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B.Tech. (Biotechnology Engineering)

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 modelling to complex engineering activities with an understanding of the limitation.
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.

PROGRAMME SPECIFIC OUTCOMES

PSO 1 The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

PSO 2 The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

PSO 3 Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.

COURSE OUTCOME

I SEMESTER			
	Subject/Lab	S.No.	Course Outcome
1	19002200 – Introduction to Programming with C:	1	Identify situations where computational methods and computers would be useful.
		2	Given a computational problem, identify and abstract the programming task involved.
		3	Approach the programming tasks using techniques learned and write pseudo-code.
		4	Choose the right data representation formats based on the requirements of the problem.
		5	Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
2	19002300 - Programming with C Lab	1	Illustrate the knowledge on various parts of a computer.
		2	Develop a flowchart and write algorithms for every C programs.
		3	Develop C program solving skills.
		4	Develop modular programming skills.
		5	Analyze the tracing and debugging of a program.
3	19000800 - Electronics and Electrical Technology	1	Illustrate the knowledge of basic electrical and electronics technology.
		2	Demonstration on general structure of power /Supply System.
		3	Acquire knowledge about battery technology.

		4	Acquire knowledge about the single phase and three base electrical circuits.
		5	Identify parameters like resonant frequency, quality factor, half power frequencies, voltage across inductor and capacitor, current through the RLC elements, in resonant circuits.
4	19000900-Electronics and Electrical Technology Lab	1	Make use of meters and instruments for measurement of quantities.
		2	Design and experiment potential divider circuits.
		3	Experimentally verify the basic circuit theorems.
		4	Measure power and power factor using AC circuits.
		5	Design and experiment with various application circuits using diodes.
5	19000600-Manufacturing Processes	1	Apply various thermodynamics concepts and design real life engineering problems (engines compressor).
		2	By using fluid mechanics concepts design notches, flow measuring devices.
		3	Make use of various fluid machineries to design pumps turbines.
		4	Design and experiment of various power plants.
6	19000700-Manufacturing Process/Workshop Lab	1	Identify and use of tools for welding, carpentry and plumbing operations.
		2	Make use of basic fabrication techniques and apply for carpentry and plumbing practices.
		3	Make use of basic fabrication techniques of different types of welding and basic machining practices.
7	19000100-Applied Mathematics- I	1	Apply the ideas and techniques of linear algebra, and to illustrate some of their applications in engineering.
		2	Make use of the physical interpretation of the gradient, divergence, and curl.
		3	Acquire knowledge of vector calculus and to apply in electromagnetic field.
		4	Prepare to evaluate multiple integrals in rectangular, polar, spherical and cylindrical coordinates.
		5	Apply Green's theorem, Stoke's theorem and Divergence theorem to obtain the solution of double, triple and line integrals.
8	19000200-Applied Physics-I	1	Build the knowledge of modern physics and quantum mechanics; solve the engineering problems using the concept of wave particle dualism in modern day applications.

		2	Make use of free electron theory to study the material properties and understand its use in engineering applications and studies.
		3	Identify the structure and various planes in a crystals, study its properties and use for applications.
		4	Apply the basic principle and concepts of light to construct lasers and optical fibers, impart the knowledge and develop skills to use modern instruments.
9	19000300-Applied Physics-I Lab	1	Analysis the concepts of quantum mechanics to verify the Stefan's law and understand Fermi energy in metals.
		2	Examine the characteristics of Zener diode, photo diode, transistor by utilizing the concepts of semiconductors physics.
		3	Discover the ability to use various passive electrical components, determine Dielectric constant and electrical resonance.
		4	Analysis the concepts of diffraction and interference of light by using diffraction grating and Newton's ring.
10	19001100-Ability & Skill Enhancement - I	1	Listen to and understand English at an advanced level and interpret its meaning.
		2	Develop English at the formal and informal levels and thus gained the confidence to use it without fear.
		3	Read and grasp the in-depth meaning of technical and non-technical passages in English.
		4	Develop the art of formal and informal writing.
		5	Think independently and creatively and also verbalize their thoughts fearlessly.
11	99002200-Business Communication	1	Develop the art of formal and informal writing.
		2	Think independently and creatively and also verbalize their thoughts fearlessly.
		3	Provide an overview of the various business communication skills.
12	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability to view things from a different angle.
		4	Think independently and contribute creative ideas.

13	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
		4	To instill the sense of responsibility for the mankind and the need to practice harmonious and synergetic way of life respecting nature, environment and values.

II SEMESTER

	Subject/Lab	S.No.	Course Outcome
1	19001800-Applied Mathematics-II	1	Learn to find the solution of constant coefficient differential equations.
		2	Acquire knowledge about the notion of convergence of numerical sequences and series and learn ways of testing convergence.
		3	Learn the basic definition and properties of partial differentiation of functions of several variables and to learn to use this to solve problems related to maxima and minima.
		4	Learn the basic results about the properties of Fourier transform and Fourier series and its convergence.
		5	Learn the properties of Laplace transforms and to learn to use this to solve differential equations.
2	19001900-Applied Physics-II	1	Acquire knowledge of Fiber Optics and Holography Technology.
		2	Learn the basic definition and properties of Insulators, Semiconductors and Conductors.
		3	Learn the properties of superconducting materials and super-conductor with Josephson theory.
		4	Acquire knowledge of Atomic & Nuclear Physics.
3	19002000-Applied Physics Lab-II	1	Performing the experiments related to the subject and apply the practical knowledge in industrial applications and for developing or modifying methods.

		2	Understand nature of experimental errors and practical means to estimate errors in acquired data.
		3	Apply theoretical principles of modern physics to analysis and measurements performed in the laboratory.
		4	Acquire knowledge about Newton's ring principles.
4	19002100-Engineering Graphics	1	To improve writing skills, use ability in legible writing letters and numbers.
		2	Perform basic sketching techniques and instrumental drawing.
		3	Draw orthographic projections of different objects irrespective of number of dimensions and to develop pictorial views.
		4	Familiar with practice and standards in technical drawing.
5	19002500-Engineering Graphics Lab	1	Develop parametric design and the conventions of formal engineering drawing.
		2	Produce and interpret 2D drawings.
		3	Communicate a design idea/concept graphically.
		4	Get a Detailed study of an engineering artefact.
6	19000400-Applied Chemistry	1	Gain basic knowledge in water analysis and suitable water treatment method.
		2	Get an idea on the type of polymers to be used in engineering applications.
		3	Get awareness about new materials.
		4	Get knowledge on the effects of corrosion and protection methods will help the young minds to choose proper metal / alloys and also to create a design that has good corrosion control.
		5	Get exposure on the important aspects of basic thermodynamics will be able to understand the advanced level thermodynamics in engineering applications.
7	19000500-Applied Chemistry Lab	1	Performing the experiments related to the subject and apply the practical knowledge in industrial applications and for developing or modifying methods.
		2	To acquire knowledge on EDTA method.
		3	To acquire training in accurate and precise data collection.

8	19002400-Basic Mechanical Engineering	1	Understand the scope of engineering, especially Mechanical Engineering and its impact on society.
		2	Know about different fields of applications of Mechanical Engineering and its interrelationship with other fields of science and engineering.
		3	Determine heat, work, internal energy, enthalpy for flow & non flow process using First and Second Law of Thermodynamics.
		4	Interpret behavior of pure substances and its applications to practical problems.
9	99001900-Environmental Studies	1	Conserve the resources.
		2	Make the environment useful for the future generations and finally to maintain ecological balance and preserve biodiversity.
		3	Think in terms of sustainable envelopment based on the knowledge on different subjects of science and engineering.
		4	To make understand the terms of scientific and technological advancement in the spirit of a sustainable earth.
		5	To make understand the relationships between natural resources, consumption, population, economics of consumerism, etc in an environmental context.
10	19001100-Ability & Skill Enhancement - II	1	Listen to and understand English at an advanced level and interpret its meaning.
		2	Develop English at the formal and informal levels and thus gained the confidence to use it without fear.
		3	Read and grasp the in-depth meaning of technical and non-technical passages in English.
		4	Develop the art of formal and informal writing.
		5	Think independently and creatively and also verbalize their thoughts fearlessly.
11	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability to view things from a different angle.
		4	Think independently and contribute creative ideas.
		1	To inculcate moral values and make socially responsible towards the society.

12	99002700-Human Values & Social Service/NCC/NSS	2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
		4	To instill the sense of responsibility for the mankind and the need to practice harmonious and synergetic way of life respecting nature, environment and values.

III SEMESTER

1	19002600-Applied Mathematics-III	1	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
		2	Identify the problems on statistical parameter estimation.
		3	Acquire knowledge about statistical hypotheses tests.
		4	Acquire knowledge about regression and correlation analysis.
		5	Utilize the Taylor's, Maclaurin's and Laurent's series functions for the problems arising in engineering fields.

2	19003400-Analysis and Design of Information Systems	1	Acquire knowledge about important probability distributions and their properties.
		2	Acquire knowledge about statistical parameter estimation.
		3	Acquire knowledge about statistical hypotheses tests.
		4	Acquire knowledge about regression and correlation analysis.
		5	Acquire knowledge about Taylor's, Maclaurin's and Laurent's series.

3	19003500-Data Structures	1	Calculate the time complexity of algorithms.
		2	Implement stacks and queues for various applications.
		3	Implement tree data structure for different applications.
		4	Implement various sorting and searching techniques.
		5	Apply the concepts of graph for computing shortest path and construct MST.

4	19003600-Data Structures Lab	1	Develop solutions for a range of problems using objects and classes.
		2	Demonstrate the implementation of constructors, destructors and operator overloading.
		3	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.
		4	Write programs using generic programming, exception handling, templates, file Handling.
		5	Analyze, design, and develop solutions to real world problems applying OOP Concepts of C++.
5	19008600-Object Oriented Programming with C/C++	1	Understand object-oriented programming features in C++.
		2	Apply these features to program design and implementation.
		3	Develop applications using Object Oriented Programming Concepts.
		4	Implement features of object oriented programming to solve real world problems.
6	19008700-Object Oriented Programming with C/C++ Lab	1	Be familiar with language environment.
		2	Implement object oriented concepts to solve problems.
		3	Develop applications using object oriented concepts.
7	19003800-Operating Systems	1	To understand the role and responsibilities of OS in the computer system.
		2	To explain how the OS deals with process management, memory management and secondary storage management.
		3	To analyze process synchronization and deadlocks.
		4	To apply the knowledge about OS, for the Linux operating system case study.
8	19003900-Operating Functions Lab	1	Simulate the principles of resource management [Processor, Memory].
		2	Install and use operating systems with an understanding of professional, ethical and social issues. [Windows, Linux etc.,].
		3	Recognize the life long need and engage in upgradation of operating system.
		4	Execute shell commends.

9	19004000-Digital Electronic Circuits	1	A thorough understanding of the fundamental concepts and techniques used in digital electronics.
		2	The ability to understand, analyze and design various combinational and sequential circuits
		3	Ability to identify basic requirements for a design application and propose a cost effective solution.
		4	The ability to identify and prevent various hazards and timing problems in a digital design.
		5	Ability to develop skill to build, and troubleshoot digital circuits.
10	19004100-Digital Electronic Circuits Lab	1	Ability to understand and analyse, linear and digital electronic circuits.
		2	To understand and apply computing platform and software for engineering problems.
		3	Design and implement interfacing.
		4	Design and develop projects using microprocessor
11	11012200-Human Values, Business & Managerial Ethics	1	To make understand the sustained happiness through identifying the essentials of human values and skills.
		2	It facilitates a correct understanding between profession and happiness
		3	Understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
		4	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.
12	19004200-Ability and Skill Enhancement -III	1	To understand to write or review of book.
		2	Develop English at the formal and informal levels and thus gained the confidence to use it without fear.
		3	Read and grasp the in-depth meaning of technical and non-technical passages in English.
		4	Develop and enhance creative Documentary to improve the technical and innovative skills.
13	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability to view things from a different angle.
		4	Think independently and contribute creative ideas.

14	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
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IV SEMESTER

1	19005300-Optimization Techniques	1	State the optimization problem
		2	Solve optimization problems using linear programming and apply for solving engineering optimization problems
		3	Solve optimization problems using nonlinear programming (Lagrange multipliers and Kuhn-Tucker conditions) and apply for solving engineering optimization problems
		4	Solve optimization problems using Dynamic programming (CPM, PERT) Methods.
		5	Solve Network Analysis problems using Transportation problem, Integer Programming Methods.

2	19006100-Advanced Numerical Techniques Computation Lab (ANTC)	1	Implement Gauss elimination and Gauss- seidel methods to design linear system.
		2	Implement a function using trapezoidal and Simpson's rule.
		3	Solve the initial value problem using modified Euler's and Runge-kutta methods.
		4	Regression analysis using least square principle.
		5	Generate random numbers using Binomial and Poisson distributions.

3	19003700-Computer System Architecture	1	Describe the basic functions of a digital computer.
		2	Illustrate the basic arithmetic and logic operations in the computer.
		3	Explain memory organisation.
		4	Describe I/O interfacing.
		5	Explain device subsystems.

4	19006000-Software Engineering	1	To learn about generic models of software development process.
		2	To understand fundamental concepts of requirements engineering and Analysis Modeling.
		3	To understand the different design techniques and their implementation.
		4	To learn various testing and maintenance measures.
		5	Apply the concepts of life cycle models to choose the appropriate model.
5	19005600-Computer Networks	1	Describe various components and categories of data communications, types of connections, topologies, protocols and standards, various transmission media and modems.
		2	Detect and correct the errors using various algorithmic techniques, be aware of the various Ethernet standards and bridges.
		3	Explain various switching techniques used and implement the various routing and router protocols,
		4	Illustrate multiplexing and demultiplexing, UDP, TCP protocols and Congestion Control mechanisms.
		5	Illustrate Network Applications
6	19005700-Computer Networks Lab	1	Implement client and server concepts in Network system.
		2	Implement Error correction method in data in flow.
		3	Implement the different protocols.
		4	Implement the concept of local area networks, their topologies, protocols.
7	19005800-Principles of Programming Languages	1	Define the semantics of a programming language using a definitional interpreter.
		2	Investigate semantic issues in programming languages by studying implementations in an interpreter.
		3	Solve problems using a range of programming paradigms and assess the effectiveness of each paradigm for a particular problem.

8	19005900-Principles of Programming Languages Lab	1	To introduce the major programming paradigms, and the principles and techniques involved in design and implementation of modern programming languages.
		2	To introduce the concepts of concurrent programming, logic programming.
		3	To grasp different programming paradigms
		4	Projects assigned on different languages/ platforms.
9	19005400-Web Technologies	1	Describe the basic concepts of Internet programming, Network Security and protocols used.
		2	Create webpages using HTML, HTML5 ,DHTML.
		3	Write scripts using CSS and Java Script.
		4	Develop applications using Web Programming.
10	19005500-Web Technologies Lab	1	Create applications using HTML, DHTML.
		2	Develop web based application using suitable client side and server side web technologies.
		3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
		4	Write scripts using CSS and Java Script.
11	11017100-Organizational Behavior	1	Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
		2	Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
		3	Analyze the complexities associated with management of the group behavior in the organization.
		4	Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
12	19006200-Ability and Skill Enhancement -IV	1	Develop Tele-Etiquettes.
		2	Develop good habits and having principles and always follow them.
		3	Design Resume using PI Kit.
		4	To improve Interview and Presentation Skills.
13		1	Acquire knowledge of New Technologies.

	99002800-Workshops & Seminars	2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability view things from a different angle.
		4	Think independently and contribute creative ideas.
14	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
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V SEMESTER			
1	19007400-Micro processor	1	To learn the basics of Digital Systems.
		2	To understand the working of a microprocessor/controller.
		3	To learn to program a processor using assembly language.
		4	To learn configuring and using different peripherals in a digital system.
		5	To compile and debug a Program.
		6	To generate an executable file and use it.
2	19007500-Micro processor Lab	1	To apply the assembly language programming to develop small real life embedded application.
		2	To understand the architecture of the advanced processor thoroughly to use the resources for programming.
		3	To understand the higher processor architectures descended from ADC, DAC, 8253, Printer, UP- PC Interface.
3	19007600-Analysis and Design of Algorithm	1	Various methods of calculating complexity.
		2	Finding out the best method for different algorithms.
		3	About computational geometry, like Lower bound theory, modular arithmetic, and CRT.
		4	Various Decision Problems like NP Complete, NP hard.
		5	Knowledge of Graph and its algorithm.

4	19007700-Analysis and Design of Algorithm Lab	1	Implement Divide and Conquer algorithm design technique for various applications.
		2	Implement dynamic programming algorithm design technique for various applications.
		3	Implement Greedy algorithm design technique for various applications.
		4	Implement backtracking algorithm design technique for various applications.
5	19007800-Database Management Systems	1	Awareness of database management basics and different models and use for database design.
		2	Design and architecture of relational model, relational algebra, and SQL queries.
		3	Implement different form of normalization.
		4	Logical representation of internet database.
		5	Analysis and concepts of transaction, concurrency, and recovery systems.
6	19007900-Database Management Systems Lab	1	Construct software solutions by evaluating alternate architectural patterns.
		2	Develop the ability to handle databases of varying complexities.
		3	Use advanced database Programming concepts.
7	19008000-Computer Graphics	1	Understand the structure of modern computer graphics system.
		2	Understand the basic principles of implementing computer graphics primitives.
		3	Familiarity with key algorithms for modeling and rendering graphical data.
		4	Develop design and problem-solving skills with application to computer graphics.
8	19008100-Computer Graphics Lab	1	Apply mathematics and logic to develop Computer programs for elementary graphic operations.
		2	Develop scientific and strategic approach to solve complex problems Computer in the domain of Computer Graphics.
		3	Develop the competency to understand the concepts related to Computer Vision and Virtual reality.
		4	Apply the logic to develop animation and gaming programs.
9	19008200-Core Java	1	Create and Use packages and interfaces in java.
		2	Use user defined and inbuilt exceptions Create multi-threaded Applications.
		3	Use all types of Character and Byte Streams.

		4	Create GUI based trivial applications.
10	19008300-Core Java Lab	1	Apply decision and iteration control structures to implement algorithms in Java.
		2	Able to implement String and string buffer methods.
		3	Implement inheritance, polymorphism and object relationship in java.
		4	Able to implement Packages.
		5	Analyze and create Applet Programs.
		6	Able to generate multiple threads.
11	19008400-PHP & My SQL	1	Explain the differences between typical scripting languages and typical system and application programming languages.
		2	Apply your knowledge of the strengths and weaknesses of scripting languages to select an implementation language.
		3	Create software systems using scripting languages like VB Script and JavaScript.
		4	Learns server-side scripts. File uploads and Database Connections.
12	19008500-PHP & My SQL Lab	1	To provide practical knowledge of basic PHP object-oriented programming concepts.
		2	To provide practical knowledge of Array concepts.
		3	Work on some real time software modules.
		4	Ability to understand PHP programming language.
13	19006300-Ability and Skill Enhancement -V	1	Develop and Improve Leadership Quality.
		2	Develop an entrepreneurial mind-set by learning key skills such as design, personal selling, and communication.
		3	To make able to take right decision at right time.
		4	To build Interview and Presentation Skills to deal with industry experts.
14	19007300-Summer Internship and Report	1	Encouraged to take internship program during their semester break.
		2	Give guidelines, suggestions, and scope regarding companies.
		3	Provide the interacting lectures with the industrial experts.
		4	To improve the skills for choose best company for internship and make a report on internship.

15	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability to view things from a different angle.
		4	Think independently and contribute creative ideas.
16	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
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VI SEMESTER			
1	19008800-Theory of Computation	1	Apply the theoretical concepts and techniques in designing finite automata.
		2	Convert regular expressions to FA and minimize Automata.
		3	Write context free Grammar and design PDA for the Grammar.
		4	Design turing machine and identify recursively enumerable languages.
		5	Define undecidability and identify class P and NP problems.
2	19008900-Theory of Computation Lab	1	Design Deterministic Turing Machine for all inputs and all outputs.
		2	Design program based on Non-deterministic and Deterministic finite automata.
		3	Study of LEX/FLEX tool and write some basic programs.
3	19009000-.NET Technologies	1	Learn the basis of .Net framework
		2	Understand object-oriented Aspects of C# and ASP.Net.
		3	Develop simple applications under .Net framework.

		4	Develop Web based Applications using .Net programming languages.
4	19009100-.NET Technologies Lab	1	Acquire fundamentals of Web application design, development, and deployment using ASP.NET (Active Server Pages) and the .NET framework.
		2	Design and Develop web applications using server-side technologies (ASP.NET, ADO.NET).
		3	Utilize .NET languages to manage and create web forms, server controls, and web services to accomplish complex data access tasks and implement dynamic content.
		4	Provide knowledge on some Validation controls and Database Queries.
5	19009200-Engineering Economics	1	To solve engineering problems by using the mathematics, economics, and engineering principles.
		2	To understand and control the major capabilities and limitations of cash flow analysis for evaluating proposed capital investments.
		3	To Recognize, formulate, analyze and solve cash flow models in practical situations.
		4	Develop the ability to account for time value of money using engineering economy factors and formulas, as well as the implications and importance of considering taxes, depreciation and inflation.
		5	To develop Engineering alternatives by economic analysis techniques and models.
6	19009300-Database Administration with MySQL	1	Awareness of MySQL basics and different models that we use for database.
		2	Configuring and architecture of MySQL Database and MySQL queries.
		3	Implement different form of MySQL Security and Optimizing Query Performance.
		4	Logical representation of internet database.
		5	Analysis Replication Threads and Troubleshooting Replication.
7	19009400-Database Administration with MySQL Lab	1	Construct client and utility programs using MySQL architecture.
		2	Develop the ability to handle MySQL threads, information schema.

		3	Use advanced database Programming concepts.
		4	Construct User management-based modules.
8	19009500-Cloud Computing	1	Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
		2	Design different workflows according to requirements and apply map reduce programming model.
		3	Apply and design suitable Virtualization concept, Cloud Resource Management, and design scheduling algorithms.
		4	Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds.
		5	Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.
9	19009600-Software Verification and Validation	1	Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.
		2	Design and develop project test plan, design test cases, test data, and conduct test operations.
		3	Apply recent automation tool for various software testing for testing software.
		4	Apply different approaches of quality management, assurance, and quality standard to software system.
		5	Apply and analyze effectiveness Software Quality Tools.
10	19006400-Ability and Skill Enhancement -VI	1	Develop and Improve Verbal Reasoning & English Aptitude.
		2	Develop winning attitude.
		3	Comparing & Analyzing the news and improve Vocabulary.
		4	Preparing a report on major National/International News.
11	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability to view things from a different angle.
		4	Think independently and contribute creative ideas.

12	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
		4	To instill the sense of responsibility for the mankind and the need to practice harmonious and synergetic way of life respecting nature, environment and values.
VII SEMESTER			
1	19010500-Compiler Construction	1	Differentiate the various phases of a compiler.
		2	Apply parsing techniques and able to write Context Free Grammars for various languages.
		3	Design the structure of intermediate code for various types of statements and expressions.
		4	Design code generator and apply code optimization techniques.
		5	Apply Lambda Calculus to verify programs.
2	19010700-Artificial Intelligence	1	Identify and apply suitable Intelligent agents for various AI applications.
		2	Design smart system using different informed search / uninformed search or heuristic approaches.
		3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
		4	Apply the suitable algorithms to solve AI problems.
3	19010600-Multimedia Technologies	1	Understand different realizations of multimedia tools and their usage.
		2	Implement various multimedia standards.
		3	Implement different compression and decompression technologies.
		4	Analyze various storage technologies.
4	19010900-Data Warehouse & Data mining	1	Design a Data warehouse system and perform business analysis with OLAP tools.
		2	Apply suitable pre-processing and visualization techniques for data analysis.

		3	Apply frequent pattern and association rule mining techniques for data analysis.
		4	Apply appropriate classification and clustering techniques for data analysis.
		5	Understand clustering and learning algorithms.
5	19011100-Network Security & Cryptography	1	Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.
		2	Encrypt and decrypt messages using block ciphers.
		3	Demonstrate techniques to Sign and verify messages using well-known signature generation and verification algorithms.
		4	Develop code to implement a cryptographic algorithm or write an analysis report on any existing security product.
		5	Understand and demonstrate the technologies to protect cipher space against security threats.
6	19011200-Network Security & Cryptography Lab	1	Apply the cryptographic algorithms.
		2	Compare the performance of various security algorithms.
		3	Apply the Digital signature for secure data transmission.
		4	Demonstrate intrusion detection system using network security tool.
7	19010400-Capstone Project	1	Formulate a real world problem and develop its requirements develop a design solution for a set of requirements.
		2	Test and validate the conformance of the developed prototype against the original requirements of the problem.
		3	Work as a responsible member and possibly a leader of a team in developing software solutions.
		4	Express technical and behavioral ideas and thought in oral settings.
		5	Participate in and possibly moderate, discussions that lead to making decisions.
8	19012000-Summer Internship & Report II	1	To Encourage to take internship program during their semester break.
		2	Give guidelines, suggestions and scope regarding companies.
		3	Provide the interacting lectures with the industrial experts.

		4	It help to choose best company for internship and make a report on internship.
9	19012100-Professional Development (CLD)	1	Enhance holistic development and improve employability skills.
		2	To know the process of Interview Techniques& Group discussion.
		3	To understand the needs and benefits of written communication.
		4	To study the personality development of individuals in the micro perspective.
10	99002800-Workshops & Seminars	1	Acquire knowledge of New Technologies.
		2	Get hands on training in Basic/Advanced Technologies.
		3	Expand the thinking capability of the learners so that they would learn how to view things from a different angle.
		4	Think independently and contribute creative ideas.
11	99002700-Human Values & Social Service/NCC/NSS	1	To inculcate moral values and make socially responsible towards the society.
		2	To make understand empathetic in the attitude towards fellow beings.
		3	To aware of the problems of modern society and understand the need as engineers and responsible citizens to use the professional knowledge and skills for the alleviation such problems.
		4	To instill the sense of responsibility for the mankind and the need to practice harmonious and synergetic way of life respecting nature, environment and values.
VIII SEMESTER			
1	19011400-Project Semester	1	Express technical ideas, strategies and methodologies in written form.
		2	Prepare and conduct oral presentations.
		3	Self learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.
		4	Generate alternative solutions, compare them and select the optimum one.
		5	Understand and find solutions by formulating proper methodology.
		6	Perform well in teams.

		7	Develop various skills and perform well in teams.
		8	Able to communicate in facing reviews and contribute societal development.
		9	Able to take up challenging practical problems.
		10	Apply technical knowledge and project management skills for solving the problem
		11	Design and develop hardware and/or software for their project specific problem
		12	Prepare the project reports and give proper explanation during the presentation and demonstration