INVERTIS
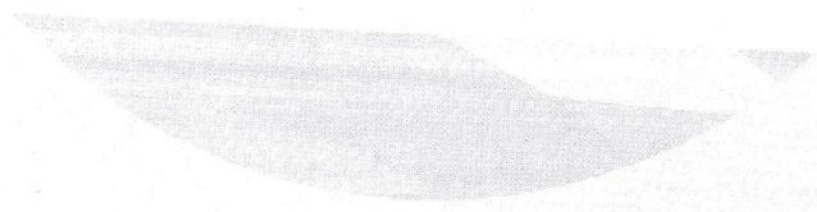## UNIVERSITY BAREILLY
BUILDING VIBRANT PERSONALITIES

COURSE STRUCTURE

DEPARTMENT OF ELECTRICAL ENGINEERING

NAAC CRITERIA 1.2.2

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DEPARTMENT OF ELECTRICAL
ENGINEERING

SCHEME OF INSTRUCTIONS AND
DETAILED SYLLABI OF
B.TECH PROGRAM IN ELECTRICAL
ENGINEERING

Effective from 2019-2020 and onwards

DEPARTMENT OF ELECTRICAL ENGINEERING

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.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1	To prepare students for a professional career in Electrical Engineering.
PE02	To develop the capability in students to solve engineering problems, carry out higher studies and research in core areas.
PEO3	To induct professionalism, creativity, innovativeness and ethical attitude leading to better services of the society.
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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PROGRAM OUTCOMES:

At the end of the program the student will be able to:

PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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 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	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	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	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO7	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO8	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO9	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.

SYLLABUS

B.Tech.(Electrical Engineering)
Course Structure

B. Tech. I - Year I – Semester

S.No.	Course code	Course title	L	T	P	credits	Cat. Code
1	BAS-103	Mathematics-I	3	1	0	4	
2	BAS-102 or BME-102	Engg. Chemistry or Engg. Mechanics	3	1	0	4	
3	BEE-101 or BCS-101	Electrical Engg. or Computer Fundamentals & Programming in C	3	1	0	4	
4	BEC-101 or BHU-101	Electronics Engineering or Professional Communication	3	1	0	4	
5	BAS-101	Engg. Physics-I	3	1	0	4	
6	BME-101 or BAS-104	Manufacturing Process or Environment & Ecology	2	0	0	2	
7	BAS-152 or BME-152	Engg. Chemistry Lab or Engg. Mechanics Lab	0	0	2	1	
8	BEE-151 or BCS-151	Electrical Engg Lab or Computer Fundamentals & Programming in C Lab	0	0	2	1	
10	BAS-151 or BHU-151	Physics Lab or Professional Communication Lab	0	0	2	1	
11	GP-101	General Proficiency	-	-	-	1	
TOTAL			17	6	9	28	

B.Tech. I - Year II - Semester

S.No.	Course code	Course title	L	T	P	Credits	Cat. Code
1	BAS-203	Mathematics-II	3	1	0	4	
2	BME-202 or BAS-202	Engg. Mechanics -I or Engg. Chemistry	3	1	0	4	
3	BCS-201 or BEE-201	Computer Fundamentals & Programming in C or Electrical Engg.	3	1	0	4	
4	BHU-201 or BEC-201	Professional Communication or Electronics Engineering	3	1	0	4	
5	BAS-201	Engg. Physics-II	3	1	0	4	
6	BAS-201 or BME-201	Environment & Ecology or Manufacturing Process	2	0	0	2	
7	BCE-251 or BME-251	Engg. Drawing & Computer Graphics or Workshop Practice	0	1	3	2	
8	BME-252 or BAS-252	Engg. Mechanics Lab or Engg. Chemistry Lab	0	0	2	1	
9	BAS-251 or BEE-251	Computer Fundamentals & Programming in C Lab or Electrical Engg. Lab	0	0	2	1	
10	BHU-251 or BAS-251	Professional Communication Lab or Physics Lab	0	0	2	1	
11	GP-201	General Proficiency	-	-	-	1	
Total			17	6	9	28	

STUDY AND EVALUATION SCHEME
B.Tech. in EE, EEE and EC
(Effective from session 2018-2019)
YEAR II, SEMESTER III

S. No.	Course Code	SUBJECTS	HOURS L	HOURS T	HOURS P	SESSIONAL EXAM. CT	SESSIONAL EXAM. TA	SESSIONAL EXAM. AT	SESSIONAL EXAM. TOTAL	END SEM.	SUBJECT TOTAL	Credit
		THEORY										
1	BHU-302/BHU-301	Industrial Sociology / Industrial Psychology	2	1	0	10	5		15	35	50	2
2	BOE31-38/BAS 301	Science Elective/Mathematics -III	3	1	0	20	10	-	30	70	100	4
3	BEC-301	Fundamentals of Electronics Devices	3	1	0	20	10	-	30	70	100	4
4	BEC-302	Digital Electronics	3	1	0	20	10	-	30	70	100	4
5	BEC-304	Electromagnetic Field Theory	3	1	0	20	10	-	30	70	100	4
6	BEE-302/BEC-303	Electrical Measurement and Measuring Instruments(EE & EEE)/Electronics Measurements and Instrumentation (EC)	3	1	0	20	10		30	70	100	4
		PRACTICALS AND PROJECTS										
7	BEE-351/BEC-352	MATLAB Programming (EE & EEE)/Digital Electronics Lab (EC)	0	0	2	-	-		10	15	25	1
8	BEE-352/BEC-353	Electrical Measurement Lab (EE & EEE)/Electronics Measurements & Instrumentation Lab (EC)	0	0	2	-	-		10	15	25	1

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9	BEC-351	Electronics I Lab	0	0	2	-	-		10	15	25	1
10	GP-301	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6				245	430	675	27

L-Lecture, **T**- Tutorial , **P**- Practical , **CT** – Cumulative Test ,**TA** –Teacher Assessment ,
AT – Attendance , **E-Sem** – End Semester Marks

STUDY AND EVALUATION SCHEME
B.Tech. in EE, EEE & EC
(Effective from session 2018-2019)
YEAR II, SEMESTER IV

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME				END SEM.	SUBJECT TOTAL	Credit
						SESSIONAL EXAM.						
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BHU-402/BHU-401	Industrial Sociology / Industrial Psychology	2	1	0	10	5		15	35	50	2
2	BOE41-48/BAS 401	Science Elective/Mathematics -III	3	1	0	20	10		30	70	100	4
3	BEC-401	Signals and Systems	3	1	0	20	10		30	70	100	4
4	BEE-401/BEC-403	Electromechanical Energy Conversion-I **(EE and EEE)**/ Electronic Circuits **(EC)**	3	1	0	20	10		30	70	100	4
5	BEE-403/BCS-405	Electrical Engineering Material **(EE & EEE)**/Computer Organization **(EC)**	3	1	0	20	10		30	70	100	4
6	BEE-402	Network Analysis and Synthesis	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BEE-451/BEC-451	Electromechanical Energy Conversion-I Lab **(EE & EEE)**/Electronics Circuit lab **(EC)**	0	0	2	-	-		10	15	25	1
8	BEC-452	PCB Lab	0	0	2	-	-		10	15	25	1
9	BEE-452/BCS-455	Network Systems Lab **(EE & EEE)**/ Computer Organization Lab **(EC)**	0	0	2	-	-		10	15	25	1
10	GP-401	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6				245	430	675	27

L-Lecture, **T-** Tutorial , **P-** Practical , **CT** – Cumulative Test ,**TA** –Teacher Assessment , **AT** – Attendance , **E-Sem** – End Semester Marks

STUDY AND EVALUATION SCHEME
B.Tech. in EE, EEE
(Effective from session 2019-2020)
YEAR III, SEMESTER V

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME				END SEM.	SUBJECT TOTAL	Credit
						SESSIONAL EXAM.						
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BHU-501	Engineering and Managerial Economics	2	1	0	10	5		15	35	50	2
2	BEE-501	Electromechanical Energy Conversion-II	3	1	0	20	10	-	30	70	100	4
3	BIC-501	Control Systems	3	1	0	20	10	-	30	70	100	4
4	BEE-502	Elements of Power System	3	1	0	20	10	-	30	70	100	4
5	BEE-503	Power Electronics	3	1	0	20	10	-	30	70	100	4
6	BEC-504	Microprocessors	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BIC-551	Control Systems Lab	0	0	2	-	-		10	15	25	1
8	BEE-551	Electromechanical Energy Conversion-II Lab	0	0	2	-	-		10	15	25	1
9	BEC-554	Microprocessor Lab	0	0	2	-	-		10	15	25	1
10	GP-501	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6				245	430	675	27

L-Lecture, T- Tutorial , P- Practical , CT – Cumulative Test ,TA –Teacher Assessment ,
AT – Attendance , E-Sem – End Semester Marks

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STUDY AND EVALUATION SCHEME
B.Tech. in EE, EEE
(Effective from session 2019-2020)
YEAR III, SEMESTER VI

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME				END SEM.	SUBJECT TOTAL	Credit
						SESSIONAL EXAM.						
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BHU-601	Industrial Management	2	1	0	10	5		15	35	50	2
2	BEC-601	Digital Communication	3	1	0	20	10		30	70	100	4
3	BEC-602	Digital Signal Processing	3	1	0	20	10		30	70	100	4
4	BEE-601	Power System Analysis	3	1	0	20	10		30	70	100	4
5	BEE-602	Electrical Instrumentation and Process Control	3	1	0	20	10		30	70	100	4
6	BEE-603	High Voltage Engineering	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BEC-651	Digital Communication Lab	0	0	2	-	-		10	15	25	1
8	BEE-651	Electrical Instrumentation Lab	0	0	2	-	-		10	15	25	1
9	BEE-652	Power Electronics Lab	0	0	2	-	-		10	15	25	1
10	GP-601	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6				245	430	675	27

L-Lecture, **T**- Tutorial , **P**- Practical , **CT** – Cumulative Test ,**TA** –Teacher Assessment , **AT** – Attendance , **E-Sem** – End Semester Marks

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STUDY AND EVALUATION SCHEME
B.Tech in EE, EEE
(Effective from session 2020-2021)
YEAR IV, SEMESTER VII

S. No.	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME				END SEM.	SUBJECT TOTAL	Credit
						SESSIONAL EXAM.						
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1		Open Elective-I	3	1	0	20	10	-	30	70	100	4
2		Departmental Elective-I	3	1	0	20	10	-	30	70	100	4
3		Departmental Elective-II	3	1	0	20	10	-	30	70	100	4
4	BEE-701	Switch Gear & Protection	3	1	0	20	10	-	30	70	100	4
5	BEE-702	Power Station Practice	3	1	0	20	10	-	30	70	100	4
PRACTICALS AND PROJECTS												
6	BEE-751	Power System Lab	0	0	2	-	-		10	15	25	1
7	BEE-752	Seminar	0	0	2	-	-		25	-	25	1
8	BEE-753	Project	0	0	4	-	-		50	-	50	2
9	BEE-754	Industrial Training	-	-	-	-	-		25	-	25	1
10	GP-701	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6			-	410	365	675	27

L-Lecture, **T**- Tutorial , **P**- Practical , **CT** – Cumulative Test ,**TA** –Teacher Assessment , **AT** – Attendance , **E-Sem** – End Semester Marks

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STUDY AND EVALUATION SCHEME
B.Tech in EE, EEE
(Effective from session 2020-2021)
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		Open Elective-I	3	1	0	20	10	-	30	70	100	4
2		Departmental Elective-I	3	1	0	20	10	-	30	70	100	4
3		Departmental Elective-II	3	1	0	20	10	-	30	70	100	4
4	BEE-701	Switch Gear & Protection	3	1	0	20	10	-	30	70	100	4
5	BEE-702	Power Station Practice	3	1	0	20	10	-	30	70	100	4
PRACTICALS AND PROJECTS												
6	BEE-751	Power System Lab	0	0	2	-	-		10	15	25	1
7	BEE-752	Seminar	0	0	2	-	-		25	-	25	1
8	BEE-753	Project	0	0	4	-	-		50	-	50	2
9	BEE-754	Industrial Training	-	-	-	-	-		25	-	25	1
10	GP-701	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6			-	410	365	675	27

L-Lecture, T- Tutorial , P- Practical , CT – Cumulative Test ,TA –Teacher Assessment , AT – Attendance , E-Sem – End Semester Marks

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STUDY AND EVALUATION SCHEME
B.Tech in EE, EEE
(Effective from session 2020-2021)
YEAR IV, SEMESTER VIII

S. No	Course Code	SUBJECTS	HOURS			EVALUATION SCHEME				END SEM.	SUBJECT TOTAL	Credit
						SESSIONAL EXAM.						
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	BEE-801	Utilization of Electrical Energy &Traction	3	1	0	20	10		30	70	100	4
2	BOE-081 BOE-084	Open Elective-II	3	1	0	20	10		30	70	100	4
3	BEE-041 BEE-044	Departmental Elective-IV	3	1	0	20	10		30	70	100	4
4	BEE-051 BEE-053	Department Elective-V	3	1	0	20	10		30	70	100	4
PRACTICALS AND PROJECTS												
7	BEE-851	Project	0	0	18	-	-		75	150	225	9
10	GP-801	General Proficiency	-	-	-	-	-		50	-	50	2
		TOTAL	17	6	6				245	430	675	27

L-Lecture, **T-** Tutorial , **P-** Practical , **CT –** Cumulative Test ,**TA –**Teacher Assessment ,
AT – Attendance , **E-Sem –** End Semester Marks

List of Electives

DEPARTMENTAL ELECTIVES

ELECTIVE – I
BCS-019 Data Base Management System, Data Mining and Warehousing
BEE-011 Digital Control System
BEE-012 Special Electrical Machines
BEE-013 Advanced microprocessors and micro controllers

ELECTIVE – II
BCS-029 Object Oriented Systems and C++
BEE-021 Power System Operation and Control
BEE-022 Neural Networks and fuzzy System
BEE-023 EHV AC & DC Transmission

ELECTIVE – III
BCS-039 Computer Networks
BEC-039 Digital Communication
BEE-031 Bio Instrumentation
BEE-032 Reliability Engineering

ELECTIVE – IV
BEE-041 Energy Efficiency & Conservation
BEE-042 Power Quality
BEE-043 SCADA & Energy Management System
BEE-044 Power Converters Applications

LIST OF OPEN ELECTIVES:

OPEN ELECTIVE-I
BOE-071 Introduction to Biotechnology
BOE-072 Quality Management
BOE-073 Nonlinear Dynamic Systems
BOE-074 Automation & Robotics

Electrical Engineering Department

PhD Course work:

1. Research Methodology
2. Recent topic paper (PEE-101)
3. Specialized paper

   A. Power system dynamics & reliability (PEE-201)
   B. Electric drives & their control (PEE-202)
   C. advanced power system protection (PEE-203)
   D. Evolutionary Techniques   (PEE-204)
   E. Renewable energy generation sources (PEE-205)
   F. Advanced Control Systems   (PEE-206)