71
CO4 AT	2.76
CO5 AT	2.86
CO6 AT	2.86

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	1	1	1	1	1	1	1
CO2	3	2	1	1	1	1	1	1	1	1	1	1
CO3	1	1	2	2	3	1	1	1	1	1	1	3
CO4	1	2	2	2	1	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	1	1	1	1	1
CO6	1	2	1	1	3	1	1	1	1	1	1	3

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PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
25.71	28.43	22.48	22.48	28.14	17.00	17.00	17.00	17.00	17.00	17.00	28.14
9.00	10.00	8.00	8.00	10.00	6.00	6.00	6.00	6.00	6.00	6.00	10.00
2.86	**2.84**	**2.81**	**2.81**	**2.81**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.81**

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: PEDAGOGY OF MATHEMATICS
Course Code: BED504
Mapping of CO with PO

CO1 AT	2.90
CO2 AT	2.90
CO3 AT	2.71
CO4 AT	2.76
CO5 AT	2.86
CO6 AT	2.86

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	1	2	3	3	2
CO2	1	1	1	1	1	1	1	1	3	2	2	2
CO3	1	1	1	1	1	1	1	1	2	3	3	2
CO4	1	1	1	1	1	1	1	1	2	2	2	2
CO5	1	1	1	1	1	1	1	1	2	2	2	2
CO6	1	1	1	1	1	1	1	1	2	2	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
17.00	17.00	17.00	17.00	17.00	17.00	36.90	39.62	42.48	36.86	#REF!	#REF!
6.00	6.00	6.00	6.00	6.00	6.00	13.00	14.00	15.00	13.00	#REF!	#REF!
2.83	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.84**	**2.83**	**2.83**	**2.84**	**#REF!**	**#REF!**

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: CORE MATHEMATICS
Course Code: BELED105
Mapping of CO with PO

CO1 AT	2.94
CO2 AT	2.86
CO3 AT	2.48
CO4 AT	2.64
CO5 AT	2.54

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CO6 AT	2.50

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	2	1	1	1	1	1	1	1
CO2	2	2	1	1	2	1	1	1	1	1	1	1
CO3	1	1	2	1	2	1	2	1	1	1	1	2
CO4	1	1	2	1	1	3	1	3	1	3	1	1
CO5	1	2	1	1	3	1	1	1	1	1	1	1
CO6	1	2	1	1	3	1	1	1	1	1	1	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
18.82	29.74	21.08	15.96	34.32	21.24	18.44	21.24	15.96	21.24	15.96	20.94
7.00	11.00	8.00	6.00	13.00	8.00	7.00	8.00	6.00	8.00	6.00	8.00
2.69	2.70	2.64	2.66	2.64	2.66	2.63	2.66	2.66	2.66	2.66	2.62

SAMPLE COURSE-PO AND COURSE-PSO MAPPING COURSE: MATHEMATICS-II
Course Code: BELED323
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	3.00
CO3 AT	2.78
CO4 AT	2.78
CO5 AT	3.00
CO6 AT	3.00

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	1	1	1	1	1	1	1
CO2	3	3	1	1	1	1	1	1	1	1	1	1
CO3	1	1	2	3	2	1	1	2	1	2	1	2
CO4	1	3	2	2	1	1	1	1	1	1	1	1
CO5	1	1	1	1	2	1	1	1	1	1	1	1
CO6	1	2	1	1	3	1	1	1	1	1	1	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
26.56	35.11	23.11	25.89	29.33	17.56	17.56	20.33	17.56	20.33	17.56	23.33
9.00	12.00	8.00	9.00	10.00	6.00	6.00	7.00	6.00	7.00	6.00	8.00

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2.95	2.93	2.89	2.88	2.93	2.93	2.93	2.90	2.93	2.90	2.93	2.92

SAMPLE **COURSE-PO AND COURSE-PSO**
MAPPING **COURSE:** EDUCATIONAL TECHNOLOGY
Course Code: BED103
Mapping of CO with PO

CO1 AT	2.96
CO2 AT	2.88
CO3 AT	2.52
CO4 AT	2.68
CO5 AT	2.58
CO6 AT	2.54

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	3	3	1	3	3	3	3	2	2
CO2	1	3	1	3	3	3	1	3	3	2	2	3
CO3	2	3	3	2	3	3	3	2	2	2	2	2
CO4	3	2	3	3	2	2	3	3	2	3	3	3
CO5	3	3	2	3	1	3	3	2	2	3	2	3
CO6	3	3	3	1	3	3	3	3	3	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
40.20	39.88	40.14	40.88	40.64	39.88	42.72	43.38	40.70	43.08	37.54	43.00
15.00	15.00	15.00	15.00	15.00	15.00	16.00	16.00	15.00	16.00	14.00	16.00
2.68	2.66	2.68	**2.73**	**2.71**	**2.66**	**2.67**	**2.71**	**2.71**	**2.69**	**2.68**	**2.69**

SAMPLE **COURSE-PO AND COURSE-PSO**
MAPPING **COURSE:** ICT and Education
Course Code: BELED303
Mapping of CO with PO

CO1 AT	2.93
CO2 AT	2.87
CO3 AT	2.63
CO4 AT	2.73
CO5 AT	2.70
CO6 AT	2.73

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

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CO1	3	3	3	3	3	3	3	3	3	1	2	2
CO2	3	3	3	1	2	1	3	3	1	3	2	3
CO3	3	2	2	3	2	2	2	2	3	3	2	2
CO4	2	3	3	3	3	3	2	3	3	2	3	3
CO5	1	3	2	3	3	3	2	2	3	3	2	3
CO6	3	1	3	3	3	3	3	3	3	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
41.67	41.70	44.47	44.07	44.30	41.43	41.73	44.47	44.07	41.20	38.67	44.23
15.00	15.00	16.00	16.00	16.00	15.00	15.00	16.00	16.00	15.00	14.00	16.00
2.78	2.78	2.78	**2.75**	**2.77**	**2.76**	**2.78**	**2.78**	**2.75**	**2.75**	**2.76**	**2.76**

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: ICT in Education-II
Course Code: **BEB506**
Mapping of **CO with PO**

CO1 AT	2.96
CO2 AT	2.88
CO3 AT	2.52
CO4 AT	2.68
CO5 AT	2.58
CO6 AT	2.54

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	3	3	1	3	3	3	3	2	2
CO2	1	3	1	3	3	3	1	3	3	2	2	3
CO3	2	3	3	2	3	3	3	2	2	2	2	2
CO4	3	2	3	3	2	2	3	3	2	3	3	3
CO5	3	3	2	3	1	3	3	2	2	3	2	3
CO6	3	3	3	1	3	3	3	3	3	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
40.20	39.23	40.14	40.88	40.64	39.88	42.72	43.38	40.70	43.08	37.54	43.00
15.00	15.00	15.00	15.00	15.00	15.00	16.00	16.00	15.00	16.00	14.00	16.00
2.68	2.66	**2.68**	**2.73**	**2.71**	**2.66**	**2.67**	**2.71**	**2.71**	**2.69**	**2.68**	2.69

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: ICT in Education-II
Course Code: **BED506**

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Mapping of **CO with PO**

CO1 AT	2.95
CO2 AT	2.86
CO3 AT	2.53
CO4 AT	2.70
CO5 AT	2.60
CO6 AT	2.60

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	3	3	3	3	3	3	3	3	2	2
CO2	3	1	3	3	2	1	1	3	3	3	2	3
CO3	3	3	2	2	2	2	3	2	2	3	2	2
CO4	2	3	3	2	3	3	3	3	3	2	3	3
CO5	3	3	2	2	3	3	3	2	3	1	2	3
CO6	3	3	3	3	3	3	3	3	1	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
40.16	43.05	43.63	40.93	43.37	40.51	43.05	43.63	41.02	40.86	37.81	43.28
15.00	16.00	16.00	15.00	16.00	15.00	16.00	16.00	15.00	15.00	14.00	16.00
2.68	2.69	2.73	**2.73**	**2.71**	**2.70**	**2.69**	**2.73**	**2.73**	**2.72**	**2.70**	**2.70**

SAMPLE **COURSE-PO AND COURSE-PSO**
MAPPING **COURSE:** Development of Education system in India
Course Code:BED301
Mapping of **CO with PO**

CO1 AT	2.95
CO2 AT	2.87
CO3 AT	2.43
CO4 AT	2.58
CO5 AT	2.57
CO6 AT	2.42

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	2	2	3	2	3	1
CO2	1		1	1	1	1	3	3	3	3	3	1
CO3	1		1	1	1	1	2	3	3	3	3	3
CO4	1	1	1	1	1	1	3	3	3	3	3	1

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CO5	1	1	1	1	1	1	2	3	3	3	3	3
CO6	1	1	1	1	1	1	2	2	2	2	2	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
15.82	15.82	15.82	15.82	15.82	15.82	37.08	42.08	45.03	42.08	45.03	30.65
6.00	6.00	6.00	6.00	6.00	6.00	14.00	16.00	17.00	16.00	17.00	12.00
2.64	2.64	**2.64**	**2.64**	**2.64**	**2.64**	**2.65**	**2.63**	**2.65**	**2.63**	**2.65**	**2.55**

SAMPLE **CO STATEMENTS:**
MAPPING **Course: PUBLIC ECONOMICS**
Course Code: **BAB504**

CO1 AT	2.82
CO2 AT	2.82
CO3 AT	2.55
CO4 AT	2.55
CO5 AT	2.73
CO6 AT	2.73

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	2	3	3	3	3	2
CO2	1	1	1	1	1	1	3	2	2	2	2	2
CO3	1	1	1	1	1	1	2	3	3	3	3	2
CO4	1	1	1	1	1	1	2	2	2	2	2	2
CO5	1	1	1	1	1	1	2	2	2	2	2	2
CO6	1	1	1	1	1	1	2	2	3	2	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
16.18	16.18	16.18	16.18	16.18	16.18	35.18	37.73	40.45	37.73	40.45	35.09
6.00	6.00	6.00	6.00	6.00	6.00	13.00	14.00	15.00	14.00	15.00	13.00
2.70	2.70	**2.70**	**2.70**	**2.70**	**2.70**	**2.71**	**2.69**	**2.70**	**2.69**	**2.70**	**2.70**

SAMPLE CO **STATEMENTS:**
MAPPING **Course: Educational Technology**
Course Code: :BED103

CO1 AT	2.94
CO2 AT	2.86
CO3 AT	2.48
CO4 AT	2.64
CO5 AT	2.54

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CO6 AT	2.50

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	2	2	1	2	1	1
CO2	1	1	1	1	1	1	3	2	2	2	2	2
CO3	1	1	1	1	1	1	2	2	1	2	1	3
CO4	1	1	1	1	1	1	2	2	1	2	1	2
CO5	1	1	1	1	1	1	2	3	3	3	3	3
CO6	1	1	1	1	1	1	1	3	2	3	2	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
15.96	15.96	15.96	15.96	15.96	15.96	32.28	36.96	26.40	36.96	26.40	36.50
6.00	6.00	6.00	6.00	6.00	6.00	12.00	14.00	10.00	14.00	10.00	14.00
2.66	2.66	2.66	2.66	2.66	2.66	2.69	2.64	2.64	2.64	2.64	2.61

COURSE-PO AND COURSE-PSO

COURSE: Childhood and Growing Up

Course Code:BED101

Mapping of **CO with PO**

CO1 AT	2.93
CO2 AT	2.83
CO3 AT	2.48
CO4 AT	2.64
CO5 AT	2.55
CO6 AT	2.55

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	1	3	1	1	2
CO2	2	1	1	1	1	1	1	1	2	1	1	2
CO3	1	2	1	1	1	1	2	1	1	2	1	2
CO4	1	1	3	1	1	3	1	3	1	2	1	1
CO5	1	1	1	1	1	1	1	1	2	1	1	3
CO6	1	1	1	1	1	1	1	1	2	1	1	3

18.81	18.45	21.26	15.98	15.98	21.26	18.45	21.26	29.76	21.10	15.98	34.40
7.00	7.00	8.00	6.00	6.00	8.00	7.00	8.00	11.00	8.00	6.00	13.00
2.69	2.64	2.66	2.66	2.66	2.66	2.64	2.66	2.71	2.64	2.66	2.65

COURSE-PO AND COURSE-PSO

COURSE: Mechanics and thermodynamics

Course Code: **BEB108**

Mapping of **CO with PO**

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CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

1. UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. LAW DEPARTMENT VISION AND MISSION

VISION

To be amongst the top ten law schools in India by imparting excellence in legal education.

MISSION

Learner centered education of excellence

To strengthen ties with industries, professional societies, accrediting bodies and statutory authorities.

To develop students as global citizens with conscience, commitment and dedication.

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES. PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF POs

4.1 PROGRAM OUTCOMES (POs):

Program Outcomes (POs)		
PO1	**Legal Knowledge**	To acquire & apply legal knowledge to the complex Socio-legal problems.
PO2	**Professional Practice**	to make students eligible to practice in Courts, Industries, Companies as legal practitioner.
PO3	**Professional Skills**	To possess professional skills required for legal practice such as Argument, Pleading, drafting, conveyancing etc.
PO4	**Professional Ethics**	To understand and apply principles of professional ethics of legal profession.
PO5	**Legal research & legal reasoning**	to develop legal research skills & legal reasoning and apply it during programme & in Legal practice.
PO6	**Self-reflection**	To develop an attitude of self-reflection while learning & Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of changing legal contexts.
PO7	**Self-employability**	To provide a platform of self-employability by developing professional skills in legal industry.
PO8	**Leadership skills:**	To develop leadership qualities amongst students.
PO9	**Lifelong Learning**	To make awareness about Constitutional legislative & societal transformation in society & to develop clinical abilities.
PO10	**Lawyering skills**	Every graduate will become skilled in legal research, written and oral communication, teamwork, advocacy, and problem-solving.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from Memory to a customer. Recite the safety rules.
Understanding: Comprehending The meaning, translation, interpolation, and Interpretation of Instructions and problems. State a Problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the Principles of test writing. Explain in one's own words The steps for Performing a Complex task. Translate an Equation into a computer spreadsheet.

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Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learning the classroom into novel situations in the workplace.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.
Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.
Evaluating: Make Judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports	Select the most Effective solution. Hire the most qualified candidate. Explain and justify a new budget.

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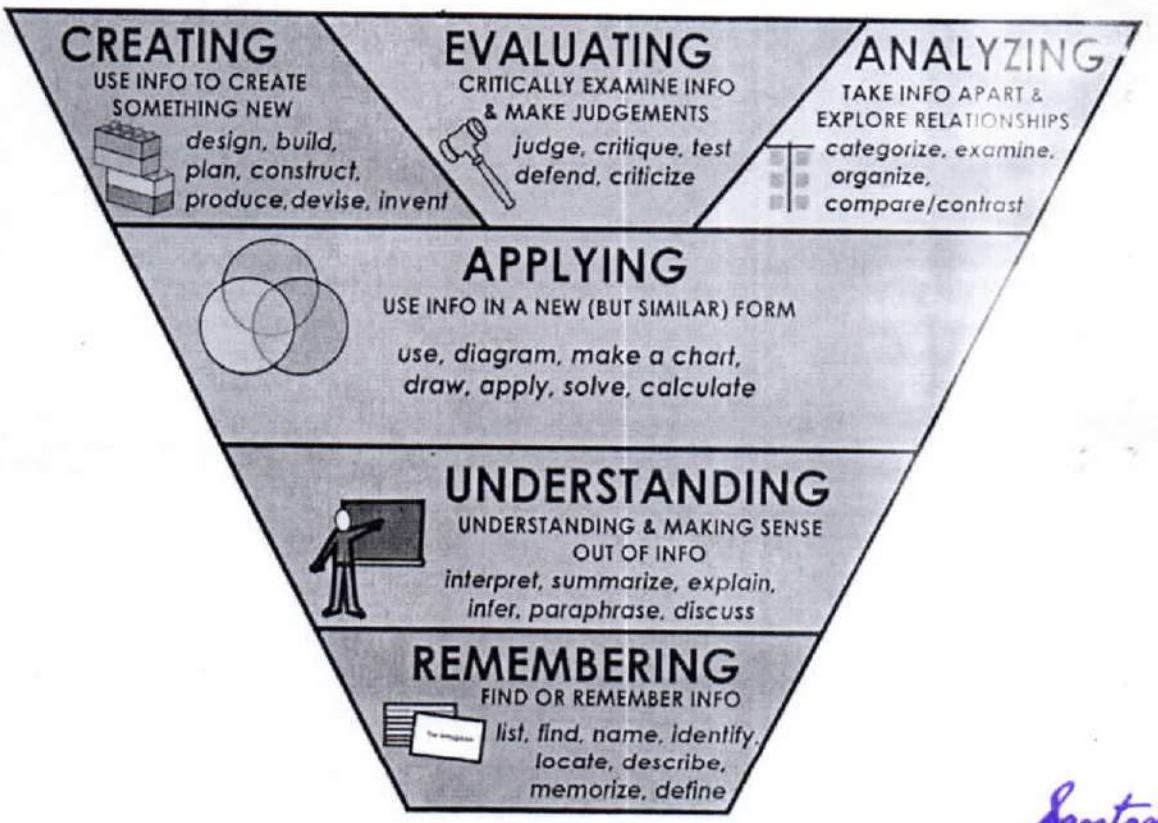
Creating: Builds a structure or Pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

BLOOM'S TAXONOMY



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6. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

SAMPLE CO STATEMENTS:
Course: Contract I
Course Code: BBL104

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	**Understand all the relevant legal provisions that relate to essentials of valid contract**
CO2	**To differentiate between contract and agreement**
CO3	**To understand the contingent contract and their enforcement.**
CO4	**To know about the remedies on the breach of contract.**

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7. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"-"** indicates there is nocorrelation.

7.1 Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate the POs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts to achieve.

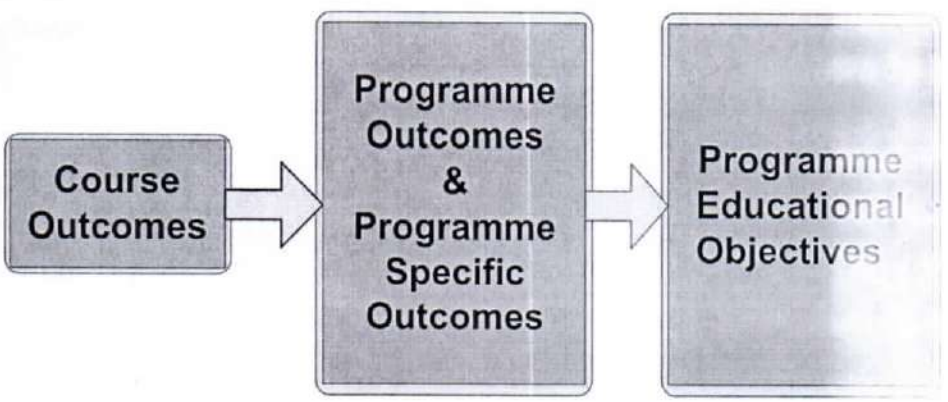

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

This is shown in figure 7.2.

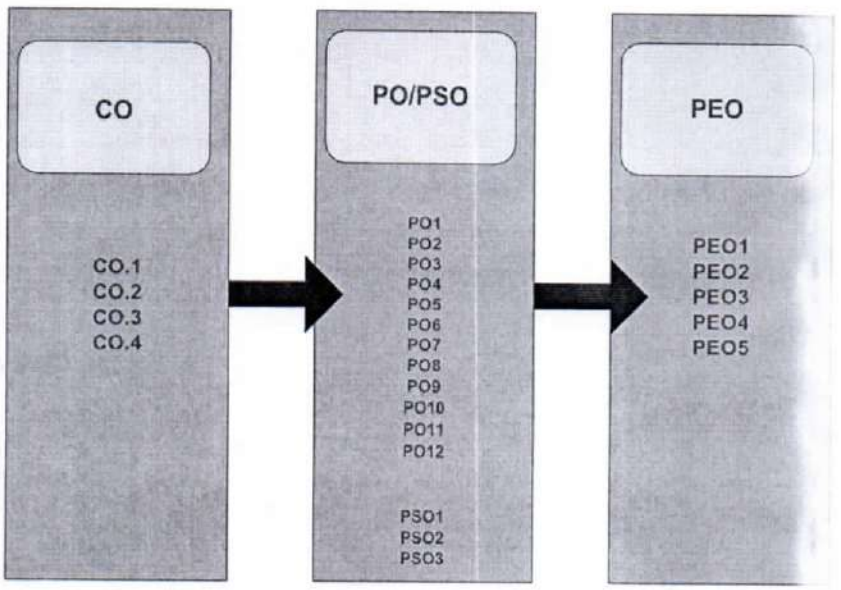

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course. attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 SAMPLE CO-PO Mapping

Course: Contract I
Course Code: BBL104
Mapping of CO with PO

First two numeric digit indicates year of study and next two digits indicate branch number in the respective year of study. PC01 is the first course in second year. A sample course outcome statements and sample CO-PO matrix are given in Table 7.1

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '-'. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '-' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome MBA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment of COs/POs

Step-1: The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2: The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gap and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

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Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

8. COURSE OUTCOMES TO PO AND PSO MAPPING

Mapping strength of a course to PO/ PSO can be obtained by taking the average of the CO-PO/ PSO mapping matrices of that course.

SAMPLE COURSE-PO AND COURSE-PSO
MAPPING COURSE: English I
Course Code: LLB 101
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	2.81
CO3 AT	2.12
CO4 AT	1.98
C05 AT	1.74
C06 AT	1.41

CO PO MATRIX **Subject Code: LLB 101** **English I**

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	**1**	**2**	**2**	**1**	**0**	2	0	0	0	0
CO2	2	2	3	0	**0**	0	1	0	0	2
CO3	0	2	3	2	**0**	0	1	0	0	2
CO4	0	3	3	1	**0**	0	0	0	0	1
C05	0	3	3	0	**0**	0	0	0	0	2
C06	0	2	3	0	**0**	0	0	0	0	0

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	P10 AT
8.62	29.83	36.17	9.21	0.00	6.00	4.93	0.00	0.00	15.19
3.00	14.00	17.00	4.00	0.00	2.00	2.00	0.00	0.00	7.00
2.87	**2.13**	**2.13**	**2.30**	**0.00**	**3.00**	**2.46**	**0.00**	0.00	2.19

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PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	P10 AT
23.93	10.71	0.00	0.00	18.57	5.00	0.00	0.00	18.5	21.07
9.00	4.00	0.00	0.00	7.00	2.00	0.00	0.00	7.00	8.00
2.66	**2.68**	**0.00**	**0.00**	**2.65**	**2.50**	**0.00**	**0.00**	2.7	2.63

MAPPING COURSE: Contract I
Course Code: LLB 104
Mapping of CO with PO

CO1 AT	2.57
CO2 AT	2.64
CO3 AT	1.76
CO4 AT	1.76

CO PO MATRIX **Subject Code: LLB 104** **Law of Contract I**

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P10
CO1	**3**	**3**	**2**	**1**	**3**	2	1	0	2	3
CO2	3	3	2	1	3	2	1	0	2	3
CO3	3	3	3	1	3	2	2	0	2	3
CO4	3	3	3	1	3	2	3	0	2	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	P10 AT
	26.21	26.21	21.00	8.74	26.21	20.00	14.02	0.00	17.48	21.21
	12.00	12.00	10.00	4.00	12.00	8.00	7.00	0.00	8.00	9.00
	2.18	**2.18**	**2.10**	**2.18**	**2.18**	**2.50**	**2.00**	0.00	2.1	2.3

MAPPING COURSE: Human Rights & Practices
Course Code: LLB 105
Mapping of CO with PO

CO1 AT	2.48
CO2 AT	2.67
CO3 AT	1.62
CO4 AT	1.64

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MAPPING COURSE: Political Science I
Course Code: LLB 102
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	2.85
CO3 AT	2.45
CO4 AT	2.31
C05 AT	2.29

CO PO MATRIX **Subject Code: LLB 102** Political Science I

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	**2**	**2**	**0**	**1**	**1**	1	0	0	0	0
CO2	2	2	1	0	0	1	0	0	0	0
CO3	2	2	0	1	0	0	1	0	1	0
CO4	3	0	0	0	0	0	0	0	1	0
C05	3	2	1	1	2	1	1	0	0	1
C06	2	2	1	0	0	0	2	0	0	1

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	P09 AT	P10 AT
34.45	25.23	7.16	7.74	7.57	8.14	8.79	0.00	1.76	4.31
14.00	10.00	3.00	3.00	3.00	3.00	4.00	0.00	2.00	2.00
2.46	**2.52**	**2.39**	**2.58**	**2.52**	**2.71**	**2.20**	0.00	2.38	**2.15**

MAPPING COURSE: Sociology I
Course Code: LLB 103
Mapping of CO with PO

CO1 AT	2.86
CO2 AT	2.86
CO3 AT	2.50
CO4 AT	2.50

CO PO MATRIX **Subject Code: LLB 103** Sociology I

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	**2**	**1**	**0**	**0**	**1**	1	0	0	2	2
CO2	2	1	0	0	2	1	0	0	2	1
CO3	3	1	0	0	2	0	0	0	3	2
CO4	2	1	0	0	2	0	0	0	2	3

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CO PO MATRIX **Subject Code: LLB 105** **Human Rights Practices**

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	3	2	1	2	2	1	0	1	2	2
CO2	3	3	1	2	2	1	0	0	2	2
CO3	3	3	1	2	2	2	0	0	2	2
CO4	3	3	2	2	2	1	0	0	2	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	P09 AT	P10 AT
	25.21	22.74	10.05	16.81	16.81	10.00	0.00	2.48	16.81	18.45
	12.00	11.00	5.00	8.00	8.00	5.00	0.00	1.00	8.00	9.00
	2.10	**2.07**	**2.01**	**2.10**	**2.10**	**2.00**	**0.00**	2.48	16.81	**2.05**

MAPPING COURSE: English I
Course Code: BBL 101
Mapping of CO with PO

CO1 AT	2.58
CO2 AT	2.58
CO3 AT	2.42
CO4 AT	2.17
CO5 AT	2.08
CO6 AT	2.25

CO PO MATRIX **Subject Code: BBL101** **English I**

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	1	2	2	1	0	2	0	0	0	0
CO2	2	2	3	0	0	0	1	0	1	2
CO3	0	2	3	2	0	0	1	0	2	2
CO4	0	3	3	1	0	0	0	0	0	1
CO5	0	3	3	0	0	0	0	0	2	2
CO6	0	2	3	0	0	0	0	0	1	0

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	P09 AT	P10 AT
7.75	32.41	39.66	9.58	0.00	6.00	5.00	0.00	5.48	5.33
3.00	14.00	17.00	4.00	0.00	2.00	2.00	0.00	2.00	2.00
2.58	**2.31**	**2.33**	**2.40**	**0.00**	**3.00**	**2.50**	**0.00**	5.48	5.33

MAPPING COURSE: Principles Of Management

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Course Code: BBL 102
Mapping of CO with PO

CO1 AT	2.58
CO2 AT	2.58
CO3 AT	2.58
CO4 AT	2.58
CO5 AT	2.83

CO PO MATRIX **Subject Code: BBL102** Priciples of Management

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P010
CO1	**1**	**2**	**2**	**1**	**0**	2	0	0	0
CO2	2	2	3	0	**0**	0	1	0	2
CO3	0	2	3	2	**0**	0	1	0	2
CO4	0	3	3	1	**0**	0	0	0	1
C05	0	3	3	0	**0**	0	0	0	2
C06	0	2	3	0	**0**	0	0	0	0

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	P0	P10 AT
7.75	31.75	36.92	10.33	0.00	0.00	5.17	0	18.58
3.00	14.00	17.00	4.00	0.00	2.00	2.00	0	7.00
2.58	**2.27**	**2.17**	**2.58**	**0.00**	**0.00**	2.58	0	**2.65**

MAPPING COURSE: Manegerial Economics
Course Code: BBL103
Mapping of CO with PO

CO1 AT	2.00
CO2 AT	1.00
CO3 AT	3.00
CO4 AT	2.00

CO PO MATRIX **Subject Code: BAL 103** Manegerial Economics

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P10
CO1	**1**	**2**	**2**	**1**	**0**	2	0	0	0
CO2	2	2	3	0	**0**	0	1	0	2
CO3	0	2	3	2	**0**	0	1	0	2
CO4	0	3	3	1	**0**	0	0	0	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	0

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4.00	18.00	22.00	10.00	0.00	4.00	4.00	0.00
3.00	9.00	11.00	4.00	0.00	2.00	2.00	0.00
1.33	**2.00**	**2.00**	**2.50**	**0.00**	**2.00**	**2.00**	0.00

MAPPING COURSE: Contract I
Course Code: BBL104
Mapping of CO with PO

CO1 AT	1.00
CO2 AT	1.00
CO3 AT	1.00
CO4 AT	1.00

CO PO MATRIX **Subject Code: BBL 104** **Law of Contract I**

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08
CO1	**3**	**3**	**2**	**1**	**3**	2	1	0
CO2	3	3	2	1	3	2	1	0
CO3	3	3	3	1	3	2	2	0
CO4	3	3	3	1	3	2	3	0
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
	12.00	12.00	10.00	4.00	12.00	10.00	7.00	0.00
	12.00	12.00	10.00	4.00	12.00	8.00	7.00	0.00
	1.00	**1.00**	**1.00**	**1.00**	**1.00**	**1.25**	**1.00**	0.00

MAPPING COURSE: Human Rights & Practices
Course Code: BBL105
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	3.00
CO3 AT	3.00
CO4 AT	2.00

CO PO MATRIX **Subject Code: BBL 105** **Human Rights Practices**

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	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010
CO1	3	2	1	2	2	1	0			2
CO2	3	3	1	2	2	1	0			2
CO3	3	3	1	2	2	2	0			2
CO4	3	3	2	2	2	1	0			3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	P09 AT	P10 AT
	33.00	30.00	13.00	22.00	22.00	10.00	0.00	3.00	22.00	24.00
	12.00	11.00	5.00	8.00	8.00	5.00	0.00	1.00	8.00	9.00
	2.75	**2.73**	**2.60**	**2.75**	**2.75**	**2.00**	**0.00**	3.00	2.75	2.67

4.2PROGRAM OUTCOMES (POs):

LLB

Program Outcomes (POs)		
PO1	**Legal Knowledge**	To acquire & apply legal knowledge to complex Socio-legal problems.
PO2	**Professional Practice**	to make students eligible to practice in Courts, Industries, Companies as legal practitioner.
PO3	**Professional Skills**	To possess professional skills required in legal practice such as Argument, Pleading, drafting, conveyancing etc.
PO4	**Professional Ethics**	To understand and apply principles of professional ethics of legal profession.
PO5	**Legal research & legal reasoning**	to develop legal research skills & legal reasoning and apply it during programme & in Legal practice.
PO6	**Self-reflection**	To develop an attitude of self-reflection, critical thinking & Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of changing legal conditions.
PO7	**Self-employability**	To provide a platform of self-employability by developing professional skills in legal industry.
PO8	**Leadership skills:**	To develop leadership qualities amongst students.
PO9	**Lifelong Learning**	To make awareness about Constitutional rights & societal transformation in society & to develop legal

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		abilities.

MAPPING COURSE: CONSTITUTIONAL LAW
Course Code: (LAW 101)
Mapping of CO with PO

CO1 AT	2.60
CO2 AT	2.70
CO3 AT	2.15
CO4 AT	2.15
C05AT	1.50

CO PO MATRIX **Subject Code:** (LAW 101) CONSTITUTIONAL LAW

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09
CO1	**3**	**1**	**1**	**3**	**2**	3	0	1	3
CO2	3	1	1	0	2	3	0	1	2
CO3	3	3	2	1	3	3	1	3	3
CO4	3	3	3	3	2	3	3	3	3
CO5	3	3	3	3	2	2	2	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
12.60	7.20	7.20	12.60	8.40	21.00	4.50	7.20
15.00	11.00	10.00	10.00	11.00	14.00	6.00	11.10
0.84	**0.65**	**0.72**	**1.26**	**0.76**	**1.50**	**0.75**	0.65

MAPPING COURSE: LAW OF CONTRACT
Course Code: (LAW 102)
Mapping of CO with PO

CO1 AT	2.52
CO2 AT	2.74
CO3 AT	2.00
CO4 AT	2.04

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CO PO MATRIX **Subject Code: BBL102** LAW OF CONTRACT

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09
CO1	3	2	0	1	1	2	1		1
CO2	3	2	1	0	1	2	2		2
CO3	3	2	1	1	1	2	2		2
CO4	3	2	1	1	1	3	2		2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT
27.91	18.61	6.78	6.57	9.30	24.00	16.09	4.00	1.09
12.00	8.00	3.00	3.00	4.00	9.00	7.00	2.00	.00
2.33	**2.33**	**2.26**	**2.19**	**2.33**	**2.67**	2.30	2.00	2.00

MAPPING COURSE: Law Of crimes -I
Course Code: LAW 103
Mapping of CO with PO

CO1 AT	2.35
CO2 AT	2.39
CO3 AT	1.35
CO4 AT	1.39

CO PO MATRIX **Subject Code: LAW 103** Law Of crimes -I

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09
CO1	3	3	3	1	3	3	3	0	2
CO2	3	3	3	1	3	3	1	0	2
CO3	3	3	2	2	2	3	3	1	2
CO4	3	3	2	2	2	3	3	1	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT
22.43	22.43	19.70	10.22	19.70	30.00	17.65	1.74	1.96
12.00	12.00	10.00	6.00	10.00	12.00	10.00	2.00	.00
1.87	**1.87**	**1.97**	**1.70**	**1.97**	**2.50**	**1.77**	1.37	1.37

MAPPING COURSE: FAMILY LAW -I
Course Code: LAW 104
Mapping of CO with PO

CO1 AT	2.52
CO2 AT	2.65
CO3 AT	2.09
CO4 AT	2.22

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CO PO MATRIX **Subject Code: LAW 104** FAMILY LAW -I

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09
CO1	**3**	**1**	**0**	**2**	**3**	3	1	0	2
CO2	3	3	0	1	2	2	0	0	1
CO3	3	3	2	2	2	2	3	1	2
CO4	3	3	2	2	2	3	3	1	2
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	[illegible]
	28.43	23.39	8.61	16.30	21.48	24.00	15.43	4.30	[illegible]
	12.00	10.00	4.00	7.00	9.00	10.00	7.00	2.00	[illegible]
	2.37	**2.34**	**2.15**	**2.33**	**2.39**	**2.40**	**2.20**	2.15	[illegible]

MAPPING COURSE: TORTS
Course Code: LAW 105
Mapping of CO with PO

CO1 AT	2.57
CO2 AT	2.52
CO3 AT	1.78
CO4 AT	2.04

CO PO MATRIX **Subject Code: LAW 105** TORTS

	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09
CO1	**3**	**2**	**3**	**2**	**3**	3	3	[illegible]	2
CO2	3	3	3	1	2	2	0	[illegible]	2
CO3	3	3	3	1	2	3	1	[illegible]	2
CO4	3	2	1	2	2	3	2	[illegible]	2
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT
	26.74	22.13	22.65	13.52	20.39	24.22	8.43	[illegible]	17.83
	12.00	10.00	10.00	6.00	9.00	11.00	4.00	[illegible]	[illegible]
	2.23	2.21	**2.27**	**2.25**	**2.27**	**2.20**	2.11	[illegible]	[illegible]

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PROGRAM OUTCOMES (POs):

LLM

Programme Outcome of LL.M. is produce competent Students who are equipped with the knowledge of teaching methods through the subject on Teaching Pedagogy thereby enabling them to enter the teaching profession. Apply ethical principles and commit to legal professional ethics, responsibilities and norms of the established legal practices.

Program Outcomes (POs)		
PO1	**Legal Knowledge**	Explore and explain the substantial & procedural laws in which they are made/ drafted and how courts think and understand the legislative setup
PO2	**Professional Practice**	Interpret And Analyze the legal and social problems and work towards finding solutions to the problems by application of laws and regulations
PO3	**Professional Skills**	Students are equipped with the knowledge of teaching methods through the subject on Teaching Pedagogy thereby enabling them to enter the teaching profession
PO4	**Professional Ethics**	Apply ethical principles and commit to legal professional ethics, responsibilities and norms of the established legal practices
PO 5	**Self-employability**	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broader context of legal changes

MAPPING COURSE: Research Methodology
Course Code: LLM 101
Mapping of CO with PO

CO1 AT	2.74
CO2 AT	3.00
CO3 AT	2.37
CO4 AT	2.31

CO PO MATRIX **Subject Code: LLM 101**

	PO1	PO2	PO3	PO4	PO5

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CO1	**0**	**1**	**3**	**0**	**3**
CO2	0	1	3	2	2
CO3	0	1	3	0	2
CO4	1	2	3	0	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
2.31	12.72	31.24	6.00	25.87
1.00	5.00	12.00	2.00	10.00
2.31	2.54	**2.60**	**3.00**	**2.59**

MAPPING COURSE: LOCAL SELF GOVERNMENT AND FEDERAL GOVERNMENT
Course Code: LMA103
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	3.00
CO3 AT	3.00
CO4 AT	3.00

CO PO MATRIX **Subject Code: LMA103**

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	1	3
CO2	3	3	2	3	2
CO3	3	3	2	1	3
CO4	3	3	3	1	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
36.00	36.00	27.00	18.00	33.00
12.00	12.00	9.00	6.00	11.00
3.00	3.00	**3.00**	**3.00**	**3.00**

MAPPING COURSE: FUNDAMENTAL RIGHTS AND DIRECTIVE PRINCIPLES
Course Code: LMA102
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	2.75
CO3 AT	2.25
CO4 AT	3.00

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CO PO MATRIX **Subject Code: LMA102**

	PO1	PO2	PO3	PO4	PO5
CO1	**3**	3	**2**	**1**	**2**
CO2	3	3	2	1	2
CO3	3	3	2	1	2
CO4	3	3	2	2	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
33.00	33.00	22.00	14.00	22.00
12.00	12.00	8.00	5.00	8.00
2.75	2.75	**2.75**	**2.80**	**2.75**

MAPPING COURSE: COMPARATIVE PUBLIC LAW
Course Code: LLM 102
Mapping of CO with PO

CO1 AT	2.74
CO2 AT	3.00
CO3 AT	2.36
CO4 AT	2.00

CO PO MATRIX **Subject Code: LLM 102**

	PO1	PO2	PO3	PO4	PO5
CO1	**2**	1	**2**	**1**	**3**
CO2	2	3	2	1	2
CO3	3	3	2	3	3
CO4	3	2	1	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
24.55	22.81	18.19	18.81	27.29
10.00	9.00	7.00	8.00	11.00
2.45	2.53	**2.60**	**2.35**	**2.48**

MAPPING COURSE: Centre State Relationship and Constitutional Governance
Course Code: LMA 101
Mapping of CO with PO

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CO1 AT	3.00
CO2 AT	2.75
CO3 AT	3.00
CO4 AT	3.00

CO PO MATRIX Subject Code: LMA **101**

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	1	1	3
CO2	3	2	1	1	3
CO3	3	2	1	1	3
CO4	3	2	1	1	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
35.25	26.50	11.75	11.75	35.25
12.00	9.00	4.00	4.00	12.00
2.94	**2.94**	**2.94**	**2.94**	**2.94**

MAPPING COURSE: CRIMINOLOGY, PENOLOGY AND TREATMENT OF OFFENDERS
Course Code: LMC101
Mapping of CO with PO

CO1 AT	2.94
CO2 AT	3.00
CO3 AT	3.00
CO4 AT	2.94

CO PO MATRIX Subject Code: **LMC101**

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	3
CO2	3	2	2	2	2
CO3	3	3	3	3	3
CO4	3	3	2	2	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
53.65	50.65	44.76	44.76	47.71
18.00	17.00	15.00	15.00	16.00

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2.98	2.98	2.98	2.98	2.98

MAPPING COURSE: PRIVILAGED CLASS DEVIENCE AND INTERNATIONAL CRIMES
Course Code: LMC102
Mapping of CO with PO

CO1 AT	2.82
CO2 AT	2.35
CO3 AT	2.47
CO4 AT	2.88

CO PO MATRIX Subject Code: LMC102

	PO1	PO2	PO3	PO4	PO5
CO1	**3**	3	**2**	**2**	**2**
CO2	3	3	2	1	3
CO3	2	3	1	3	2
CO4	3	3	3	2	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
29.12	31.59	21.47	21.18	26.29
11.00	12.00	8.00	8.00	10.00
2.65	2.63	**2.68**	**2.65**	**2.63**

MAPPING COURSE: JUVENILE DELIQUENCY
Course Code: LMC103
Mapping of CO with PO

CO1 AT	3.00
CO2 AT	3.00
CO3 AT	3.00
CO4 AT	3.00

CO PO MATRIX Subject Code: LMC103

	PO1	PO2	PO3	PO4	PO5
CO1	**3**	3	**2**	**2**	**3**
CO2	3	3	1	3	3
CO3	3	3	2	2	3

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CO4	3	3	2	2	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT
36.00	36.00	21.00	27.00	36.00
12.00	12.00	7.00	9.00	12.00
3.00	**3.00**	**3.00**	**3.00**	**3.00**

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MBA DEPARTMENT

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

INDEX		
1		UNIVERSITY VISION AND MISSION
2		DEPARTMENT VISION AND MISSION
3		PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES, PROGRAMSPECIFIC OUTCOMES DEFINITION
4		STATEMENT OF PROGRAM EDUCATIONALOBJECTIVES, PROGRAM OUTCOMES, PROGRAM SPECIFICOUTCOMES
	4.1	Program Educational Objectives
	4.2	Program Outcomes
	4.3	Program Specific Outcomes
5		BLOOMS TAXONOMY
6		COURSE OUTCOME STATEMENTS
7		COURSE OUTCOME TO PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES MAPPING FOR ALL THE COURSES
	7.1	Levels of Outcomes
	7.2	Process involved in CO-PO Mapping
	7.3	Sample CO-PO and CO-PSOMapping
	7.4	Identification of curricular gap
8	8.1	COURSE OUTCOMES TO PROGRAM OUTCOMES/ PROGRAM SPECIFIC OUTCOMES MAPPING
	8.2	CO Attainment Calculation of a Course
9		ASSESSMENT PROCESS FOR OVERALL PO AND PSO ATTAINMENT
	9.1	PO and PSO attainment

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. MBA DEPARTMENT VISION AND MISSION

VISION

"To become a leading MBA program of choice in the Country by shaping businesses and societies."

MISSION

"Invertis University MBA program provides an integrated set of learning opportunities for students in mastering Knowledge, Skill and Attitude for effectively managing modern Organization and create value for the world."

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1- PROFESSIONAL DEVELOPMENT

To develop student'scapacity to acquire managerial knowledgeand apply it professionally within realistic constraints across the industry with sustainability and ethical responsibility.

PEO2- DEVELOPING CORE PROFICIENCY

To impart knowledge of Management theory and practice forproviding ability to identify,comprehend, analyze, design and formulate solution for various issues with hands on experience from the industry.

PEO3- MANAGERIAL SKILL ACCOMPLISHMENTS

Todevelop ability to design, simulate, experiment, analyze, optimize and interpret Managerial tools for decision making required for solvingcomplex managerial problemsthrough multidisciplinary concepts and contemporary learning.

PEO4- PROFESSIONALISM

To provide exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude toproduce industry ready graduates having highest regard for Personal &InstitutionalIntegrity, Social Responsibility, Teamwork and Continuous Learning.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, leadership, and entrepreneurialcapability.

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The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the MBA Department are taken into consideration to interact with various stake holders,and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them to departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- Inputs are also obtained from alumni and other stakeholders.
- Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Program Outcomes (POs)		
PO1	Managerial knowledge	An ability to apply knowledge of management
PO2	Problem analysis	An ability to analyze and interpret problems
PO3	Interpersonal Skills	An ability to Utilize interpersonal skills to lead/manage employees in an organizational setting,
PO4	Critical thinking Skills	An ability to demonstrate critical thinking skills.
PO5	Conduct investigations of problems	An ability to identify, formulate, comprehend, analyze, synthesis of the information to solve managerial problems and provide valid conclusions.
PO6	Use of Modern tools	An ability to use the contemporary techniques, skills and moderntools necessary for managerialdecision.
PO7	Ethics	Understand the ethical implication of business decision making and recognize ethical dilemmas.
PO8	Individual and teamwork	Exhibit the leadership capacity and teamwork skills for business decision making.
PO9	Communication skill	An ability to Demonstrate effective communication.
PO10	Project management and finance	An ability to use skills and management principles to do work as a member and leader in a team, tomanage projects and demonstrate capabilities in new venture creation.
PO11	Holistic Development	Ensuring holistic and sustainable development of students
PO12	Life-long learning	A recognition of the need for,Achieve higher levels of proficiency and self-actualization through pursuing lifelong learning.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	An ability to apply conceptual foundations of management to solve practical decision-making problems.
PSO2	An ability to adapt to dynamic changes in an environment with an understanding of societal and ecological issues relevant to professional managerial practice through life-long learning.
PSO3	Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologis Dr Benjamin Bloom in order to promote higherforms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learningprocesses.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previouslearned information.	defines,describes, identifies, knows, labels, lists,matches,names, outlines,recalls, recognizes,reproduces, selects, states	Reciteapolicy. Quotepricesfrom Memorytoa customer.Recite the safety rules.
Understanding: Comprehending Themeaning, translation, interpolation,and Interpretationof Instructionsand problems. State a Problemin one'sown words.	comprehends,converts, defends,distinguishes, estimates,explains, extends,generalizes, gives an example, infers, interprets,paraphrases, predicts,rewrites, summarizes, translates	Rewritethe Principlesoftest writing. Explain in one'sownwords Thestepsfor Performinga Complextask. Translatean Equationinto acomputer spreadsheet.

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Applying: Use a concept in a new situationor unprompted use of an abstraction.Applies what was learningthe classroom into novel situations in the workplace.	applies,changes, computes,constructs,demonstrates, discovers,manipulates, modifies, operates,predicts, prepares,produces, relates, shows,solves, uses	Use a manual to calculatear. employee'svacation time. Apply laws of statisticsto evaluatethe reliability of a writtentest.
Analyzing: Separates material or conceptsinto component parts sothatits organizational structuremaybe understood. Distinguishes betweenfacts and inferences.	analyses,breaksdown, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishesidentifies, illustrates,infers, outlines,relates,selects, separates	Troubleshoota piecc ofequipment by using logical deduction. Recognizelogical fallaciesin reasoning. Gathers information from a departmentand selects the required tasks fortraining.
Evaluating: MakeJudgmentsaboutthe value of ideas or materials.	appraises,compares,concludes, contrasts,criticizes,critiques, defends,describes, discriminates, evaluates, explains,interprets, justifies,relates, summarizes,supports	Select the most Effectivesolution. Hire the most qualified candidate. Explain andjustify a newbudget.

Creating: Buildsa structureorPatternfromdiverseelements.Put parts togetherto form a whole,with emphasis oncreating a newmeaningorstructure.	categorizes,combines,compiles,composes,creates, devises, designs,explains,generates,modifies,organizes,plans,rearranges,reconstructs,relates,reorganizes,revises,rewrites,summariz	Integrates training from several sourses to solve a problem. Revise and process to improve the outcomes

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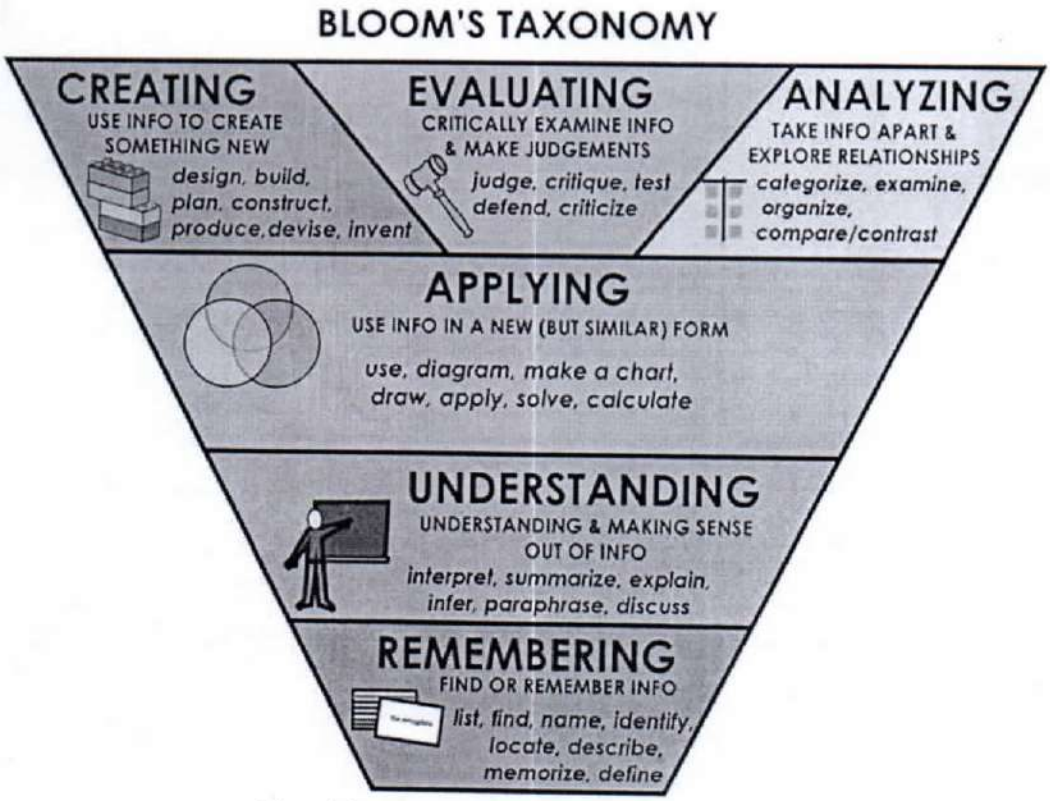
	es,tells, writes	



Pictorial representation of Blooms Taxonomy

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6. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statemen are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

CO STATEMENTS:
Course: MANAGEMENT – MICRO AND MACRO
Course Code: MBA101
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding the behaviour of individuals and groups in organisations.
CO2	Analyse the behaviour of individuals and groups in organisations.
CO3	Assess the potential effects of organisational level factors (such as structure, culture and change) on organisational behaviour.
CO4	Critically evaluate the potential effects of important developments in the external environment (such as globalisation and advances in technology) on organisational behaviour.
CO5	Analyse organisational behavioural issues in the context of organisational behaviour theories
CO6	Ability to identify and apply the knowledge of subject practically in real life situations

CO STATEMENTS:
Course: MARKET SCIENCE
Course Code: MBA102
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding*general concepts about marketing management and the marketing process.*
CO2	Analyse *consumer and buyer behaviour models as they influence customer purchase decision making*
CO3	Assessing the*concepts of segmentation, targeting and positioning as part of a comprehensive Marketing plan.*
CO4	*Develop a set of skills important to successful performance in marketing management positions, including critical thinking, working in a group environment, oral and wr presentation skills.*
CO5	*Explain the prospect of the global market and application of digitalization to reach there.*

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CO6	Apply the knowledge of subject practically in real life situations

CO STATEMENTS:
Course: COMPUTING TECHNIQUES
Course Code: MBA103
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding*Microsoft office and their application*
CO2	Analyse *use of application software in business*
CO3	Assessing the*concepts*
CO4	*Develop a set of skills*
CO5	*Explain the prospect of the knowledge*
CO6	Apply the knowledge of subject practically in real life situations

CO STATEMENTS:
Course: RECORDING AND ANALYSIS OF BUSINESS OPERATIONS
Course Code: MBA104
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding*the concepts and principles for their routine monetary transaction.*
CO2	*Analyse the needs of accounting data and demonstrate the ability to communicate*
CO3	*Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures.*
CO4	*Prepare financial statements in accordance with Generally Accepted Accounting Principles and its excel application.*
CO5	*Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting methods on the financial statements.*
CO6	Ability to apply the knowledge of subject practically in real life situations

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CO STATEMENTS:
Course: MICRO ECONOMICS AND ECONOMIC PLANNING
Course Code: MBA105
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding*micro and macro-economic principles and ever changing demand and supply conditions.*
CO2	*Analyse the tools and techniques to make effective economic decisions*
CO3	Ability to appreciate the role of various monetary policy tools in controlling inflation
CO4	Ability to analyse various market structures and demand forecasting
CO5	*Employ critical thinking skills to analyzemacroeconomic concepts and the volatility in the business world.*
CO6	Ability to apply the knowledge of subject practically in real life situations

CO STATEMENTS:
Course: COMMUNICATION SKILLS
Course Code: MBA106
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Able to understand fundamentals of business communication strategies.
CO2	Analyse basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.
CO3	Able to develop the proficiency in Language through reading, writing, listening and speaking.
CO4	Ability to communicate via electronic mail and other technologies for business messages.
CO5	Able to apply business communication strategies and principles to prepare effective communication for domestic and international business.
CO6	Ability to apply the knowledge of subject practically in real life situations

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CO STATEMENTS:
Course: QUANTITATIVE SKILLS
Course Code: MBA107
On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Able to understand Estimation Theory and to develop understanding of hypothesis testing concepts & perform various parametric and non-parametric tests.
CO2	Able to calculate and interpret Ratio, Arithmetic and Geometric mean, measures of central tendency, symmetrical and asymmetrical distribution, patterns.
CO3	Able to interpret correlation coefficients & Formulate regression line by identifying dependent and independent variables.
CO4	Calculate and interpret statistical values by using statistical tool (correlation & regression)
CO5	Demonstrate an ability to apply various statistical tool to solve business problem
CO6	Ability to identify and apply the knowledge of subject practically in real life situations.

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7. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

7.1 Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

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The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.

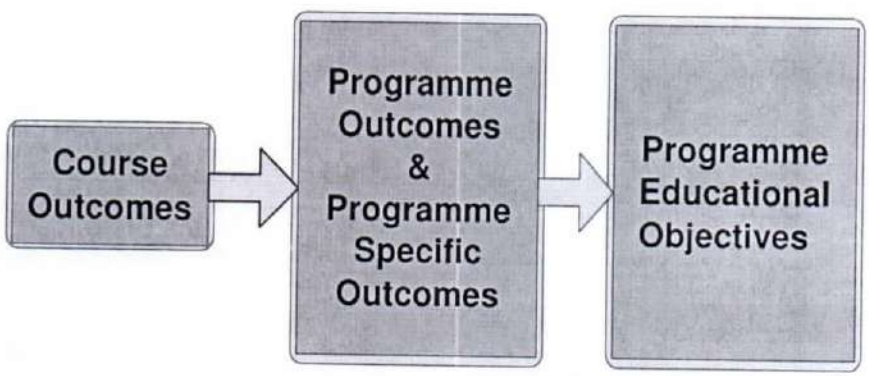

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statement are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

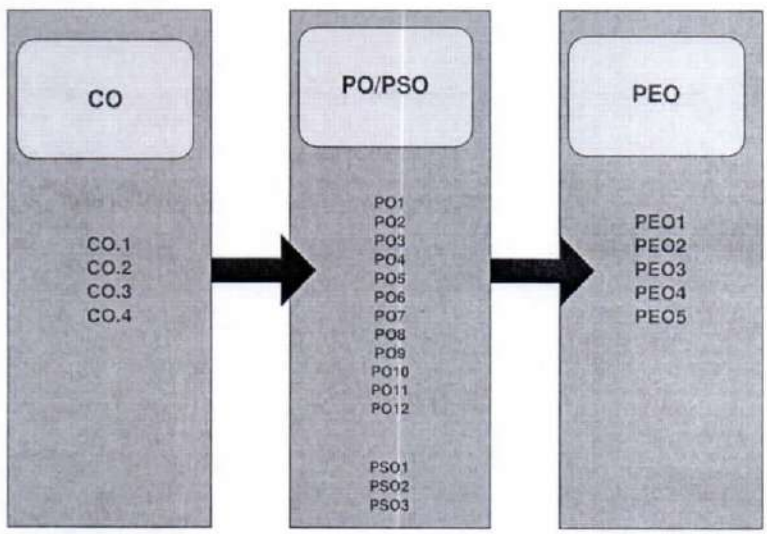

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-POMapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect meth after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 CO-PO Mapping

A sample course outcome statements and sample CO-PO matrix are given in Table 7.1
The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '0. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '0' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome MBA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment ofCOs/POs

Step-1:The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

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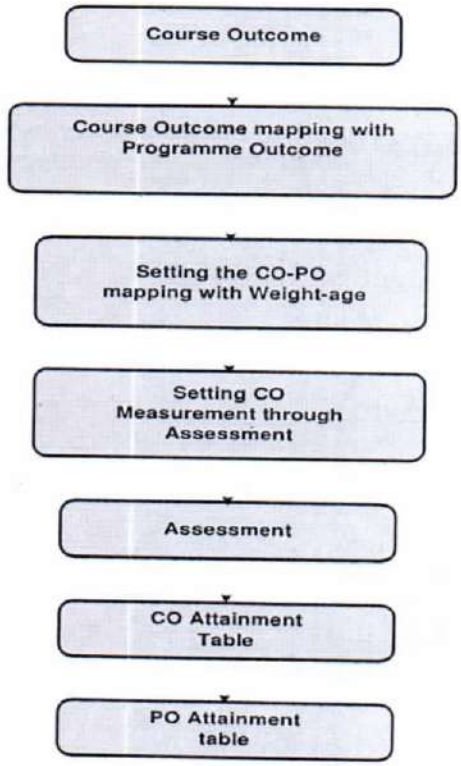
Validation of CO-PO mapping



The process of CO-PO mapping validation

Process of CO-PO Attainment

Step 1 : Obtain courseoutcome.

Step 2 : Mapping of course outcome with programoutcome.

Step 3 : Setting weightage for CO assessment.

Step 4 : COmeasurement throughassessment.

Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct andindirect assessmentmethods.

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8. COURSE OUTCOMES TO PO MAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

Table 8.1: CO – PO ATTAINMENT
Course: MANAGEMENT – MICRO AND MACRO
Course Code: MBA101

CO1 AT	2.93
CO2 AT	2.73
CO3 AT	2.83
CO4 AT	2.79
CO5 AT	2.11
CO6 AT	2.56

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	2	3	2	3	2	3
CO2	0	1	1	0	0	1	0	1	2	0	1	1
CO3	3	3	3	3	2	2	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	3	2	3	3	3
CO5	0	1	0	2	0	1	1	0	0	1	0	0
CO6	1	0	1	0	1	0	0	1	0	0	0	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	28.20	30.48	30.93	29.85	25.37	24.72	24.81	28.11	25.39	27.75	25.44	30.93
	10.00	11.00	11.00	11.00	9.00	9.00	9.00	10.00	9.00	10.00	9.00	11.00
	2.82	**2.77**	**2.81**	**2.71**	**2.82**	**2.75**	**2.76**	**2.81**	**2.82**	**2.77**	**2.83**	**2.81**

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Table 8.2: **CO – PO ATTAINMENT**
Course: MARKET SCIENCE
Course Code: MBA102

CO1 AT	2.99
CO2 AT	2.83
CO3 AT	2.93
CO4 AT	2.94
CO5 AT	2.61
CO6 AT	2.96

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**2**	**2**	**3**	**0**	**2**	**3**	2	3	2	2
CO2	2	3	3	1	0	1	1	1	2	3	2	3
CO3	1	3	2	1	2	2	1	1	1	2	2	2
CO4	2	1	3	1	0	1	1	2	2	1	2	1
CO5	2	1	2	2	2	2	3	3	2	2	2	3
CO6	2	2	1	2	2	2	3	2	1	3	3	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	34.57	34.72	37.32	25.82	25.96	22.77	31.39	34.35	28.62	40.35	37.48	39.98
	12.00	12.00	13.00	9.00	9.00	8.00	11.00	12.00	10.00	14.00	13.00	14.00
	2.88	**2.89**	**2.87**	**2.87**	**2.88**	**2.85**	**2.85**	**2.86**	**2.86**	**2.88**	**2.88**	**2.86**

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Table 8.3: **CO – PO ATTAINMENT**
Course: COMPUTING TECHNIQUES
Course Code: MBA103

CO1 AT	2.97
CO2 AT	2.89
CO3 AT	2.98
CO4 AT	2.93
CO5 AT	2.70
CO6 AT	2.95

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	2	2	3	1	3	2
CO2	2	1	2	0	2	3	2	3	1	3	3	3
CO3	1	3	2	3	0	0	1	2	3	2	2	2
CO4	2	1	0	3	3	3	3	0	3	1	3	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3
CO6	1	0	2	0	0	0	0	3	2	3	1	1
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	34.58	31.76	31.67	31.76	31.58	31.51	31.59	37.51	43.52	37.47	43.29	37.48
	12.00	11.00	11.00	11.00	11.00	11.00	11.00	13.00	15.00	13.00	15.00	13.00
	2.88	**2.89**	**2.88**	**2.89**	**2.87**	**2.86**	**2.87**	**2.89**	**2.90**	**2.88**	**2.89**	**2.88**

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Table 8.4: **CO – PO ATTAINMENT**
Course: RECORDING AND ANALYSIS OF BUSINESS OPERATIONS
Course Code: MBA104

CO1 AT	2.75
CO2 AT	2.48
CO3 AT	2.83
CO4 AT	2.78
CO5 AT	2.06
CO6 AT	2.68

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	2	3	2	3	2	3
CO2	0	1	3	1	0	1	0	1	3	0	1	1
CO3	3	3	3	3	3	2	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	3	2	3	3	3
CO5	0	1	0	2	0	1	1	0	0	1	0	0
CO6	3	3	2	2	2	3	2	1	1	0	1	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	33.14	37.67	37.89	37.05	30.46	34.84	29.76	27.42	29.67	27.15	27.50	35.62
	12.00	14.00	14.00	14.00	11.00	13.00	11.00	10.00	11.00	10.00	10.00	13.00
	2.76	**2.69**	**2.71**	**2.65**	**2.77**	**2.68**	**2.71**	**2.74**	**2.70**	**2.72**	**2.75**	**2.74**

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Table 8.5: **CO – PO ATTAINMENT**
Course: MICRO ECONOMICS AND ECONOMIC PLANNING
Course Code: MBA105

CO1 AT	2.91
CO2 AT	2.73
CO3 AT	2.91
CO4 AT	2.88
CO5 AT	2.29
CO6 AT	2.88

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	2	3	2	3	3	3
CO2	0	2	3	1	3	1	0	1	2	0	2	1
CO3	1	3	3	3	2	2	2	2	3	3	3	2
CO4	3	3	3	0	3	3	3	3	2	2	3	3
CO5	2	1	0	2	1	2	2	2	2	3	3	2
CO6	2	2	3	2	2	2	3	1	2	1	3	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	30.60	39.59	42.91	30.52	39.41	33.33	33.47	33.36	36.09	32.95	40.18	39.12
	11.00	14.00	15.00	11.00	14.00	12.00	12.00	12.00	13.00	12.00	14.00	14.00
	2.78	**2.83**	**2.86**	**2.77**	**2.82**	**2.78**	**2.79**	**2.78**	**2.78**	**2.75**	**2.87**	**2.79**

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Table 8.6: **CO – PO ATTAINMENT**
Course: COMMUNICATION SKILLS
Course Code: MBA106

CO1 AT	2.85
CO2 AT	2.70
CO3 AT	2.87
CO4 AT	2.88
CO5 AT	2.20
CO6 AT	2.77

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	2	3	2	3	2	3
CO2	0	1	1	0	0	1	0	1	2	0	1	1
CO3	3	3	3	3	2	2	3	2	0	3	3	3
CO4	3	3	2	3	2	3	3	3	2	2	2	2
CO5	2	1	1	2	2	1	1	1	0	1	1	2
CO6	1	0	3	2	3	0	0	1	3	0	3	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	32.98	30.70	36.14	35.75	32.77	24.98	25.15	30.60	25.17	25.12	33.29	38.34
	12.00	11.00	13.00	13.00	12.00	9.00	9.00	11.00	9.00	9.00	12.00	14.00
	2.75	**2.79**	**2.78**	**2.75**	**2.73**	**2.78**	**2.79**	**2.78**	**2.80**	**2.79**	**2.77**	**2.74**

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Table 8.7: CO – PO ATTAINMENT
Course: QUANTITATIVE SKILLS
Course Code: MBA107

CO1 AT	2.69
CO2 AT	2.01
CO3 AT	2.68
CO4 AT	2.69
CO5 AT	1.79
CO6 AT	2.62

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**3**	**2**	**3**	**3**	**2**	**2**	**3**	2	3	2	3
CO2	0	0	1	0	2	1	0	1	2	0	1	0
CO3	3	3	3	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	3	2	3	3	3
CO5	0	1	0	3	1	1	1	0	0	1	0	0
CO6	3	3	3	2	3	0	0	1	3	0	3	3
	PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
	32.05	33.83	31.36	34.79	37.85	25.29	23.28	26.13	30.68	25.97	31.36	32.05
	12.00	13.00	12.00	14.00	15.00	10.00	9.00	10.00	12.00	10.00	12.00	12.00
	2.67	**2.60**	**2.61**	**2.48**	**2.52**	**2.53**	**2.59**	**2.61**	**2.56**	**2.60**	**2.61**	**2.67**

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9. MAPPING OF COURSE WITH POs and PSOs FOR BATCH: 2019-21

SEM 1st	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FIRST YEAR	MBA101	2.82	2.77	2.81	2.71	2.82	2.75	2.76	2.81	2.82	2.77	2.83	2.81			
	MBA102	2.88	2.89	2.87	2.87	2.88	2.85	2.85	2.86	2.86	2.88	2.88	2.86		-	-
	MBA103	2.88	2.89	2.88	2.89	2.87	2.86	2.87	2.89	2.90	2.88	2.89	2.88			-
	MBA104	2.76	2.69	2.71	2.65	2.77	2.68	2.71	2.74	2.70	2.72	2.75	2.74		-	-
	MBA105	2.78	2.83	2.86	2.77	2.82	2.78	2.79	2.78	2.78	2.75	2.87	2.79			-
	MBA106	2.75	2.79	2.78	2.75	2.73	2.78	2.79	2.78	2.80	2.79	2.77	2.74	-		
	MBA107	2.67	2.60	2.61	2.48	2.52	2.53	2.59	2.61	2.56	2.60	2.61	2.67		-	-

Figure 9.1: Program level CO-PO matrix

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DEPARTMENT OF COMPUTER APPLICATIONS(MCA)

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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1. INVERTIS UNIVERSITY VISION AND MISSION

VISION

To groom professionals of calibre and competence who will bring about a qualitative change to the society through their contributions.

MISSION

To provide quality education for all deserving students sans caste, creed, gender or money and present a real projection of education as a guiding torch for the development of human society.

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2. DEPARTMENT of Computer Applications
VISION AND MISSION

VISION

To create the most conducive environment for quality academic and research oriented postgraduate education in computer Applications and prepare the students for a globalize technological society and orient them towards serving the society. To be among the nation's premier small research and teaching Computer Science departments

MISSION

- To be among the nation's premier small research and teaching Computer Application departments
- To impart moral and ethical values, and interpersonal skills to the students
- To achieve academic excellence by imparting in-depth knowledge to the students through effective pedagogies and hands on experience on latest tools and technologies
- To establish nationally and internationally recognized research centers and expose the students to broad research experience
- To pursue interdisciplinary research that will serve the needs of the entire global community

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The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the University is taken as the basis.

Step 2: The Department conducts brain-storming sessions with Industry expert and Faculty members on the skillset required by the industry, Industry and required expertise in technology and Research and Development, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Educationist, Professional Bodies, Industry experts and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

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3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific management program should be able to do.

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4. STATEMENTS OF PEOs, POs ANDPSOs

4.1PROGRAM EDUCATIONAL OBJECTIVES(PEOs):

PEO1-PROFESSIONAL DEVELOPMENT

To prepare the post graduates as successful professionals ready for Industry, Government sectors, Academia, Research, Entrepreneurial Pursuit and Consultancy firms.

PEO2-CORE PROFICIENCY

To prepare the graduates with Ethical Attitude, Effective Communication Skills and admit themselves as ethical and responsible citizens with social commitments.

PEO3- TECHNICAL ACCOMPLISHMENTS

To prepare the graduates with excellent computing ability so that to Comprehend,Analyze, Design and Create computing solutions for the real-time problems.

PEO4- PROFESSIONALISM

To prepare the graduates to adapt themselves for life-long learning through professional activities on latest technology and trends needed for a successful career.

PEO5- LEARNING ENVIRONMENT

To prepare graduates the ability to gain multidisciplinary knowledge through real-time projects and industry internship training and providing a sustainable competitive edge in R&D and meeting industry needs.

The Process for Establishing the PEO"s

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the MCA Department are taken into consideration to interact with various stake holders, and establish the PEO's

STEP 2: The Head of the Department and other Senior Faculty prepares the draft version of PEOs and POs

STEP 3: The draft version is discussed with stakeholders and their views are collected by the head of the department.

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STEP 4: Head of the department reviews and analyzes the PEOs and POS and submits them .. departmental committee.

STEP 5: The Departmental committee deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOS for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council and industry.

- ❖ Inputs are also obtained from alumni and other stakeholders.
- ❖ Therefore, PEOs are established, checked for consistency with the mission statement of the department.

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4.2 PROGRAM OUTCOMES(POs):

Program Outcomes (POs)		
PO1	Computational Knowledge	Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
PO2	Problem analysis	Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
PO3	Design / Development of Solutions	Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies
PO4	Conduct Investigations of Complex Computing Problems	Ability to devise and conduct experiments, interpret data and provide well informed conclusions.
PO5	Modern Tool Usage	Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.
PO6	Professional Ethics	Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO7	Life-long Learning	Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
PO8	Project Management and Finance	Ability to understand, management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
PO9	Communication efficacy	Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.
PO10	Societal & Environmental Concern	Ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.
PO11	Individual & Team Work	Ability to work as a member or leader in diverse teams in multidisciplinary environment.
PO12	Innovation and Entrepreneurship	Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

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The Process for Establishing the POs

The POs are established through the following process steps:

The Vision, Mission, PEOs of the Department along with the 10 Graduate Attributes given by the NBA are used in defining the POS

STEP1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs

STEP2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

STEP3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

STEP4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

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4.3 PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs)	
PSO1	Understand the concepts and applications in the field of Computing Sciences like Web designing and development, Mobile application development, and Network and communication technologies.
PSO2	Apply the learning from the courses and develop applications for real world problems.
PSO3	Understand the technological developments in the usage of modern design and development tools to analyze and design for a variety of applications.
PSO4	Communicate in both oral and written forms, demonstrating the practice of professional ethics and the concerns for social welfare.

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5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higherforms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learningprocesses.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve Previouslearned information.	defines,describes, identifies, knows, labels, lists,matches,names, outlines,recalls, recognizes,reproduces, selects, states	Reciteapolicy. Quotepricesfrom Memorytoa customer.Recite the safety rules.
Understanding: Comprehending Themeaning, translation, interpolation,and Interpretationof Instructionsand problems. State a Problemin one'sown words.	comprehends,converts, defends,distinguishes, estimates,explains, extends,generalizes, gives an example, infers, interprets,paraphrases, predicts,rewrites, summarizes, translates	Rewritethe Principlesoftest writing. Explain in one'sownwords Thestepsfor Performinga Complextask. Translatean Equationinto acomputer spreadsheet.

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Applying: Use a concept in a new situationor unprompted use of an abstraction.Applies what was learningthe classroom into novel situations in the workplace.	applies,changes, computes,constructs,demonstrates, discovers,manipulates, modifies, operates,predicts, prepares,produces, relates, shows,solves, uses	Use a manual to calculatean employee'svacation time. Apply laws of statisticsto evaluatethe reliability of a writtentest.
Analyzing: Separates material or conceptsinto component parts sothatits organizational structuremaybe understood. Distinguishes betweenfacts and inferences.	analyses,breaksdown, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishesidentifies, illustrates,infers, outlines,relates,selects, separates	Troubleshoota piece ofequipment by using logical deduction. Recognizelogical fallaciesin reasoning. Gathers information from a departmentand selects the required tasks fortraining.
Evaluating: MakeJudgmentsaboutthe value of ideas or materials.	appraises,compares,concludes, contrasts,criticizes,critiques, defends,describes, discriminates, evaluates, explains,interprets, justifies,relates, summarizes,supports	Select the most Effectivesolution. Hire the most qualified candidate. Explain andjustify a newbudget.

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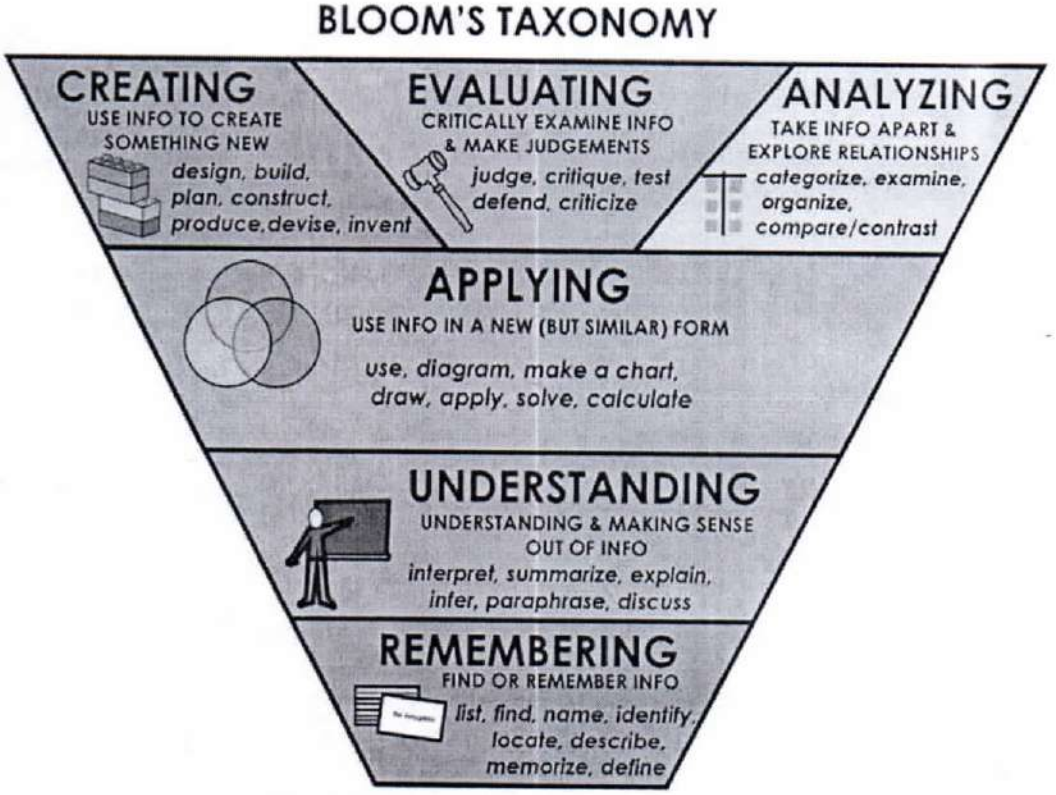
Creating: Builds a structure or Pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes,combines,compiles ,composes,creates, devises, designs,explains,generates,mod ifies,organizes,plans,rearranges ,reconstructs,relates,reorganize s,revises,rewrites,summarizes,t ells, writes	Integrates training from several sourses to solve a problem. Revise and process to improve the outcomes



Pictorial representation of Blooms Taxonomy

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6. COURSE OUTCOME STATEMENTs

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statemen are defined by considering the course content covered in each unit of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

CO STATEMENTS:

Course: Computer Concepts and C Programming

Course Code: MCA 101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understanding the concept and recognize the basic terminology used in computer programming.
CO2	Write, Compile and Debug programs in C language and use different data types for writing the programs
CO3	Design programs connecting decision structures, loops and functions.
CO4	Able to define data types and use them in simple data processing applications alsohe/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.
CO5	Understand the dynamic behaviour of memory by the use of pointers
CO6	Use different data structures and create / manipulate basic data files and developing applications for real world problems.

CO STATEMENTS:

Course: Computer Organization

Course Code: MCA 102

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Know various components of a digital computer.
CO2	Design basic computer instructions
CO3	Propose a new processor design.
CO4	Understand the working of input and output devices and device controller.
CO5	Understand computer memory hierarchy
CO6	Implement paging and segmentation in computer memory.

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CO STATEMENTS:

Course: Discrete Mathematics

Course Code: MCA 103

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
CO2	Understand the basic principles of sets and operations in sets.
CO3	Apply counting principles to determine probabilities.
CO4	Demonstrate an understanding of relations and functions and be able to determine their properties.
CO5	Demonstrate different traversal methods for trees and graphs
CO6	Model problems in Computer Science using graphs and trees.

CO STATEMENTS:

Course: Accounting and Financial Management

Course Code: MCA 105

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the contents of both internal and external financial reports.
CO2	Explain the objectives, concepts and relationships that underpin both internal and external financial reports.
CO3	Apply analytical tools, techniques and frameworks to evaluate and critically examine the contents of both internal and external financial reports.
CO4	Communicate financial information to interested stakeholders in an ethical and professional manner.
CO5	Effectively collaborate in both the construction and presentation of management information data pertaining to a reporting entity or unit.
CO6	Communicate financial information to interested stakeholders in an ethical and professional manner

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CO STATEMENTS:

Course: Professional Communication I

Course Code: BPC 101

On successful completion of this course, students should be able to

	COURSE OUTCOMES DESCRIPTION
CO1	Understand the process of communication and its effect on giving and receiving information.
CO2	Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar.
CO3	Apply effective communication skills in a variety of public and interpersonal settings.
CO4	To draft effective correspondence with brevity and clarity.
CO5	Demonstrate his verbal and nonverbal communication ability through presentations.
CO6	Become aware the numerous carrier opportunities within the fields of communication.

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7. CO – PO AND CO – PSO MAPPING OFCOURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

a. **"1"** – Slight (Low)Correlation

b. **"2"** – Moderate (Medium)Correlation

c. **"3"** – Substantial (High)Correlation

d. **"0"** indicates there is nocorrelation.

7.1 Levels ofOutcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course.

Program outcomes are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal program should have.

After writing the CO statements, CO will be mapped with PO of the department. The role of the program coordinator is to review the CO statements and the CO-PO mapping which h. been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 4th semester. The Program coordinator has to evaluate thePOs.

The Program outcomes reflect the ability of post graduates to demonstrate knowledge in fundamentals principles of management and apply these principles in understanding an.

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practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of postgraduation.

The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, ability to deal with finances and project and managerial positions during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts toachieve.

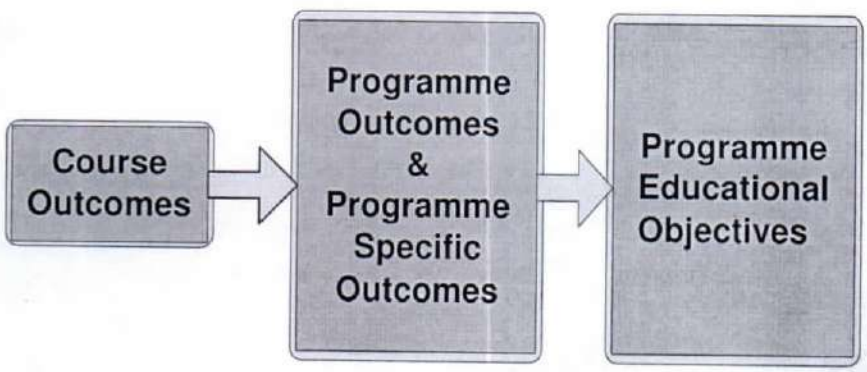

Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

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Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

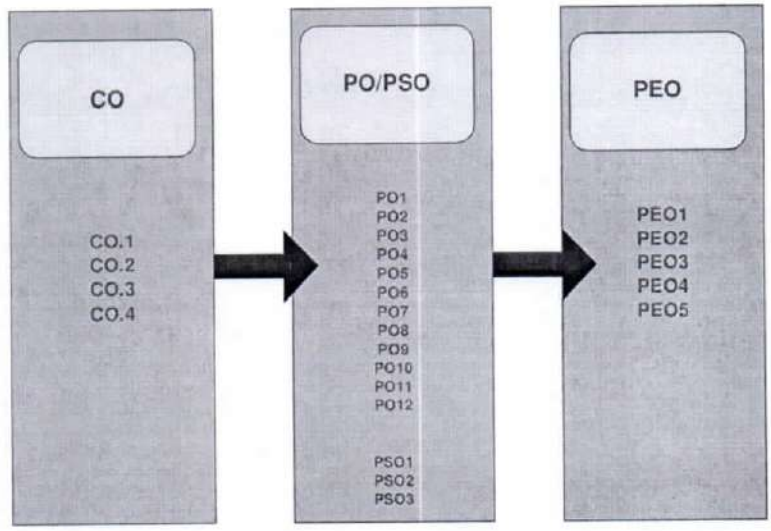

Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-POMapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate Cos for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behaviour that students will acquire through the course.attainment of individual student through direct and indirect metho after the student completing their program. All these works have to be done under the guidance of Board of studies.

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7.3 CO-PO Mapping

A sample course outcome statements and sample CO-PO matrix are given in Table 7.1
The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '0. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '0' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome MCA101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M
CO5												

Process used to identify the curricular gaps to the attainment ofCOs/POs

Step-1:The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.

Step-3:The year wise coordinators who are the members of the departmental committee would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4: The departmental committee would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to board of studies.

Program Assessment Committee after getting prior approval from Board of studies about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, projects, online quiz, etc.

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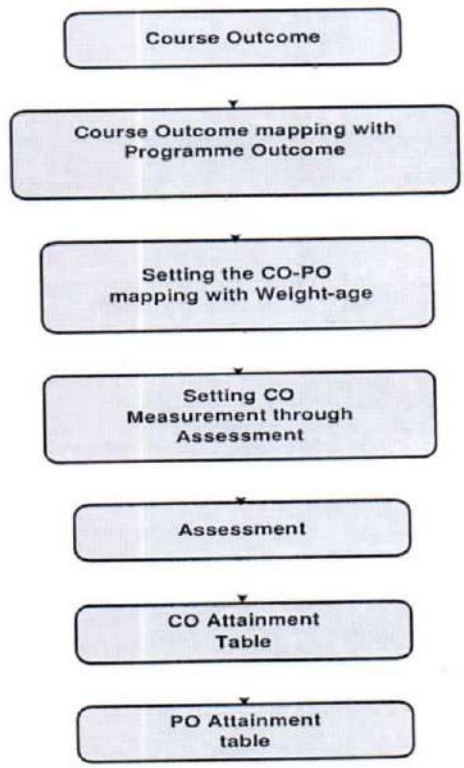
Validation of CO-PO mapping



The process of CO-PO mapping validation

Process of CO-PO Attainment

Step 1 : Obtain courseoutcome.

Step 2 : Mapping of course outcome with programoutcome.

Step 3 : Setting weightage for CO assessment.

Step 4 : COmeasurement throughassessment.

Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct andindirect assessmentmethods.

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8. COURSE OUTCOMES TO PO MAPPING

Mapping strength of a course to PO/ PSO can be obtained bytaking the average of the CO-PO/ PSO mapping matrices of that course.

Table 8.1: CO – PO ATTAINMENT
Course: Computer Concepts and C Programming
Course Code: MCA 101

CO1 AT	3.00
CO2 AT	2.83
CO3 AT	2.83
CO4 AT	3.00
CO5 AT	3.00
CO6 AT	2.80

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	0	2	1	0	2	0	2	3	2	1
CO2	2	2	2	0	0	2	3	2	3	2	2	2
CO3	1	3	3	2	3	3	2	2	1	2	1	2
CO4	3	2	3	1	3	3	2	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	3	3	3	3	2	3	2	1	2	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
43.90	34.56	34.56	29.06	34.89	34.76	43.56	34.93	26.13	34.93	37.90	40.73
15.00	12.00	12.00	10.00	12.00	12.00	15.00	12.00	9.00	12.00	13.00	14.00
2.93	**2.88**	**2.88**	**2.91**	**2.91**	**2.90**	**2.90**	**2.91**	**2.90**	**2.91**	**2.92**	**2.91**

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Table 8.2: **CO – PO ATTAINMENT**
Course: Computer Organization
Course Code: MCA102

CO1 AT	3.00
CO2 AT	2.83
CO3 AT	2.83
CO4 AT	3.00
CO5 AT	3.00
CO6 AT	2.80

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	0	2	1	0	2	0	2	3	2	1
CO2	2	2	2	0	0	2	3	2	3	2	2	2
CO3	1	3	2	2	2	2	2	2	2	2	2	2
CO4	3	3	3	2	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	3	3	3	2	2	3	3	1	3	3	3

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
43.90	37.56	31.73	32.06	29.26	31.93	46.56	37.73	28.96	37.73	40.73	40.73
15.00	13.00	11.00	11.00	10.00	11.00	16.00	13.00	10.00	13.00	14.00	14.00
2.93	**2.89**	**2.88**	**2.91**	**2.93**	**2.90**	**2.91**	**2.90**	**2.90**	**2.90**	**2.91**	**2.91**

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Table 8.3: **CO – PO ATTAINMENT**
Course: Discrete Mathematics
Course Code: MCA103

CO1 AT	3.00
CO2 AT	2.83
CO3 AT	2.83
CO4 AT	3.00
CO5 AT	3.00
CO6 AT	2.80

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	0	0	2	1	0	2	0	2	3	2	1
CO2	2	2	2	0	0	2	3	2	3	2	2	2
CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	0	0	0	2	0	0	0	0	3	0	0

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
43.90	26.16	23.33	20.66	29.26	26.33	38.16	29.33	23.33	37.73	32.33	32.33
15.00	9.00	8.00	7.00	10.00	9.00	13.00	10.00	8.00	13.00	11.00	11.00
2.93	**2.91**	**2.92**	**2.95**	**2.93**	**2.93**	**2.94**	**2.93**	**2.92**	**2.90**	**2.94**	**2.94**

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Table 8.4: **CO – PO ATTAINMENT**
Course: Accounting and Financial Management
Course Code: MCA105

CO1 AT	3.00
CO2 AT	2.83
CO3 AT	2.83
CO4 AT	3.00
CO5 AT	3.00
CO6 AT	2.80

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	0	0	2	1	0	2	0	2	3	2	1
CO2	2	2	2	0	0	2	3	2	3	2	2	2
CO3	1	3	2	2	2	2	2	2	1	2	2	2
CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	3	0	0	0	2	0	0	0	0	3	0	0

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
43.90	26.16	23.33	20.66	29.26	26.33	38.16	29.33	23.33	37.73	32.33	32.33
15.00	9.00	8.00	7.00	10.00	9.00	13.00	10.00	8.00	13.00	11.00	11.00
2.93	**2.91**	**2.92**	**2.95**	**2.93**	**2.93**	**2.94**	**2.93**	**2.92**	**2.90**	**2.94**	**2.94**

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Table 8.5: **CO – PO ATTAINMENT**
Course: Professional Communication
Course Code: BPC101

CO1 AT	3.00
CO2 AT	2.83
CO3 AT	2.83
CO4 AT	3.00
CO5 AT	3.00
CO6 AT	2.80

CO PO MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	0	1	0	1	2	0	2	2	2	0
CO2	3	0	0	1	2	2	2	2	3	2	2	2
CO3	2	3	2	2	1	2	2	2	3	2	2	2
CO4	3	3	3	1	3	3	3	3	2	1	3	3
CO5	3	1	1	2	2	2	3	3	0	2	2	3
CO6	1	1	0	0	2	3	0	0	3	3	3	2

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
43.96	29.29	17.66	20.49	29.10	37.73	35.33	29.33	37.39	34.73	40.73	34.93
15.00	10.00	6.00	7.00	10.00	13.00	12.00	10.00	13.00	12.00	14.00	12.00
2.93	**2.93**	**2.94**	**2.93**	**2.91**	**2.90**	**2.94**	**2.93**	**2.88**	**2.89**	**2.91**	**2.91**

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9. MAPPING OF COURSE WITH POs and PSOs FOR BATCH: 2019-21

SEM 1st	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FIRST	MCA101	2.93	2.88	2.88	2.91	2.91	2.90	2.90	2.91	2.90	2.91	2.92	2.91			
	MCA102	2.93	2.89	2.88	2.91	2.93	2.90	2.91	2.90	2.90	2.90	2.91	2.91			-
	MCA103	2.94	2.89	2.88	2.90	2.92	2.91	2.91	2.90	2.89	2.93	2.90	2.96			-
	MCA105	2.93	2.91	2.92	2.95	2.93	2.93	2.94	2.93	2.92	2.90	2.94	2.94		-	-
	BPC101	2.93	2.93	2.94	2.93	2.91	2.90	2.94	2.93	2.88	2.89	2.91	2.91			-

Figure 9.1: Program level CO-PO matrix

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CO – PO Attainment Report

OF

BACHELOR OF JOURNALISM AND MASS COMMUNICATION (B.J.M.C.)

INVERTIS UNIVERSITY

Invertis Village, NH-24, Bareilly

1. INSTITUTE VISION AND MISSION

VISION

• Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.

• To offer world class training to the promising Engineers.

MISSION

• To nurture high level of Decency, Dignity and Discipline in students to attain high intellectual abilities.

• To produce employable students at National and International levels by effective training programmes.

• To create pleasant academic environment for generating high level learning attitudes

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FACULTY OF MANAGEMENT

DEPARTMENT OF JOURNALISM AND MASS COMMUNICATION

About the Department:

Department of Journalism and Mass Communication aims at imparting quality education in order to cater to the increasing demands of the industry and trains the students in various techniques of Communication. We take up challenges, which come due to day-to-day innovations in communication technology. We have state of the art infrastructure- TV and Radio studio, graphics lab, postproduction unit and central library. The core strength of the department lies in the harmony among all its stakeholders: Students, Faculty, Staff and Management. It is our firm faith that value based learning can transform a student into an efficient professional and a responsible citizen. It is in this backdrop that we strive to help our students claim their rightful place in the world that is fast turning into a global village. The courses and programs have been designed keeping in view the current technology trends, innovations in journalism and the demands of the media industry.

Vision:

Department of Journalism & Mass Communication, is dedicated and committed to train and equip its students with latest knowledge and skills in the field of media and communication technology, in the backdrop of responsibility and accountability associated with the profession, and to transform them insightful, honorable and responsible citizens.

Mission:

- To provide and create an academic ecology in which role of a teacher is not only to teach but facilitate nurturing inquisitiveness and research mindset in the students.
- To inculcate skills both technical and soft skills so that dormant potential is utilized in grooming media professionals and leaders.
- To ingrain a sense of responsibility through experience sharing and practical exposure so that students can withstand the vagaries of the profession with dedication and self esteem.

Programmes:

- Bachelor of Journalism & Mass Communication (3 years)

APPLICABILITY:

This ordinance shall apply to programme of Bachelor of Journalism and Mass Communication (B.J.M.C).

1. DEFINITIONS:

(a) Academic Programme/ Programmes shall mean a programme of courses and/or any othercomponent leading to the degree of Bachelor of Journalism and Mass Communication.

(b) An Academic Year is a period of nearly 12 months devoted to completion of requirementsspecified in the Scheme of Teaching and the related examinations.

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(c) **Board of Studies (BOS)** shall mean the Board of Studies of the School concerned.

(d) **Course** means a component of the academic programme, carrying a distinctive code number and specific credits assigned to it.

(e) **External examiner** shall mean an examiner who is not in the employment of the University.

(f) **Semester System** – A programme wherein each academic year is apportioned into two partsknown as semesters.

(g) **Student** shall mean a person admitted and registered for a programme in the Institutes of theUniversity.

(h) **University** shall mean Invertis University.

2. ADMISSION

Admission to B.J.M.C. will be made as per the rules prescribed by the Academic Council of the University.

3. ELIGIBILITY FOR ADMISSION

For admission to B.J.M.C programme, a candidate should have passed Senior Secondary Examination on the pattern of 10+2 from a recognized Board of Education or an equivalent examination recognized as equivalent thereto by the University with at least 50% marks in aggregate. In case of SC/ST candidates the eligibility requirement is a minimum of 45% marks in aggregate.

4. CANCELLATION OF ADMISSION

The admission of a student at any stage of study shall be cancelled if:

(i) He / She is not found qualified as per the eligibility criteria prescribed by the University.

or

(ii) He / She is found unable to complete the course within the specified period for completion of the course as per clause 6(g).

or

(iii) He / She is found involved in creating indiscipline in the School/Institute or in the University.

or

(iv) He/ She is involved in ragging.

5. CURRICULUM

B.J.M.C programme is of three years duration and its curriculum is divided into 6 semesters. Curriculum for Semesters 1 to 6 shall consist of lectures, tutorials, practical's and seminars as defined in the Scheme of Teaching & Examination and Syllabi issued by the University from time to time.

Further a student may be allowed to "audit" a course(s) not included in the Scheme of Teaching &Examination. The University may also ask a student to audit one or more courses as pre-requisite courses so as to make up any deficiency at the entry level.

Such audited course(s) shall be shown in the final mark-sheet under a distinct head of "Audited Course(s)" provided the attendance requirement of the course is duly certified to have been met by the concerned teacher(s). However, a student shall neither be entitled to any credits for such course(s), nor these shall be considered for the purpose of declaration of results.

6. PROGRAMME CONTENTS and DURATION

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a) The minimum period required for completion of B.J.M.C programme is three years i.e. **6** semesters. Each semester will have at least 90 working days.

b) Students shall be required to register for all the courses offered in any particular semester. If a student fails in a subject, he has to re-register for that subject in the supplementary /carry over exam.

c) Students are permitted to register for additional course(s) as backlog from second semester onwards provided the subject is being offered in that semester.

d) Except for the first semester, registration for the next semester will be done during the first week of the next semester.

e) From the second semester onwards, all students have to enroll on a specified day at the beginning of a semester. A student is eligible for enrolment if he has paid all the dues for that semester.

f) Students will not be allowed to register for more than two failed courses in a semesterin addition to the regular courses in order to clear backlog.

g) The maximum permissible period for completing B.J.M.C programme for which the prescribedprogramme duration is **n** semesters, shall be **(n+4)** semesters. All the programme requirementsshall have to be completed in **(n+4)** semesters. This excludes the period of expulsion orsuspension by the university / approved medical leave.

h) After second semester, students will be required to undergo 4-6 weeks training in Print Media Organisation. They will be required to submit Summer Training Report by the second week of commencement of the third semester and deliver a power point presentation for the same.

i) After fourth semester, students will be required to undergo 4-6 weeks training in electronic media organization. They will be required to submit Summer Training Report by the second week of the commencement of fifth semester.

j) After fifth semester, students will be assigned with a field research project for which they will be required to submit a research report along with power point presentation and also deliver a seminar. This will be called "Professional Project".

7. SEMESTER DURATION

(a) An academic year shall be apportioned into two semesters with a working duration of about 20weeks each. There shall be a break of 3 to 5 weeks after autumn semester and 6 to 10 weeks after the spring semester. The Academic Calendar shall be notified by the University each year before the start of the Academic Session.
(b) The academic break-up of the semesters devoted to instructional work shall be as below:

Imparting of instructions and/or laboratory work - 16 -18 Weeks
(including class tests, sessional exams. etc.)

Semester-end Examination, including Practical / - 02 - 04 Weeks
Laboratory Examination

8. BOARD OF STUDIES

The constitution of the Board of Studies of each School shall be:

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(a) Head of the Department (Chair)
(b) All Professors and Readers of the Department
(c) Two Experts from another University nominated by the Vice-Chancellor
(d) Two Assistant Professors by rotation
(e) One Professor/ Associate Professor/ Reader from Associate Department nominated by the Director.

9. DEPARTMENTAL COMMITTEE

a) There shall be a Departmental Committee in the Department/ Constituent Institutions of the University.
b) All the permanent teachers of a Department of study shall constitute the Departmental Committee of which the HOD of the Department shall act as its Chairperson. This Committee shall coordinate the implementation of the courses for optimum utilization of resources and shall also take care of the coordination of the Department's programmes with the other programmes run by the different Institutes/Schools of the University.
c) The Departmental Committees shall also perform other tasks as assigned to it by the Board of Studies of the concerned Institute/ School of the University.
d) The Departmental Committee shall meet as and when required but at least once every month. The Chairperson of the Committee will convene the meetings.

10. APPLICABLE FEES

- All the fees including the course fee and the examination fee, as determined by the University from time to time, will be payable by the students at the beginning of each semester.
- Registrar will notify the quantum of fees payable and the schedule of registration before the start of each semester.
- Fees once paid, and once the student has started attending classes, are not refundable in any case except for the caution money. In some cases of genuine hardship, the Vice-Chancellor may permit at his discretion, an extension in the last date of payment of fees. However, all the students will be required to pay the prescribed fee before the start of examinations. In case any student has been allowed to appear for the examinations, the results of such student shall be withheld till all his dues are cleared.

11. ATTENDANCE

All students are normally expected to have an attendance of 100% in each subject. Relaxation up to 25%may be given on account of illness and other pre-approved occasions. Vice Chancellor may furthercondone attendance shortage up to 5% on genuine grounds. However, under no circumstances, a student with an attendance of less than 70% in a subject, shall be allowed to appear in the semester-endexamination of that subject, provided that the late admitted students in the first semester of any coursemaintain at least 80% attendance (including medical and other reasons) from the date of their admission.

Director of the Institute/ School / Programme Coordinator shall announce the names of all such studentswho are not eligible to appear in the subject(s) of semester-end examination, at least one week before thestart of the semester-end examination and simultaneously intimate the same to the Controller of Examinations.

In case any student appears in the Examinations by default, who in fact has been detained by the Institute/School, his/ her result shall be treated as null and void.

12. EVALUATION

Examinations of the University shall be open to all regular (residential) / part-time/ ex-students who have undergone a course of study in the University for a period specified for that programme of study in the Teaching & Examination Scheme and are not debarred from appearing in the semester-end examinations as provided in the applicable Ordinance of the University.

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(a) The performance of a student in a semester shall be evaluated through continuous class assessment and end semester examination.

(b) The distribution of weightage for various components of evaluation shall be as defined in the Teaching & Examination Scheme.

(c) Conduct of semester-end examinations

(i) All semester-end examinations shall be conducted by the Controller of Examinations.

(ii) The schedule of examination shall be notified by the Controller of Examinations at least 10 days prior to the first day of the commencement of semester-end examinations.

(iii) For theory as well as practical examinations and dissertation/ thesis/ project report/ training report etc, the concerned subject teacher(s) shall be the examiners. In case any external examiners are desired, then the same shall be appointed by the Controller of Examinations with the recommendations of the Director of the concerned School / Programme Coordinator subject to approval of the Vice-Chancellor.

(d) <u>Continuous Evaluation:</u>

A student shall be evaluated for academic performance in a course through tutorials, homework, assignments, quizzes and mid semester tests (MSM), practical laboratory work (PRM) and final theory and practical examination (FTM & FPM). Evaluation of a course is based on the weightage assigned to various components of the course examination scheme. Components are designated as under:

CWM Class Work Marks will be awarded on the basis of attendance (5%), assignments and quizzes (5%) taken in the class. (Weightage: 10%)

MSM Mid Semester Examination Marks. (Three tests will be conducted during the semester and their average will be considered to finalize the marks). The student will be shown his answer book/ answer sheets immediately after the evaluation. (Weightage: 20%)

PRM Practical Sessional Marks will be awarded on the basis of attendance in practical classes, practical records etc. There shall be no mid semester test in laboratory class. (Weightage: 30%)

FTM Final Theory Examination Marks (Weightage: 70%)

FPM Final Practical Examination Marks (Weightage: 70%)

The examiner shall set semester-end examination question paper and submit to the Controller of Examinations at least two weeks before the commencement of End-Term Examinations. Papers will be moderated by a moderation committee approved by the Vice-Chancellor. The examiner for the final examination may be one of the subject teachers of the concerned course in that semester.

(e) The University shall have the right to call for the complete records of any teacher's evaluation and moderate the teacher's evaluation, if it deems fit.

(f) Semester-end practical examinations shall be conducted by a Board of Examiners for each course duly approved by the Vice-Chancellor. The Board shall consist of one or more examiners.

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(g) For any other type of examination, not covered by sub-clause (c) and (f) above, the mode of conduct of examination shall be as specifically provided in the Teaching & Examination Scheme, and in the absence of such a provision, it shall be decided by the Controller of Examinations on the recommendations of the Board of Studies / Coordination Committee concerned, with the approval of the Vice-Chancellor.

(h) If a student has missed semester-end examination due to valid reasons like illness, injury, death of an immediate relative etc., he may be allowed to appear in a make-up examination for the missed paper provided he was eligible for the end-semester examination of that paper.

(i) The complete results of a semester examination (including both the semester-end examination and teacher's continuous evaluation) shall be declared by the Controller of Examination after it is cleared by the Examination Results and Moderation Committee, specially constituted by the Vice-Chancellor for the purpose.

(j) The award-list / mark-sheet containing the marks obtained by a student in various courses shall be issued by the Controller of Examinations, at the end of each semester, after the declaration of the result.

(k) The marks obtained in a subject shall consist of marks allotted in end semester theory paper, practical examination and sessional work.

(l) The minimum pass marks in each subject (theory and sessional marks including) shall be 40 % in each subject in the end semester examination.

(m) The minimum pass marks in a project/ practical subject (including sessional marks if any) shall be 50%.

(n) A candidate in order to pass must secure 50% marks in aggregate in a particular semester. (This clause shall come into effect and applicable for all the batches of students admitted from the academic year 2012-13.

(o) The minimum pass marks in seminar, Industrial Training and Educational tour Viva-Voce shall be 50%.

13. PROMOTION:-

i. A candidate satisfying all the requirements under clause 12 shall be promoted to the next academic year of study.

ii. A candidate shall be eligible for provisional promotion to the next academic year of study provided, he/she has not failed in more than 4 papers in a year. (At the end of two semesters) and not more than 4 (four) papers arrears at the end of any semester.

iii. A candidate who fails in not more than 3 theory papers and 2 practical/ project subjects and does not secure the required aggregate marks also may be promoted to the next year. In such a case, aggregate marks shall be treated as one subject.

iv. A candidate who fails in aggregate shall be eligible for provisional promotion with carry over. He/ She may choose upto a maximum of any four theory papers of that particular academic year as per his/her choice to pass the examination of that year.

v. There shall be a supplementary examination every year after the declaration of the results of even semester (sometime in

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July and students may appear in requisite no. of papers subject to clause (iv) above in the supplementary examination.)

14. USE OF UNFAIR MEANS

All reported cases of use of unfair means in the examination shall be placed before a Standing 'Unfair Means Hearing Committee' for decision on case to case basis. The actions under the category of 'Use of Unfair Means' and procedure for dealing with such cases of suspected/ alleged/ reported use of unfair means shall be specified by the Academic Council.
The Following would be considered as unfair means adopted during examinations and other contexts:
i. Communicating with the fellow students for obtaining help.
ii. Copying from the other student's script / report/ paper etc.
iii. Possession of any incriminating document whether used or not.
iv. Any approach in direct or indirect form to influence teacher / invigilator.
v. Unruly behaviour, which disrupts academic environment.

15. STUDENTS GRIEVANCE COMMITTEE

In case of any written representation / complaints received from the students within seven days after completion of the examination regarding setting up of the question paper etc. along with specific recommendations of the course Co-ordinator & Director of the school, the same shall be considered by the Students Grievance Committee to be constituted by the Vice-Chancellor. The Vice-Chancellor shall take appropriate decision on the recommendations of the Students Grievance Committee, before the declaration of result(s) of the said examination.

16. SCRUTINY and RE-EVALUATION

A student can apply to Controller of Examination for the scrutiny of the marks obtained in the end-Semester Examination on payment of Fee to be decided by the Academic Council from time to time.
He can also apply for re-evaluation of his answer-book on payment of fee to be decided by the
Academic Council from time to time.

17. AWARD OF DEGREE

A student shall be awarded a degree if:
i) He/she has registered himself/herself, undergone the course of studies, completed the project report/ dissertation specified in the curriculum of his/ her programme within the stipulated time, and secured the minimum credits prescribed for award of the concerned degree/ diploma.
ii) There are no dues outstanding in his/her name of a School of the University / constituent Institution, and
iii) No disciplinary action is pending against him/her

18. Subject to the provisions of the Act, the Statutes and the Ordinances such administrative issues as disorderly conduct in examinations, other malpractices, dates for submission of examination forms, issue of duplicate degrees / diplomas, instructions to examiners, superintendents, invigilators, their remuneration and any other matter connected with the conduct of examinations will be dealt with as per the guidelines approved for the purposes by the Academic Council.
19. Notwithstanding anything stated in this Ordinance, for any unforeseen issues arising, and not covered by this Ordinance, or in the event of differences of interpretation, the Vice-Chancellor may take a decision after obtaining, if necessary, the opinion / advice of a Committee consisting of any or all the Directors of the Schools. The decision of the Vice-Chancellor shall be final.

The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department :-

Step 1. The Vision & Mission of the Institute is taken as the basis.

Step 2: The Department conducts brain-storming sessions with the faculty on the

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skill-set required by the local and global employers, Industry Advances in Technology and R & D, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Parents, Professional Bodies, Industry representatives and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

The process for defining department vision and mission are illustrated in the flow chart Figure 2.1.

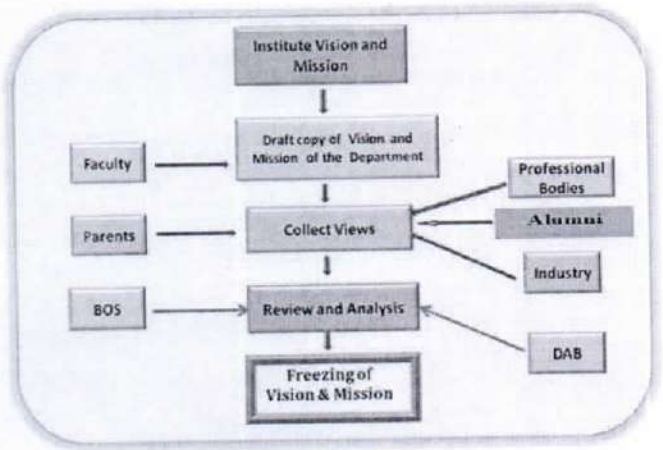

Figure 2.1 Process for defining Vision and Mission of the Department

1. BLOOM"S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM"S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering:		

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Recall or retrieve previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from memory to a customer. Recite the safety rules.
Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the principles of test writing. Explain in one's own words the steps for performing a complex task. Translate an equation into a computer spreadsheet.
Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's Vacation time. Apply laws of statistics to evaluate the eligibility of a written test.
Understanding: Comprehending the meaning, translation, interpolation, and	comprehends, converts, defends, distinguishes, estimates, explains,	Rewrite the principles of test writing. Explain in one's own

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interpretation of instructions and problems. State a problem in one's own words.	extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	words the steps for performing a complex task. Translate an equation into a computer spreadsheet.
Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.
Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.
Evaluating: Make judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.	Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.
Creating: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training From several sources to solve a problem. Revises and process to Improve the outcome.

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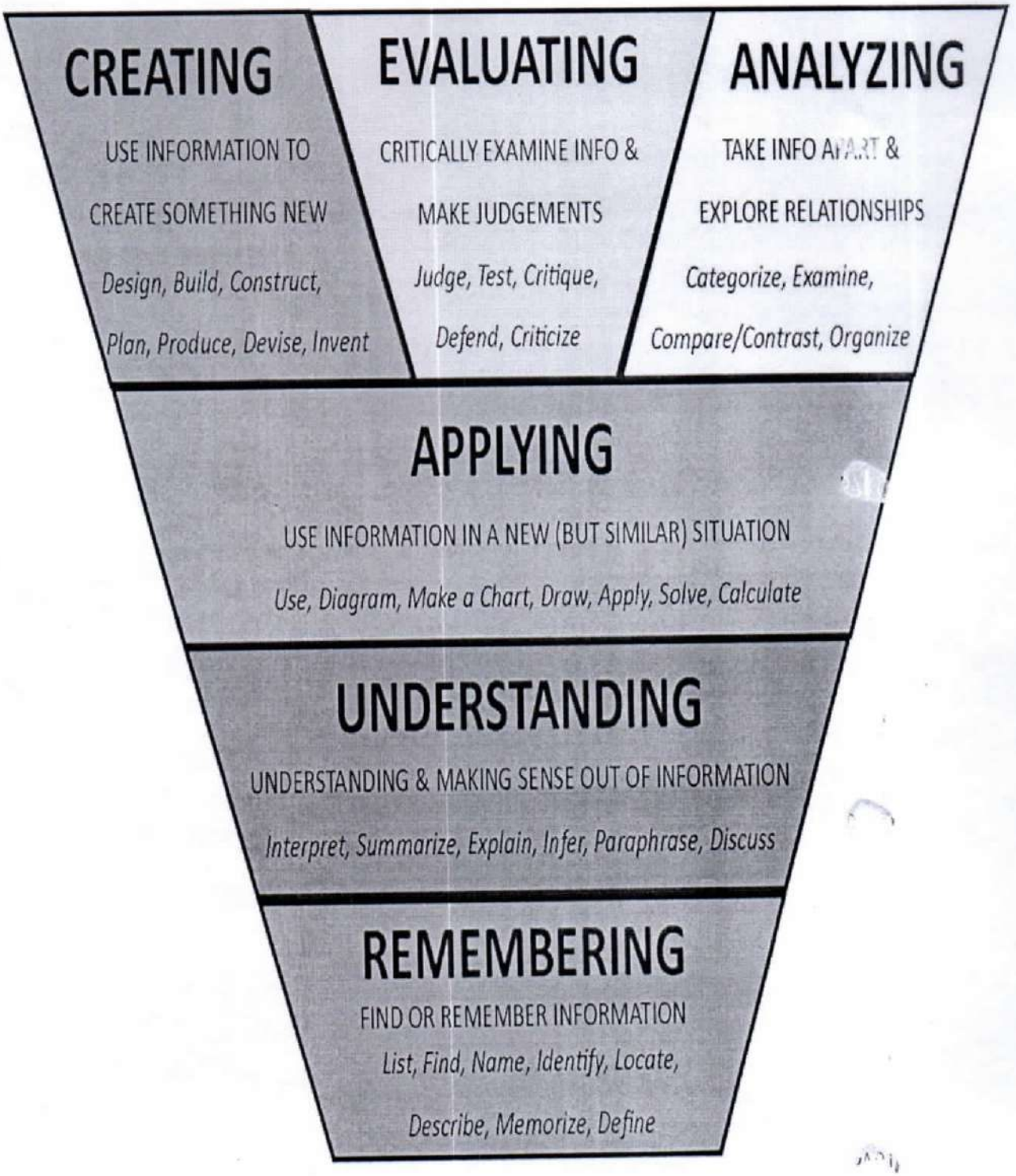

Figure 5.1 Pictorial representation of Blooms Taxonomy

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Programme Outcomes
For Journalism and Mass Communication

PO 1: To Create the sound knowledge about journalism filed to develop problem solving ability and challenges in media filed.

PO 2: An ability to design a system, component, or process to meet desired needs within realistic constraints such as to inform, educate and entertain to the masses through their writing skills and knowledge.

PO 3: Multidisciplinary knowledge through projects and internships, providing a sustainable competitive edge in R&D to meet industrial needs.

PO 4: Technical skills as well as soft skills to use modern tools and technique necessary forpracticing Journalism.

PO5: Understanding of the role of a journalist towards the community and the society as a whole and an ability to communicate effectively with health professionals and other people of multidisciplinary background.

PO 6: Leadership quality for technology innovation and entrepreneurship forprofessional identity with ethical responsibility.

PO 7: To have effective communication skills, teamwork skills and work with values that meets the diversified needs of industry, academia and research.

PO 8: Understanding of the role of a media personality towards the community and the society as a whole and an ability to communicate effectively with professionals and other people of multidisciplinary backgrounds.

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Semester wise CO -PO Assessment

SEMESTER I

*** L-Lecture, P-Practical, T-Tutorial**

S. No.	Subject Code and Name	Hours/ Week			Maximum Marks			Credit Points
Theory Courses		**L**	**T**	**P**	**Final Exam**	**Sessional**	**Total**	
1	BMC 101 Principles of Communication	3	1	0	70	30	100	4
2	BMC 102 Journalism & Mass Media:History & Growth	3	1	0	70	30	100	4
3	BMC 103 Language Skills for Mass Media	3	1	0	70	30	100	4
4	BMC 104 Computer Application for Mass Media	3	1	0	70	30	100	4
5	BMC 105 Reporting & Editing-I	3	1	0	70	30	100	4
6	BMC 106 Environmental Studies	3	1	0	70	30	100	4

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Practical Courses								
7	BMC 151 Communication Lab	-	-	4	35	15	50	2
8	BMC 152 Computer Lab	-	-	4	35	15	50	2
Total					700			28

BMC 101 - PRINCIPLES OF COMMUNICATION

	1	1
	1	

CO1	To understand the Elements and Barriers of Effective Communication.
CO2	To enhance the knowledge of students with regard to fundamentals of communication and its various forms.
CO3	To make them understand communication better through various theories
CO4	To enhance communication skills by undertaking various kinds of exercises based on different modes of communication.
CO 5	To develop among them broad understanding of the concepts and process of communication
CO 6	To guide students towards understanding of Modern Tools of Communication

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
C	0	1	1	0	3	2	1	3	3	1	0	1

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O 3												
CO 4	1	2	2	3	2	2	3	2	1	3	3	2
CO 5	3	2	3	3	3	3	2	0	2	2	2	0
CO 6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I (8 hours)

Fundamentals of Communication - Definition, Concept & Process, Scope & Importance, Elements of Communication, Functions of Communication, 7 Cs of Communication, Barriers to Effective Communication.

Unit II (8 hours)

Forms of Communication - Interpersonal, Intrapersonal, Organizational, Group Communication, Social Communication, Mass Communication, Public Communication.

Types of Communication - Verbal & Nonverbal Communication, Oral & Written Communication, Formal & Informal, External & Internal Communication.

Unit III (12 hours) Communication Theories

Psychological Theories -Hypodermic Needle Theory, Individual Difference Theory – selective exposure, selective perception, selective retention, Personal Influence theory-Two-step flow, Multi-step flow.

Sociological Theories – The Cultivation Theory, Social Learning Theory, Agenda Setting Theory, Play Theory, Uses & Gratification Theory, Dependency Theory.

Normative Theories of Mass Media - Authoritarian Theory, Libertarian Theory, Soviet Communist Theory, Social Responsibility Theory, Development Media Theory, Democratic Participant Media Theory.

Indian Theories of Communication – Sadharnikaran, Sahridya. Bharatmuni Natyashastra.

Unit IV (10 hours)

Models of Communication SMCR Model, Shannon & Weaver Model, Schramm's Model, Osgood Model, Laswell Model, Dance's Helical Model, New Comb's Model, Gate Keeping Model, Gerbner's Model, Convergence Model.

Unit V (10 hours)

Introduction to Mass Communication Mass Communication and Origin of Media – Meaning, Definition, Functions, Elements. Difference between Mass Communication and Interpersonal Communication.

Brief introduction to Mass Media - Newspapers and Journalism, Wireless Communication : From Morse Code to Blue Tooth, Visual Communication : Photographs, Traditional and Folk Media, Films, Radio, Television & New Media.

Unit VI (8 hours)

Modern Tools of Communication - SMS, E-mails, Social Networking sites, Web Blogs, News Portals, Online Advertising, Videotext, Video on Demand, Online Newspaper, Teleconferencing, Teleshopping.

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Suggested Readings :

1. Mass Communication Theory, Denis Mcquail, New Delhi, Vistaar Publications 2005.
2. Essentials of Mass Communication Theory, Arthur Asa Berger, New Delhi, Sage Publicaions 1995.
3. Mass Communication in India, Keval J. Kumar, Jaico Pblication, Chennai, 2000
4. Communication, C S Raidu, Himalaya Publication.
5. Book on Indian Theories of Mass Communication by, J. S. Yadav. IIMC New Delhi.

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
27.25	30.06	29.89	31.88	22.84	25.36	29.62	19.93	27.92	26.95	22.50	29.28
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.48	2.51	2.49	2.45	2.54	2.54	2.47	2.49	2.54	2.45	2.50	2.44

CO1 AT	2.57
CO2 AT	2.48
CO3 AT	2.53
CO4 AT	2.50
CO5 AT	2.59
CO6 AT	2.20

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BMC102 – Journalism & Mass Media :History, Growth

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COURSE OUTCOMES

CO1	To understand audience and type of audiences and types of media. To understand journalism and various types of journalism.
CO2	To understand struggle of Indian journalism. To Understand about potential of newspaper.
CO3	To Understand difference between government and private media. To understand nature of media and its ownership pattern. Develop journalistic approach about ownership of media.
CO4	To develop understanding how government control media. To understand how media is helpful in development of society
CO 5	To make clear understanding about public service media and commercial media. To develop a sense that why all media houses have different objectives.
CO 6	To guide students towards understanding of new media and it's objective. To guide students towards understanding of alternative media.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	2	3	2	2	3	2	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	2	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	0	2	3	0	0	2	1	3	2	1	3

UNIT I (10 hours)

Basic differences between the print, electronic and online journalism, Relationship between the reader/viewer and media.

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Origin of Newspaper, Recent Developments in Print Media. Penny Press, Yellow Journalism, Gonzo Journalism, Jazz Journalism, Alternative Journalism.

UNIT II (10 hours)

History of the Press in India (Colonial Period; National Freedom Movement, Post Independence Era till date.

UNIT III (10 hours)

Press Commissions, Press Council, DAVP, INS, ABC, PIB, other media organizations- government/public and private.

UNIT IV (10 hours)

History of Broadcast in India : Radio & Television, Evolution of Programming, Formation of Prasar Bharati, FM: Radio Privatization, Community Radio, Internet Radio.

UNIT V (10 hours)

TV as a medium of mass communication: Potentials and limits - Brief history of TV with special reference to Indian TV - Introduction to Public Service and Commercial Television

Unit VI (6 hours)

New Media : Overview of internet and blogs, e-newspapers, advertisements, online news, sms alerts for mass media.

Suggested Reading :

1. Cyberspace Aur Media Sudhir Pachauri
2. Electronic Media & the Internet Y K D ' Souza
3. Handbook Of Journalism- Vir Bala Agarwal
4. History of Indian Journalism: J. Natarajan, Publications Division, New Delhi.
5. Journalism In Modern India: Edited by Roland E. Wolseley, Asia PublishingHouse, Bombay-Calcutta.

PO1AT	PO2AT	PO3AT	PO4AT	PO5AT	PO6AT	PO7AT	PO8AT	PO9AT	PO10AT	PO11AT	PO12AT
28.31	27.20	31.03	30.19	24.42	24.42	28.50	24.80	26.85	23.71	21.57	28.69
12.0	11.0	13.0	13.0	10.0	10.0	12.0	10.0	11.0	10.0	0.0	12.0

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0	0	0	0	0	0	0	0	0	0		0
2.36	2.47	2.39	2.32	2.44	2.44	2.38	2.48	2.44	2.37	2.40	2.39

CO1 AT	2.59
CO2 AT	2.46
CO3 AT	2.59
CO4 AT	2.46
CO5 AT	2.27
CO6 AT	2.01

BMC 103 – LANGUAGE SKILLS FOR MASS MEDIA

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	1	0

COURSE OUTCOMES

1. To improve the speaking ability in terms of fluency and comprehensibility.
2.To demonstrate competence in creating and designing media products.
3. To enable effective writing strategies to prepare content for news media outlets.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	1	3	2	3	2	2	2	1	3	3	2
CO5	2	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

UNIT I (10 hours)

Language for Communication

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Language as a tool of communication, characteristics of language. Principles and methods of effective writing for mass media communication, Glossary of Newspaper terminology

UNIT II (10 hours)

Sentences – types and construction. Use of tenses in mass media writing. Use of Active & Passive Voice. Use of direct Indirect in making news. Common Errors : Use of double negatives, redundancy, subject verb agreement, prepositions, articles.

UNIT III (10 hours)

Phonetics: Introduction to speech sounds, syllable, accent – word stress and sentence stress, intonation (falling tone, rising tone, falling-rising tone)

Presentation Skills

Importance of Presentation Skills, Capturing Data, Voice & Picture Integration, Guidelines to make Presentation Interesting. Body Language, Voice Modulation, Audience Awareness, Presentation Plan, Visual Aids, Forms of Layout, Styles of Presentation.

UNIT IV (10 hours)

Translation in Journalism : Concept & Definition of Translation , Types of translation, translating news and other media scripts.

Practice exercises - English to Hindi and vice-versa translation

UNIT V (6 hours)

Freelance writing: what is freelance journalism? Its nature, scope and future prospects. Qualities of a freelance journalists. Freelancing for newspaper, magazines, TV, radio and on – line media.

UNIT VI (10 hours)

Paragraph writing, story writing, dialogue writing. Study of different quotations. Preparing questions for interview. News Report Writing, Story Writing (Single - Incident Story - Attribution - Identification - Time and Timeliness – The Stylebook.)

Suggested Readings :

1. Handbook of Journalism and Mass Communication, VirBala Agarwal, Jain Book Depot.
2. English Grammar & Composition, R.P. Sinha
3. Becoming a Translator: An Introduction to the Theory and Practice of Translation
by Douglas Robinson, Publisher: Routledge; 2nd edition (October, 2003), ISBN: 0415300339
4. The Translator's Handbook, Fifth Revised Edition (Translator's Handbook)
by Morry Sofer, Publisher: Schreiber Publishing, Inc.; 5th Rev edition (March, 2004) ISBN: 1887563881 .
5. Technical Communication, Meenakshi Raman, Oxford Publications.
6. A Textbook of Phonetics, T. Balasubramaniam
7. News Writing - George Hough (Indian edition by Kanishka Publishers, No. 4697/5-21A. Ansari Road. Daryaganj, New Delhi – 110 002. Ph. 3270497.3288285. Fax no.: 3288285).
8. The Journalist 's Handbook - M.V. Kamath

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PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.79	28.03	32.54	29.22	25.62	25.57	27.45	20.92	28.21	27.08	22.65	30.31
10.00	11.00	13.00	12.00	10.00	10.00	11.00	8.00	11.00	11.00	9.00	12.00
2.48	2.55	2.50	2.44	2.56	2.56	2.50	2.62	2.56	2.46	2.52	2.53

CO1 AT	**2.68**
CO2 AT	**2.61**
CO3 AT	**2.72**
CO4 AT	**2.62**
CO5 AT	**2.33**
CO6 AT	**2.16**

BMC 104 - COMPUTER APPLICATION FOR MASS MEDIA

	1	0
	1	0

COURSE OUTCOMES:

CO1	To recognizecomputer terms, parts, applications, storage systemsand various devices
CO2	To understand the relevance, importance & role of Computers in Mass Media
CO3	To apply the different DTP software in relevant areas of Mass Media
CO4	To analyse the need of Multi-media in Mass Communication
CO5	To Evaluate between good/effective websites and bad/non-effective websites, Social Media activities

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CO6	To Create Newspaper, Magazines, Tabloids

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

UNIT I (10 hours)

Introduction to Computers, Types of Computers, brief history and generation of computers. Overview of Information Technology – Scope - Binary Systems - Standard systems - Octal systems - Hexadecimal systems,

UNIT II (6 hours)

Computer Hardware – CPU - Memory Storage capacity - Primary and Secondary Memory (RAM, ROM) – Microprocessors - Input and Output devices.

UNIT III (10 hours)

Storage and Databases - Storage Fundamentals – Diskettes - Hard disks - Optical disks- Memory Cards - Magnetic tape - Software - Operating System, MS-DOS, MS - Windows, Linux.

UNIT IV (10 hours)

Multimedia - Goals of Multimedia - Applications of Multimedia - Compression, Decompression - File formats - Text - Designing the text - Elements of text, graphics, images and colors,

UNIT V (10 hours)

Introduction to Html – Xml – Networking – Internet - Web page designing - Web hosting,

UNIT VI (10 hours)

Page Maker, Interfacing, Working with text, Page Setup, Printing, Formatting Techniques. Graphics and Design. Introduction to Quark Express, Photoshop and Coral Draw.

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Suggested Readings-

1. Author Adobe Adobe Pagemaker – Publisher TechmediaAdobe Photoshop –Publisher Techmedia
2. Coburn, Foster D. Corel Draw
3. A. Jaiswal, Wiley Dreamtech Fundamentals of computer Information technology today
4. D.P. Mukherjee Fundamentals of computer graphics and multimedia Prentice Hall of India
5. V.Rajaraman Fundamentals of computer Prentice Hall of India

PO1AT	PO2AT	PO3AT	PO4AT	PO5AT	PO6AT	PO7AT	PO8AT	PO9AT	PO10AT	PO11AT	PO12AT
28.23	31.68	31.11	33.38	23.75	26.38	31.36	21.62	29.41	28.41	23.58	31.58
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.57	2.64	2.59	2.57	2.64	2.64	2.61	2.70	2.67	2.58	2.62	2.63

CO1 AT	**2.72**
CO2 AT	**2.68**
CO3 AT	**2.77**
CO4 AT	**2.75**
CO5 AT	**2.42**
CO6 AT	**2.37**

BMC 105 - REPORTING AND EDITING-I

	1	1
	1	-

CO1 To introduce students to basics of reporting and writing for print media.

CO2 To enable the students understand news values and qualities of reporters.

CO3 To enable students to understand newspaper organization structure and editorial department.

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CO4 To introduce to different types of reporting and their importance

CO5 To enable students to understand different forms of journalistic writing

CO6 To provide them basic understanding on various media laws and ethics

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	0	1	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	3	3	3	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	2	2	1	3

UNIT I (6 hours)

News: Definition, news values, sources of news, news gathering methods. Difference between news report and news feature, style of language in feature.

UNIT II (10 hours)

News Writing : Different formats of news writing-Inverted Pyramid, Focus Style, Hour Glass Style, Narrative, advantages & disadvantages.
Headlining – principles, types and techniques. Lead – types of lead. Body- technique of rewriting news agency copy.
Writing features, articles, profiles, interview stories, book and movie reviews.

UNIT III (10 hours)

Reporting: Principles of reporting, functions and responsibilities of reporters. Pitfalls and problems in reporting – attribution – off-the-record
Embargo – Pool reporting; follow-up – advocacy, interpretation, investigation.

UNIT IV (10 hours)

Reporting:- Reporting techniques – qualities of a reporter – news-elements, sources –Reporting Types – crime, court, society, culture, politics, commerce and business, Education reporting.

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UNIT V (10 hours)

Editing: Definition, nature and need for editing: Principles of editing.
Editorial Desk, Functions of editorial desk, copy editing, preparation of copy for press –
Style sheet – editing symbols, proofreading symbols and their significance.

UNIT VI (10 hours)

Function and qualification of a sub-editor and chief –sub editor, copy selection And copy pasting.

Suggested Readings-

Shrivastava K M Publisher: Sterling Pub. (2003)
News writing-george Hough(Indian edition by Kanishka Publication),No.4697/5-21A The profes.
Journalism-M.V. kamath
The Journalist's Handbook- M.V. kamath Keval J Kumar
Virbala Agarwal

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
29.77	33.21	29.94	38.03	24.55	30.28	32.91	25.3
11.00	12.00	11.00	14.00	9.00	11.00	12.00	9.00
2.71	2.77	2.72	2.72	2.73	2.75	2.74	2.82

CO1 AT	2.88
CO2 AT	2.79
CO3 AT	2.81
CO4 AT	2.87
CO5 AT	2.53
CO6 AT	2.59

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BMC 106 – ENVIRONMENTAL STUDIES

Course Outcome:

BMC 106	Environmental studies	3-1-0	4-Credits
CO1	To develop the understanding of environment and its different physical structure.		
CO2	To understand the conventional and non – conventional energy resources, and the types of energy resources and its uses.		
CO3	To give detail information about the pollution and types of pollutants, and its various effects on environment.		
CO4	To understand the function of forestation and deforestation. Its causes and impact on environment.		
CO5	To analyse the process of solid waste management. Its impact on environment and various health issues by toxicology.		
CO6	To evaluate the various environmental terms, as global warming, Acid Rain, Climate Change, Ozone layer depletion.		

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	2	2	2	2	2	2	3	2	1	3	3	2
CO5	3	1	2	3	2	3	2	0	2	2	2	0
CO6	2	1	2	3	0	3	3	2	3	3	1	3

UNIT I (8 Hours)

Environment- Atmosphere, Hydrosphere, Lithosphere and Biosphere, Ecology- Definition- Scope &

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Importance, Need for Public Awareness, Ecosystem-Types and component parts of ecosystem, Structural and functional properties of Ecosystem, Food chain, Food-web, Ecological pyramids, Energy-photosynthesis, Energy Flow, Laws of Thermodynamics, 10% Law, Human Activities- Food, Shelter, Economic & Social Security. Effect of Human activities on environment- Agriculture, Housing, Industry, Transportation and Mining.

UNIT II (8 Hours)

Energy- Conventional & Non- Conventional Energy resources - Solar, Hydro-power, Wind, Ocean Thermal, Biogas, Biomass, Fossil Fuels (Coal, Oil & Natural gas). Hydrogen as an alternative source of energy.

UNIT III (12 Hours)

Pollution and Pollutants – Types of Pollutants, Air, water- Eutrophication, noise & soil, Indian Legislation of Air & water Act, Environmental Protection Act 1986, Wild Life Conservation in India- Vanishing wild life, concept of rare species (Extinct, Endangered, Vulnerable, Rare, Threatened and Out of danger) causes of destruction, Importance of Wild Life, Sanctuaries and National Parks, Wild Life Organizations, Steps for Wild Life Conservation, Wild Life Act, Environment Impact Assessment (EIA). Steps taken in International Regions (Stockhome declaration, Rio-de-Janerio Convention etc.)

UNIT IV (12 Hours)

Natural Resources- Forest Resources-Types & Functions of Forests, Deforestation- causes & impacts, Chipko Movement, Water Resources- Hydrologic cycle, water quality and availability, Rain Water Harvesting, Water born and water induced diseases, Fluoride Problem in drinking water, Biogeochemical Cycles- Carbon, nitrogen & sulphur cycle.

UNIT V (8 Hours)

Solid Waste Management- Types of Solid waste, their contribution, Therapy of 4Rs, Landfill, Sanitary landfill, Composting, Pyrolysis, Incineration, Public Health Aspects, Toxicology and Eco-Toxicology-Definition, scope and types of Toxicology, Survey of Environmental toxicants (heavy metals, pesticides, insecticides, food additives, fertilizers), Bioaccumulation and Biomagnifications, Radioactive Pollution, Sustainable Development.

UNIT VI (8 Hours)

Global Warming, Acid Rain, Climate Change, Ozone Layer Depletion, Green House Effects, Urbanisation, Population (Demography, Census, Factors influencing population, Impacts of population growth-exponential growth and zero potential growth, Environment and human population pressure, Control of population increase) Animal Husbandry, Environmental Education, Women Education, Abuses of Child Labour.

Suggested Readings:

Environmental Studies- Benny Joseph- Tata McgrawHill-2005

Text Book of Environmental Science & Technology- M. Anji Reddy-BS Publication.

Text Book of Environmental Science & Engineering-P.Venugopalan Rao, Prenitice Hall of India.

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PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT
32.87	30.66	30.25	32.53	22.38	35.42	35.49	24.8
12.00	11.00	11.00	12.00	8.00	13.00	13.00	9.00
2.74	2.79	2.75	2.71	2.80	2.72	2.73	2.77

CO1 AT	**2.85**
CO2 AT	**2.81**
CO3 AT	**2.85**
CO4 AT	**2.81**
CO5 AT	**2.70**
CO6 AT	**2.51**

BMC 152 – COMPUTER LAB

	T	P
	0	4

COURSE OUTCOME:

1. Making MS Word documents
2. Making Power Point Presentation
3. Surfing e-news portals and blogs
4. Finding story ideas through netsurfing and making news

BMC 151 – COMMUNICATION LAB

	T	P
	0	4

COURSE OUTCOME:

1.To enable effective language learning through latest technology.

2.To impart good communication skills in English using audio visual aids.

3.To give exposure to new evolving techniques of reporting, editing, production and distribution.

4. To enhance the quality of the language proficiency.

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1. Exercises in Phonetics using Language Lab
2. Training in voice modulation
3. Gathering news,
4. Covering events
5. Writing and editing news
6. Design and layout of news

SEMESTER III

BMC 301 - Development Communication

	1	0

COURSE OUTCOME:

1. To make students recognized with the need and issues of development

2. To understand paradigms of development, and their adoption and **study various theories of development so as to understand the concept**

3. To apply of approaches to development communication and to establish the relationship between communication and development for the betterment of Society and well being of people

4. To analyze the development issues, particularly in Indian perspective.

5. To Evaluate the role that media play for the sake of development.

6. To Create awareness of development issues and development Reporting

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	1	0	1	1	2	1	2		3
CO2	2	3	2	2	1	2	2	1	2	1	1	3
CO3	1	3	3	1	3	3	3	3	3	0	1	2
CO4	1	1	3	3	3	2	2	3	1	2	3	2
C	3	1	3	3	1	2	2	3	1	1		1

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O 5												
C O 6	1	1	0	0	2	3	1	2	3	3	0	2

UNIT I (10 hours)

Meaning, Concept, Process and stages of Development, Measurement of Development, Human Development Index. Development Experience in the Third World and Problems of Underdevelopment.

UNIT II (8 hours)

Concept of Development Communication; Genesis /Evolution of Development Communication; Development Communication and Society. Development and Media.

UNIT III (8 hours)

Mass Media as a tool for development;
Problems with the use of media for development;
Role of development agencies and NGOs in Development Communication.

UNIT IV (12 hours)

Indian Models of Development and Planning

Gandhian model of development; Nehruvian model of development; National development model: Five Year Plans; Social development model: The Kerala experience; Governance and decentralized development model: The Karnataka experience; Welfare model of development: The Tamil Nadu experience; Community mobilization model of development: The Andhra Pradesh experience; The 'India Shining' model: Turning globalization for development

.

UNIT V (10 hours) Communication Strategies for –

Rural Development – Origin and Growth, Role of three modes of media in rural development, Health and Family Welfare, Education and Literacy Mission, Women Empowerment, Poverty and Unemployment

UNIT VI (8 hours) Development Reporting

Examples of Development Reporting – Finding Story ideas – Constraints in Development Reporting – Do's and Don'ts in Development Reporting.

Suggested Readings

1. Communication and Development: The Challenge of the Twenty First Century, V S Gupta h
2. hnm(2000), Concept Publishing Company, ew Delhi.
3. Co.mmunication, Development and Civil Society, V S Gupta (2003), Concept Publishing,

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4. Company, New Delhi.
5. India 2020: A Vision for the New Millennium, APJ Abdul Kalam and Y S Rajan, Penguin Books, New Delhi.
6. Developmental Journalism, DVR Murthy (2001), Dominant Publishers and Distributors, New Delhi.
7. Development Communication: Uma Narula

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
22.28	25.82	33.44	23.40	22.41	28.23	25.41	31.35	23.29	18.61	21.43	29.65
10.00	11.00	14.00	10.00	10.00	13.00	11.00	14.00	11.00	9.00	9.00	13.00
2.23	2.35	2.39	2.34	2.24	2.17	2.31	2.24	2.12	2.07	2.38	2.28

CO1 AT	2.47
CO2 AT	2.44
CO3 AT	2.55
CO4 AT	2.50
CO5 AT	2.00
CO6 AT	1.41

	1	1
	1	0

BMC 302 – Media Organisation & Media Management

COURSE OUTCOMES

CO1	To understand types of media organization and its nature. To guide students that media is social service along with it's also an business.
CO2	To understand students reach of media to target audience. To Understand about how media ownership play a big role .

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CO3	To Understand difference between journalist and non-journalist. To understand nature and job of various department in media houses. .
CO4	To develop understanding of opportunities for media students . To understand how editorial team work in media houses.
CO 5	To make clear understanding about importance of circulation and it's factors . To make clear understanding about importance and responsibilities of circulation department.
CO 6	To guide students towards foreign direct investment rules in media and its types. To guide students importance of press commission in media .

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	1	0	1	1	2	1	2	2	3
CO2	1	3	2	2	1	2	2	1	2	1	1	3
CO3	1	2	2	2	3	3	2	3	3	0	1	2
CO4	2	2	3	3	3	3	2	1	1	2	3	3
CO5	3	1	3	3	2	2	2	3	2	1	2	1
CO6	1	1	0	0	2	3	1	2	3	3	1	2

UNIT I (6 hours)

Media Organisations - Nature and Structure. Types of media organizations, Media Industries: their rise and management environment

UNIT II (10 hours)

Behaviour in Media Organisations, Risk and Reach in Media, Group Behaviour, Ownership and control of Media in India – sole proprietorship, partnership, private limited companies, public limited companies, trusts.

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UNIT III (10 hours)

Media Management – nature and scope, Various Departments - Duties and responsibilities, Innovation and Creativity in Media.

UNIT IV (8 hours)

Employment opportunities in Indian Media industry, SWOT Analysis, SMART in media organization, Editorial Management.

UNIT V (10 hours)

Newspaper as a business enterprise and its public service role.
Circulation of newspapers - Circulation factors: Geographical factor, Social Factors, Economic Factors, Technological Factors, Promoting Circulation, Newspaper Policy.
Circulation Department; Organization; Functions; Duties and responsibilities of the circulation manager.

UNIT VI (10 hours)

Economics of print and electronic media – Foreign equity in Indian media (including print media), Importance of Entrepreneurship and sources of revenue, Cost & Revenue Relationship, and Press Commissions on Indian newspaper management structure – Blue Ocean strategy business model.

Suggested Readings :

1. Block et al. Managing in the Media. Focal Press, 2001
2. History of Indian Journalism: J. Natarajan, Publications Division, New Delhi.
3. Journalism In Modern India: Edited by Roland E. Wolseley, Asia Publishing House, and Bombay-Calcutta.
4. Handbook of Journalism And Mass Communication: Vir Bala Aggarwal and V.S. Gupta, Concept Publishing, New Delhi.

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
21.76	24.89	29.81	24.87	23.97	30.19	22.16	26.21	25.35	18.37	22.14	31.23
10.0	11.0	13.0	11.0	11.0	14.0	10.0	12.0	12.0	9.00	10.0	14.0

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0	0	0	0	0	0	0	0	0		0	0
2.18	2.26	2.29	2.26	2.18	2.16	2.22	2.18	2.11	2.04	2.21	2.23

CO1 AT	2.47
CO2 AT	2.20
CO3 AT	2.61
CO4 AT	2.32
CO5 AT	1.94
CO6 AT	1.55

BMC 303 Economic Development & Planning

	1	0

COURSE OUTCOME:

1. To enable students understand the fundamentals of Indian economy, planning and development.

2. To broaden their perspective with regard to Budgeting financial sector and stock markets.

3.To Open their horizon for understanding key domestic and international economic issues.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	1	0	1	1	2	1	2	2	3
CO2	2	3	2	2	1	2	2	1	2	1	1	3
CO3	1	2	1	2	3	1	2	3	1	0	1	1
CO4	2	2	3	3	2	3	2	2	1	2	2	3
CO5	3	1	3	3	2	2	2	3	2	2		1
C	1	1	1	0	2	3	2	2				

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	3	3	1	2								

UNIT I (10 hours) Introduction of Economics

Definition and Scope of Economics, Micro & Macro Economics – meaning and scope. Concept of Economic Development and Underdevelopment.

Indian Economy : General Characteristics of Indian Economy, New Economic Policy (1991) of India, Finance Commission and Its Functions, Planning Commission and Its Functions, Five Year Plans: Objectives & Its Impact on Society. Agriculture Sector and Its Pricing Policy. Union Budget & Fiscal Deficit, GDP. GNP, Inflation, deflation.

UNIT II (10 hours)

Indian Economy – Major Issues

Population, Poverty, Unemployment.
Economic Inequality: Concept and measurement of Economic inequality, causes and remedies of economic inequality, Concept of Inclusive growth.
Major government policies for people living below poverty line.

Unit III (10 hours) Money and Banking

Definition & functions of Money, Meaning, definition and types of bank - Commercial, Regional, Rural Banks, Cooperative, Agricultural Cooperative Credit Societies, NABARD.
Reserve Bank of India & It's functions, Understanding capital market and SEBI.

Unit IV (10 hours)

International Economics and Globalization

Globalization – meaning and concept, FDI, FII, MNCs in India, Indian MNCs, Introduction and Functions of WTO, IMF, World Bank, UNCTAD. Contribution of India in world trade.

UNIT V (8 hours)

Role of Public Sector in India's Growth Process. Small Scale and Cottage Industry and Government Policy. Sick Industry and Government Policy. Value added Tax, Goods & Service Tax, Government Debt.

UNIT VI (8 hours) Economic Thoughts

Marxism, Socialism, Capitalism, Ghandhian Thought on Economics, Mixed Economy, Social Choice theory of Amartya Sen.

Selected Readings:

1. Datt, R. and K.P.M. Sundharam, (2001), Indian Economy, Chand & Company Ltd., New Del'i.
2. Dhingra. I.C. (2001,) The Indian Economy; Environment and Policy, Sultan Chand & Sons, New Delhi.
3. Dutt, R.C. (1950), The Economic History of India Under Early British Rule, Low Price Publications, Delhi.

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4. Kumar, D. (Ed) (1982), The Cambridge Economic History Of India, Volume II 1757- 1970,Orient Longman Ltd., Hyderabad.
5. Misra, S.K and V.K Puri (2001), Indian Economy - its Development Experience, Himalaya Publishing House, Mumbai.
6. Haris C.L., (1961), Money and Banking, Allyan land Bacon, London.
7. Gupta, S.B. (1994), Monetary Economics, S. Chand & Company, New Delhi.
8. Halm, G.N. (1955), Monetary Theory, Asia Publishing House, New Delhi.
9. Harris, C.L. (1961), Money and Banking, Allyn and Bacon, London.
10. Mishra., S.S. (1981), Money, Inflation and Economic growth, Oxford & IBH Publishing Company, New Delhi.
11. Reserve Bank of India (1983), The Reserve Bank of India: Functions and Working, Bombay.
12. Sayers R.S., (1978), Modern Banking, (7th Edition),Oxford University Press, Delhi.

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
19.59	20.70	23.58	20.26	17.14	20.18	19.20	22.83	16.42	16.36	16.12	23.78
11.00	11.00	13.00	11.00	10.00	12.00	11.00	13.00	10.00	10.00	9.06	13.00
1.78	1.88	1.81	1.84	1.71	1.68	1.75	1.76	1.64	1.64	1.79	1.83

CO1 AT	2.11
CO2 AT	2.00
CO3 AT	2.05
CO4 AT	1.88
CO5 AT	1.47
CO6 AT	1.15

BMC 304 - PHOTO JOURNALISM

	1	0

CO1 To enhance knowledge about photography, still camera and lighting
CO2 To enhance visualization and creativity of the students
CO3 To apprise the students with techniques involved in various beats of photography
CO4 To make the students learn the use of photography in journalism and advertising

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CO5 To Familiarization with photography equipments
CO6 To study and practice in various photographic cameras

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	2	2	1	2	2	1	2	1	1	3
CO3	1	2	0	0	3	1	1	3	2	0		1
CO4	2	2	3	3	2	2	2	2	1	2	2	3
CO5	3	1	3	3	3	2	2	3	2	3	2	1
CO6	1	1	1	2	2	3	2	1	3	3	1	3

UNIT I (8 hours)

Photo Journalism - Meaning, Definition and scope, History and Role in Mass Communication. Photography – element principles – visual language – meaning –photographer's jargon; composition of photography – subject and light.

UNIT II (8 hours)
Photographic equipment – camera- types – formats- lens- their types and functions – film – digital photography-types and functions – accessories.

UNIT III (10 hours)
Shots – focus – shutter – speed – selection of subject – different types of photographs – action – photo editing – procedure – pictures for newspaper and magazines & websites– developing photographers manual and computerized photography.

UNIT- IV (10 hours)
Photographing people; portrait and still, wildlife ; environment; sports; landscape; industrial disasters; photography for advertising; conflicts –war, political and social photography.

UNIT V (10 hours)
News values for pictures – photo- essays – photo features; qualities essential for photojournalism; picture magazine – color photography, caption writing.

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UNIT VI (10 hours)

Impact of Technology.
Care & Maintenance of Equipments. Problems related to photography.
Practical field assignment and evaluation.

Suggested Reading-

1. Photojournalism — By the editors of Time-Life Books. New York, 1971.
2. Basic Photography — John Hedgecoe. London: Collins & Brown, 1993.
3. The Color Photo Book — Andreas Feininger. New Jersey: Prentice-Hall, 1969.
4. The Colour Book of Photography — L. Lorelle. London: Focal Press, 1956.

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
23.05	24.05	23.02	19.88	20.34	19.56	18.36	23.48	19.72	19.18	17.3	26.26
12.00	12.00	12.00	11.00	11.00	11.00	10.00	12.00	11.00	11.00	9.00	14.00
1.92	2.00	1.92	1.81	1.85	1.78	1.84	1.96	1.79	1.74	1.92	1.88

CO1 AT	2.17
CO2 AT	2.02
CO3 AT	2.24
CO4 AT	2.05
CO5 AT	1.71
CO6 AT	1.20

BMC 305 – DESIGN & GRAPHICS

	1	1

COURSE OUTCOMES:

CO1	To recognizeElements and Principles of Design
CO2	To understand the role and importance of colours, forms and shapes
CO3	To apply various Elements and Principles of design to various forms of visual and

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	graphic communication for Print Media
CO4	To analyse the need of good designs
CO5	To Evaluate various design requirements for various publications such as Newspaper, magazines, tabloids, Brochures
CO6	To Create Posters, Brochures, Lab Journals

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	2	3	2	3	1	2	2	1	1	1	1	3
CO3	1	1	1	0	3	2	1	3	2	0	1	1
CO4	1	2	3	3	2	2	3	2	1	3	3	2
CO5	3	0	3	2	3	2	2	1	2	3	2	1
CO6	2	1	2	3	0	3	2	1	3	3	1	3

UNIT I (8 hours)

Basic elements and principles of graphics & design, lay–out and production, typeface families – principles of good typography : spacing-measurement point system.

UNIT II (8 hours)

Design and Graphics : Visualization, convergence and divergence conceptualization functions and significance, fundamentals of creativity in art – logic – style – value – tools of art – illustrations – graphs.

UNIT III (10 hours) Web Designing

- Basic of Web Designing
- Web page Designing:Illustrator, Corel & Photoshop
- Working with Front Page, front page layout & Macromedia Dreamweaver

UNIT IV (10 hours) PhotoShop & Illustrations

- Basic of Art : Maging Designing, Logo Creation, Advertising Designing
- Cartoon Creation & Image Editing
- Special Effect: Filter & Plug ins , Adobe after effects

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UNIT V (10 hours)
Printing methods – letterpress, cylinder, rotary, gravure, screen, offset, plate making, types of papers, magazines layout, pagination, designing and printing of bromides, art pulls. Basics of Animation in Print & Electronics Journalism.

UNIT VI (10 hours)
Colour printing colour combinations colour scanning colour separation colour correction colour positives colour negatives preparation of bromides art pulls.

Suggested Readings :

The Newspaper Designer's Handbook, 5th Ed., Tin Harrower. The Little Book of Layouts, David E. Carter.

CO1 AT	**2.32**
CO2 AT	**2.38**
CO3 AT	**2.32**
CO4 AT	**2.29**
CO5 AT	**1.91**
CO6 AT	**1.50**

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
2 2 . 7 4	2 2 . 5 0	2 9 . 6 4	2 4 . 6 5	1 9 . 6 6	2 4 . 6 3	2 3 . 0 9	2 1 . 9 8	2 0 . 9 6	2 4 . 1 2	2 1 . 5 3	2 7 . 4 1
1 1 . 0 0	1 0 . 0 0	1 4 . 0 0	1 2 . 0 0	9 . 0 0	1 2 . 0 0	1 1 . 0 0	1 0 . 0 0	1 0 . 0 0	1 2 . 0 0	1 0 . 0 0	1 3 . 0 0
2 . 0 7	2 . 2 5	2 . 1 2	2 . 0 5	2 . 1 8	2 . 0 5	2 . 1 0	2 . 2 0	2 . 1 0	2 . 0 1	2 . 1 5	2 . 1 1

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COURSE OUTCOMES

CO1	To help students learn the rules of Hindi grammar, and polish the language skills
CO2	To polish the skills of students in Hindi language by undertaking various exercises
CO3	To acquaint students with exclusive writing styles, like editorials, articles, columns, writing styles, like features, interviews.
CO4	To apprise students with the changing language and expression in contemporary media
CO 5	To apprise students with the changing language and expression in contemporary media
CO 6	To guide students towards the importance of translation in journalism.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	
CO 1		2	3	3	1	0	1	1	2	1	2	2	3
CO 2		2	3	1	3	1	2	3	1	1	1	1	3
CO 3		0	1	1	0	3	2	1	3	3	0	0	1
CO 4		1	2	3	3	2	2	3	2	1	3	3	2
CO 5		3	2	3	3	3	2	2	0	2	2	2	0
CO 6		2	1	2	3	0	0	2	1	3	3	1	3

भाग एक

हिन्दी व्याकरण, वाक्य संरचना, शब्द ज्ञान

भाग दो

शब्दावली

, खेल, स्वास्थ्य, व्यापार, फैशन,

शिक्षा, साइंस एवम टेक्नोलॉजी,
शासनेमा, अपराध, कान

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सहित्य, राजनीति, संसद, शिरी एवम ग्रामीन ववकास, योजनायेें, नारी एवम बाल ववकास, अन्ि रणाष्टीय ववषय से सम्बन्धि शब्दावली.

भाग तीर्

समाचार लेखन, सम्पादकीय लेखन, फीचर लेखन, ववज्ञापन, साक्षात्कार लेखन, साहित्य समीक्षा

भाग चार

समकालीन हिन्दी पत्रकार एवम उनके लेख

मणाल पाण्डेय, , , यशवंि व्यास, शशश शेखर,
िवलीन शसि शशवदा
न
शसि

भाग पांच

i) राजनीति, शसनेमा, पत्रकाररिा, समाजसेवा, खेल जगि आहद के प्रशसद्ध व्यन्क्ियों का जीवन चररत्र शलखे.

ii) सामान्य ज्ञान एवं सम-सामतयक (करंट अफेयस) घटनायोें का संक्षपे मेें

व शलखे.
भा णन
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हिदी समाचार एवं आलेखोें का अंग्रजीे मेें िथा अंग्रजे ी के समाचार एवं आलेखोें का

ह ी ाद करें.
िमेें

अनव

संदभन पटतक

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पत्रकारिता ज्ञानकोष, ऋचा घोटी, नवीन पब्लिशर एवम् डिसट्रिब्यूटर, २००४,
अनुवाद व्याख्यान और संप्रेषण, किरमोटिन

हिन्दी पत्रकारिता का इतिहास

आधुनिक हिन्दी व्याकरण,
मिथिलेश कुमार शर्मा, स

भा प्रकाशन

O2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT
.93	29.44	28.70	20.92	21.31	27.38	21.60	25.19	24.32
.00	13.00	13.00	9.00	9.00	12.00	9.00	11.00	11.00
.33	2.26	2.21	2.32	2.37	2.28	2.40	2.29	2.21

CO1 AT	2.44
CO2 AT	2.41
CO3 AT	2.47
CO4 AT	2.55
CO5 AT	2.00
CO6 AT	1.79

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BMC 351

Design and Graphics Lab

	T	P
	0	4

1. Preparing powerpoint presentations.
2. Working on pagemaker, corel draw, photoshop and quark.
3. Designing visiting cards, brochure, title page of a book, a magazine cover page.
4. Designing Magazine, news/article pages with text, photographs and graphics.
5. Preparing a tabloid/newspaper with masthead, news blocks, visuals and essential components that a newspaper must carry.

Suggested Readings-

1. Author Adobe Adobe Pagemaker – Publisher Techmedia Adobe Photoshop – Publisher Techmedia
2. Coburn, Foster D. Corel Draw
3. A. Jaiswal, Wiley Dreamtech Fundamentals of computer Information technology today
4. D.P. Mukherjee Fundamentals of computer graphics and multimedia Prentice Hall of India
5. V.Rajaraman Fundamentals of computer Prentice Hall of India

BMC 352

Photography Lab

	T	P
	0	4

CO1 To practice photography, still camera and lighting

CO2 To enhance visualization and creativity of the students

CO3 Upon completion of the course, students will create a photo story essay & Photo Feature

CO4 To Familiarization with outdoor and indoor photography Shoots

CO5 To Teach and Practice different photo editing software.

CO6 To make the students Market Ready Photographer

1. Understanding Camera, Lens and other accessories. Developing an idea forphotograph. Photography practice with SLR camera.
2. Shooting exercises in natural and artificial light.
3. Editing digital photo.
4. Making a photo feature on a specific topic by using own photographs, making a photo feature after collecting photographs from newspapers/magazines

Suggested Reading-

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5. Photojournalism — By the editors of Time-Life Books. New York, 1971.
6. Basic Photography — John Hedgecoe. London: Collins & Brown, 1993.
7. The Color Photo Book — Andreas Feininger. New Jersey: Prentice-Hall, 1969.
8. The Colour Book of Photography — L. Lorelle. London: Focal Press, 1956.

BMC354: INTERNSHIP AND VIVA

COURSE OUTCOME: The Viva Voce is aimed at testing the knowledge, learning and understanding

that the student would have acquired during the period of three-year studies in this undergraduate programme.

Comprehensive Viva:

There shall be Comprehensive Viva Voce on the completion of BJMC programme.

Evaluation:

Comprehensive Viva Voce will be conducted by a Board of Examiners comprising the Director/Dean and two external experts, of whom one would be preferably from the industry. The quorum shall be deemed to have been met if 2 out of 3 members are present.

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SEMESTER V

BMC: 501 Event Management

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CO1 To help students to learn sense of responsibility for the multi-disciplinary nature of event management

CO2 gain confidence and enjoyment from involvement in the dynamic industry of event management

CO3 To acquaint the students best practice in the development and delivery of successful conference and corporate gatherings

CO4 identify the key elements of a conference and the processes involved in venue selection, registration, catering, accommodation, transport, theming, security and entertainment

CO5 identify management essentials such as developing budgets, critical paths, work breakdown structures, risk mitigation and contingency planning

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	1	0	1	0	3	2	1	3	3	1	0	1
CO4	1	2	1	3	3	2	3	2	1	3	3	2
CO5	3	2	3	2	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

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Unit I (10 hours)

Events : Need and Management - Introduction, Types of Events, Event Management, Understanding Events (Events as a Communication Tool, Events as a Marketing Tool), Growing Importance of Events Like Exhibitions, Seminars and Conventions Worldwide, Elements of Event Management (Event Infrastructure, Organizers, Sponsors, Logistics).

Unit II (10 hours)

Creating an Event : Conceptualization and Planning (The Nature of Planning, Project Planning, Planning the Setting, Location and Site, The Operations Plan, The Business Plan, Developing the Strategic Plan),Setting up an Event Organization structure, Programming and Service Management.

Unit III (10 hours)

Human Resource and Revenue : Human Resource Management (Need Assessment, Policies and Procedures, Job Descriptions, Recruitment and Motivation), Generating Revenue, Sponsorship, Financial and Risk Management (The Budget and Cost-Revenue Management, The Key Financial Statements, Measures of Financial Performance, Financial Controls).

Unit IV (10 hours)

Evaluation and Assessment : Why People Attend Events?, Consumer Research on Events, Visitor Surveys, The Sampling Method, Attendance Counts and Estimates, Market Area Surveys, Communications.

Unit V (6 hours)

Reaching the Customer, Evaluation Concepts, Observation Techniques and Applications, Evaluation of Costs and Benefits.

Unit VI (10 hours)

Planning, budgeting, organizing and reporting an event. (practical assignment)

Suggested Readings :

1. Event Sponsorship, Publisher Wiley 2002, ISBN 0471126012
2. Successful Event Management,Thomson Learning ISBN 1844800768, 2004

PO1AT	PO2AT	PO3AT	PO4AT	PO5AT	PO6AT	PO7AT	PO8AT	PO9AT	PO10AT	PO11AT	PO12AT
28	26	25	28	23	23	28	19	26	25	21	28

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.11	.12	.59	.10	.91	.85	.40	.26	.64	.58	.26	.44
12.00	11.00	11.00	12.00	10.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.34	2.37	2.33	2.34	2.39	2.39	2.37	2.41	2.42	2.33	2.36	2.37

3. Event Planning, John Wiley and Sons,ISBN 0471644129, 2000

CO1 AT	2.40
CO2 AT	2.46
CO3 AT	2.46
CO4 AT	2.46
CO5 AT	2.23
CO6 AT	2.16

BMC 502 - Advertising & Sales Promotion

	T	P
	1	0

1.To recognize the various terms related to Advertising
2.To understand the difference between Advertising & Advertisement, functions, role and importance of Advertising& Advertising agencies
3.To apply various Communication models of Advertising
4.To analyse different types of Advertising and their impacts on target audience
5.To evaluate between advertising as Communication, Marketing and PR tool
6.To develop concepts and create effective Ad Campaigns

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3

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CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I-Introduction to Advertising (10 hours)

Advertising as a tool of communication Meaning and definition, Nature and scope of Advertising. Origin and development of advertising. Role of Advertising in marketing (mix), in society, in public relations, in National Economy and Development.

Unit II - Types of Advertising (10 hours)

Types of Advertising-Commercial & Non-commercial, Product & Consumer, Classified & Display, Retail & Wholesale, Regional, National & Co-operative, Govt. advertising Public service ad, Political advertising, Corporate/Institutional ad, Public relations ad, financial advertising, advocacy, surrogate.

Advertising Theories and Models-AIDA model, DAGMAR Model , Maslow's Hierarchy Model.

Unit III - New trends in Advertising (10 hours)

Advertising through Print, electronic and online media.

Types of Media for advertising -Print , electronic, cyber, outdoor, Transit, direct, speciality, POP/In- shop media, yellow pages, cinema, traditional, inflight. Their Characteristics, Merits & Limitations, Media for Advertising Media selection, Planning, Strategy and Research.

Unit IV -Advertising Agencies (10 hours)

Organisation- Advertising Department vs Agency-Structure, Functions, role & importance, Agency client relationship, media buying houses, agency commission factors affecting selection of advertising agency, Govt ad deptt.

Unit V - Ad budgeting (10 hours)

Advertising Budget –Determining advertising expenditure, process and methods of budgeting·

Campaign Planning-Various stages of the campaign, inter-media co-ordination

Media Planning, Scheduling and Research-Selection of media category, Reach, Frequency & Impact of selected media, Cost & other factors influencing the choice of media, Media Scheduling

Advertising Production- Conceptualisation, Visualisation and Creativity, elements of a copy, advertising message and its types, appeals, USP , copywriting and ad designing for print ,radio, TV and cyber media.

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Unit VI (6 hours)

Branding & Sales Promotion

Market Research, Segmentation, Positioning and Targeting.
Advertising Objectives -Setting the objectives and Strategies to achieve those objectives.
Branding- Brand logo, brand image, brand identity, brand equity
Generating sales thorough ads promotional features, sales drive, promotional campaign, outdoor and indoor advertising using different mediums.

Suggested Reading -

1. Advertising and Sales Promotion, S.K. Sarangi, Asian Book Publication
2. Advertising and Sales Promotion-3rd ed., S H H Kazmi, Satish K Batra, Excel Books India.
3. Advertising and Sales Promotion, Ken Kaser, South Western Educational Publication.

PO1AT	PO2AT	PO3AT	PO4AT	PO5AT	PO6AT	PO7AT	PO8AT	PO9AT	PO10AT	PO11AT	PO12AT
26.86	30.76	29.49	31.59	22.50	25.30	30.06	20.90	27.58	26.66	22.61	30.62
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.44	2.56	2.46	2.43	2.50	2.53	2.51	2.61	2.51	2.42	2.51	2.55

CO1 AT	2.73
CO2 AT	2.73
CO3 AT	2.66
CO4 AT	2.70
CO5 AT	2.13
CO6 AT	2.06

BMC 503: Public Relations & Corporate communication

	1	1
	1	0

- To recognize the importance of events as tool of public relations
- To make them understand the basics of event management and essential elements
- To apply the learning of the designing, planning and execution of an event
- To analyse the aspects of human resource, and cost and revenue and pr tools and techniques.
- To acquaint the students with the process of evaluation and assessment of an event.
- To create the awareness of advertising, marketing, publicity and propaganda as a tool in media.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	1	2	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	3
CO6	3	1	2	3	0	0	2	1	3	3	1	3

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Unit 1 (8 hours)

Meaning and Definition of Public Relations - Its need, nature and scope, functions History , growth and development of PR.

Unit II (8 hours)
How PR is different from advertising, marketing, publicity and propaganda. Principles of Public relations.

Unit III (10 hours)
Corporate Communication : Tools & techniques, Difference between Corporate communication & PR, Role of PR in developing countries, Educational and Research Institutions, Rural Sector, Defense, Political and Election Campaigns, Principles of Public relations

Unit IV (10 hours)
Tools of Public relations- use of news, speeches, special events, press release, handouts and leaflets, audiovisual media, internet, e-mail, and digital photography. corporate film, house journal, annual report, speech writing, minutes and official memo, institutional advertising.
PR in govt and Private sectors.

Unit V (10 hours)
PR with Internal and External publics- employees, community, industry, marketing, shareholders and investors, suppliers, govt, media, publishers, designers, photographers and printers.

Unit VI (10 hours)
PR Campaign-planning, execution, evaluation, Research for PR
Managing promotions and functions, VIP visits, public service activities, working with causes and ideas, Role of PR in Crisis management.

SUGGESTED READINGS

1. David Ogilvy, Ogilvy on Advertising ,Pan/Prion Books
2. Frank Jefkins ,Advertising Made Simple, Rupa & Co.
3. Chunawalla , Advertising Theory And Practice, Himalaya Publishing House
4. Aaker, Myers & Batra, Advertising Management
5. Jethwaney Jaishri, Advertising , Phoenix Publishing House
6. Lewis Herschell Gordion, The Complete Advertising and Marketing Handbook, East West Books
7. Mohan Mahender Advertising Management: Concepts & Cases, Tata McGraw Hill Publishers
8. Douglas Torin, The Complete Guide to Advertising, MacMilan, London

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

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AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
31.74	33.02	29.49	31.71	24.96	27.81	32.39	21.92	29.98	28.96	24.52	32.08
12.00	12.00	11.00	12.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.65	2.75	2.68	2.64	2.77	2.78	2.70	2.74	2.73	2.63	2.72	2.67

CO1 AT	2.83
CO2 AT	2.83
CO3 AT	2.81
CO4 AT	2.80
CO5 AT	2.70
CO6 AT	2.23

BMC 504: - FILM STUDIES

L	T	P
3	1	0

COURSE OUTCOMES

CO1	To guide students towards understanding of Film. To develop a sense about film, movie, documentary etc.
CO2	To guide students towards understanding of silent era. To Understand about parallel movies and it's objectives To develop understanding of new age Indian cinema.
CO3	To Understand about Indian cinema. To develop understanding about western cinema.
CO4	To develop understanding of films and its various types. To develop a sense of watching movies as a film critic.

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CO 5	To make clear understanding about film makers. To develop a sense that frame of references is important in film making.
CO 6	To guide students towards understanding of film review and film critic. To develop a sense of writing film critic and it's types

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I

Introduction to Film Studies: A Overview, Difference between Film and Cinema, Difference between Movie and Documentary, Short Film and Feature Film, Modern Film Studies, Film Making.

Unit II

Pre Independence Indian Cinema, The Silent Era,Talkies Post Independence Indian Cinema, Origin of Parallel Cinema New Age Indian Cinema, Bollywood & New Media.

Unit III

Western Vs Indian Films: A Historical Analysis.

UNIT IV-

Types of Films – Experimental, Fictional, New Age, others.

Semiotics of Films - Raja Harishchandra, Alam Ara, Devdas, Aag, Sri 420, Pather Panchali, Mother India, Pakeeza, Sholey, Bobby, Aakrosh, Gaman, Pinjar, Traffic Signal, Avtaar, Gulab Gang.

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UNIT V

Major Film Makers

Dada Saheb Phalke, Ardeshir Irani, Amar Choudhary, Pramathesh Barua, Satyajeet Ray,V Shantaram, Raj Kapoor, Guru Dutt,Mehboob Khan, Shyam Benegal, Govind Nihlani,Ramesh Sippy, Prakesh Jha, Aparna Sen, Meera Nair, Subhash Ghai,Yash Chopra,Vishal Bhardwaj, Kiran Rao, Anurag Kyashyap, Sanjay Leela Bhansali, Aamir Khan

UNIT VI

Major Film Critics-Sudhish Kamath (The Hindu), Tom Brook (BBC), Rajeev Masand (CNN-IBN India), Khalid Mohammad (Hindustan Times).

Major Film Magazines, Reporting cinema news, writing film reviews, feature stories, editorial for film magazines.

Suggested Readings-

1. The Classical Hollywood Cinema: Film Style and Mode of Production to 1960 by DavidBordwell
2. Janet Staiger and Kristin Thompson, published by Routledge, London.
3. Hollywood Cinema: An Introduction - R. Maltby and I. Craven
4. The Hollywood Studio System - D. Gomery
5. Narration in Fiction Film - D. Bordwell
6. Narrative Comprehension in Film - E. Brannigan
7. Early Cinema, Space, Frame, Narrative - T. Elsaesser and A. Barker (Ed.)

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
21.84	24.76	23.80	25.64	18.88	20.94	24.37	16.67	22.71	21.34	18.14	24.16
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
1.99	2.06	1.98	1.97	2.10	2.09	2.03	2.08	2.06	1.94	2.02	2.01

CO1 AT	2.06

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CO2 AT	2.23
CO3 AT	2.23
CO4 AT	2.13
CO5 AT	1.90
CO6 AT	1.60

BMC 505: Cyber Journalism

L	T	P
3	1	0

COURSE OUTCOMES

CO1	To guide students towards understanding of new media reporting and it's need. To guide students how new media is helpful in reporting. To develop sense difference between new media and traditional media.
CO2	To develop a sense media is now more powerful and news platforms are increasing. To Understand why new media is more popular than other forms of media.
CO3	To Understand difference between new and traditional trends in media. To understand role of journalist. To know the characteristics of new media journalist.
CO4	To develop understanding on need of HTML in media. To understand how audience analysis is important in new media.
CO 5	To make clear understanding about virtual research and it's importance. To develop a sense on importance of Plagiarism. To develop a sense how to search content related to research.
CO 6	To guide students towards understanding storytelling and its objective. To guide students towards understanding of writing for web.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1	2	3	3	1	0	1	1	2	1	2	2	3	
CO2	3	3	1	3	1	2	3	0	1	0	1	3	
CO3	0	1	1	0	3	2	1	3	3	1	0	1	
CO4	1	2	2	3	2	2	3	2	1	3	3	2	

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CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I (10 hours)

Definition and Advantages of New Media, Characteristics and technologies in New Media. New Media as a medium of Journalism and Communication. Difference of elements between web journalism, traditional journalism and other media.

Unit II (10 hours)

Definition and characteristics of Online-Journalism-Immediacy, Interactivity and Universality.
Websites of major International/national/Ragional Newspapers, Magazines and channels.
Blogs, blogsphere, video blogging, websites, pod cast.

Unit III (8 hours)

Characteristics of the online writer/journalist New roles of journalists in the Internet age Trends in web/online journalism

Unit IV (8 hours)

Basic HTML for writers
Audience analysis, Content planning, structure, Visual Design. Copyright issues, Web page elements.

Unit V (10 hours)

Online research and Ethical issues
Conducting online searches, research and interviews Online searching techniques
Journalism ethics and restraint in new media Citing Internet sources
Legal issues in cyberspace. Questions of Plagiarism Using social media to engage public

Unit VI (10 hours)

Writing and editing for the Web Overview of Web writing
Writing for the screen vs. writing for print Web page writing techniques
Web page style, Editing web text Storytelling structures that work on the Web

Suggested Reading:

On Line Journalism, Tapas Ray Foundation Books
and New Media by John v.pavlik(Coulmbia University Press,2001)
Introduction Digital Journalism: Emerging Media and the Changing Horizons of Journalism, Edited by Kevin Kawamoto(Rowman and Lilltlefield Publishers,2003)
Journalism to Online Journalism: Publishing News and Information by Roland De Wolk(Allyn &

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Bacon,2001)
Kumar, Keval, Teleommunications and New Media Technology in India: Social and Cultural Implication, Gazette, Volume 54 no 3, pp 267-277, 1995.

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
28.33	32.32	31.18	33.01	24.74	27.50	31.39	21.60	28.71	27.65	23.89	30.84
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.58	2.69	2.60	2.54	2.75	2.75	2.62	2.70	2.61	2.51	2.65	2.57

CO1 AT	2.80
CO2 AT	2.80
CO3 AT	2.84
CO4 AT	2.81
CO5 AT	2.60
CO6 AT	1.86

BMC 506 : COMMUNICATION RESEARCH

	T	P
	1	0

COURSE OUTCOMES

CO1	To provide the students the basic understanding of research and its process.
CO2	To guide students towards understanding research problem and a sense of writing research and it's types.
CO3	To help them learn the research design and to provide the basic understanding and Need for Research Design.

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CO4	To help them learn the research sampling.
CO 5	To help the students understand the types of data and the tools of data collection .
CO 6	To familiarize the students with the process of data analysis and report writing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I – Research Methodology

Meaning, Objectives, Type of Research. Criteria of Good Research. Significance of Research. Research Method vs. Methodology.

Unit II – Defining Research Problem

Research Problem, Selecting the Problem, Techniques to Define Research Problem.

Unit III – Research Design

Meaning of Research Design, Need for Research Design, Types of Research Designs.

Unit IV – Sample Survey

Sample Design, Types of Sampling Design, Sample Survey vs. Census Survey, Sampling and non-sampling errors, Probability and non-probability sampling.

Unit V- Data Collection & Data Interpretation

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CO4	To help them learn the research sampling.
CO 5	To help the students understand the types of data and the tools of data collection .
CO 6	To familiarize the students with the process of data analysis and report writing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	0	1	1	2	1	2	2	3
CO2	3	3	1	3	1	2	3	0	1	0	1	3
CO3	0	1	1	0	3	2	1	3	3	1	0	1
CO4	1	2	2	3	2	2	3	2	1	3	3	2
CO5	3	2	3	3	3	3	2	0	2	2	2	0
CO6	2	1	2	3	0	0	2	1	3	3	1	3

Unit I – Research Methodology

Meaning, Objectives, Type of Research. Criteria of Good Research. Significance of Research. Research Method vs. Methodology.

Unit II – Defining Research Problem

Research Problem, Selecting the Problem, Techniques to Define Research Problem.

Unit III – Research Design

Meaning of Research Design, Need for Research Design, Types of Research Designs.

Unit IV – Sample Survey

Sample Design, Types of Sampling Design, Sample Survey vs. Census Survey, Sampling and non-sampling errors, Probability and non-probability sampling.

Unit V- Data Collection & Data Interpretation

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Introduction, Experiments & Surveys, Collection of Primary Data, Collection of Secondary Data, Method for Data Collection, Testing of Hypothesis, Data Interpretation.

Unit VI- Media Research & Report Writing
Techniques of Report Writing, Significance of Report Writing, Types of Reports, Steps in Writing Research Report.

Measuring Impact, Evaluation, Monitoring, and Feedback.

Assignment – Writing Research proposal and Research Report.

Suggested Readings

1 Doing Your Research Project by Judith Bell
3. Research Methodology-Methods & Techniques by C R Kothari
4. Research Methodology in Social Sciences by Sandhu & Singh
5. Communication & Research for Management by V P Michael
6. Research in Mass Media by S R Sharma & Anil Chaturvedi

PO1 AT	PO2 AT	PO3 AT	PO4 AT	PO5 AT	PO6 AT	PO7 AT	PO8 AT	PO9 AT	PO10 AT	PO11 AT	PO12 AT
24.45	29.01	27.24	28.61	21.75	24.25	27.91	20.24	25.44	24.27	21.08	28.27
11.00	12.00	12.00	13.00	9.00	10.00	12.00	8.00	11.00	11.00	9.00	12.00
2.22	2.42	2.27	2.20	2.42	2.43	2.33	2.53	2.31	2.21	2.34	2.36

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CO1 AT	2.63
CO2 AT	2.60
CO3 AT	2.73
CO4 AT	2.63
CO5 AT	1.90
CO6 AT	1.53

BMC 551: Advertising lab

	T	I
	0	4

Course Outcome:

1. Designing an ad copy for a product, leaflets, pamphlets, brochure its layout
2. Script writing for electronic media (Radio jingle, TV Commercial), right and catchy phrases, online research

3 Planning & Designing advertising campaigns according to the target audience

4. Critical evaluation of advertisements, errors, outfocus elements
5. Planning and designing PR campaign, attaining maximum affect & results on the customers & targets.

Conceptualization of the page designing, formats, best possible formats, current technologies and software languages used.
Writing for websites, specific beats lie sports, crime, trends, breaking news flash. Search engine optimization(SEO). Deadlines in writing copies
To prepare a website of their own with exercises in Visual design, Content management. Merits & demerits, language accuracy. Catching the trends etc.

BMC 552: Cyber Journalism Lab

	T	I
	0	4

Course outcome:

i. To make the students learn creative aspects by producing Cyber content for readers and for themselves

ii. To ask them handling fake news, content analysis as also media planning and scheduling

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Conceptualization of the page designing, formats, best possible formats, current technologies and software languages used.
Writing for websites, specific beats lie sports, crime, trends, breaking news flash. Search engine optimization(SEO). Deadlines in writing copies
To prepare a website of their own with exercises in Visual design, Content management. Merits & demerits, language accuracy. Catching the trends etc.

BMC 553 : INTERNSHIP AND VIVA

COURSE OUTCOME: The Viva Voce is aimed at testing the knowledge, learning and understanding

that the student would have acquired during the period of three-year studies in this undergraduate

programme.

Comprehensive Viva:

There shall be Comprehensive Viva Voce on the completion of BJMC programme.

Evaluation:

Comprehensive Viva Voce will be conducted by a Board of Examiners comprising the

Director/Dean and two external experts, of whom one would be preferably from the industry. The

quorum shall be deemed to have been met if 2 out of 3 members are present.

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DEPARTMENT OF FASHION DESIGN

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

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	11.3	The attainment of the PEOs
	11.4	Process of Redefining the PEOs
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		Graduate Exit Survey Format
		Alumni Survey Format

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1. INSTITUTE VISION AND MISSION

VISION

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class training to the promising Engineers.

MISSION

- To nurture high level of Decency, Dignity and Discipline in students to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes

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2. DEPARTMENT VISION AND MISSION

VISION

To promote specialized knowledge in the field of electrical engineering along with interdisciplinary awareness and to develop a framework to support the communicative and ethical needs of industry and society at global level.

MISSION

To impart quality education in the field of electrical engineering and to facilitate and develop students for their superior employability, to pursue research and higher studies.

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POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
Questions	Q3	Q3	Q3, Q4	Q4, Q5	Q5	Q6	Q6	Q6	Q5

PSOs	PSO1	PSO2	PSO3
Questions	Q3	Q5, Q6, Q5	Q6, Q5

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(iii) EvaluationProcess

Thequestionnaireconsistsof6questionswhichisrelevantforassessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These survey results are tabulated and the average values corresponding to each PO and PSO are determined.

2. Alumni Survey:

Feedback is taken from alumni. Relevant questionnaire in alumni survey form to evaluate attainment of POs and PSOs is given in section (i) and relation of POs& PSOs with questionnaire is given in section(ii).

(i) QuestionnaireFormat

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. VeryGood 3.Good 2.Average 1. Poor

S. No	Criteria	Rating
1	Extent of curriculum meeting the industry needs.	
2	Your ability to apply knowledge and design process to meet desired specifications and needs.	
3	Benefit from value added certifications, workshops and training programmes conducted during your course.	
4	Your ability to use techniques, skills and modern designing software tools necessary for Designing practice.	
5	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities.	
6	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
7	Competence to function on multidisciplinary teams	
8	Skills attained to create, select and apply appropriate techniques, resources and modern Designing and pattern making tools.	
9	Extent of Ethical, social and environmental values inculcated, helping you to relate with social media and Communication designing issues with social needs.	

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(ii) Relation of POs and PSOs withquestionnaire:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
Questions	Q3	Q3,Q5	Q3	Q5	Q5	Q5,Q6	Q5,Q6	Q6	Q6

PSOs	PSO1	PSO2	PSO3
Questions	Q3,Q4,Q5	Q5,Q4,	Q6,Q5,Q3

(iii) EvaluationProcess

Thequestionnaireconsistsof6questionswhichisrelevantforassessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO aredetermined.

IndirectAttainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
Graduate Exit Survey	Attainment values of Graduate Exit Survey								
Alumni Survey	Attainment values of Alumni Survey								

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Overall Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}

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Indirect Attainment I_i= 50% attainment of Graduate Exit survey +

50% attainment of Alumni survey

Overall PO and PSOattainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Indirect Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}
Overall Attainment	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	O_{10}	O_{11}	O_{12}

Overall AttainmentofPO$_i$; $O_i = 80\%$ of $D_i + 20\%$ ofI_i

where D_i – Direct Attainment of each PO
I_i – Indirect Attainment of each PO

Similarly PSO attainment is also evaluated.

POs	PSO1	PSO2	PSO3
Direct Attainment	D_1	D_2	D_3
Indirect Attainment	I_1	I_2	I_3
Overall Attainment	O_1	O_2	O_3

Overall AttainmentofPSO$_i$; $O_i = 80\%$ of $D_i + 20\%$ ofI_i

where D_i – Direct Attainment
ofeachPSOI_i – Indirect Attainment

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of eachPSO

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11 ASSESSMENT PROCESS OF THE ATTAINMENT OF PROGRAMME EDUCATIONAL OBJECTIVES

TheAdministrativeSystem ensuring the Attainment of thePEO"s

The following administrative setup is put in place to ensure the attainment of PEOs

- ProgramCoordinator
- Program AssessmentCommittee
- Department AdvisoryBoard

Program Coordinator:

- Interacts and maintains liaison with key stake holders, students,faculty, Department, Head, andEmployer.
- Monitor and reviews the activities of each year in program (II,III) independently with coursecoordinators.
- Schedules program work plan in accordance with specifications of PEOsand Pos.
- Oversees daily operation and coordinates activities of program with appropriate policies, procedures and specifications given byHOD.
- Coordinates and supervise the faculty teaching the particular course inthe module.
- Responsible for assessment of the course objectives andoutcomes.
- Recommend and facilitate workshops, faculty development programs, meetings or conferences to meet the courseoutcomes.
- Analyzes results of Particular course and recommends the Programcoordinator and/or Head of the Department to take appropriateaction.

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- Liaise with students, faculty, program coordinator and Head of theDepartment to determine priorities andpolicies.

Program Assessment Committee:

- Program assessment committee consists of program coordinator and faculty representatives
- Chaired by program Coordinator, the committee monitors the attainment of PO and PEOs
- Evaluates program effectiveness and proposes necessarychanges
- Prepares periodic reports records on program activities, progress, status or to other special reports for management of key stakeholders
- Motivates the faculty and students towards attending workshops, developing projects, working models, paper publications andresearch
- Interact with students, faculty, program coordinators, Module Coordinator and outside/Communityagencies(throughtheirrepresentation)infacilitatingPEO's
- PAC meets at least once in 6 months to review the program and submits report of Department AdvisoryBoard.

Department Advisory Board:

The Departmental Advisory Board (DAB) has been formed with the objective of remaining up to date with the latest requirements of the industry and incorporating necessary components in the curriculum as much as possible.

The DAB is enriched with members from eminent institutions as well as senior members of faculty who periodically monitor the departmental

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activities and suggest improvements of the program.

It is highest decision-making body at the department level.

- DAB chaired by HOD, receives the report of the PAC and monitorsthe progress of theprogram
- DAB on current and future issues related to programs
- Develops and recommends new or revised program goals andobjectives
- DAB meets at least once in a year to review theprograms

List of Committees and their Contribution for ensuring the achievement of PEO's

S.NO	Committee Name	Name of the Faculty members	Functions	PEO's
1	Industry Institute Interaction & Industrial Visits committee	Ms. Shewali Sahay Dr. Monika Negi	To schedule and conduct regular visits to industries in thevicinity and otherstates	PEO-2 PEO-3
2	Project Review Committee	Ms.Anshu Singhal	To allot projects to the group of students regularly monitor the progressandevaluatethequality of projects	PEO-2
3	Fashion show Fests organizing committee	Ms.Anshu Singhal Ms. Shewali Sahay Dr. Monika Negi	To conduct various technical events on emerging trends from time to time	PEO-2 PEO-4
4	Guest Lectures organizing Committee	Ms. Shewali Sahay	To contact various reputed persons from R&D and Industries for arranging guest lecturers for the benefit of the students and faculty	PEO-2 PEO-3
5	Skills enhancement Training Committee	Dr. Monika Negi	To train and prepare the students for placement	PEO-1 PEO-2 PEO-4 PEO-5

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6	Student Mentoring Committee	Ms. Shewali Sahay Dr. Monika Negi Ms. Anshu Singhal	To solve problems faced by the students	PEO-1 PEO-2 PEO-3 PEO-4
7	Consultancy and R&D Advisory Committee	Ms. Shewali Sahay Dr. Monika Negi Ms. Anshu Singhal	To guide and motivate faculty to apply various funded projects	PEO-3
8	Class Review Committee	Class teachers Course instructors	To monitor the progress of class work, syllabus coverage fromtime totime. To plan remedial classes for slow learners	PEO-1 PEO-2
9	Department Library Committee	Ms. Shewali Sahay	To monitor and update the library text books, maintaining the group, mini and major project Reports	PEO-1 PEO-4
10	Placements Co-ordination committee	Ms. Shewali Sahay	To design and update the curriculum which meet thecurrent needs of the industry. Conducting the CRT classes, monitoring the studentseligibility criteria	PEO-1 PEO-2 PEO-4 PEO-5
11	Alumni Affairs	Ms. Anshu Singhal	TocontactandoverseetheAlumni affairs like conducting special lectures byAlumni recruited in Industry	PEO-1 PEO-2 PEO-4

Tools and processes used in achievement of thePEOs

This describes the assessment process that periodically documents and demonstrates the degree to which the programme educational objectives are attained. also include information on:

a) A listing and description of the assessment processes used to gather the data upon whichtheevaluationofeachprogrammeeducationalobjectiveisbased.Examples ofdatacollectionprocessesmayinclude,butarenotlimitedto,employersurveys, graduate surveys, focus groups, industrial advisory committee meetings, or other processes that are relevant and appropriate totheprogramme.

b) The frequency with which these assessment processes are carriedout.

The curriculum is designed by taking into consideration various components

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prescribed by various Designing Institute. All courses that are included under each of the following components enlisted below contribute to the achievement of PEOs. The course instruction, marks secured by the students in these components indicate the level of achievement of the PEOs. In addition, Graduate Exit survey, Alumni survey, Industrialadvisorycommitteemeetings,gainfullyengaged/Placementsofstudents also contribute to the attainment ofPEOs.

Table 11.1: Assessment Tools for PEOs

Type of Assessment Tool	Assessment Tool	Assessment criteria	Data collection frequency	Responsible entity	Indicators for Attainment of PEO
Direct	Results	Internal, External examination	Once in a semester	Examination Cell	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5
	Placement Record	Number of students Placed	Once every year	Placement cell	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5
	Higher Education	Number of students opted for higher education	Once every year	Department	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5
Indirect	Graduate Exit survey	Level of achievement	Once every Year	Department	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5
	Alumni Survey	Level of achievement	Once every Year	Department	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5

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The attainment of thePEOs

The Expected Level of Attainment for each of the Program Educational Objectives

Table 11.2: Levels of Attainment for each PEO

PEO	Level of Attainment
Value >=70%	Excellent
Value > = 60 and value < 70%	Very good
Value > = 50 and value < 60	Good
Value >= 40 and value < 50	Satisfactory
Value < 40	Not Satisfactory

PEO Evaluation Processes and an Analysis

For the purpose of assessing the levels of achievement of PEO's, certain weightages are given for various tools as indicated below.

Table 11.3: PEO Evaluation Criteria

S. No.	Name of the Evaluation Criterion	Weightages in %
Direct Assessment (80%)		
1.	Direct Evaluation of Program Outcomes (POs) of the concerned PEO	60
2.	Placements	15
3.	Higher Studies	5
Indirect Assessment (20%)		
4.	Graduate Exit Survey	10
5.	AlumniSurvey	10
Total		100

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CO-PO attainment of the course Fundamental of Textiles (BFD-202)

Table: Direct attainment of CO-PO of Fundamental Of Textiles(BFD-202)

Course Outcome FOT(BFD-202)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2.834								
CO2		2.834	2.834						
CO3			2.834	2.834					
Average CO(FOT)	2.834	2.834	2.834	2.834	1.89				1.89
Average CO(FOT) (%)	94.4	94.4	94.4	94.4	63				63

Average of direct attainmentsof PO_i obtained for all Courses

POs	PO1	PO2	PO 3	PO 4	PO5	PO6	PO 7	PO 8	PO 9
Direct Attainment	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3
(%) Direct Attainment	96.08	91.4	85.9	88	77	75.5	72.2	84	77

Direct Evaluation of Program Outcomes (POs) of the concerned PEO

Mapping of Program Outcomes (POs) of the concerned PEOs is shown in table 11.4.

Table 11.4 Mapping of Program Outcomes (POs) of the concerned PEOs

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	X				
PO2		X	X		
PO3			X		
PO4		X	X		
PO5		X	X		
PO6				X	X
PO7				X	
PO8				X	X

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PO9				X	

Mapping of Program Outcomes (POs) of the concerned PEOs by using average of direct attainments of PO_i obtained for all Courses (2016-2020) is shown in table 11.5.

Table 11.5 Mapping of Program Outcomes (POs) of the concerned PEOs (2016-2020)

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	90.96				
PO2		89.41	89.41		
PO3			85.61	86.9	
PO4		88	88	83.9	
PO5		77	77	77.9	
PO6				75.5	75.5
PO7				72.2	77.9
PO8				84	84
PO9		83.9		77	83.9
AVG	**96.08**	**85.07**	**85.57**	**79.63**	80.325
AVG(PEOs) (%)	**84.1**				

% AVERAGE ACHIEVEMENT O F PEOs =84.1%

Program Outcomes of the concerned PEO (%)	**96.08**	**85.07**	**85.57**	**79.63**	80.325

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Table 11.5: Attainment of PEO's

S.no	Name of the Evaluation Criterion	PEO-1	PEO-2	PEO-3	PEO-4	PEO-5
1.	Program Outcomes of the concerned PEO (60%)	57.6	52.8	51.3	47.7	48.1
2.	Placements/ Higher Studies (20%)	15.5	15.5	15.5	15.5	15.5
3.	Graduate Exit Survey (10%)	9.8	9.7	9.6	9.5	9.8
4.	Alumni Survey (10%)	9.7	9.6	9.5	9.7	9.6
Total		**92.6**	**87.6**	**85.9**	**82.4**	**83**

Process of Redefining thePEOs

Outcome based education system was adopted by NBA in the beginning of 2011 and various departments of the college have started orienting their programmes accordingly. The initial drafts were presented to various stake holders and made suitable modifications and thus, the process of redefining has taken place and the second draft of PEOs was formulated. There were some modifications suggested by NBA from time to time as reflected in their website and further redefining was carriedout.

As a regular academic activity, the college has always been involving the key stakeholdersincollectinginformationandsuggestionswithregardofcurriculum development and curriculum revision. This practice was being followed even before the introduction of outcome-based accreditation process by NBA. Based ontheinformationcollectedtheobjectivesoftheprogramaredefined,refinedand are inscribed in the form ofPEO's.

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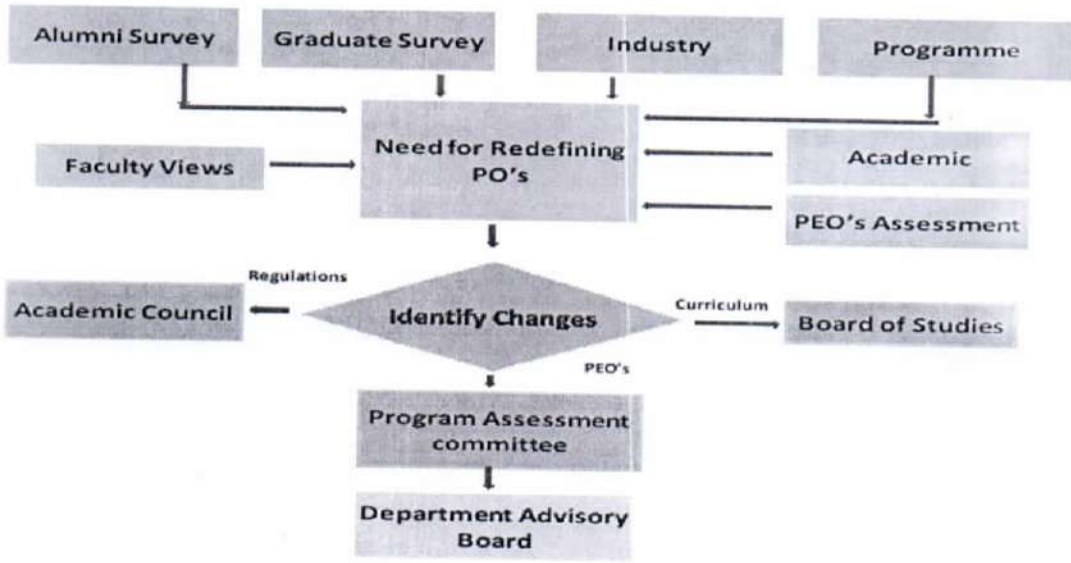

Figure 11.1: Flow chart for redefining PEO's

The following process is followed to redefine the PEOs as and when required.

- The process is initiated by Department Advisory Board during PEOs assessment and attainmentprocess.
- To redefine, the existing PEOs assessment data is gathered through direct and indirect assessmentmethods.
- To improve the program performance, the collected data is analyzed to identify the need for redefiningPEOs.
- Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like BOS, Academic Council and Program Assessment Committee involve appropriateactions.

In addition to the above, the following inputs are also taken into account in the process of redefining PEO's:

1. The level of attainment of PEO's definedearlier.
2. Suggestions/ experiences of experts from sister colleges and various organizations.
3. The information gathered during Accreditation awarenessprograms.

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A. GRADUATE EXIT SURVEYFORM

Invertis University, Bareilly

Department of Fashion Design

Graduate Exit Survey

Academic Year:

Name(inFull): RollNo: Mail-id:

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in FD.

5.Excellent 4.Very Good 3. Good 2.Average 1.Poor

S.No	Criteria	Rating
1	Opinion about UG programme in FD at INVERTIS UNIVERSITY, BAREILLY.	
2	Overall Rating for attainment of your PEOs & POs.	
3	Ability acquired to apply knowledge of Drafting, Construction and Designing in real time.	
4	Competence developed to analyze and interpret data and design complex electronic system or process specific needs.	
5	Skill gained to apply modern designing software tools and techniques for Designing practice.	
6	Responsibility level acquired to develop Designing solutions for sustainable development, ethically and economically.	
7	Leadership qualities and team spirit inculcated through various student development programmes.	
8	Zeal to engage in, to resolve contemporary issues and acquire lifelong learning.	
9	Benefit from INVERTIS UNIVERSITY, BAREILLY	

Signature

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A. ALUMNI SURVEYFORM

Invertis University, Bareilly

Department of Fashion Design

AlumniSurveyForm **Academic Year:**

Name			
Specialization and Period ofGraduation			
Address for Communication:			
City:	State:	Pin code	
Employment details:		Email:	
Company and Designation:			

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in FD.

5.Excellent **4. VeryGood** **3.Good** **2.Average** **1.** Poor

S.No	Criteria	Rating
1	Overall Rating for attainment of your PEOs & Pos.	
2	Extent of curriculum meeting the industry needs.	
3	Your ability to apply knowledge and design computing system or process to meet desired specifications and needs.	
4	Benefit from value added certifications, workshops and training programmes conducted during your course.	
5	Your ability to use techniques, skills and modern Designing software tools necessary for Designing practice in your organization.	
6	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities in your career/higher education.	
7	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
8	Competence to function on multidisciplinary teams in your job.	
9	Benefit from skills attained to create, select and apply appropriate techniques, resources and modern designing and pattern making tools to show professional efficiency.	
10	Extent of Ethical, social and environmental values inculcated, helping you to relate designing issues with social needs.	

Suggestions for Improvement:

_____

_____

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