LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Approved by A.I.C.T.E & Affiliated to JNTUK,Kakinada,
Accredited by NAAC with "A" Grade & NBA)
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DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

COURSE OUTCOMES (CO_S)

R20 REGULATION		
I Year - I Semester		
COURSE CODE	**COURSE NAME**	**COURSE OUTCOMES**
R20BSH-EN1101	Communicative English	Understand the value of Human Conduct for career development through life skills: Ethics & Values and use root words and Prepositions without errors. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading. Enhance pronunciation with befitting tone for clarity in a speech to communicate language effectively.
		Observe the significance of imagery in poetry to use it in real-time contexts and learn to use and misuse of Articles, Prefixes, Suffixes, and Punctuations. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading. Participate in short conversations in routine contexts on topics of interest and ask questions and make requests politely.

		Acquire conversation skills through drama and enhance the correct use of Nouns, Pronouns, Verbs and Concord to write paragraphs effectively. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading. Listen for specific information, gist, note-taking, note-making and comprehension and develop convincing and negotiating skills through debates
		Develop reading for inspiration, interpretation & innovation and learn to use modifiers, synonyms and antonyms to write essays effectively. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading.
		Learn meaningful use of language by avoiding meaningless cliches, bureaucratic euphemisms and academic jargon in order to acquire the skill of summarising. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading.
R20BSH MA1101	Numerical Method and Ordinary Differential Equations	Solve non-linear equations using various numerical methods and apply numerical methods to find interpolation polynomial for a given data
		Apply numerical methods to evaluate derivatives and integration of a function and find the solutions of ordinary differential equations.
		Solve the first order ordinary differential equations related to various engineering fields
		Solve the higher order differential equation and analyze physical situations
		Apply the Laplace transform for solving differential equations and integral equations.
R20CSS-ES1101	Problem Solving and Programming using C	Illustrate the Fundamental concepts of Computers and basics of computer programming
		Use Control Structures and Arrays in solving complex problems.
		Develop modular program aspects and Strings fundamentals.
		Demonstrate the ideas of pointers usage.

		Solve real world problems using the concept of Structures, Unions and File operations
R20BSH-PH1101	Applied Chemistry	Illustrate the properties and applications of polymers.
		Design the metallic materials to prevent the corrosion.
		Assess the quality of fuels and identify the suitable one.
		Analyze the suitable method for industrial water treatment.
		Demonstrate the preparation, properties and applications of nano materials and importance of green chemistry.
R20EEE-ES1101	Essentials of Electrical & Electronics Engineering	Apply concept of KVL/KCL and network theorems in solving electrical circuits.
		Understand the principle of operation of different DC Machines.
		Measure the performance quantities such as losses, efficiency of transformers.
		Understand the importance and applications of p-n junction diode Zener diode and rectifiers.
		Apply different modes of op-amps in different applications.
R20CSS-ES1102	Problem Solving and Programming using C Lab	Implement basic programs in C and design flowcharts in Raptor.
		Apply conditional and iterative statements to solve real time scenarios in C.
		Implement the concept of arrays and modularity and strings.
		Apply the dynamic memory allocation functions using pointers.
		Develop programs using structures and files.
R20BSH-PH1101	Applied Chemistry Lab	Apply working principles of lab experiments in optic electronics, pH meter, conductivity meter to perform them.
		Compute the required parameter by suitable formula using experimental values in optic electronics, pH meter, conductivity meter.
		Analyze the experimental results through graphical interpretation.

		Analyze the required precautions to carry out the experiment and handling the apparatus in the laboratory.
		Analyze the working principles, procedures and applications.
R20EEE-ES1101	Essentials of Electrical & Electronics Engineering Lab	Prove the laws and theorems.
		Analyze the characteristics of DC machines.
		Analyze the performance of a transformer.
		Analyze the V-I characteristics of diode.
		Develop inverting and non-inverting amplifier using PSPICE.
I Year –II Semester		
R20BSH-MA1201	Linear Algebra and Multivariable Calculus	Apply the matrix algebra techniques to engineering applications.
		Apply the concepts of eigenvalues and eigenvectors to free vibration of a two mass system
		Apply partial differentiation to find maxima and minima of functions of several variables
		Evaluate the volume and surface area of solids using multiple integrals.
		Apply vector differential operators to find potential functions and estimate the work done against a field, circulation and flux using vector integral theorems.
R20BSH-MA1202	Mathematical Methods	Apply mean value theorems to real world problems.
		Apply elementary number theory concepts, including the divisibility properties of number to perform modulo arithmetic and use them in cryptographic applications.
		Apply simplex method to solve an LPP.

		Find the fourier series of periodic functions and evaluate fourier integral, fourier transform and inverse fourier of a given function.
		Solve partial different equations of first order using analytical methods.
R20BSH-CH1201	Applied Physics	Understand the interaction of optic energy with matter on the basis of interference.
		Understand the principles of diffraction of light by using diffractive grating.
		Apply the principles of polarization and lasers to computer applications.
		Enumerate the applications of fiber optics to computer science.
		Identify the principles of quantum computing based on quantum physics.
R20MEC-ES1201	Engineering Drawing	Apply the basics of engineering drawing to construct the polygons, curves and orthographic projections of points.
		Develop the orthographic projections of straight lines inclined to both the planes.
		Develop the orthographic projections of planes in various conditions.
		Develop the projections of regular solids inclined to one of the planes.
		Develop 3D isometric views from 2D orthographic views and vive versa.
R20CSIT-ES1201	Data Structures	Analyze different searching and sorting techniques.
		Analyze concepts of linked lists and with their implementation of different linked lists.
		Apply the concepts of stacks and queues in real applications.
		Analyze the nonlinear data structures trees and their operations.
		Implementation of different advanced trees with their applications.
R20BSH-EN1201	Communicative English -2	Acquire Listening skills for answering questions, make formal presentations without graphical elements, prioritize information from reading texts, paraphrase short academic texts and get awareness about plagiarized content and academic ethics.

		Comprehend academic lectures by taking notes, make formal presentations on academic topics using PPT slides with relevant graphical elements, distinguish facts from opinions while reading, write formal letters and emails and use a range of vocabulary in formal speech and writing.
		Participate in group discussions using appropriate language strategies, comprehend complex texts, produce logically coherent argumentative essays and use appropriate vocabulary to express ideas and opinions..
		Draw inferences and conclusions using prior knowledge and verbal cues, express thoughts and ideas accurately and fluently, develop advanced reading skills for a deeper understanding of texts, prepare a CV with a cover letter to seek internship/ job, and understand the use of passive voice in academic writing.
		Develop advanced listening skills for an in-depth understanding of academic texts, make presentations collaboratively, understand the structure of Project Reports and use grammatically correct structures with a wide range of vocabulary.
R20BSH-BS1202	Applied PhysicsLab	Apply the working principles of laboratory experiments in optics, mechanics and acoustics.
		Compute the required parameter by suitable formula using experimental values in mechanics, optics & acoustic experiments.
		Analyze the experimental results through graphical interpretation.
		Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory.
		Demonstrate the working principles, procedures and applications.
R20CSIT-ES1202	Data Structures Using C Lab	Analyze different searching and sorting techniques.
		Implement and Analyze concepts of linked lists its types.

		Apply the concepts of stacks and queues in real time applications.
		Analyze the non linear data structures trees and their operations.
		Implement different trees and their applications.
R20BSH-MC1201	Environmental Science	Understand the environment and natural resources.
		Understand about various attributes different types of pollution and impact.
		Illustrate about the ecosystem and importance of conservation of biodiversity.
		Understand the current environmental impacts with the societal problems.
		Analyze the current population explosion and their impacts on environment.
R20 REGULATION		
II YEAR – I SEMESTER		
R20BS-HM2101	Managerial Economics and Financial Accountancy	Analyze macro, micro economic concepts useful for business units and determine influences of demand and supply analysis.
		Assess the production functions, types of costs and solving engineering problems by applying knowledge of economics.
		Analyze the consciousness about market structures and pricing methods of industries. Identify suitable form of business and understand different stages of business cycle.
		Comprehend financial accounting process and Evaluation of financial statements.
		Interpretation of financing methods, their applicability in decision making and problem-solving skills according to new trends.
R20CS-PC2102	Python Programming	Understand the program structure of python REPL shell environment.
		Implement iterators and functions for data processing.
		Implement different modules and objects to organize data.
		Implement different data structures and their functionalities.
		Understand Object oriented concepts and handle different errors through exceptions.
R20BS-PC2103	Mathematical Foundations of Computer Science	Test the validity of an argument through enhanced logical capabilities.
		Implement shortest path algorithm for different graphs.
		Construct minimal spanning tree using algorithms for graphs.

		Understand the algebraic structure and their properties.
		Finding a general solution of recurrence equations using suitable method.
R20CS-PC2104	Database Management Systems	Understand File System Vs Databases.
		Design and implement ER-model and relational models.
		Construct simple and complex queries using SQL.
		Analyze Schema refinement techniques.
		Design and build database system for a given real world problem.
R20EC-PC2105	Digital Logic Design	Able to define different number systems, arithmetic operation of binary numbers, 2's complement representation and its operations.
		To Familiarize Boolean algebra theorems and simplify the given logic function to the minimum number of literals. Minimization of logic functions by using different levels of K-Map methods and design using logic gates.
		Develop different combinational logic circuits for the realization of digital logic circuits.
		Design various synchronous and asynchronous sequential circuits using Flip-Flops.
		Design various registers and counters using different flip flops and also develop different programmable logic devices using logic circuits.
R20CS-PC2106	Python Programming LAB	Understand the working environment of python and its program structure.
		Implement conditional and iterative statements.
		Create custom modules and functions to handle different operations.
		Implement Object oriented concepts through real time scenarios and handle errors.
		Design different shapes and objects using turtle graphics.
R20CS-PC2107	Database Management Systems Lab	Illustrate database authorization for the different kinds of users.
		Create the tables by properly specifying Integrity constraints.
		Create database objects and Solve Query for a given Database.

		Develop programs on PL/SQL.
		Develop programs on stored functions and Triggers.
R20EC-PC2108	Digital Logic Design LAB	Acquire the knowledge of numbering systems and logic gates.
		Design of logic gates using IC's.
		Design of combinational circuits using IC's.
		Design of Sequential circuits using IC's.
		Design of synchronous and asynchronous counters using flip-flops.
R20CST-SD2109	R-Programming (Skill Course)	Implement the R Programming to the real world situations.
		Apply suitable statistical and mathematical method to real world problems.
		Visualize the data sets using suitable methodology.
		Analyze the data sets to predict the solution of the real world problems in different situations.
		Interpret the solutions to the real world data sets.
R20BSH-MC2101	Constitution of India	Know the sources, features and principles of Indian Constitution.
		Learn about Union Government role and responsibilities and its structure.
		Comprehend the state government and its administration.
		Get acquainted with Local administration and Panchayati Raj.
		Gain knowledge on roles and functioning of Election Commission.
		Enable students to identify Parts of Speech and use them flawlessly, write Emails in formal correspondence effectively, participate confidently by introducing oneself in any formal discussion.
		Attain Language Proficiency & Accuracy through Contextualized Vocabulary, Verb forms, Tense and subject verb agreement, produce coherent expressions for professional writing, introduce themselves unhesitatingly with Task-Based Activities.

R20BSH-MC2104	Employability Skills-1 (Skill Oriented Course)	Develop the fluency and accuracy to write Technical Reports and Emails for professional communication by using appropriate vocabulary and participate confidently in any formal discussion.
		Assimilate lifelong reading habit to comprehend a passage for its gist. Avoid the errors in both Speech & Writing and write Letters and Emails for official communication.
		Realize the technical communicative competence and attainment of grammatically correct structures for formal communication.
II YEAR – II SEMESTER		
R20CS-PC2201	Computer Organization & Architecture	Identify the Architecture of modern computer.
		Measure the performance of a computer.
		Explain different instruction types, addressing modes.
		Demonstrate the concepts of interrupts and memory accessing methods.
		Illustrate different memory types and the functions of control unit.
R20CST-PC2202	Object Oriented Analysis and Design (OOAD)	Compare and contrast object oriented analysis and design
		Create class diagrams that model both the domain model and design model of a software system.
		Analyze the conceptual model of UML.
		Create interaction diagrams and other diagrams that model the dynamic aspects of a software system.
		Detailed case study experience with architecture, analysis and design.
R20CS-PC2203	Object Oriented Programming Through Java (OOPs through Java)	Understand the environment of JRE and Control Statements.
		Implement real world objects using class Hierarchy.
		Implement generic data structures for iterating distinct objects.
		Implement error handling through exceptions and file handling through streams.
		Design thread-safe GUI applications for data communication between objects.
		Understand the importance of operating system and system calls.

R20CS-PC2204	Operating Systems	Analyze communication between processes, process scheduling algorithms.
		Evaluate various memory mapping techniques and page replacement algorithms.
		Apply concurrency control techniques for handling deadlocks.
		Evaluate various file allocation methods and disk scheduling algorithms.
R20CS-PC2205	Probability and Statistics	Evaluate correlation and regression for the given data.
		Apply Baye's theorem to probabilistic experiments.
		Apply discrete and continuous probability distributions to the real time problems.
		Design the components of a classical hypothesis test.
		Infer the statistical inferential methods based on small sampling tests.
R20CS-PC2206	Object Oriented Programming Java Lab	Understand and design real world applications.
		Enhanced skills in Application Programming to face Campus Interviews.
		Developing user defined packages and availing user defined packages.
		Analyze and apply parallel processing through Multi-Threading.
		Understand and apply way of handling abnormal conditions through program execution.
R20CS-PC2207		Implement various process scheduling programs.
		Implement various memory management algorithms.

	Operating Systems Lab	Identify various solutions for critical section problems and also implement differentalgorithms that are applied in virtual memory .
		Implement various file allocation algorithms.
		Describe and write shell scripts in order to perform basic shell programming.
R20CST-PC2208	OOAD Lab	Detailed case study experience with architecture, analysis and design.
		Design class diagrams that model both the domain model and design model of a software system.
		Design interaction diagrams that model the dynamic aspects of a software system.
		Design class diagrams that model both the domain model and design model of software system.
		Design activity, state, component and deployment diagrams.
R20BS-HM2209	MATLAB For Computational Methods (Skill Oriented Course)	Construct and apply small programs in MATLAB to mathematical problems.
		Develop a program to find a real root of an equation using various numerical methods.
		Develop programs to find the interpolation values using Lagrange's and Newton's interpolation formulae for a given set of points.
		Develop programs to find solutions of ordinary differential equations using various numerical methods.
		Develop programs to solve system of linear equations.

R20 REGULATION		
III YEAR - I SEMESTER		
R20CSE-PC3101	Formal Languages & Automata Theory	Understand finite state machines for acceptance of language
		Understand regular expressions and finite automata.
		Develop context free grammars for formal languages.
		Design pushdown automata for context free grammars.
		Develop turing machine.
R20CIT-PC3101	Computer Networks	Understand and analyze reference models.
		Identify the networks components and understand their functions.
		Analyze the services of data link layer.
		Apply routing algorithms to create routes in different networks.
		Understand the architecture of IEEE 802.11.
R20CIT-PC3102	Web Technologies	Analyze a web page and identify its elements and attributes.
		Develop a web page using XHTML and CSS.
		Develop dynamic web page using PHP.
		Apply perl and ruby language to design applications.
		Develop simple client script using AJAX.
R20ECE-OE3105	Embedded Systems	Understand the basic knowledge of embedded system.
		Analyze the architecture of microcontroller.
		Analyze various preemptive and non-preemptive task scheduling algorithms.

		Analyze various task communication and synchronization mechanisms in real time operating systems.
		Apply the basic knowledge of embedded systems to develop applications.
R20CIT-PE3101.1	Software Engineering	Understand the need of SDLC.
		Analyze the requirements of software systems.
		Summarize the system models of software engineering.
		Apply any specific software architecture style for real time application.
		Analyze various testing techniques, risk management and quality measures.
R20CSS-PC3103	Computer Networks Programming Lab	Understand the basic components of networking tools.
		Understand the basic framing techniques.
		Apply error detecting techniques for sample data.
		Implement the routing protocols.
		Understand the usage of packet tracer.
R20CIT-PC3103	Web Technologies Lab	Develop few static web pages.
		Apply CSS to design a static and dynamic web pages.
		Apply java script to check few services in dynamic web page.
		Apply DTD to validate an XML file.
		Apply ruby and perl to develop simple applications using strings.
R20BSH-SC3101	Employability Skills	Understand the grammatical forms of English and the use of these forms in specific communicative and career context.

		Use a wide range of reading comprehension strategies appropriate to txt and retrieve information.
		Strengthen the ability to write paragraph, essays, emails and summaries.
		Improve their speaking ability in English both in terms of fluency and comprehensibility by participating in group discussion and oral assignments.
		Prepare their own resume and answer interview related question unhesitatingly with acceptable soft skills.
R20BSH-MC3101	Entrepreneurship and Incubation	Enriches the knowledge of entrepreneurship behavior and skill development.
		Initiate business ideas that have valuate in the end-market.
		Identify the validity of idea and its unique selling proportion.
		Understand the opportunity and challenges of start-up.
		Analyze various government and non-government financial resource.

III YEAR – II SEMESTER		
R20CIT-PC3201	Data Mining and Data Warehouse	Understand the stages in building a data warehouse and correlate the various system architectures.
		Understand the need and importance of reporting and query tools.
		Apply the query tools for data mining.
		Apply classification algorithms for processing.
		Apply the clustering techniques on sample data.
R20CIT-OC3202	Compiler Design	Understand the functionalities of compilation phases and the role of lexical analyzer.
		Analyze the working process of top-down parser.
		Analyze the working process of bottom-up parser.
		Understand the symbol table and storage organization techniques.
		Develop an optimized code by applying optimization techniques.
R20CIT-PC3203	Software Testing Methodologies	Understand the basic testing process.
		Apply the test techniques to generate the test cases for an application.
		Apply testing tools to test the applications.
		Apply testing tools to resolve real time problems.
		Apply state graphs and transition testing techniques.
R20CIT-PE3201.1	Design and analysis of algorithms	Understand the fundamentals of algorithms.
		Analyze the searching and sorting algorithms using divide and conquer method.

		Apply greedy method to solve multi solution problems.
		Apply dynamic programming to resolve real applications.
		Analyze back tracking and branch – bound techniques.
R20BSH-OE3201	Operation Research	Understand the methodology of operation research.
		Apply linear programming to solve methods and sensitivity analysis.
		Apply integer programming to design network flow.
		Analyze multi criteria decision techniques.
		Apply dynamic programming technique for game theory.
R20CIT-PC3204	Data Mining & Data Warehouse Lab	Understand the environment of WEKA tool to prepare data sets.
		Understand various pre-processing techniques using WEKA tool.
		Analyze classification algorithms in WEKA tool.
		Apply association rule to various data sets to extract patterns.
		Analyze clustering algorithms in WEKA tool.
R20CIT-PC3205	Compiler Design Lab	Understand the basic knowledge to design lexical analyzer.
		Understand the basic knowledge to design parsers.
		Implement lex program using LEX tool.
		Understand the techniques of loop unrolling and constant propagation.
		Apply code optimization techniques on few sample codes.
R20CIT-PC3206	Software Testing Methodologies	Understand practical solutions to a set of problems.
		Apply specific problem design techniques using testing techniques.
		Analyze a project for all stages using different testing techniques.

		Analyze the team and individual team test analysis.
		Analyze and formulate a real time problem with various testing techniques.
R20CIT-SC3201	DJANGO Framework	Understand the environment of Django web server framework.
		Develop URL Mappings and views using Templates.
		Develop Django models for processing data from templates.
		Understand Django forms and signals.
		Implement Restfull APIs using Django Rest Framework.
R20BSH-MC3203	Intellectual Property Rights & Patents	Understand IPR law, innovations and inventions of trade related.
		Understand the principles and rights afforded by copyright.
		Understand the patent requirements, patent law, Infringement and Litigation.
		Analyze the registration process of trade mark and dilution of ownership of trademark.
		Identify the main ideas of employee confidentiality agreement and the legal procedures to prevent cybercrimes.

R20 REGULATION		
IV YEAR - I SEMESTER		
R20CIT-PE4101.3	Software Project Management	Understand various software management activities.
		Understand the organization strategic plans and business justification throughout the project life cycle.
		Analyze project cost estimation and perform cost benefit evolution.
		Analyze the outcomes of risk management plan.
		Develop framework for monitoring & control in project management.
R20CIT-PE4102.3	E-Commerce	Understand the basic concepts & technologies used in management information systems.
		Understand the process of developing & implementing information system.
		Analyze the ethical, social and security issues of information systems.
		Develop a system how various information systems work to accomplish objectives of an organization.
		Understand the role of information systems in organization.
R20CIT-PE4103.3	Distributed Systems	Understand the characteristics of distributed systems and architectural models.
		Apply IPC features to design distributed system.
		Apply standard protocols RMI-RPC to design communication system in distributed systems.
		Understand the fundamentals of distributed file system.
		Analyze how transactions and replications operated in distributed system.

R20CIT-OE4104	Human Computer Interaction	Understand the capabilities of interactive systems.
		Understand the models of HCI.
		Apply interactive design process and universal design principles to an interactive system.
		Understand the standards and guidelines required to design an interactive system.
		Analyze tasks and dialogs of real time interactive system.
R20MEC-OE4101	Robotics	Understand the classification of Robots.
		Identify and use different types of actuators in robotics.
		Analyze the different sensors and their use for robots.
		Understand the control system of robots.
		Apply testing techniques to measure the performance of robot.
R20BSH-HM4101	Universal Human Values-2:Understanding Harmony	Understand the knowledge of value education.
		Understand the co-existence of self and body.
		Identify the basic unit of human interaction.
		Understand the harmony of nature.
		Analyze and explore ethical human conduct.
R20CIT-SC4101	ReactJS Framework	Understand the anatomy of React JS.
		Understand the life cycle hooks of React JS.
		Develop React components for building applications.
		Develop React hooks for component reusability and monitoring.
		Implement react rendering for an interactive application.

IV YEAR - II SEMESTER		
R20CIT-PJ4201	Project Work	Analyze and define complex engineering problems, conduct a thorough literature review, and establish well-defined, measurable objectives.
		Design innovative and creative engineering solutions that meet practical constraints, adhering to engineering standards and best practices.
		Demonstrate proficiency in using modern engineering tools and technologies, ensuring the quality and effectiveness of solution implementation.
		Validate project solutions through simulations, experiments, and testing, while effectively collaborating within multidisciplinary teams and communicating project ideas clearly.
		Recognize and embrace lifelong learning, adhere to ethical practices, and assess the societal, environmental, and economic impacts of engineering solutions, with a focus on future improvements and extensions.