DEPARTMENT OF INFORMATION TECHNOLOGY

REGULATIONS – 2017 - PEO/PO/CO

CHOICE BASED CREDIT SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. To ensure graduates will be proficient in utilizing the fundamental knowledge of basic sciences, mathematics and Information Technology for the applications relevant to various streams of Engineering and Technology.

2. To enrich graduates with the core competencies necessary for applying knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.

3. To enable graduates to think logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and to design optimal solutions.

4. To enable graduates to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.

5. To enable graduates to gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

PROGRAMME OUTCOMES (PO):

ENGINEERING GRADUATES WILL BE ABLE TO:

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

2. **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.

3. **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.

4. **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.

5. **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.

6. **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.

7. **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.

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

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

10. **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.

11. **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.

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.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

1. To create, select, and apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

2. To manage complex IT projects with consideration of the human, financial, ethical and environmental factors and an understanding of risk management processes, and operational and policy implications.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES A broad relation between the programme objective and the outcomes is given in the following table

PROGRAMMABLE EDUCATIONAL OBJECTIVES	PROGRAM OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	2										
2	3	3	1	1								2
3			3			1						3
4			3		1	2	3	1				
5				3				1	1	2	2	1

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES A broad relation between the Program Specific Objectives and the outcomes is given in the following table

PROGRAM SPECIFIC OBJECTIVE	PROGRAM OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	2			3				2	2		
2				3			3	3			3	

Contribution 1: Reasonable 2: Significant 3: Strong

COURSE OUTCOMES 2017

SEMESTER I

HS8151 COMMUNICATIVE ENGLISH

CO1	Read articles of a general kind in magazines and newspapers.
CO2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
CO3	Comprehend conversations and short talks delivered in English
CO4	Write short essays of a general kind and personal letters and emails in English.

MA8151 ENGINEERING MATHEMATICS – I

CO1	Use both the limit definition and rules of differentiation to differentiate functions.
CO2	Apply differentiation to solve maxima and minima problems.
CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
CO5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
CO6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
CO7	Apply various techniques in solving differential equations.

PH8151 ENGINEERING PHYSICS

CO1	The students will gain knowledge on the basics of properties of matter and its applications,
CO2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
CO3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
CO4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
CO5	The students will understand the basics of crystals, their structures and different crystal growth techniques.

CY8151 ENGINEERING CHEMISTRY

CO1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1	Develop algorithmic solutions to simple computational problems.
CO2	Read, write, execute by hand simple Python programs.
CO3	Structure simple Python programs for solving problems.

CO4 Decompose a Python program into functions.
CO5 Represent compound data using Python lists, tuples, dictionaries.
CO6 Read and write data from/to files in Python Programs.

GE8152 ENGINEERING GRAPHICS

CO1 Familiarize with the fundamentals and standards of Engineering graphics.
CO2 Perform freehand sketching of basic geometrical constructions and multiple views of objects.
CO3 Project orthographic projections of lines and plane surfaces.
CO4 Draw projections and solids and development of surfaces.
CO5 Visualize and to project isometric and perspective sections of simple solids.

GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

CO1 Write, test, and debug simple Python programs.
CO2 Implement Python programs with conditionals and loops.
CO3 Develop Python programs step-wise by defining functions and calling them.
CO4 Use Python lists, tuples, dictionaries for representing compound data.
CO5 Read and write data from/to files in Python.

BS8161 PHYSICS AND CHEMISTRY LABORATORY

CO1 Apply the principles of elasticity.
CO2 The knowledge on optics.
CO3 Understood the thermal properties for engineering applications.
CO4 Understood the basic principles of laser.
CO5 Determine the Thermal conductivity of a bad conductor.
CO6 Estimate the Iron content and molecular weight.
CO7 Knowledge on the quantitative chemical analysis of water quality.

SEMESTER II

HS8251 TECHNICAL ENGLISH

CO1 Read technical texts and write area- specific texts effortlessly.
CO2 Listen and comprehend lectures and talks in their area of specialisation successfully.
CO3 Speak appropriately and effectively in varied formal and informal contexts.
CO4 Write reports and winning job applications.

MA8251 ENGINEERING MATHEMATICS – II

CO1 Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
CO2 Gradient, divergence and curl of a vector point function and related identities.
CO3 Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
CO4 Analytic functions, conformal mapping and complex integration.
CO5 Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

PH8252 PHYSICS FOR INFORMATION SCIENCE

CO1 Gain knowledge on classical and quantum electron theories, and energy band structures.
CO2 Acquire knowledge on basics of semiconductor physics and its applications in various devices.
CO3 Get knowledge on magnetic properties of materials and their applications in data storage.
CO4 Have the necessary understanding on the functioning of optical materials for optoelectronics.
CO5 Understand the basics of quantum structures and their applications in carbon electronics.

BE8255 BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

CO1 Discuss the essentials of electric circuits and analysis.
CO2 Discuss the basic operation of electric machines and transformers
CO3 Introduction of renewable sources and common domestic loads.
CO4 To understand the fundamentals of electronic circuit constructions.
CO5 Introduction to measurement and metering for electric circuits.
CO6 Understand the concepts of Electrical circuits.

IT8201 INFORMATION TECHNOLOGY ESSENTIALS

CO1 Design and deploy web-sites
CO2 Design and deploy simple web-applications
CO3 Create simple database applications
CO4 Develop information system
CO5 Describe the basics of networking and mobile communications

CS8251 PROGRAMMING IN C

CO1 Develop simple applications in C using basic constructs
CO2 Design and implement applications using arrays and strings
CO3 Develop and implement applications in C using functions and pointers.
CO4 Develop applications in C using structures.
CO5 Design applications using sequential and random access file processing

GE8261 ENGINEERING PRACTICES LABORATORY

CO1 Fabricate carpentry components and pipe connections including plumbing works.
CO2 Use welding equipments to join the structures.
CO3 Carry out the basic machining operations.
CO4 Make the models using sheet metal works.
CO5 Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
CO6 Carry out basic home electrical works and appliances.
CO7 Measure the electrical quantities.
CO8 Elaborate on the components, gates, soldering practices.

CS8261 C PROGRAMMING LABORATORY

CO1 Develop C programs for simple applications making use of basic constructs, arrays and strings.
CO2 Develop C programs involving functions, recursion, pointers, and structures.
CO3 Design applications using sequential and random access file processing.

IT8211 INFORMATION TECHNOLOGY ESSENTIAL SLABORATORY

CO1 Design interactive websites using basic HTML tags, different styles, links and with all
CO2 Basic control elements.
CO3 Create client side and server side programs using scripts using PHP.
CO4 Design dynamic web sites and handle multimedia components
CO5 Create applications with PHP connected to database.
CO6 Create Personal Information System
CO7 Implement the technologies behind computer networks and mobile communication

SEMESTER III

MA8351 DISCRETE MATHEMATICS

CO1 Have knowledge of the concepts needed to test the logic of a program.
CO2 Have an understanding in identifying structures on many levels.
CO3 Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO4 Be aware of the counting principles. Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN

CO1 Simplify Boolean Functions using Kmap
CO2 Design and Analyze Combinational and Sequential Circuits
CO3 Implement designs using Programmable Logic Devices
CO4 Write HDL code for Combinational and Sequential Circuits

CS8391 DATA STRUCTURES

CO1 Implement abstract data types for linear data structures.
CO2 Apply the different linear and non-linear data structures to problem solutions.
CO3 Critically analyze the various sorting algorithms.

CS8392 OBJECT ORIENTED PROGRAMMING

CO1 Develop Java programs using OOP principles.
CO2 Develop Java Programs with the concepts inheritance and interfaces.
CO3 Build Java applications using exceptions and IO Streams.
CO4 Develop Java Applications with threads and generic classes.
CO5 Develop interactive Java programs using swings.

EC8394 ANALOG AND DIGITAL COMMUNICATION

CO1 Apply analog and digital communication techniques.
CO2 Use data and pulse communication techniques.
CO3 Analyze Source and Error control coding.
CO4 Utilize multi-user radio communication.

CS8381 DATA STRUCTURES LABORATORY

CO1 Write functions to implement linear and non-linear data structure operations
CO2 Suggest appropriate linear / non-linear data structure operations for solving a given problem
CO3 Appropriately use the linear / non-linear data structure operations for a given problem
CO4 Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY

CO1 Develop and implement Java programs for simple applications that make use of classes, Packages and interfaces.
CO2 Develop and implement Java programs with arraylist, exception handling and multithreading.
CO3 Design applications using file processing, generic programming and event handling.

CS8382 DIGITAL SYSTEMS LABORATORY

CO1	Implement simplified combinational circuits using basic logic gates
CO2	Implement combinational circuits using MSI devices
CO3	Implement sequential circuits like registers and counters
CO4	Simulate combinational and sequential circuits using HDL

HS8381 INTERPERSONAL SKILLS / LISTENING & SPEAKING

CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

SEMESTER IV

MA8391 PROBABILITY AND STATISTICS

CO1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
CO3	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
CO5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

CS8491 COMPUTER ARCHITECTURE

CO1	Understand the basics structure of computers, operations and instructions.
CO2	Design arithmetic and logic unit.
CO3	Understand pipelined execution and design control unit.
CO4	Understand parallel processing architectures.
CO5	Understand the various memory systems and I/O communication.

CS8492 DATABASE MANAGEMENT SYSTEMS

CO1	Classify the modern and futuristic database applications based on size and complexity
CO2	Map ER model to Relational model to perform database design effectively
CO3	Write queries using normalization criteria and optimize queries
CO4	Compare and contrast various indexing strategies in different database systems
CO5	Appraise how advanced databases differ from traditional databases.

CS8451 DESIGN AND ANALYSIS OF ALGORTIHMS

CO1	Design algorithms for various computing problems.
CO2	Analyze the time and space complexity of algorithms.
CO3	Critically analyze the different algorithm design techniques for a given problem.
CO4	Modify existing algorithms to improve efficiency.

CS8493 OPERATING SYSTEMS

CO1 Analyze various scheduling algorithms.
CO2 Understand deadlock, prevention and avoidance algorithms.
CO3 Compare and contrast various memory management schemes.
CO4 Understand the functionality of file systems.
CO5 Perform administrative tasks on Linux Servers.
CO6 Compare iOS and Android Operating Systems.

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

CO1 Public awareness of environment at infant stage.
CO2 Ignorance and incomplete knowledge has lead to misconceptions.
CO3 Development and improvement in standard of living has lead to serious environmental disasters.

CS8481 DATABASE MANAGEMENT SYSTEMS LABORATORY

CO1 Use typical data definitions and manipulation commands.
CO2 Design applications to test Nested and Join Queries
CO3 Implement simple applications that use Views
CO4 Implement applications that require a Front-end Tool
CO5 Critically analyze the use of Tables, Views, Functions and Procedures

CS8461 OPERATING SYSTEMS LABORATORY

CO1 Compare the performance of various CPU Scheduling Algorithms
CO2 Implement Deadlock avoidance and Detection Algorithms
CO3 Implement Semaphores
CO4 Create processes and implement IPC
CO5 Analyze the performance of the various Page Replacement Algorithms
CO6 Implement File Organization and File Allocation Strategies

HS8461 ADVANCED READING AND WRITING

CO1 Write different types of essays
CO2 Write winning job applications
CO3 Read and evaluate texts critically.
CO4 Display critical thinking in various professional contexts.

SEMESTER V

MA8551 ALGEBRA AND NUMBER THEORY

CO1 Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
CO2 Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO3 Demonstrate accurate and efficient use of advanced algebraic techniques.
CO4 Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
CO5 Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

CS8591 COMPUTER NETWORKS

CO1 Understand the basic layers and its functions in computer networks
CO2 Evaluate the performance of a network.
CO3 Understand the basics of how data flows from one node to another.
CO4 Analyze and design routing algorithms.
CO5 Design protocols for various functions in the network.
CO6 Understand the working of various application layer protocols

EC8691 MICROPROCESSORS AND MICRO CONTROLLERS

CO1 Understand and execute programs based on 8086 microprocessor.
CO2 Design Memory Interfacing circuits.
CO3 Design and interface I/O circuits.
CO4 Design and implement 8051 microcontroller based systems.

IT8501 WEB TECHNOLOGY

CO1 Design simple web pages using markup languages like HTML and XHTML.
CO2 Create dynamic web pages using DHTML and java script that is easy to navigate and use.
CO3 Program server side web pages that have to process request from client side web pages.
CO4 Represent web data using XML and develop web pages using JSP.
CO5 Understand various web services and how these web services interact.

CS8494 SOFTWARE ENGINEERING

CO1 Identify the key activities in managing a software project.
CO2 Compare different process models.
CO3 Concepts of requirements engineering and Analysis Modeling.
CO4 Apply systematic procedure for software design and deployment.
CO5 Compare and contrast the various testing and maintenance.
CO6 Manage project schedule, estimate project cost and effort required.

EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

CO1 Write ALP Programmes for fixed and Floating Point and Arithmetic operations
CO2 Interface different I/Os with processor
CO3 Generate waveforms using Microprocessors
CO4 Execute Programs in 8051
CO5 Explain the difference between simulator and Emulator

CS8581 NETWORKS LABORATORY

CO1 Implement various protocols using TCP and UDP.
CO2 Compare the performance of different transport layer protocols.
CO3 Use simulation tools to analyze the performance of various network protocols.
CO4 Analyze various routing algorithms.
CO5 Implement error correction codes.

IT8511 WEB TECHNOLOGY LABORATORY

CO1 Design simple web pages using markup languages like HTML and XHTML.
CO2 Create dynamic web pages using DHTML and java script that is easy to navigate and use.
CO3 Program server side web pages that have to process request from client side web pages.
CO4 Represent web data using XML and develop web pages using JSP.
CO5 Understand various web services and how these web services interact.

SEMESTER VI

IT8601 COMPUTATIONAL INTELLIGENCE

CO1 Provide a basic exposition to the goals and methods of Computational Intelligence.
CO2 Study of the design of intelligent computational techniques.
CO3 Apply the Intelligent techniques for problem solving
CO4 Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN

CO1 Express software design with UML diagrams
CO2 Design software applications using OO concepts.
CO3 Identify various scenarios based on software requirements
CO4 Transform UML based software design into pattern based design using design patterns
CO5 Understand the various testing methodologies for OO software

IT8602 MOBILE COMMUNICATION

CO1 Explain the basics of mobile telecommunication system
CO2 Illustrate the generations of telecommunication systems in wireless network
CO3 Understand the architecture of Wireless LAN technologies
CO4 Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks
CO5 Explain the functionality of Transport and Application layer

CS8091 BIG DATA ANALYTICS

CO1 Work with big data tools and its analysis techniques
CO2 Analyze data by utilizing clustering and classification algorithms
CO3 Learn and apply different mining algorithms and recommendation systems for large volumes of data
CO4 Perform analytics on data streams
CO5 Learn NoSQL databases and management.

CS8092 COMPUTER GRAPHICS AND MULTIMEDIA

CO1 Design two dimensional graphics.
CO2 Apply two dimensional transformations.

CO3 Design three dimensional graphics.
CO4 Apply three dimensional transformations.
CO5 Apply Illumination and color models.
CO6 Apply clipping techniques to graphics.
CO7 Understood Different types of Multimedia File Format
CO8 Design Basic 3d Scenes using Blender

CS8662 MOBILE APPLICATION DEVELOPMENT LABORATORY

CO1 Develop mobile applications using GUI and Layouts.
CO2 Develop mobile applications using Event Listener.
CO3 Develop mobile applications using Databases.
CO4 Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
CO5 Analyze and discover own mobile app for simple needs.

CS8582 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

CO1 Perform OO analysis and design for a given problem specification.
CO2 Identify and map basic software requirements in UML mapping.
CO3 Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
CO4 Test the compliance of the software with the SRS

HS8581 PROFESSIONAL COMMUNICATION

CO1 Make effective presentations.
CO2 Participate confidently in Group Discussions.
CO3 Attend job interviews and be successful in them.
CO4 Develop adequate Soft Skills required for the workplace.

SEMESTER VII

MG8591 PRINCIPLES OF MANAGEMENT

CO1 Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.

CS8792 CRYPTOGRAPHY AND NETWORK SECURITY

CO1 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2 Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3 Apply the different cryptographic operations of public key cryptography
CO4 Apply the various Authentication schemes to simulate different applications.
CO5 Understand various Security practices and System security standards

CS8791 CLOUD COMPUTING

CO1 Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2 Learn the key and enabling technologies that help in the development of cloud. Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO3 Explain the core issues of cloud computing such as resource management and security.
CO4 Be able to install and use current cloud technologies.
CO5 Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

IT8711 FOSS AND CLOUD COMPUTING LABORATORY

CO1 Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2 Design and deploy a web application in a PaaS environment.
CO3 Learn how to simulate a cloud environment to implement new schedulers.
CO4 Install and use a generic cloud environment that can be used as a private cloud.
CO5 Manipulate large data sets in a parallel environment.

IT8761 SECURITY LABORATORY

CO1 Develop code for classical Encryption Techniques to solve the problems.
CO2 Build cryptosystems by applying symmetric and public key encryption algorithms.
CO3 Construct code for authentication algorithms.
CO4 Develop a signature scheme using Digital signature standard.
CO5 Demonstrate the network security system using open source tools.

PROFESSIONAL ELECTIVES(PE)

SEMESTER VI
ELECTIVE -I

IT8076 SOFTWARE TESTING

CO1 Design test cases suitable for a software development for different domains.
CO2 Identify suitable tests to be carried out.
CO3 Prepare test planning based on the document.
CO4 Document test plans and test cases designed.
CO5 Use automatic testing tools.
CO6 Develop and validate a test plan.

CS8077 GRAPH THEORY AND APPLICATIONS

CO1 Understand the basic concepts of graphs, and different types of graphs
CO2 Understand the properties, theorems and be able to prove theorems.
CO3 Apply suitable graph model and algorithm for solving applications.

IT8071 DIGITAL SIGNAL PROCESSING

CO1 Perform mathematical operations on signals.
CO2 Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory.
CO3 Transform the time domain signal into frequency domain signal and vice-versa.
CO4 Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.

IT8001 INFORMATION STORAGE MANAGEMENT

CO1 Understand the logical and physical components of a Storage infrastructure.
CO2 Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.
CO3 Understand the various forms and types of Storage Virtualization.
CO4 Describe the different role in providing disaster recovery and business continuity capabilities.
CO5 Distinguish different remote replication technologies.

CS8072 AGILE METHODOLOGIES

CO1	Realize the importance of interacting with business stakeholders in determining the requirements for a software system
CO2	Perform iterative software development processes: how to plan them, how to execute them.
CO3	Point out the impact of social aspects on software development success.
CO4	Develop techniques and tools for improving team collaboration and software quality.
CO5	Perform Software process improvement as an ongoing task for development teams.
CO6	Show how agile approaches can be scaled up to the enterprise level.

IT8072 EMBEDDED SYSTEMS

CO1	Describe the architecture and programming of ARM processor.
CO2	Explain the concepts of embedded systems
CO3	Understand the Concepts of peripherals and interfacing of sensors.
CO4	Capable of using the system design techniques to develop firmware
CO5	Illustrate the code for constructing a system

GE8075 INTELLECTUAL PROPERTY RIGHTS

CO1	Ability to manage Intellectual Property portfolio to enhance the value of the firm.

ELECTIVE-II

IT8002 WEB DEVELOPMENT FRAMEWORKS

CO1	Analyze the fundamentals of web framework
CO2	Use the concept of Java web framework
CO3	Implement the concept using Struts framework
CO4	Apply the concept of python web framework to the problem solutions.
CO5	Critically analyze the various Web frameworks.

CS8082 MACHINE LEARNING TECHNIQUES

CO1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
CO2	Apply specific supervised or unsupervised machine learning algorithm for a particular problem
CO3	Analyse and suggest the appropriate machine learning approach for the various types of problem
CO4	Design and make modifications to existing machine learning algorithms to suit an individual application
CO5	Provide useful case studies on the advanced machine learning algorithms

IT8003 FORMAL LANGUAGES AND AUTOMATA THEORY

CO1	Design a finite automaton for a specific language.
CO2	Design a Turing machine.
CO3	Select appropriate grammar for the implementation of compiler phases
CO4	Design a lexical analyzer
CO5	Design a simple parser
CO6	Design and implement techniques used for optimization by a compiler.
CO7	Write a very simple code generator

CS8081 INTERNET OF THINGS

- **CO1** Explain the concept of IoT.
- **CO2** Analyze various protocols for IoT.
- **CO3** Design a PoC of an IoT system using Rasperry Pi/Arduino
- **CO4** Apply data analytics and use cloud offerings related to IoT.
- **CO5** Analyze applications of IoT in real time scenario

IT8075 SOFTWARE PROJECT MANAGEMENT

- **CO1** Understand Project Management principles while developing software.
- **CO2** Gain extensive knowledge about the basic project management concepts, framework and the process models.
- **CO3** Obtain adequate knowledge about software process models and software effort estimation techniques.
- **CO4** Estimate the risks involved in various project activities.
- **CO5** Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
- **CO6** Learn staff selection process and the issues related to people management

IT8074 SERVICE ORIENTED ARCHITECTURE

- **CO1** Understand XML technologies
- **CO2** Understand service orientation, benefits of SOA
- **CO3** Understand web services and WS standards
- **CO4** Use web services extensions to develop solutions
- **CO5** Understand and apply service modeling, service oriented analysis and design for application development

GE8077 TOTAL QUALITY MANAGEMENT

- **CO1** The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

ELECTIVE –III

CS8079 HUMAN COMPUTER INTERACTION

- **CO1** Design effective dialog for HCI
- **CO2** Design effective HCI for individuals and persons with disabilities.
- **CO3** Assess the importance of user feedback.
- **CO4** Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- **CO5** Develop meaningful user interface.

CS8073 C# AND .NET PROGRAMMING

- **CO1** Write various applications using C# Language in the .NET Framework.
- **CO2** Develop distributed applications using .NET Framework.
- **CO3** Create mobile applications using .NET compact Framework.
- **CO4** Write various applications using C# Language in the .NET Framework. Develop distributed applications using .NET Framework.
- **CO5** Create mobile applications using .NET compact Framework.

CS8088 WIRELESS ADHOC AND SENSOR NETWORKS

- **CO1** Identify different issues in wireless ad hoc and sensor networks .
- **CO2** To analyze protocols developed for ad hoc and sensor networks .
- **CO3** To identify and understand security issues in ad hoc and sensor networks.

GE8072 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

CO1	Define, formulate and analyze a problem
CO2	Solve specific problems independently or as part of a team
CO3	Gain knowledge of the Innovation & Product Development process in the Business Context
CO4	Work independently as well as in teams
CO5	Manage a project from start to finish

CS8071 ADVANCED TOPICS ON DATABASES

CO1	To develop in-depth understanding of relational databases and skills to optimize database performance in practice.
CO2	To understand and critique on each type of databases.
CO3	To design faster algorithms in solving practical database problems.
CO4	To implement intelligent databases and various data models.

GE8074 HUMAN RIGHTS

CO1	Engineering students will acquire the basic knowledge of human rights.

GE8071 DISASTER MANAGEMENT

CO1	Differentiate the types of disasters, causes and their impact on environment and society
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

ELECTIVE IV

CS8085 SOCIAL NETWORK ANALYSIS

CO1	Develop semantic web related applications.
CO2	Represent knowledge using ontology.
CO3	Predict human behaviour in social web and related communities.
CO4	Visualize social networks.

CS8086 SOFT COMPUTING

CO1	Apply suitable soft computing techniques for various applications.
CO2	Integrate various soft computing techniques for complex problems.

CS8074 CYBER FORENSICS

CO1	Understand the basics of computer forensics
CO2	Apply a number of different computer forensic tools to a given scenario
CO3	Analyze and validate forensics data
CO4	Identify the vulnerabilities in a given network infrastructure
CO5	Implement real-world hacking techniques to test system security

IT8073 INFORMATION SECURITY

CO1	Discuss the basics of information security
CO2	llustrate the legal, ethical and professional issues in information security
CO3	Demonstrate the aspects of risk management.
CO4	Become aware of various standards in the Information Security System
CO5	Design and implementation of Security Techniques.

EC8093 DIGITAL IMAGE PROCESSING

CO1 Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
CO2 Operate on images using the techniques of smoothing, sharpening and enhancement.
CO3 Understand the restoration concepts and filtering techniques.
CO4 Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

IT8004 NETWORK MANAGEMENT

CO1 Gather, derive, define and validate real requirements for the specified network.
CO2 Understand different types of requirements from the user, application, device and network component
CO3 Develop traceability between requirements, architecture decisions, and design decisions
CO4 Implement how and where addressing and routing, security, network management, and performance are required in the network.
CO5 Use SNMPv1, v2 and v3 protocols.

GE8076 PROFESSIONAL ETHICS IN ENGINEERING

CO1 Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

ELECTIVES V

CS8080 INFORMATION RETRIEVAL TECHNIQUES

CO1 Use an open source search engine framework and explore its capabilities
CO2 Apply appropriate method of classification or clustering.
CO3 Design and implement innovative features in a search engine.
CO4 Design and implement a recommender system.

CS8078 GREEN COMPUTING
CO1 Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
CO2 Enhance the skill in energy saving practices in their use of hardware.
CO3 Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
CO4 Understand the ways to minimize equipment disposal requirements

CS8084 NATURAL LANGUAGE PROCESSING

CO1 To tag a given text with basic Language features
CO2 To design an innovative application using NLP components
CO3 To implement a rule based system to tackle morphology/syntax of a language
CO4 To design a tag set to be used for statistical processing for real-time applications
CO5 To compare and contrast the use of different statistical approaches for different types of NLP applications.

IT8077 SPEECH PROCESSING
CO1 Create new algorithms with speech processing
CO2 Derive new speech model
CO3 Perform various language phonetic analysis
CO4 Create a new speech identification system
CO5 Generate a new speech recognition system

IT8078 WEB DESIGN AND MANAGEMENT

CO1	Design Website using HTML CSS and JS
CO2	Design Responsive Site
CO3	Manage, Maintain and Support Web Apps

IT8005 ELECTRONIC COMMERCE

CO1	Design Website using HTML CSS and JS
CO2	Design Responsive Sites
CO3	Manage, Maintain and Support Web Apps

GE8073 FUNDAMENTALS OF NANOSCIENCE

CO1	Will familiarize about the science of nanomaterials
CO2	Will demonstrate the preparation of nanomaterials
CO3	Will develop knowledge in characteristic nanomaterial