Scheme of Instructions & Syllabi

of

Bachelor of Science (Honors)
in Computer Science
Second Year

(Effective from session 2020-21)

Department of Computer Applications

INVERTIS UNIVERSITY
Bareilly-243123 U.P.

STUDY AND EVALUATION SCHEME
B. Sc. (Honors) in Computer Science
(Effective from session 2020-2021)

SEMESTER III, YEAR II

Course Code	Course Title	Course Category	L+T+P	CA	EE	Total	Credit
CSH301	RDBMS	CC7	3+1+0	30	70	100	4
CSH305	Java Programming	CC8	3+1+0	30	70	100	4
CSH306	Software Engineering	CC9	5+1+0	50	100	150	6
CSH**	GE2	GE	2+0+0	15	35	50	2
LAB							
CSH351	RDBMS Lab	CC7P	0+0+4	15	35	50	2
CSH353	Java Lab	CC8P	0+0+4	15	35	50	2
Total				**155**	**345**	**500**	**20**

SEMESTER IV, YEAR II

Course Code	Course Title	Course Category	L+T+P	CA	EE	Total	Credit
CSH402	Computer Graphics	CC11	3+1+0	30	70	100	4
CSH406	Programming in Python	CC10	3+1+0	30	70	100	4
CSH407	Cryptography & Data Security	CC12	5+1+0	50	100	150	6
CSH408	Computer Networking	CC13	5+1+0	50	100	150	6
LAB							
CSH453	Python Lab	CC10(P)	0+0+4	15	35	50	2
CSH451	Computer Graphics Lab	CC11(P)	0+0+4	15	35	50	2
	Total			**190**	**410**	**600**	**24**

L – Lecture
T – Tutorial
P – Practical
ESM – End Semester Marks
MSM – Max. Sessional Marks

	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 broadest context of technological change.

CSH 301: Relational Database Management Systems

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12Marks
Tutorials: 1 hr/Week	Teachers Assessment - 6Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 marks

Prerequisite: Computer Organization, Operating System, Data Structure, Mathematics

Course Objectives:

Understanding values of Data, significant role of DBMS, normalizing a Database, problems with unnecessary duplication of data, transaction, concurrent transactions

Detailed Syllabus:

Unit-1
Introduction to Database System: DBMS Definition, Characteristics of DBMS, Application and advantages of DBMS, Instances, Schemas and Database States, Three Levels of Architecture , Data Independence, DBMS languages, Data Dictionary, Database Users, Data Administrators.

Unit-2
Data Models: Data Models, types and their comparison, Entity Relationship Model, Entity Types, Entity Sets, Attributes and its types, Keys, E-R Diagram, Data Integrity, RDBMS: Concept, Components and Codd's rules.

Unit-3
Relational Databases: Introduction to Relational Databases and Terminology-Relation, Tuple, Attribute, Cardinality, Degree, Domain. Keys, Super Key, Candidate Key, Primary Key, Foreign Key, Relational Algebra. Operations, Select, Project, Union, Difference, Intersection Cartesian product, Join, Natural Join.

Unit-4
Structured Query Language (SQL): Introduction to SQL, History of SQL, Basic Structure, DDL Commands, DML Commands, TCL Commands, Simple Queries, Nested Queries, Join queries, semi-join queries, self-join. Aggregate Functions and Clauses.

Unit-5
Relational Database Design: Introduction to Relational Database Design, DBMS vs RDBMS.

Unit-6
Normalization: Anomalies of un-normalized database, Need of Normalization, Normal Forms-1NF, 2NF, 3NF, BCNF and functional dependency.

Text and Reference Books
1. 1. Database System Concepts, Henry Korth , A. Silberschatz, 5th Edition, 2005.
2. An Introduction to Database System, Bipin Desai, Galgotia Publications, 1991.
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB Publications, 4th Edition.
4. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.

Course Outcomes:
After completing the course, students will be able to:
1. Differentiate between multiprocessing, multiprogramming, and multitasking.
2. Differentiate between programs, processes and threads.
3. Apply segmentation and paging techniques.
4. Compare file naming in Linux and Windows.

CSH305: Java Programming

Teaching Scheme	Examination Scheme	
Lectures: 3 hrs/Week	Class Test	– 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment	– 6 Marks
	Attendance	– 12 Marks
Credits: 4	End Semester Exam	– 70 Marks

Prerequisite: C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1
Core Java: Introduction: Features of Java Language, JVM, Byte-code, Operator, Data type, Variable **Array:** Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array. Control Statements, Methods & classes, inheritance, Types of Inheritance, Inheriting Data Members and Methods.

Unit-2
Package, Interface and Exception Handling: Exceptions & Errors, Types of Exception, Control Flow in Exceptions, Use of try, catch, finally, throw, throws in Exception Handling. In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.

Unit-3
I/O, String Handling and File Handling: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer. **I/O:** Buffered Reader class , Input Stream Reader class, Scanner class. **File Handling:** Creating File, Finding File Reading and Writing File (Doc File, Html File, Text File).

Unit-4
Multi-Threading: Understanding Threads, Needs of Multi-Threaded Programming, Solution of Producer consumer problem by Multi Thread, Thread Life-Cycle, Thread Priorities, Synchronization of Thread.

Unit-5
GUI Application Development: Introduction to AWT, AWT controls Java Applet, Layout Managers, Menus, Images, Graphics, Event Handling, Swing, Containers, Panes, Frames, Dialogue boxes, working with image controls.

Unit-6
JDBC: The connectivity Model, JDBC/ODBC Bridge, Java, SQL package, connectivity to remote

database, navigating through multiple rows retrieved from a table/ multiple tables of a database.

Suggested Readings:
1. The Complete Reference Internet, Margaret Levine Young, TMH, 1999.
2. The Complete Reference JAVA 2, Naughton Schildt, TMH, 5th Edition.
3. Programming in JAVA, E. Balagurusamy E, TMH, 3rd Edition, 2006.
4. Java Black book, Steven Helzner, Dreamtech , 2002.

Course Outcomes:

After completing the course, students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

CSH 306: Software Engineering	
Teaching Scheme	**Examination Scheme**
Lectures: 4 hrs/Week	Class Test -20 Marks
Tutorials: 2 hr/Week	Teachers Assessment – 10 Marks
	Attendance – 20 Marks
Credits: 6	End Semester Exam – 100 marks

Prerequisite: -

Computer Fundamental and Programming using C.

Course Objectives:

1. To recognize basic software design principles, software engineering methods and practices, software cost estimation, testing approaches and their appropriate application.
2. To exemplify the critical understanding of software process models, project management and requirements, implementation issues, verification and validation.
3. To implement techniques, skills, and modern software engineering tools for designing a system and to apply the basic project management practices in real life projects.
4. To demonstrate development of a computing-based system in terms of design, verification, validation, implementation, and maintenance within realistic constraints.
5. To evaluate software design principles, software requirements with existing tools and to test the project with respect to effort and development time.

Detailed Syllabus

UNIT-I (10 Hours)

Introduction: Introduction to Software Engineering, Software Characteristics, Software Engineering Processes, And Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, and Iterative Enhancement Models.

UNIT-II (6 Hours)

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document.

UNIT-III (10 Hours)

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Coupling and Cohesion, Top-Down and Bottom-Up Design Strategies: Function Oriented Design, Object Oriented Design.

UNIT-IV (10 Hours)

Software Testing :Testing Objectives, Test Data Suit Preparation, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up testing. White Box Testing, Black Box Testing, Alpha and Beta Testing of Products. Formal Technical Reviews, Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT-V (10 Hours)

Software Maintenance: Need for Maintenance, Preventive, Corrective and Perfective Maintenance Cost of Maintenance, Maintenance Models.

UNIT- VI (10 Hours)

Software Project Management: Estimation of Various Parameters such as Size, Cost, Efforts, Schedule/Duration, Constructive Cost Model (COCOMO), Resource Allocation Models, Software

Risk Analysis and Management, Software Quality Attributes and Factors Software Configuration Management, CASE Tools**.**

Text and Reference Books
1. Software Engineering: A Practitioners Approach, R. S. Pressman, McGraw Hill, 6th Edition.
2. Fundamentals of Software Engineering, Rajib Mall, PHI Publication, 2nd Edition.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers, 3rd Edition.
4. Software Engineering, Pankaj Jalote, Wiley, 5th Edition.
5. Ian Sommerville, Software Engineering, Addison Wesley, 7th Edition

Course Outcomes:

1. Understand that how to apply the software engineering lifecycle by demonstrating competence in planning, analysis, design, testing and implementation.

2. Identify the best software model to develop a real-life software product.

3. Demonstrate an ability to use the techniques and tools necessary for engineering practice.

4. Work in one or more significant application domains.

5.Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.

CSH307: Environment and Ecology

Teaching Scheme	Examination Scheme
Lectures: 1 hrs/Week	Class Test -6 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 3 Marks
	Attendance – 6 Marks
Credits: 2	End Semester Exam – 35 marks

Prerequisite: -Study of interrelationships between human activities and the environment.

Course Objectives:
1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds

Detailed Syllabus

Unit-1
Definaition, Scope & Importance, Need For Public Awareness- Environment definition, Eco system – Balanced ecosystem, Human activities – Food, Shelter, Economic and social Security.

Unit-2
Effects of human activities on environment-Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment.

Unit-3
Natural Resources- Water Resources- Availability and Quality aspects. Water borne diseases, Water induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles- Carbon, Nitrogen and Sulphur Cycles.

Unit-4
Energy – Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio-gas. Hydrogen as an alternative future source of Energy.

Unit-5
Environmental Pollution and their effects. Water pollution, Land pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management. Current Environmental Issues of Importance: Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution.

Unit-6
Acid Rain, Ozone Layer depletion, Animal Husbandry. Environmental Protection- Role of Government, Legal aspects, Initiatives by Non-governmental Organizations (NGO), Environmental Education, Women Education.

Course Outcomes:

After completing the course, students will be able to:

1. 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.

2. Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts

3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

5. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

6. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

CSH402: Computer Graphics	
Teaching Scheme	**Examination Scheme**
Lectures: 3 hrs/Week	Class Test – 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

Students will try to learn:
1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Unit-1   **Introduction to computer graphics:** Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Color CRT, Flat panel displays, Frame buffer and video controller, interactive input and output devices
Unit-2   **Line drawing algorithms:** DDA, Bresenham. Circle generating algorithms: Mid point circle generating algorithm, Bresenham circle generating algorithm.
Unit-3   **2D Transformations:** Definition of transformation, geometric and coordinate transformation, translation, rotation about origin, scaling, reflection transformations, Matrix representations and homogenous coordinates, Composite transformations.
Unit-4   **Polygon Filling:** Convex and concave polygons, scan line algorithm, boundary fill algorithm, flood fill algorithm. Two-Dimensional Viewing: Viewing pipeline, Viewing transformations
Unit-5   **Clipping:** Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.
Unit-6   **Three Dimensional:** 3-D geometric primitives, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.   **Curves and Surfaces:** Quadric surfaces, Spheres, Ellipsoid, Blobby objects.
Suggested Readings: 1. Computer Graphics-C Version, Donald Hearn, M. Pauline Baker, Pearson Education, 2007   2. Computer graphics, Schaum's outline, TMH, 2006.   3. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984.   4. Computer Graphics Principles and Practice, James D Foley, Pearson education 2004.

Course Outcomes:

After completing the course, students will be able to:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

CSH406: Programming in Python	
Teaching Scheme	**Examination Scheme**
Lectures: 3 hrs/Week	Class Test -12Marks
Tutorials: 1 hr/Week	Teachers Assessment - 6Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 marks

Course Objectives:

1. To give knowledge about python programming.
2. To introduce python development language.
3. To give knowledge about concept of python.
4. To explore the skills of web programming using python.

Detailed Syllabus

Unit-1
Introduction to Python: Importance of Python, Installing and working with Python in Windows, Linux and Mac, Using Python as calculator, Comments, How to define main function in Python
The concept of data types - Variables, Arithmetic Operators and Expressions.

Unit-2
Subscript Operator, Indexing, Slicing a string, Converting strings to numbers and vice versa, split function, **Control flow** - if statements, for and while loops, nested loops, Short-circuit (lazy evaluation), range() function, break and continue statements, pass statements.

Unit-3
Data Structures: **Lists** - Basic list operations, Replacing, inserting, removing an element; Searching and sorting a list, Methods of list objects, Using lists as Stacks and Queues, How efficient lists are when used as stack or queue, List and nested list Comprehensions Tuple, Sets, Difference between list and tuple, **Dictionary** - adding and removing keys, accessing and replacing values, traversing dictionaries

Unit-4
Python functions and modules - **OS** and **SYS** modules, Defining python functions, calling a function, function arguments, Lambda and map function, Importing python module, **Useful Python Packages** – Beautiful Soup, NumPy, iPython, tkinter, **Classes and OOP** - Class definition syntax, objects, class and instance variables, Inheritance and multiple inheritance, Polymorphism, Overloading, Overriding, Data Hiding.

Unit-5
Regular Expressions - re module, Searching a string (match and search), Finding a string (findall), Break string into substrings (split), Replace part of a string (sub), **Examples of Regex** - Return the first word of a given string, Extract all the words of a given string, Extract domain name from given e-mail id's, Extract date from given string, Return all the words of a string that starts with vowel, Split a string with multiple delimiters, Retrieve some information from HTML or XML file.

Unit-6
File Handling - Reading keyboard input, opening and closing file, Read, Write and Append mode, Create and Read a text file, Looping over a file object, Writing on a file, with statements, splitting lines in a text file, Renaming and Deleting files, **Exception Handling** - Exceptions, Why use exceptions, Raising an exception, try and except, try, except and else clause; try and finally

Text and Reference Books

1. Python Programming for the Absolute Beginner By Laila M. Dawson
2. Learn Python the Hard Way By Zed A.Shaw
3. Learning Python By Mark Putz Python Documentation (https://docs.python.org)

Course Outcomes:

After completing the course, students will be able to:

1. Understand various types of website development using python.
2. Analyze the latest language designing and optimize new technology.
3. Identify benefits of using python in the fiels of latest development in machine learning, web.
4. Understand data structure using python implementation.
5. Data mining and data analyzing.

CSH407: Cryptography and Data Security

Teaching Scheme	Examination Scheme
Lectures: 4 hrs/Week	Class Test -20 Marks
Tutorials: 2 hr/Week	Teachers Assessment – 10 Marks
	Attendance – 20 Marks
Credits: 6	End Semester Exam – 100 marks

Prerequisite: - BCA 203 C Programming, BCA 304 Computer Networking.

Course Objectives:
1- To define cryptography, its use, areas where cryptography is needed.
2- To understand security concepts, Ethics in Network Security, security threats, and the security services.
3- To develop code to implement a cryptographic algorithm using any programming language.
4- To analyze all key less and keyed algorithms to identify their strength and weaknesses and try to solve and remove the limitations or optimize the complexity of algorithm(s).
5- To test different available algorithms in terms of complexity, response time, key size, data size, security assurance, etc.
6- To design an algorithmic solution of a problem either by applying existing algorithms or a new one. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.

Detailed Syllabus

Unit-1
Introduction to Cryptography: Introduction To Security Attacks, Services & Mechanisms, And Conventional Encryption: Classical Techniques, cryptanalytic attacks.

Unit-2
Private Key Encryption: Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, Double DES, Triples DES.

Unit-3
Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, RSA Algorithm, public key distribution, symmetric key distribution using asymmetric cryptosystem.

Unit-4
Hash Functions: Message Authentication & Hash Functions, Authentication Functions, Message Authentication Codes (MAC), Secure Hash Algorithm (SHA), Digital Signatures.

Unit-5
Application Layer Security: Electronic Mail Security, Pretty Good Privacy (PGP).**Transport Layer Security:** Secure Socket Layer & Transport Layer Security. **Network Layer Security:** Authentication Header, Encapsulating Security Payloads.

Unit – 6
Network and System Security: Authentication Applications-Kerberos X.509, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles.

Text and Reference Books
1. Cryptography and Network Security: Principles and Practice, William Stallings, Prentice Hall, New Jersey, 4th Edition.
2. Introduction to cryptography, Johannes A. Buchmann, Springer, Verlag, 2001.
3. Cryptography and Network Security, Atul Kahate, TMH, 2nd Edition.
4. Cryptography, Forouzan, TMH, 2007.

Course Outcomes:

After completing the course, students will be able to:

1. Identify some of the factors driving the need for network security.

2. Identify and classify particular examples of attacks.
3. Define the terms vulnerability, threat and attack.

4. Identify physical points of vulnerability in simple networks.

5. Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

CSH408: Computer Networking

Teaching Scheme	Examination Scheme
Lectures: 4 hrs/Week	Class Test -20 Marks
Tutorials: 2 hr/Week	Teachers Assessment – 10 Marks
	Attendance – 20 Marks
Credits: 6	End Semester Exam – 100 marks

Prerequisite: -
1. Familiarity with the fundamentals of Digital Electronics.
2. A network simulation method

Course Objectives:
6. To learn the basics of topology.
7. To learn the principles of Inter Networking.
8. To build an application using Network Simulator.

Detailed Syllabus

UNIT-I (10 Hours)
Introduction to Computer Networks: Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

UNIT-II (6 Hours)
Physical Layer: Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise,. Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching methods, integrated services digital networks.

UNIT-III (10 Hours)
Medium Access sub layer: Channel Allocations, LAN protocols -ALOHA protocols, Collision free Protocols-Token Passing, IEEE standards, Ethernet and Token Ring. Data Link Layer: Framing, Error detection and correction codes: checksum, CRC, hamming code, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ,

UNIT-IV (10 Hours)
Network Layer: Point-to Point networks, Routing algorithms, Congestion control algorithms, Internetworking Devices, IP protocol, IP addresses: IPv4 classful and classless addressing, Introduction to IPv6.

UNIT-V (10 Hours)
Transport Layer: Connection management: Three-way Handshaking. Introduction of User Datagram Protocol (UDP), Basics of Transmission Control Protocol. (TCP).

UNIT- VI (10 Hours)
Application Layer: File Transfer Protocol, Domain Name System, Electronic mail, Intro of Client server model, Hyper Text Transfer Protocol, WWW, Example Networks - Internet and Public Networks

Text and Reference Books
1. Computer Networks, A. S Tanenbaum, Pearson   education, 4th Edition.
2. Data and Computer Communication, W. Stallings, Macmillan Press, 7th Edition
3. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
4. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross

Course Outcomes:

1.Explain and demonstrate the mechanics associated with IP addressing, device interface, association between physical and logical addressing, subnetting and supernetting
2.Understand the techniques and protocols used (DSL, SONET, ATM).

3.Know the principles of congestion control and trade-offs in fairness and efficiency
4.Distinguish between analog and digital signals and understand their characteristics (Fourier representation, signal corruption).