



**Netaji Subhas Institute of Technology, Bihta, Patna
Bihar Engineering University**

B. Tech.

DEPARTMENT OF

Computer science and engineering

Course List

S.NO	SEM	COURSE CODE	COURSE TITLE
1	I	10013	CHEMISTRY
2	I	100104	PROGRAMMING FOR PROBLEM SOLVING
3	I	100105	WORKSHOP MANUFACTURING PRACTICES
4	I	100106	ENGLISH
5	I	100102	MATHEMATICS-I(CALCULUS AND LINEAR ALGEBRA)
6	I	100103P	CHEMISTRY(PRACTICAL)
7	I	100104P	PROGRAMMING FOR PROBLEM SOLVING(PRACTICAL)
8	I	100105P	WORKSHOP MANUFACTURING PRACTICES(PRACTICAL)
9	I	100106P	ENGLISH(PRACTICAL)
10	II	100201	BASIC ELECTRICAL ENGINEERING
11	II	100202	ENGINEERING GRAPHICS&DESIGN
12	II	105201	PHYSICS(SEMICONDUCTOR PHYSICS)
13	II	105202	MATHEMATICS-II(PROBABILITY AND STATISTICS)
14	II	10020IP	BASICS ELECTRICAL ENGINEERING(PRACTICAL)
15	II	100202P	ENGINEERING GRAPHICS&ALGORITHMS
16	II	10520IP	PHYSICS(SEMICONDUCTOR PHYSICS)(PRACTICAL)
17	III	100302	ANALOG ELECTRONIC CIRCUITS
18	III	100304	DATA STRUCTURE &ALGORITHMS
19	III	100311	MATHEMATICS-III(DIFFERENTIAL CALCULUS)
20	III	100313	OBJECT ORIENTED PROGRAMING USING C++
21	III	100314	TECHNICAL WRITING
22	III	100302P	ANALOG ELECTRONICS CIRCUITS LABORATORY(PRACTICAL)
23	III	100304P	DATA STRUCTURE &ALGORITHMS(PRACTICAL)
24	III	100313P	OBJECT ORIENTED PROGRAMMING USING C++(PRACTICAL)
25	III	100399P	INTERNSHIP(PRACTICAL)
26	IV	100403	DIGITAL ELECTRONICS
27	IV	100404	DISCRETE MATHEMATICS
28	IV	100407	HUMAN RESOURCE DEVLOPMENT AND ORGANIZATIONAL BEHAVIOR
29	IV	100401	COMPUTER ORGANIZATION & ARCHITECTURE
30	IV	105402	DESIGN &ANALYSIS OF ALGORITHMS

31	IV	105403	OPERATING SYSTEMS
32	IV	100403P	DIGITAL ELECTRONICS(PRACTICAL)
33	IV	10540IP	COMPUTER ORGANIZATION & ARCHITECTURE(PRACTICAL)
34	IV	105402P	DESIGN & ANALYSIS OF ALGORITHMS (PRACTICAL)
35	IV	105403P	OPERATING SYSTEMS(PRACTICAL)
36	V	100508	PROFESSIONAL SKILL DEVELOPMENT
37	V	105501	ARTIFICIAL INTELLIGENCE
38	V	105502	DATABASE MANAGEMENT SYSTEMS
39	V	105503	FORMAL LANGUAGE & AUTOMATA THEORY
40	V	105504	SOFTWARE ENGINEERING
41	V	100510P	SUMMER ENTREPRENEURSHIP-II(PRACTICAL)
42	V	100511P	MOOCS/SWAYAM/NPTEL.COURSES-2(PRACTICAL)
43	V	105502P	DATABASE MANAGEMENT SYSTEMS(PRACTICAL)
44	V	105505	SEMINAR
45	VI	100602	COMPUTER NETWORKS
46	VI	105601	COMPILER DESIGN
47	VI	105602	MACHINE LEARNING
48	VII	105713	CYBER SECURITY
49	VII	105705	INTERNET OF THINGS
50	VII	100708	BIOLOGY FOR ENGINEERS
51	VII	100713	SOFT SKILL
52	VII	100707P	Summer Entrepreneurship - III
53	VII	100709P	Project-I
54	VII	100719P	Python as tool for Machine learning
55	VIII	100817	CLOUD COMPUTING
56	VIII	105816	EMBEDDED
57	VIII	100813	BIG DATA
58	VIII	105819	AD HOC AND SENSOR NETWORK
59	VIII	100801P	Project-II



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List of Course Outcomes

FIRST YEAR: FIRST SEMESTER	
Course Name: PPS	
Course code-100104	
At the end of course Students will	
C01	Illustrate and explain the basic computer concepts and programming principles of C language.
C02	Develop C program to solve simple mathematical and decision making problems.
C03	Develop C program to solve simple engineering problems using looping constructs.
C04	Develop C programs to demonstrate the applications of derived data types such as arrays, pointers, strings and functions.
Course Name: PPS Lab	
Course code-100104P	
At the end of course Students will	
LO1	Develop a C program
LO2	Control the sequence of the program and give logical outputs
LO3	Implement strings in your C program
LO4	Store different data types in the same memory
LO5	Manage I/O operations in your C program
LO6	Repeat the sequence of instructions and points for a memory location
LO7	Apply code reusability with functions and pointers
LO8	Understand the basics of file handling mechanisms
LO9	Explain the uses of pre-processors and various memory models

Course Name: Chemistry		Course code-100103
At the end of course Students will		
C01	Analyse the need, design and perform a set of experiments	
C02	Learn and apply basic techniques used in chemistry laboratory for volumetric analysis; redox titrations with different indicators; EDTA titrations	
C03	Enhance the thinking capabilities in the modern trends in Engineering & Technology	
C04	Expose to different methods of chemical analysis and use of some commonly employed instruments	
C05	Explain and demonstrate a few instrumental methods of chemical analysis	
C06	Function as a member of a team, communicate effectively and engage in further learning. Also, learn safety rules in the practice of laboratory investigations	
Course Name: Chemistry Lab		Course code-100103
At the end of course Students will		
L01	Determine the chloride content of water.	
L02	Learn and apply basic techniques used in chemistry laboratory for volumetric analysis; redox titrations with different indicators; EDTA titrations	
L03	Expose different methods of chemical analysis and use of some commonly employed instruments.	
L04	Synthesize a small drug molecule and analyze a salt sample	
L05	Estimate rate constants of reaction from concentration of reactant such as surface tension and viscosity	
Course Name: Workshop Manufacturing Practices		Course code-100105
At the end of course Students will		
C01	Understand the appropriate tools, materials, instruments required for specific operations in workshop.	
C02	Define practical skills in various machining operations and safety consciousness and show team work	
C03	Understand the figures of the hand tools used in fitting, carpentry, black smithy, foundry, welding shop and machine tools such as lathe machine and drilling machine etc.	
C04	Apply different manufacturing techniques and measuring instruments for making a job.	
C05	Discriminate solution for real engineering problems using machine and equipments in workshop.	

Course Name: Workshop Manufacturing Practices Lab		Course code-100105P
At the end of course Students will		
L01	Observe safety precaution in the workshop	
L02	Use various engineering materials, tools and measuring equipment	
L03	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry, black smithy and welding.	
L04	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping.	
Course Name: English		Course Code-100106
The outcomes of the Course / Subject are:		
C01	Ability to communicate effectively and write and present properly.	
C02	Ability to work individually and in intra disciplinary and multidisciplinary teams.	
C03	Recognition of the need for lifelong learning and to access information as well as development in science and technology.	
C04	Knowledge of project management, risk management, innovation and change management, entrepreneurship and sustainable development.	
C05	Ability to identify, define, formulate and solve complex engineering problems as well as electing and applying appropriate analysis and modeling methods for wide purpose.	
Course Name: Language Lab		Course code-100206
At the end of course Students will		
L01	Identify common errors in spoken and written communication	
L02	Get familiarized with English vocabulary and language proficiency	
L03	Improve nature and style of sensible writing, acquire employment and workplace communication skills.	
L04	Improve their Technical Communication Skills through Technical Reading and Writing practices.	
L05	Perform well in campus recruitment, engineering and all other general competitive examinations	

Course Name: Math 1		Course code-105102
At the end of course Students will		
C01	To learn properties of real line and learn the concept of limit, continuity, differentiability of a real valued function. To learn various other properties of a differentiable function and how to expand a function in powers of independent variable.	
C02	To learn the basics of Riemann integral and learn how to compute area, volume, mass etc by using Riemann Integration. To learn improper Riemann Integral and use Gamma and Beta function in solving integrations.	
C03	To learn how to expand a function in powers of independent variable and find the radius of convergence, interval of convergence and centre of the series.	
C04	To learn about Fourier series and solve various problems with the help of Fourier Series.	
C05	Theory of Matrices, various matrices, eigen values, eigenvectors, diagonalization and quadratic forms.	
C06	To learn how to solve system of equations by using theory and rank of a matrix.	
C07	To learn about the maxima and minima of two variables using Lagrange's multiplier, tangent and normal plane.	

FIRST YEAR: SECOND SEMESTER		
Course Name: Math II		Course code-15202
At the end of course Students will		
C01	Learn about the probability spaces, conditional and independent probabilities,; Poisson approximation; Bernoulli trials their expectations and moments.	
C02	Study continuous random variable; Normal, Exponential and Gamma Densities.	
C03	Analyse Bivariate distributions and their properties.	
C04	Describe measure of Central tendency: Moments, Skewness, kurtosis, Correlation and regression.	
C05	Discuss curve fitting by the method of least squares; Fitting of straight lines, Parabolas and general curves.	
C06	Evaluate test for single mean, difference of means, correlation coefficients, test for ratio of variances-Chi squares test for goodness of Fit .	

Course Name: Basic electrical engineering		Course code-100201
At the end of course Students will		
C01	Examine and execute the basic concepts of AC and DC electric circuit and its behaviour	
C02	Students are capable of analysing the fundamental ideas behind magnetic circuits, including their definition, magnetic hysteresis phenomena, B-H curve, and hysteresis loop.	
C03	Students are capable of applying the essential ideas and definitions of AC circuits, including single-phase, three-phase, RC and RLC circuits, and star and delta connections	
C04	To identify the different kinds of single-phase transformers and to compute efficiency, losses, and regulations	
C05	To study the working principles of Electrical Machines	
C06	To introduce various switches & batteries.	
Course Name: Basic electrical engineering lab		Course code-100201
At the end of course Students will		
C01	Get an exposure to basic electrical laws.	
C02	Understand the response of different types of electrical circuits to different excitations.	
C03	Understand the measurement ,calculation and relation between the basic electrical parameters.	
C04	Understand the basic characteristics of transformer and electrical machines.	
Course Name PHYSICS		Course code-105201
At the end of course Students will		
C01	Understand various types of oscillators and their implications	
C02	Demonstrate different types of oscillations and waves in both electrical and magnetic fields.	
C03	Analyse the intensity variation of light due to polarization, interference and diffraction.	
C04	Understand the different optical phenomenon and apply to real life incidents	
C05	Study of different types of lasers and its applications are to import knowledge and to develop skills and to use modern instruments in the engineering applications	
C06	Study of material properties and their applications is the prime role to understand and use in engineering applications.	
C07	Explain fundamentals of quantum mechanics and apply to one dimensional motion of particles.	
C08	Classify solids on the basis of band theory	

Course Name PHYSICS LAB		Course code-105201P
At the end of course Students will		
C01	Analyse the electrical properties of semiconductor materials by determining energy gap of semiconductor.	
C02	Students will understand how to find out threshold voltage and calculate Planck's constant using various LEDs	
C03	They will understand about various types of diodes characteristics.	
C04	How to find out dielectric constant value using parallel plate capacitor.	
C05	How to determine the frequency of alternating current using sonometer and they will be able to relate the tension of the wire, linear density of the wire, and the resonating length of the wire.	
Course Name Engineering graphics and design		Course code-105201
At the end of course Students will		
C01	Apply the concept of drawing in practical applications.	
C02	Draw the projection of points, lines and planes	
C03	Classify solids and projection of solids at different positions	
C04	Show sectioned view of solids and development of surfaces	
C05	Discuss about conics and orthographic views , isometric view of engineering components.	
C06	Understand the basic AUTOCAD commands.	
Course Name: Engineering graphics & algorithms		Course Code-100202P
The Laboratory outcomes of the Course / Subject are:		
C01	Get acquainted with the knowledge of various lines, geometrical constructions and construction of various kinds of scales, and Ellipse.	
C02	Improve their imagination skills by gaining knowledge about points, lines and planes.	
C03	Become proficient in drawing the projections of various solids.	
C04	Gain knowledge about orthographic and isometric projections.	
C05	Development of surface of different kind of solid.	
C06	Gain knowledge of basic Auto Cad command and their uses.	

SECOND YEAR: THIRD SEMESTER**Course Name: Data Structure & Algorithm****Course code-100304**

At the end of course Students will

C01	Understand the concept Data Structure & algorithm.
C02	Concept of searching & sorting techniques.
C03	Basic concept of stack, queues, list, trees and graphs.
C04	Learn algorithms for solving problems with the help of fundamental Data Structure.

Course Name: Data Structure & Algorithm Lab**Course code-100304P**

At the end of course Students will

C01	To remember basic C Programming such as Array, Structure, Pointer and File etc.
C02	To understand implementation concepts of linear and non-linear data structures.
C03	To analyze the concepts of static and dynamic data structure algorithms.
C04	To apply different sorting and searching algorithms.
C05	To evaluate time complexity of different data structure algorithms.
C06	To create different Data Structures which plays a vital role in real world applications.

Course Name: OOPs using C++**Course code-100313**

At the end of course Students will

C01	Understand the concept the class, object, inheritance and polymorphism.
C02	Apply overload operators in C++.
C03	Understand the difference between function overloading and function over riding.
C04	Incorporate exception handling in object oriented programs.
C05	Able to use template classes.
C06	Able to write oops program of moderate, complexity in C++.

Course Name: OOPS Lab**Course Code- 100313P**

At the end of course Students will

C01	Understand the concept of class, object, inheritance and polymorphism
C02	Apply overload operators in C++
C03	Understand the difference between function overloading and function overriding
C04	Incorporate exception handling in object-oriented programs
C05	able to use template classes

Course Name: Analog Electronic circuits		Course code-100302
At the end of course Students will		
C01	Understand the characteristics of transistors.	
C02	Design and analyze various rectifier and amplifier circuits	
C03	Design sinusoidal and non sinusoidal oscillator.	
C04	Understand the functioning of OP-AMP and design OP-AMP based circuits	
Course Name: Analog Electronic circuits Lab		Course code-100302P
At the end of this course, Students will able to:		
C01	Analyze the characteristics of semiconductor devices.	
C02	Analyze the frequency response of BJT.	
C03	Implement adder and scalar circuits using Operational amplifier.	
C04	Practice different types of wiring and instruments connections keeping in mind technical, Economical, safety issues.	
Course Name: Technical Writing		Course code-100314
At the end of course Students will		
C01	Skill set upgrade and acquire knowledge of better framework and planning.	
C02	Ability to clear, concise, concrete, correct, coherent, complete and courteous.	
C03	Recognition of the need for lifelong learning and to access information as well as development in science and technology.	
C04	Knowledge of project management, risk management, innovation and change management, entrepreneurship and sustainable development.	
C05	Ability to identify, define, formulate and solve complex engineering problems as well as electing and applying appropriate analysis and modelling methods for wide purpose.	
Course Name: Mathematics III		Course code-100311
At the end of course Students will		
C01	Apply the concept of successive differentiation and Leibnitz theorem, limit continuity and Differentiability of function.	
C02	Apply partial differentiation for evaluating different types of problem and applying Eulers Theorem for homogeneous function of ,maxima and minima several variavle ,method of lagrange Multipliers	
C03	Have a better understanding of partial differential equations of first order and their solution processes that are used in various techniques dealing engineering problems and Apply the effective mathematical tools for solutions of partial differential equations	
C04	Understand differentiation of vector function. Apply the tools of integration of vector functions and solve many types of problem,green ,gauss and stokes	
C05	Discuss the applications of power series solution ,legender polynomials ,Bessel Function .etc	

Course Name: Internship		Course code-100399P
At the end of this course, Students will able to:		
C01	The students will be able to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.	
C02	The students will be able to analyse a given engineering problem, identify an appropriate problem solving methodology, implement the methodology and propose a meaningful solution	
C03	The students will be able to apply prior acquired knowledge in problem solving.	
C04	The students will be able to take initiatives, communicate, work in a team and manage a project within a given time frame.	
SECOND YEAR: FOURTH SEMESTER		
Course Name: Operating System		Course code-105403
At the end of this course, Students will able to:		
C01	Understand algorithm for process scheduling for a given specification of CPU utilization, throughput, Turnaround Time, Waiting time and Response Time.	
C02	Develop the techniques for optimally allocating memory to process by increasing memory utilization and for improving the access time.	
C03	Understand and implement file management system.	
C04	Understand the I/O management functions in OS by performing operations for synchronization between CPU and I/O controllers	
Course Name: Operating System Lab		Course code-105403P
At the end of this course, Students will able to:		
C01	Implement CPU Scheduling algorithms.	
C02	Implement memory management schemes.	
C03	Implement Banker's Algorithm for deadlock Avoidance.	
C04	Ability to simulate and implement operating system concepts such as scheduling, Deadlock management, file management, and memory management.	
Course Name: HRD		Course code-100407
At the end of this course, Students will able to:		
C01	To understand key functions in management as applied in practice	
C02	To understand in more specific management related areas from planning till controlling.	
C03	To understand about the authority and responsibility, and different organizational structure.	
C04	To understand about the role of leadership, motivation and communication in an organization.	
C05	To understand the importance of globalization and diversity in modern organizations.	

Course Name: Digital Electronics		Course code-100403
At the end of this course, Students will able to:		
C01	Convert different type of codes and number systems which are used in digital communication and computer systems.	
C02	Employ the codes and number systems converting circuits and compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.	
C03	Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.	
C04	Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints	
Course Name: Digital Electronics Lab		Course code-100403P
At the end of this course, Students will able to:		
C01	Describe the knowledge of basic logic gates and their design using universal gates	
C02	Demonstrate the working of combinational and sequential circuits.	
C03	Appraise combinational/ sequential circuits and memories	
C04	Integrate and experiment with controlled digital circuits and digital to analog converter.	
C05	Schematize, simulate, and implement combinational and sequential circuits to solve real-world problems using VHDL systems.	
Course Name: Discrete Mathematics		Course code-100404
At the end of this course, Students will able to:		
C01	For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives	
C02	For a given problem derive the solution using deductive logic and prove the solution based on logical inference.	
C03	For a given a mathematical problem classify its algebraic structure	
C04	Evaluate Boolean function and simplify expression using the properties of Boolean algebra	
C05	Develop the given problem as graph networks and solve with techniques of graph theory.	

Course Name: Design and Analysis of Algorithm		Course code-105402
At the end of this course, Students will able to:		
C01	For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.	
C02	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.	
C03	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.	
C04	Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.	
C05	. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.	
CO6	Explain the ways to analyze randomized algorithms (expected running time, probability of error).	
CO7	Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS).	
Course Name: Design and Analysis of Algorithm Lab		Course code-105402
At the end of this course, Students will able to:		
C01	Demonstrate the fundamentals of algorithmic problem solving.	
C02	Apply various algorithm design paradigms	
C03	Analyze and categorize the algorithms into different efficiency classes.	
Course Name: Computer Organization and architecture		Course code-105401
At the end of this course, Students will able to:		
C01	Study the fundamental principles of computer systems.	
C02	Illustrate the complete execution of instruction and explain design of control unit.	
C03	To study the memory system design and various levels of memory in CPU.	
C04	To provides the knowledge of parallel processing and pipelining concept.	
C05	Illustrate how I/O devices are accessed and its principles.	
Course Name: Computer Organization and architecture Lab		Course code-105401P
At the end of this course, Students will able to:		
C01	Understand the basics of instruction sets and their impact on processor design.	
C02	. Illustrate to perform number system conversions using assembly language programming.	
C03	Understand and apply the fundamentals of assembly level programming of microprocessors.	
C04	Work with standard microprocessor real time interfaces such as DMA for data transfer.	

THIRD YEAR: FIFTH SEMESTER**Course Name: Artificial Intelligence****Course code-105501**

At the end of course Students will

C01	Understand formal methods of knowledge representation
C02	Understand foundation principles, mathematical tools and program paradigms of AI
C03	Apply intelligent agents for Artificial Intelligence programming techniques
C04	Apply problem solving through search for AI applications
C05	Apply logic and reasoning techniques to AI applications

Course Name: Formal Language & Automata Theory**Course code-105503**

At the end of course Students will

C01	Write a formal notation for strings, languages and machines.
C02	Design finite automata to accept a set of strings of a language.
C03	For a given language, determine whether the given language is regular or not.
C04	Design context free grammars to generate strings of context free language.
C05	Determine equivalence of languages accepted by pushdown automata and languages generated by context free grammars
C06	Write the hierarchy of formal languages, grammars and machines.
C07	Distinguish between computability and non-computability and decidability and undecidability.

Course Name: Database Management System**Course code-105502**

At the end of course Students will

C01	For a given query write relational algebra expression for that query and optimize the developed expression
C02	For a given specification of the requirement design the database using E-R method and normalization.
C03	For a given specification construct the SQL queries for open source and commercial DBMS_MYSQL,ORACLE and DB2
C04	For a given query optimize its execution using query optimization algorithm.
C05	For a given transaction processing system determine the transaction atomicity, consistency, isolation and durability.
C06	Implement the isolation property, including locking, time stamping based on concurrency control and serializability of scheduling

Course Name: Database Management System Lab		Course code-105502P
At the end of course Students will		
C01	Ability to design and implement a database schema for given problem.	
C02	Apply the normalization techniques for development of application software to realistic problems.	
C03	Ability to formulate queries using SQL DML/DDDL/DCL commands	
C04	Apply modified components for performance tuning in open source software.	
Course Name: Software Engineering		Course code-105504
At the end of course Students will		
C01	Concept of Software engineering and its history.	
C02	Various Requirement, importance, user needs and software features.	
C03	Different Concept of Software Design and goals of good software design, strategies, methodologies.	
C04	Learn the Software project management and project manager responsibilities and planning.	
C05	Different stages of preparing software.	
C06	Learn the Concept of Software reliability and quality management.	
Course Name: Professional Skill Development		Course code-100508
At the end of this course, Students will able to:		
C01	Communication skills develop critical thinking skills,ability to analyze dense texts and understand arguments.	
C02	Apply reasoning informed by the contextual knowledge to assess societal health,safety ,legal and cultural issues to the professional engineering practice.	
C03	Recognition of the need for lifelong learning and to access information as well as development in science and technology.	
C04	Keen communication and writing skills and to enhance capacity for creative expression.	
C05	Ability to identify, define, formulate and solve complex engineering problems as well as electing and applying appropriate analysis and modelling methods for wide purpose.	

Course Name: Summer Entrepreneurship-II		Course code-100510P
At the end of this course, Students will able to:		
C01	The students will be able to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.	
C02	The students will be able to analyse a given engineering problem, identify an appropriate problem solving methodology, implement the methodology and propose a meaningful solution	
C03	The students will be able to apply prior acquired knowledge in problem solving.	
C04	The students will be able to take initiatives, communicate, work in a team and manage a project within a given time frame.	
C05	The students will be able to adopt a factual approach to decision engineering making.	
Course Name: Seminar		Course code-105505
At the end of this course, Students will able to:		
C01	Understand the past and present of the disciplines by exploring their purpose, practice, and philosophy.	
C02	Gain an understanding of advanced research methodologies in the field, including theory, interdisciplinary approaches, and the analysis of available primary sources.	
C03	Demonstrate through short written assignments and critical reviews the ability to synthesize and assess the arguments of scholarly articles and monographs at the level of professionals in the field.	
C04	Understand the privileges and obligations associated with a career as a professional	
C05	Understand historical and recent trends in theory and method and be able to identify and explain major trends and issues in industry and research.	
C06	Learn to write a scholarly book review.	
THIRD YEAR: FIFTH SEMESTER		
Course Name: Computer Network		Course code-100602
At the end of this course, Students will able to:		
C01	Explain the functions of the different layers of OSI protocol.	
C02	Draw the functional block diagram of wide area network(WAN),local area network(LANs) and wireless LANs(WLANs) and can be able to describe the function of each block	
C03	Program for a given problem related TCP/IP protocol.	
C04	Configures DNS, DDNS, TELNET, EMAIL ,FTP, WWW ,HTTP, Bluetooth ,Firewalls using open source available software and tools	

Course Name: Computer Network Lab		Course code-100602P
At the end of this course, Students will able to:		
C01	Identify and use various networking components	Understand different transmission media and design cables for establishing a network
C02	Analyze performance of various communication protocols.	
C03	Understand the TCP/IP configuration for Windows and Linux	
C04	Implement any topology using network devices	

Course Name: Java		Course code-105606
At the end of this course, Students will able to:		
C01	Describe the concept of OOP as well as the purpose and usage principles of inheritance ,polymorphism, encapsulation and method overloading	
C02	Identify classes, objects, members of a class and the relationships among them needed for a specific problem.	
C03	Write java program using threads, event handling and input output utilities. Develop programs using the Java Collection API as well as the Java standard class library	
C04	Demonstrate the ability to use Threads and synchronization in java.	
C05	Explain and write input– output programming in java and applications using Applets	

Course Name: Compiler Design		Course code-105601
At the end of this course, Students will able to:		
C01	Develop the lexical analyser for a given grammar specification.	
C02	Design top-down and bottom-up parsers for a given parser specification	
C03	Develop syntax directed translation schemes	
C04	Develop algorithms to generate code for a target machine	

Course Name: Compiler Design Lab		Course code-105601P
At the end of this course, Students will able to:		
C01	Create lexical analyser and parser using C program	
C02	Construct lexical analyser and parser from automation tools	
C03	Design an intermediate code generator and code generator	

Course Name: Machine Learning		Course code-105602
At the end of this course, Students will able to:		
C01	Acquire strong foundation in machine learning concepts and techniques for data analysis and model optimization.	
C02	Gain knowledge in statistical learning, regression, and dimensionality reduction for advanced machine learning skills.	
C03	.Develop expertise in classification algorithms, enabling data-driven decision making and predictive modeling in ML.	
C04	Understanding clustering techniques for pattern recognition and model enhancement in machine learning.	
C05	Acquire knowledge in advanced applications in machine learning like probabilistic modeling, clustering, reinforcement learning basics, and graphical models in machine learning.	

Course Name: Cryptography and Network Security		Course code-105602
At the end of this course, Students will able to:		
C01	To Acquire knowledge in security issues, services, goals and mechanism.	
C02	To understand the basic concept of Cryptography and Network Security , their mathematical models.	
C03	To evaluate Encryption and decryption of messages using block ciphers. Sign and verify messages using well. known signature generation and verification algorithms.	
C04	To Describe and analyze existing authentication protocols for two party communications and Analyze key agreement algorithms to identify their weaknesses.	
C05	To Determine the ethical issues related to the misuse of computer security.	
C06	To Develop code to implement a new cryptographic algorithm or write an analysis report on any existing security product.	

FOURTH YEAR:SEVENTH SEMESTER

Course Name: Internet of Things		Course Code-105705
At the end of course Students will		
C01	To understand the basics of IoT Networking	
C02	To learn working of IoT Connectivity/Medium access protocols	
C03	To understand about IoT network layer/communication protocols	
C04	To Analyze various IoT Application layer Protocols	

Course Name: Cyber Security		Course Code-105713
At the end of course Students will		
C01	Understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information	
C02	Identify & Evaluate Information Security threats and vulnerabilities in Information Systems and apply security measures to real time scenarios	
C03	Identify common trade-offs and compromises that are made in the design and development process of Information Systems	
C04	Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection.	

Course Name: Biology for Engineers		Course code-100708
At the end of course Students will		
C01	Describe how biological observations of 18th Century that lead to major discoveries.	
C02	Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological	
C03	Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring	
C04	Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine	
C05	Classify enzymes and distinguish between different mechanisms of enzyme action	
C06	Identify DNA as a genetic material in the molecular basis of information transfer.	
C07	Analyse biological processes at the reductionist level.	
C08	Apply thermodynamic principles to biological systems.	
C09	. Identify and classify microorganisms.	

Course Name: Project I		Course code-100709P
At the end of this course, Students will able to:		
C01	Understand programming language concepts, particularly Java or C# along with object oriented concepts as well as software engineering principles or go through the research work and gather knowledge over the field and develop an ability to apply them to software design of real life problems in an industry/ commercial environment or propose methodology in the field of research.	
C02	Plan, analyze, design a software project and demonstrate the ability to communicate effectively in speech and writing.	
C03	Demonstrate the ability to locate and use technical information from multiple sources.	
C04	Demonstrate the ability to communicate effectively in speech and writing.	
C05	Learn to work as a team and to focus on getting a working project done on time with each student being held accountable for their part of the project.	
C06	Learn about and go through the software development cycle with emphasis on different processes - requirements, design, and implementation phases.	

Course Name: Summer Entrepreneurship-III		Course code-100707P
At the end of this course, Students will able to:		
C01	The students will be able to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.	
C02	The students will be able to analyse a given engineering problem, identify an appropriate problem solving methodology, implement the methodology and propose a meaningful solution	
C03	The students will be able to apply prior acquired knowledge in problem solving.	

C04	The students will be able to take initiatives, communicate, work in a team and manage a project within a given time frame.
C05	The students will be able to adopt a factual approach to decision engineering making.
CO6	Evaluate current professional practice in Computer Science and Engineering, to evaluate methodologies and develop critiques of them and, where appropriate, to propose new forms of practice or knowledge
C07	Advance their knowledge and to develop new skills to a high level with complex issues both systematically and creatively, make sound judgments in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences

FOURTH YEAR: EIGHTH SEMESTER

Course Name: Cloud Computing **Course code-100817**

At the end of course Students will

C01	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
C02	Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost.
C03	Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.
C04	Analyze various cloud programming models and apply them to solve problems on the cloud.

Course Name: Big Data **Course code-100813**

At the end of this course, Students will able to:

C01	Understand how to leverage the insights from big data analytics.
C02	Analyze data by utilizing various statistical and data mining approaches
C03	Perform analytics on real time streaming data.
C04	Understand the various NoSQL alternatives database models.

Course Name: AD-Hoc and Sensor Network **Course code-105819**

At the end of this course, Students will able to:

C01	Identify different issues in wireless ad hoc and sensor network
C02	Analyze protocol developed for ad hoc and sensor network
C03	Identify and understand security issues in ad hoc and sensor network

Course Name: Embedded System		Course code-105816
At the end of this course, Students will able to:		
C01	Explain basic concept of Embedded Systems.	
C02	Analyze the performance of various microprocessors and controllers.	
C03	Study and analyze various embedded computing platforms.	
C04	To study and apply various compilation techniques.	
C05	Design of RTOS based embedded systems.	

Course Name: Project II		Course code-100801P
At the end of this course, Students will able to:		
C01	Understand programming language concepts, particularly Java or C# along with object oriented concepts as well as software engineering principles or go through the research work and gather knowledge over the field and develop an ability to apply them to software design of real life problems in an industry/commercial environment or propose methodology in the field of research.	
C02	Plan, analyze, design a software project and demonstrate the ability to communicate effectively in speech and writing.	
C03	Introduce with major software engineering topics and position them to lead medium sized software projects in industry or propose any new model over the selected field of research that will be useful for future activities.	
C04	Learn about and go through the software development cycle with emphasis on different processes -requirements, design, and implementation phases and also learn details about different artifacts produced during software development.	
C05	Learn about different software development process models and how to choose an appropriate one for a project.	
C06	Gain confidence at having conceptualized, designed, and implemented a working, medium sized project with their team.	

