LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LIET/CSE/D-/2019-20/1
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LIST OF COURSE OUTCOMES (CO)

Academic Year: 2019-20

COURSE CODE & NAME	CO	CO STATEMENT
SEMESTER-1(I-I)		
C101 English-1	**C101.1**	Acquire listening, speaking, reading and writing skills necessary for the survival in the post modern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C101.2	Realise the technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
	C101.3	Develop the fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C101.4	Imbibe lifelong reading habit among the learners to grow both professionally and socially with ethical principles and values.
	C101.5	Apply own ideas as informed opinions that are in dialogue with a larger community of interpreters, and understand how their own approach compares to the variety of critical and theoretical approaches.
	C101.6	Demonstrate the intercultural competence, knowledge of civic responsibility, and able to engage effectively in regional, national, and global communities.
C102 Mathematics-I	**C102.1**	Solve the physical, geometrical and simple electrical problems using methods of first order differential equations.
	C102.2	Solve the electrical circuits using the methods of higher order linear differential equations.
	C102.3	Apply the knowledge of Laplace and Inverse Laplace transform to solve an initial value problem of differential equation.
	C102.4	Understand the concepts of partial differentiation, total derivative, Jacobian and methods to find the Maxima and Minima of function of several variables.
	C102.5	Solve first order linear and non-linear partial differential equations.
	C102.6	Solve higher order homogeneous and non-homogeneous partial differential equations.
C103 Mathematics-II	**C103.1**	Solve an algebraic and transcendental equation using an appropriate numerical method
	C103.2	Acquire knowledge of interpolation to find the interpolation

		polynomials/values for the given data.
	C103.3	Understand the concept of numerical integration and methods (Taylor's series, Picard's method, Euler's method, Modified Euler's method and Runge-Kutta method.) to obtain the numerical solution of an ordinary differential equation.
	C103.4	Understand the methods to expand the periodic and continuous functions/functions having points of discontinuity with period using Fourier series.
	C103.5	Understand the method of separation of variables on partial differential equations to solve the Wave equation, heat equation
	C103.6	Understand the concept of Fourier transforms of various types of functions.
C104 Applied Physics	**C104.1**	Apply the basic principles and properties of Interference to construct and understanding the working mechanism of Interferometer.
	C104.2	Develop the Diffractometer by the usage of basic principles and properties of diffraction of light.
	C104.3	Construct the Polarimeter and Laser by utilizing the principles of polarization of light and characteristic properties of Laser.
	C104.4	Verify the velocity of EM wave in isotropic medium by studying its propagation through dielectric medium.
	C104.5	Identify the conductivity of solids by applying the principles of Quantum Mechanics & free electron theory.
	C104.6	Classify the given semiconductor materials based on the band theory of solids by studying its charge carriers through the Hall effect.
C105 Computer Programming	**C105.1**	Understand the basic terminology used in computer programming.
	C105.2	Write, compile and debug programs in C language also able to use operators in the programming.
	C105.3	Design and analyze programs involving decision structures, loops and functions.
	C105.4	Apply arrays, strings and dynamic memory allocation concepts to solve problems.
	C105.5	Design and develop programs using different user defined data types
	C105.6	Analyze ,Design and develop file handling programs
C106 Engineering Drawing	**C106.1**	Describe the construct polygons , curves and scales
	C106.2	Impart the significance of projection of points and lines
	C106.3	Understand to draw orthographic projections of lines inclined to both planes
	C106.4	Understand to draw the projection of planes
	C106.5	Understand to draw the projection of solids
	C106.6	Impart the visualization of 3D –objects and draw the orthographic, isometric views
C107 English Communication Skills Lab-1	**C107.1**	Enabling students to use Computer assisted Language Laboratory (CALL) to enhance their pronunciation through stress, intonation and rhythm for routine and spontaneous interaction
	C107.2	Attainment of communicative competence for the fulfilment of academic, professional and social purposes.
	C107.3	Attainment of language Proficiency through Contextualized,

		Task Based Activities to realize employment potential at the end of the course.
	C107.4	Acquired listening, speaking, reading and writing skills necessary for the survival in the post modern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C107.5	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C107.6	Realisation of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
C108 Engineering Physics Lab	**C108.1**	Identify the working principles of laboratory experiments in optics, mechanics, electromagnetic and electronics.
	C108.2	Apply the working principles of laboratory experiments in optics, mechanics, electromagnetic and electronics and perform the experiments using required apparatus.
	C108.3	Compute the required parameter by suitable formula using experimental values (observed values) in mechanics, optics, electromagnetic and electronic experiments.
	C108.4	Analyze the experimental results through graphical interpretation.
	C108.5	Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory.
	C108.6	Demonstrate the working principles, procedures and applications.
C109 Computer Programming Lab	**C109 .1**	Apply and practice logical ability to solve the problems.
	C109.2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
	C109 .3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
	C109 .4	Understand and apply User defined data types.
	C109 .5	Understand and apply the arrays, pointers, memory allocation techniques and file handling to deal with variety of problems.
	C109 .6	Assembling, Disassembling and Identification of various computer components, Installation of software.
SEMESTER-2(I-II)		
C110 English – II	**C110.1**	Acquired listening, speaking, reading and writing skills necessary for the survival in the post modern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C110.2	Realisation of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
	C110.3	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C110.4	Imbibe lifelong reading habit among the learners to grow both professionally and socially with ethical principles and values.
	C110.5	Apply of own ideas as informed opinions that are in dialogue

		with a larger community of interpreters, and understand how their own approach compares to the variety of critical and theoretical approaches.
	C110.6	Demonstration of intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.
C111 Mathematics-III (MM)	**C111.1**	Evaluate the volume and surface area of solids using multiple integrals with curve tracing concept.
	C111.2	Understand the concepts and properties of Beta & Gamma functions to evaluate improper integrals.
	C111.3	Understand the concepts of the gradient, divergence & curl to determine the normal, flux, scalar potential and to establish the relations between grad, div and curl.
	C111.4	Analyze Green's, Stoke's and Gauss divergence theorems by establishing the relations between line, surface and volume integrals.
	C111.5	Apply the methods on system of simultaneous linear equations to find the current in an electrical circuits
	C111.6	Understand the concepts of eigen values & eigen vectors to solve free vibrations in mechanical strings, and analyze the nature of Quadratic forms.
C112 Applied Chemistry	**C112. 1**	Apply the basic knowledge of polymer chemistry an engineer design &develop FRP, Biodegradable polymer. Identify and analyze the problems of plastics used in household appliance.
	C112.2	Analyse the problems associated with solid,liquid & gaseous fuels using the basic knowledge of Fuel tehnology.
	C112.3	Apply the basic knowledge of galvanic cell an engineer design different types of battery cells & Analyse the problems associated with metals using the basic principles of corrosion.
	C112.4	Design the Nanomaterials like CNT using the basic knowledge of advanced engineering materials.
	C112.5	Apply the basic knowledge of solid state chemistry an engineer analyse the properties of conductors, superconductors, and semiconductors.
	C112.6	Apply the basic knowledge of non conventional sources of energy an engineer generate power from different sources.
C113 Object Oriented Programming through C++	**C113.1**	Capability to acquire better to design and implementation of a program.
	C113.2	Understanding the C++ concepts classes, objects and member functions, constructors, Destructors, variants in them
	C113.3	Analyze and gain knowledge in Operator overloading, Inheritance
	C113.4	Gaining the knowledge on effective use of pointers, polymorphism, and virtual functions.
	C113.5	Analyze the templates, function templates for generic programming and understand the Exception handling mechanism for program recovery.
	C113.6	Understanding of Standard Template Library (STL) Sequence Containers- Associative Containers- Algorithms- Iterators- Vectors- Lists- Maps.
C114 Environmental	**C114 .1**	Understand about the environment its structure and components, along with the diff. ecosystems.

Studies	**C114 .2**	Understand about the natural resources, various impacts of over utilisation of it .
	C114 .3	Ability to understand the biodiversity of India and identifies its threats and conservation practices to protect it
	C114 .4	Acquire knowledge on environmental pollution and its effects on living and non living things along with its controlling &treatment methods.
	C114 .5	Identify social issues both rural and urban environment and the possible means to applicate the environmental legislations of India towards sustainable development
	C114 .6	Acquire the knowledge of various environmental assessment stages involved in EIA and environmental audit for the self sustaining and ecofriendly Environment.
C115 Engineering Mechanics	**C115.1**	To find the resultant of any number of forces and can apply friction concept for a given body.
	C115.2	To draw free body diagram for a given body can calculate the forces in members of the truss.
	C115.3	To find the centroid and centre of gravity of composite sections.
	C115.4	To evaluate and find the moment of inertia of composite sections.
	C115.5	To analyze the motion of the bodies and the forces causing the motion.
	C115.6	To apply Work-Energy and Impulse-Momentum equations to find out the different parameters.
C116 Engineering Chemistry Laboratory	**C116.1**	Identify the working principles of acid-base, redox, complexometric, conductometric, potentiometric titrations.
	C116.2	Apply the working principles of acid-base, redox, complexometric, conductometric, potentiometric titrations to perform the experiments using required apparatus.
	C116.3	Compute the required parameter by suitable formula using experimental values (observed values) of acid-base, redox, complexometric, conductometric, potentiometric titrations.
	C116.4	Analyze the experimental results through percentage of error.
	C116.5	Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory.
	C116.6	Demonstrate the working principles, procedures and applications in acid-base, redox, complexometric, conductometric, potentiometric titrations.
C117 English - Communication Skills Lab – 2	**C117.1**	Enabling students to use Computer assisted Language Laboratory (CALL) to enhance their pronunciation through stress, intonation and rhythm for routine and spontaneous interaction
	C117.2	Attainment of communicative competence for the fulfillment of academic, professional and social purposes.
	C117.3	Attainment of language Proficiency through Contextualized, Task Based Activities to realize employment potential at the end of the course.
	C117.4	Acquired listening, speaking, reading and writing skills necessary for the survival in the post modern society through task-based and skill-based communication practices with judicious integration of modern tools.

	C117.5	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C117.6	Realization of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
C118 Object Oriented Programming Lab	**C118.1**	The understanding of computer programming concepts facilitates the better implementation of object oriented programming.
	C118.2	Acquires the basic knowledge in C++ programming, parameter passing mechanisms, function overloading, friend functions, exception handling and recursion.
	C118.3	Understanding the C++ concepts classes, objects and member functions, constructors, Destructors, variants in them, operator overloading, type conversions.
	C118.4	Real time applicability can be accomplished through inheritance and delegation.
	C118.5	Analyze the templates, function templates for generic programming and understand the Exception handling mechanism for program recovery.
	C118.6	Understanding of Standard Template Library (STL) like Containers, Algorithms and iterations.
SEMESTER-3(II-I)		
C201 Statistics with R Programming	**C201.1**	Apply the concepts of data types, data structure and advanced data structure in R Programming to the basic mathematics.
	C201.2	Develop R programs using control statement and functions.
	C201.3	Develop R programs using Mathematical and Statistical techniques.
	C201.4	Create various graphs using data interpretations.
	C201.5	Develop R programs to Probability Distributions and statistical methods like Correlation and Covariance, T-Tests,-ANOVA.
	C201.6	Develop R programs to linear, generalized and nonlinear models of regression methods.
C202 Mathematical Foundations of Computer Science	**C202.1**	Analyze the concepts of Predicate formulae, Normal forms and formal proofs
	C202.2	Apply the concepts of relations and functions to solve posets and lattices
	C202.3	Apply the concepts of Number theory and algebraic system to solve GCD, LCM and testing of prime numbers.
	C202.4	Solve applications involving counting techniques, combinations and permutations
	C202.5	Solve the recurrence relations by using various methods.
	C202.6	Analyze the concepts of graph theory to identify shortest path.
C203 Digital Logic Design	**C203.1**	Demonstrate the different number systems, arithmetic operation of binary numbers and its complement representation.
	C203.2	Explain Boolean algebra theorems and simplify the given logic function to the minimum number of literals.
	C203.3	Apply K-maps for minimization of logic functions in order to optimize the different digital logic circuits.
	C203.4	Design different types of combinational logic circuits and develop the circuits using VHDL Language.

	C203.5	Design different types of sequential logic circuits and Finite State Machines by using flip flops.
	C203.6	Design different types of registers and counters by using flip flops.
C204 Python Programming	**C204.1**	Outline the fundamentals of scripting language.
	C204.2	Illustrate data types, operators and control structures.
	C204.3	Outline the concepts of data structures.
	C204.4	Apply the concept of modularity and use packages for solving larger problems.
	C204.5	Outline Object oriented concepts.
	C204.6	Explore rich set of python libraries in real time systems and write test cases for different problems.
C205 Data Structures through C++	**C205.1**	Design ADTs such as Arrays, Polynomials' and Sparse Matrices'.
	C205.2	Apply data structures such as stacks and queues.
	C205.3	Solve problems using Linked lists.
	C205.4	Apply binary trees and binary search trees to reduce search time
	C205.5	Build Minimum spanning trees.
	C205.6	Apply suitable sorting technique based on problem.
C206 Computer Graphics	**C206.1**	Create two dimensional graphical structures.
	C206.2	Analyze concepts of 3D to represent objects in 3D.
	C206.3	Illustrate color models and graphics programming to draw three dimensional scenes.
	C206.4	Analyze shadowing models and create shaded objects.
	C206.5	Create images by iterated functions and fractals.
	C206.6	Illustrate Boolean operations on objects in ray tracing
C207 Data Structures through C++Lab	**C207.1**	Develop SLL ,DLL and Multi Stacks using OOPs concepts.
	C207.2	Develop various operations such as insertion, deletion and searching using Hashing table, BST, Circular Queues ,Binary search and Heaps
	C207.3	Investigate how the graph algorithms plays major role in Computer networks and effectively finding the efficient path using BFS and DFS
	C207.4	Design a solution for finding out MST using Prims and Kruskal algorithms.
	C207.5	Design a solution to find Shortest path between Single source to destination nodes in Network using Dijkstra algorithm
	C207.6	Analyze and implement suitable sorting technique based on problem.
C208 Python Programming Lab	**C208.1**	Develop programs using operators, control statements and command line arguments.
	C208.2	Select appropriate data structure for solving the problems.
	C208.3	Develop the operations on different categories of data using files.
	C208.4	Apply structural programming and object oriented programming approaches for solving problems.
	C208.5	Develop GUI based applications using Turtle and Tinder.
	C208.6	Build test cases for given problems using unit testing.
SEMESTER-4(II-II)		
C209 Software	**C209.1**	Recognize software process models and evolutionary models
	C209.2	Design the SRS document

Engineering	**C209.3**	Design models to experiment and interpret data.
	C209.4	Apply coding standards and software testing approaches
	C209.5	Evaluate software related issues.
	C209.6	Apply quality control process to ensure product quality.
C210 Java Programming	**C210.1**	Outline the principles and features of object oriented programming language.
	C210.2	Analyze the behavior of real world objects through Object Oriented Concepts.
	C210.3	Illustrate the relationship between the objects
	C210.4	Develop communication between objects.
	C210.5	Design Graphical User Interfaces by using plug-ins.
	C210.6	Design desktop and web based applications with different utility classes for creating look and feel applications.
C211 Advanced Data Structures	**C211.1**	Compare External sorting algorithms in large data
	C211.2	Construct index using hash concepts
	C211.3	Demonstrate concepts of priority Queues
	C211.4	Examine efficient binary searching trees(AVL ,Red-black)
	C211.5	Develop M-way search trees for indexing(B and B+ trees)
	C211.6	Explain digital search structures(binary tries and Patricia)
C212 Computer Organization	**C212.1**	Analyze the basic components of a computer, including CPU, memories, and input/output, and their organization.
	C212.2	Illustrate addressing modes, instructions sets and operations.
	C212.3	Design of digital logic circuits .
	C212.4	Elaborate organization of digital computers
	C212.5	Explain organization of memory management.
	C212.6	Summarize the input out operations.
C213 Formal Languages and Automata Theory	**C213.1**	Outline the Concept of finite automata For the design of Finite state machine for some subset of languages (problems).
	C213.2	Analyze the given problem and use the regular expression properties to form a regular expression and to do the inter conversions between RE and FA.
	C213.3	Design the relations between formal languages and grammars and simplify the grammars for the application of designing various parsing techniques.
	C213.4	Design of push down automata for some set of languages and its applications.
	C213.5	Design of Turing Machine for the language and to understand various types of TMs.
	C213.6	Analyze the differences between Decidable and Un-decidable Problems and group them into NP-Complete and NP-Hard.
C214 Principles of Programming Languages	**C214.1**	Analyze syntax and semantic of programming languages and design parsers for the grammars.
	C214.2	Design and implement the concepts of data types, arrays, pointers and control structures in various programming languages.
	C214.3	Design and implement basic concepts of subprograms in various programming languages.
	C214.4	Design and implement basic concepts of OOPs, Multithreading and Exception handling in various programming languages.
	C214.5	Outline the basic knowledge of lambda calculus, functional programming languages, Programming with Scheme, Programming with ML.

	C214.6	Outline the basic knowledge of Logic programming, Prolog and Multi-paradigm languages.
C215 Advanced Data Structures Lab	**C215.1**	Develop programs using hashing techniques
	C215.2	Analyze Balanced trees using AVL trees
	C215.3	Develop programs on Binary Heaps
	C215.4	Design programs on graph algorithms to find the shortestpath.
	C215.5	Find the minimum cost spanning trees in the given graph.
	C215.6	Develop programs on B Trees
C216 Java Programming Lab	**C216.1**	Design real world applications.
	C216.2	Apply Application Programming to face Campus Interviews.
	C216.3	Develop user defined packages.
	C216.4	Apply parallel processing through Multi-Threading.
	C216.5	Apply way of handling abnormal conditions through program execution
	C216.6	Develop window programming or GUI applications.
SEMESTER-5(III-I)		
C301 Compiler Design	**C301.1**	Identify the Phases of a Compiler and Role of Lexical Analyzer.
	C301.2	Analyze the role of Top-Down Parser and Bottom Up Parser.
	C301.3	Evaluate Syntax Directed Translation for the Syntax tree.
	C301.4	Develop intermediate code for the Syntax tree.
	C301.5	Create the target code for the intermediate code.
	C301.6	Design the optimized target code for the intermediate code.
C302 Unix Programming	**C302.1**	Acquire knowledge in Unix environment and its commands.
	C302.2	Illustrate the File system of UNIX Environment.
	C302.3	Analyze the importance of Shell scripts for UNIX administration.
	C302.4	Apply various filters on files.
	C302.5	Develop shell scripting for complex problems
	C302.6	Outline on controlling various processes
C303 Object Oriented Analysis and Design using UML	**C303.1**	Analyze the solutions to the complex problems using object oriented approach
	C303.2	Apply UML notations to represent and identifying classes using unified modeling language notation
	C303.3	Interpret the concept of the Unified Modeling Language (UML) for applications through analysis, design using UML tools
	C303.4	Analyze the modeling of structural and behavioral concepts of the system
	C303.5	Analyze advanced behavioral concepts of the system using unified modeling language.
	C303.6	Apply the concepts of architectural design for deploying the code for a software.
C304 Database Management Systems	**C304.1**	Outline the fundamental elements of database management systems.
	C304.2	Create ER-models to represent simple database application scenarios.
	C304.3	Apply ER-model to implement relational tables and formulate SQL queries on data.
	C304.4	Analyze the database design by normalization.
	C304.5	Apply the transaction management techniques on the data base to protect the data in database.

	C304.6	Demonstrate the basic database storage structures and Access techniques.
C305 Operating Systems	**C305.1**	Outline the importance of operating system and system calls.
	C305.2	Analyze communication between processes, process scheduling algorithms.
	C305.3	Evaluate various memory mapping techniques and page replacement algorithms.
	C305.4	Apply concurrency control techniques for handling deadlocks.
	C305.5	Evaluate various file allocation methods and disk scheduling algorithms.
	C305.6	Analyze Linux and Android operating system environment.
C306 Unified Modeling Lab	**C306.1**	Identify the events, use cases, domain classes for the System.
	C306.2	Develop Use case scenarios of the system.
	C306.3	Apply appropriate design patterns to the problem.
	C306.4	Differentiate structural and behavioral aspects of the system.
	C306.5	Apply UML tools to develop UML diagrams.
	C306.6	Develop Architectural model of the system.
C307 Operating System & Linux Programming Lab	**C307.1**	Evaluate various process scheduling algorithms
	C307.2	Develop various system calls
	C307.3	Evaluate different memory management techniques
	C307.4	Examine banker's algorithm.
	C307.5	Develop various page replacement algorithms
	C307.6	Develop various file allocation algorithms
	C307.7	Apply Linux commands on real time data.
	C307.8	Explain shell scripts in order to perform basic shell programming.
C308 Database Management Systems Lab	**C308.1**	Illustrate database authorization for the different kinds of users.
	C308.2	Create the tables by properly specifying Integrity constraints.
	C308.3	Create database objects.
	C308.4	Solve Query for a given Database.
	C308.5	Develop programs on PL/SQL.
	C308.6	Develop programs on stored functions and Triggers
SEMESTER-6(III-II)		
C310 Computer Networks	**C310.1**	Classify the Network Architectures and topologies
	C310.2	Analyze the data transmission Techniques.
	C310.3	Interpret framing techniques and protocols.
	C310.4	Summarize the medium access techniques.
	C310.5	Discuss various Routing Algorithms
	C310.6	Summarize the funionalities of Transport Layer and Application Layer.
C311 Data Ware housing and Mining	**C311.1**	Discuss the process of knowledge discovery from data.
	C311.2	Analyze the Data Pre-processing techniques.
	C311.3	Apply classification techniques to various data sets.
	C311.4	Analyze various alternative and statistical classification algorithms.
	C311.5	Apply the association rule mining to real time applications
	C311.6	Apply the clustering algorithms to various data sets.
C312 Design and Analysis of Algorithms	**C312.1**	Analyze the asymptotic performance of algorithms.
	C312.2	Analyze divide-and- conquer algorithms
	C312.3	Apply Greedy Method Algorithms
	C312.4	Apply dynamic programming technique
	C312.5	Apply backtracking to provide solution to various problems.

	C 312.6	Illustrate branch and bound technique to solve puzzles and problems.
C313 Software Testing Methodologies	**C313.1**	Apply Software Testing Knowledge.
	C313.2	Analyze software test process.
	C313.3	Illustrate various communication methods to conduct software testing.
	C313.4	Design the solutions on various software testing problems.
	C313.5	Design test cases effectively to ensure quality of the product.
	C313.6	Apply knowledge to use modern software testing tools.
C315 Internet of Things	**C315.1**	Outline the Concepts On IOT Technology.
	C315.2	Analyze Business Model for Internet of Things System layers and its standards.
	C315.3	Design principles of different connected devices.
	C315.4	Illustrate Various Application Layer Protocols and Internet Connectivity Principles
	C315.5	Identify Various Business Process Models.
	C315.6	Compare Service Models, Sensor networks and Storage Collection.
C320 Network Programming Lab	**C320.1**	Illustrate basic commands for socket programming.
	C320.2	Analyse the client server programming.
	C320.3	Develop the TCP/UDP programs.
	C320.4	Discuss the routing algorithms.
	C320.5	Develop the remote command execution
	C320.6	Develop the encryption and decreption using RSA algorithm
C321 Software Testing Lab	**C321.1**	Design the ad hoc test cases.
	C321.2	Design the test cases based on dynamic testing techniques.
	C321.3	Design the state machines.
	C321.4	Develop data flow testing.
	C321.5	Develop mutation testing
	C321.6	Experiment with modern automated testing tools
C322 Data Warehousing and Mining Lab	**C322.1**	Analyze the datasets.
	C322.2	Analyze the process of data cleaning and pre processing.
	C322.3	Apply the classification techniques.
	C322.4	Apply the association rule mining techniques.
	C322.5	Apply the clustering techniques.
SEMESTER-7(IV-I)		
C401 Cryptography and Network Security	**C401.1**	Illustrate Possible threats and attacks on data in network security.
	C401.2	Analyze various symmetric key cryptographic algorithms.
	C401.3	Analyze various Asymmetric key cryptographic algorithms.
	C401.4	Analyze various hashing, key management and digital signature techniques.
	C401.5	Analyze various security protocols in different OSI layers.
	C401.6	Analyze various security mechanisms to protect systems from viruses, malwares.
C402 Software Architecture & Design Patterns	**C402.1**	Analyze Interrelationships, Principles and Guidelines of Governing Architecture and Evolution over Time.
	C402.2	Outline the Various Architectural Evaluations of Software Systems.
	C402.3	Apply Well-Known Creational Design Patterns.
	C402.4	Evaluate different Categories of Structural Design Patterns.

	C402.5	Apply Behavioral Design Patterns to Incremental / Iterative Development.
	C402.6	Identify Appropriate Patterns for the Software Design of given problem with Real – Time Examples.
C403 Web Technologies	**C403.1**	Analyze the design and functionalities of web page with style sheets and dynamic scripts.
	C403.2	Analyze the web pages using different namespaces and parse the data from the document.
	C403.3	Apply web services in the web documents for request-response handling between client and server.
	C403.4	Create server side scripts to identify client requests and organize the data in database.
	C403.5	Analyze text by writing arbitrary expressions for data summarization and report generation.
	C403.6	Create server side applications using model view controller framework by implementing object oriented features.
C404 Managerial Economics and Financial Analysis	**C404.1**	Analyze macro, micro economic concepts useful for business units and determine influences of demand and supply analysis
	C404.2	Solve engineering problems by applying knowledge of economics
	C404.3	Analyze the consciousness about market structures and pricing methods of industries
	C404.4	Identify the business as their own and understand different stages of business cycle
	C404.5	Evaluate financial statements and their analysis through ratios etc.,
	C404.6	Interprete financing methods, their applicability in decision making and problem-solving skills according to new trends.
C407 Mobile Computing	**C407.1**	Outline the basic concepts in Mobile communication.
	C407.2	Illustrate the importance of MAC layer in wireless communications
	C407.3	Discuss the concept of network layer in Mobile communication.
	C407.4	Ana1yze protocol and data base issues in Transport layer.
	C407.5	Analyze Data Dissemination and Synchronization mechanisms.
	C407.6	Explain the basic concepts in Mobile Ad hoc Networks.
C408 Cloud Computing	**C408.1**	Outline the concepts on cloud computing Technology.
	C408.2	Create Virtual Machines and Virtualization of Clusters and Data Centers
	C408.3	Design Cloud Architectural and service Models
	C408.4	Illustrate Various Cloud Programming and Software Environments
	C408.5	Identify Various Cloud Resource Management and Scheduling
	C408.6	Compare Various Storage Systems.
C409 Software Project Management	**C409.1**	Identify the theoretical and methodological issues involved in modern software engineering project management
	C409.2	Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders
	C409.3	Estimate project cost and perform cost-benefit evaluation among projects

	C409.4	Evaluate outcomes of risk management plans
	C409.5	Select and use project management frameworks that ensure successful outcomes
	C409.6	Apply quality models in software projects for maintaining software quality and reliability.
C411 Software Architecture & Design Patterns Lab	**C411.1**	Demonstrate Software Development Environment Using Rational Rose Tool.
	C411.2	Construct the Logical View and Apply Risk Analysis for a Software System.
	C411.3	Apply the Process, and Deployment Views by Make Use of Software Components.
	C411.4	Examine Structural Design Patterns by Determining different Categories of Creational Design Patterns.
	C411.5	Create Behavioral Design Patterns to Incremental and Iterative Development.
	C411.6	Designing Appropriate Patterns for the Given Problem with Real – Time Examples.
C412 Web Technologies Lab	**C412.1**	Analyze the design and functionalities of web page with style sheets and dynamic scripts.
	C412.2	Analyze the web pages using different namespaces and parse the data from the document.
	C412.3	Apply web services in the web documents for request-response handling between client and server.
	C412.4	Create server side scripts to identify client requests and organize the data in database.
	C412.5	Analyze text by writing arbitrary expressions for data summarization and report generation.
	C412.6	Create server side applications using model view controller framework by implementing object oriented features.
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C413 Distributed Systems	**C413.1**	Outline the characteristics of Distributed architecture
	C413.2	Apply inter process communication in a distributed environment.
	C413.3	Apply standard protocols (RMI& RPC) in distributed systems.
	C413.4	Recall the fundamentals of OS in Distributed Environment.
	C413.5	Create Distributed File systems.
	C413.6	Create an insight of Transactions and replications in distributed systems.
C414 Management Science	**C414.1**	Evaluate management concept and its implementation in aim of achieving organizational goals.
	C414.2	Analyze the concepts of operations, project management through technical relationships of input and output and inventory control
	C414.3	Discuss the importance and vital role of human resources power in the main functional areas of organization.
	C414.4	Project handling and controlling techniques for optimum utilization of resources
	C414.5	Discuss the concept and practical issues relating to strategic management and its role in long-term decision making
	C414.6	Apply modern management techniques MIS, MRP, JIT and ERP etc to meet global challenges in effective manner
C415	**C415.1**	Illustrate Machine learning tasks and significance of binary

Machine Learning		classification.
	C415.2	Apply concept learning technique to solve the problems.
	C415.3	Solve the tasks by using tree and rule based models.
	C415.4	Apply heuristic learning approach and distance based models for classification.
	C415.5	Analyze probabilistic models, importance of feature extraction.
	C415.6	Apply dimensionality reduction and neural network techniques to obtain solutions.
C417 Artificial Neural Networks	**C417.1**	Summarize the concepts of neural networks and their architectures.
	C417.2	Demonstrate the Concepts of Learning mechanisms and their optimization techniques.
	C417.3	Illustrate Pattern classifier and their Limitations.
	C417.4	Explain Multi-layer feed forward networks and back propagation issues.
	C417.5	Design Radial Basis Function Networks.
	C417.6	Determine Support Vector machines
C419 Seminar	**C419.1**	Outline core and allied areas of interest.
	C419.2	Analyze and synthesize information related to the areas.
	C419.3	Identify information pertinent to a specific area through literature survey to conduct research.
	C419.4	Identify the applicability of modern software and tools.
	C419.5	Analyze multidisciplinary groups in emerging areas.
	C419.6	Organize written and oral technical reports.
	C419.7	Build lifelong learning to improve competence.
	C419.8	Develop professional code of conduct in the chosen area.
	C419.9	Develop independent and reflective learning.
C420 Project	**C420.1**	Outline core and allied areas of interest.
	C420.2	Analyze critically chosen project topic for conducting research.
	C420.3	Apply knowledge gained through Programme, self learning and experience for solution of a given problem efficiently
	C420.4	Develop research confidently in the project domain.
	C420.5	Make Use of the techniques, skills and modern engineering tools necessary for project work.
	C420.6	Develop a high level of interpersonal skills.
	C420.7	Organize projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
	C420.8	Develop communication skills, both oral and written for preparing and presenting reports.
	C420.9	Develop lifelong learning to improve knowledge and competence continuously.
	C420.10	Develop professional and ethical responsibility for sustainable development of society.
	C420.11	Develop independent and reflective learning.
	C420.12	Conclude Project selected is related to Environment or Sustainable