ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES – TIRUPATIAUTONOMOUS
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
AK20 Course Outcomes

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
	CO3	Familiarize with functions of several variables which is useful in optimization.
	CO4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
	CO5	Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions
Chemistry (20ABS9904)	CO1	Understand the behaviour of, and interactions between mater and energy at both the atomic and molecular levels
	CO2	Compare the materials of construction for battery and electrochemical sensors
	CO3	Understand the preparation, properties, and applications of thermoplastics & thermo settings, elastomers & conducting polymers.
	CO4	HPLC and GC methods used for separation of gaseous and liquid mixtures.
	CO5	Understand the disadvantages of using hard water and select suitable treatments domestically and industrially.
Problem Solving and Programming (20AES0501)	CO1	Construct computer using parts.
	CO2	Recognize the importance of programming language independent constructs
	CO3	Solve computational problems
	CO4	Select the features of C language appropriate for solving a problem
	CO5	Design computer programs for real world problems
	CO6	Organize the data which is more appropriated for solving a problem
Engineering Graphics (20AES0301)	CO1	Ability to discuss the conventions and methods of Engineering Drawing
	CO2	Ability to demonstrate drafting practices, visualization and projection skills
	CO3	Ability to perform basic sketching techniques of Engineering components
	CO4	Ability to draft the orthographic and pictorial views of a given Engineering components
	CO5	Ability to increasingly use architectural and engineering scales
Information Technology And Numerical Methods (20AES0505)	CO1	Usage of Digital World and Exploring Cyber space
	CO2	Explain the needs of hardware and software required for a computation task.
	CO3	Peripheral devices, networking and internet concepts
	CO4	Analyze the concepts of Errors, Algebraic & Transcendental Equations to solve different Engineering problems
	CO5	Analyze Interpolation using the concepts of the numerical methods and apply the Integration in numerical methods
	CO6	Apply the concepts of O.D.E on numerical method

COURSE NAME	COURSE OUTCOMES	
Computer Science And Engineering Workshop (20AES0506)	CO1	Assemble and disassembling parts of a computer
	CO2	Develop Documents using Word processors
	CO3	Develop presentations using the presentation tool
	CO4	Perform computations using spreadsheet tool
	CO5	Design Graphics, Videos and Web pages
Chemistry Lab (20ABS9909)	CO1	To familiarize the students with the basic concepts of chemistry of materials
	CO2	Prepare advanced polymer materials
	CO3	Measure the strength of an acid present in secondary batteries
	CO4	To familiarize with digital and instrumental methods of analysis
Problem Solving And Programming Lab (20AES0503)	CO1	Assemble and disassembling parts of a Computer
	CO2	Identify to control structure to solving the problem
	CO3	Analyze different sorting algorithms
	CO4	Design solutions for computational problems
	CO5	Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Applied Physics Lab (20ABS9902)	CO1	Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves.
	CO2	Analyze and apply the concepts of LASER S and optical fibers.
	CO3	Infer the properties of dielectric magnetic material
	CO4	Apply the fundamentals of semi conductors for device applications
	CO5	Implement the behavior of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications.
Probability And Statistics (20ABS9911)	CO1	Interpret the characteristics through correlation and regression tools.
	CO2	Make use of the concepts of probability and their applications.
	CO3	Apply discrete and continuous probability distributions.
	CO4	Inference the components of a classical hypothesis test for large sample
	CO5	Inspect the components of a classical hypothesis test for small samples.
Communicative English (20AHS9901)	CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
	CO2	Apply grammatical structures to formulate sentences and correct word forms
	CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
	CO4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
	CO5	Create a coherent paragraph interpreting a figure/graph/chart/table

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Data Structures (20AES0502)	CO1	Analyze and evaluate the efficiency of an algorithm
	CO2	Implement linear data structures
	CO3	implement non -linear data structures
	CO4	Solve the problem of efficiently using graphs and Hashing techniques
	CO5	Implement advanced sorting and organizing the file
Web Design (20AES0507)	CO1	Add elements to web pages, including colors, text, images, and more
	CO2	Add advanced features to your website including special effects
	CO3	Apply the CSS Knowledge to add colors and text formatting
	CO4	Apply advanced CSS style presentation and techniques
	CO5	Develop HTML and CSS Programs.
Communicative English Lab (20AHS9902)	CO1	Create Awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
	CO2	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussion
	CO3	Improve word knowledge and apply skills in various languages learning activities
	CO4	Analyze speech sounds, stress ,rhythm, intonation and syllable division for better listening and speaking comprehension
	CO5	Evaluate and exhibit acceptable etiquette essential in social and professional presentations.
Applied Physics Lab (20ABS9907)	CO1	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2	Apply electromagnetic wave propagation in different guided media.
	CO3	Asses the electromagnetic wave propagation and its power in different media
	CO4	Analyze the conductivity of semiconductors.
	CO5	Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.
Data Structures Lab (20AES0504)	CO1	Select the data structure appropriate for solving the problem
	CO2	Implement searching and sorting algorithms
	CO3	Derive new data types
	CO4	Illustrate the working of linear and non linear data structure
	CO5	Organize the data using Files structure
Environmental Studies (20AMC9903)	CO1	To recognize and to understand the importance and scope of Environmental Studies.
	CO2	To understand the importance of protecting natural resources, ecosystem for future generation by communication each other in the society crate the awareness
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	By studying Environmental Science, students are exposed to the environment the enables one to find out solution of various environmental problems, encountered on and often.
	CO5	At the end of the course,it is expected that student will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. These will enable every human being to live in a more sustainable manner.

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Discrete Mathematical Structures (20ABS9914)	CO1	Apply mathematical logic to solve problems.
	CO2	Understand the concepts and perform the operations related to sets, relations and functions.
	CO3	Apply basic counting techniques to solve combinatorial problems.
	CO4	Formulate problems to solve recurrence relations
	CO5	Apply Graph Theory in solving computer science problems
Digital Electronics & Microprocessors (20APC0503)	CO1	Design Logic circuit using basic concepts of Boolean algebra.
	CO2	Design Logic circuit using basic concepts of PLDs.
	CO3	Design sequential logic circuits.
	CO4	Design application using 8086 Microprocessor.
	CO5	Design application using 8051 Microcontroller.
Database Management Systems (20APC0502)	CO1	know the fundamentals of Databases
	CO2	Understand SQL and PL/SQL Concepts
	CO3	Design a database for a real-world information system
	CO4	Process and Optimize the query
	CO5	Working of transaction and concurrency techniques in real time applications
Basics of Python Programming (20AES0509)	CO1	Understanding the syntax and semantics of Python programming.
	CO2	Apply modularity to programs.
	CO3	Select appropriate data structure of Python for solving a problem.
	CO4	Implement Mutable and Immutable data types
	CO5	Interpret the concepts of object oriented programming as used in Python
Basics of Electrical & Electronics Engineering (20AES0202)	CO1	Apply concepts of KVL/KCL in solving DC circuits
	CO2	Illustrate working principles of induction motor - DC Motor
	CO3	Identify type of electrical machine based on their operation
	CO4	Describe operation and characteristics of diodes and transistors.
	CO5	Make use of diodes and transistors in simple, typical circuit applications.
	CO6	Understand operation of basic op-amp circuits.
Database Management Systems Lab (20APC0505)	CO1	Write SQL Queries
	CO2	Implement PL/SQL programs
	CO3	Design database for any real world problem
Basics of Python Programming Lab (20AES0510)	CO1	Write, Test and Debug Python Programs
	CO2	Implement Conditionals and Loops for Python Programs
	CO3	Use functions and represent Compound data using Lists, Tuples and Dictionaries

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	CO4	Read and write data from & to files in Python and develop Application using Python
	CO5	Implement the problem in terms of real world object using OOPs concepts
Basics of Electrical & Electronics Engineering Lab (20AES0204)	CO1	Verify Kirchoff's Laws & Superposition theorem for dc supply
	CO2	Analyze the performance of AC and DC Machines by testing.
	CO3	Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor
	CO4	Ability to operate diodes for finding V-I Characteristics.
	CO5	Ability to construct and operate rectifiers without & with filters
	CO6	Ability to construct and operate BJT & FET Characteristics.
Client Side Scripting (20ASC0501)	CO1	Analyze and understand the basic concepts of web programming.
	CO2	Implement Arrays, Functions and Strings
	CO3	Apply techniques of form validation using Java Script.
	CO4	Describe important concepts related to client side Web Security.
	CO5	Save client information in cookie by server
Constitution OfIndia (20AMC9902)	CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4	Discuss the Powers and functions of Governor, President, Judiciary.
	CO5	Discuss the functions of local administration bodies
Computer Organization (20APC0506)	CO1	Understand computer architecture concepts related to the design of modern processors, memories and I/Os
	CO2	Design Arithmetic and control unit
	CO3	Identify the hardware requirements of Primary and Secondary memory
	CO4	Understand the importance of I/O devices and its interface circuits.
	CO5	Identify pipeline hazards and possible solutions to those hazards
Design And Analysis Of Algorithms (20APC0511)	CO1	Analyze the complexity of the algorithms
	CO2	Use techniques of greedy and dynamic programming to solve the problems.
	CO3	Implement traversal, backtracking and searching techniques.
	CO4	choose the appropriate algorithm for solving minimization problem.
	CO5	Able to prove that a certain problem is NP-Complete

Operating Systems (20APC0515)	CO1	Distinguish between the different types of operating system environments.
	CO2	Apply the concepts of process synchronization & CPU scheduling
	CO3	solutions to deadlock and Develop memory management
	CO4	Analyze various disk scheduling algorithms and file system interfaces
	CO5	Analyze the various security issues and goals of protection

II-II

COURSE NAME	COURSE OUTCOMES	
Managerial Economics And Financial Analysis (20AHSMB01)	CO1	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2	Apply the Concept of Production cost and revenues for effective Business decision
	CO3	Analyze how to invest their capital and maximize returns.
	CO4	Evaluate the capital budgeting techniques.
	CO5	Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity
Universal Human Values (20AHS9905)	CO1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
	CO2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3	They would have better critical ability.
	CO4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
Object Oriented Programmin gthrough Java (20APC0512)	CO1	Understanding the Syntax, Semantics and features of Java Programming Language.
	CO2	To gain knowledge on Object Oriented Programming concepts.
	CO3	Design the method of creating Multi-threading programs and handle exceptions.
	CO4	Understanding the concepts of java Collection Framework and Applets.
	CO5	Ability to create GUI applications & perform event handling.
Computer Organization Lab (20APC0504)	CO1	Represent numbers and perform arithmetic operations.
	CO2	Minimize the Boolean expression using Boolean algebra and design it using logic gates
	CO3	Analyze and design combinational circuit.
	CO4	Design and develop sequential circuits
	CO5	Understand and apply the working of different operations on binary numbers
Object Oriented Programming through Java Lab (20APC0514)	CO1	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java application
	CO2	Ability to create user friendly interfaces
	CO3	Ability to solve the problem using object oriented approach and design solutions which are robust
	CO4	Implement exception handling and Templates

Operating Systems Lab (20APC0513)	CO1	Ensure the development of applied skills in operating systems related areas.
	CO2	Able to write software routines modules or implementing various concepts of operating system

III-I		
COURSE NAME	**COURSE OUTCOMES**	
Computer Networks (20APC0518)	CO1	understand the basics of data communications and networking
	CO2	classify the functionalities of two sub layers of Data link Layer
	CO3	know briefly about Network Layer through algorithms and protocols
	CO4	distinguish the services provided by Transport Layer
	CO5	recognize the services offered by Application Layer to the user
Formal Languages and Automata Theory 20APC0518	CO1	Design finite state machines to recognize formal languages.
	CO2	Identify different types of grammars in formal languages
	CO3	Construct context free grammars for context free languages
	CO4	Find solutions to the problems using PDA.
	CO5	Develop Turing machine for different computational problems.
Software Engineering (20APC0519)	CO1	Characterize software engineering models
	CO2	Focus on analysis in software project management
	CO3	Design important features of software project management
	CO4	Test the software specifications
	CO5	Measure the software quality
Sensors and IoT	CO1	Understand the characteristics of sensors and Transducers.
	CO2	Identify different types of sensors and its technologies based on recent trends.
	CO3	Determine the Market perspective of IoT
	CO4	Compare and Contrast the use of Devices, Gateways and Data Management in IoT
	CO5	Analyze IOT design methodologies and can understand basic concepts about Arduino
Optimization Techniques (20AOE0303)	CO1	Explain the need of optimization of engineering systems
	CO2	Understand optimization of electrical and electronics engineering problems
	CO3	Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
	CO4	Apply unconstrained optimization and constrained non-linear programming and dynamic programming
	CO5	Formulate optimization problems.
Deterministic & Stochastic Statistical Methods (20AOE9925)	CO1	Identify logical thinking to problem-solving in context.
	CO2	Employ methods related to these concepts in a variety of data science applications.
	CO3	Solve problems by using appropriate technology to aid problem-solving and data analysis.
	CO4	Analyze Distribution Theory and Bayesian process of inference in probabilistic reasoning system.
	CO5	Develop skills in solving unconstrained optimization problems

Data Warehousing and Mining (20APE0501)	CO1	Understand the basic concepts of Data Warehouse and data Mining
	CO2	Apply OLAP technology for Data Warehouse.
	CO3	Analyze and evaluate performance of Association Rules and classification algorithms
	CO4	Evaluate various Clustering algorithms
	CO5	Analyze advanced Data Mining techniques
DESIGN PATTERNS (20APE0502)	CO1	Know the underlying object oriented principles of design patterns.
	CO2	Understand the context in which the pattern can be applied.
	CO3	Understand how the application of a pattern affects the system quality and its tradeoffs.
	CO4	Importance in behavioral pattern in terms of different types
	CO5	Understanding about the importance of design patterns
COMPUTER GRAPHICS (20APE0503)	CO1	Explain the basic concepts used in computer graphics
	CO2	Design algorithms based on output primitives.
	CO3	Construct 2D graphics transformations
	CO4	Construct 3D graphics transformations
	CO5	Remove hidden surfaces from graphs and anime
SOFTWARE ENGINEERING LABORATORY (20APC0520)	CO1	Understand precisely about functional and non functional requirements
	CO2	Gain knowledge in project managements and its principles
	CO3	Identify the relationship between requirements and usecase
	CO4	Know the interface of modules such as cohesion and coupling
	CO5	Able to deduct the bugs during testing
COMPUTER NETWORKS SIMULATION LAB (20APC0517)	CO1	Deal with Error detection/ correction techniques
	CO2	Simulate Data link layer protocols
	CO3	Simulate network layer protocols
	CO4	Able to get knowledge about NS2 simulator
	CO5	Able to develop network applications
Mobile Application Development(**20ASA0503)**	CO1	Demonstrate knowledge on mobile platforms, mobile user interface and user interface design requirements.
	CO2	Design user interfaces by analyzing user requirements
	CO3	Develop mobile applications for messaging, location based services and networking
	CO4	Develop mobile applications and publish in different mobile platforms
	CO5	Use android studio and IoS tools to develop mobile applications
BIOLOGY FOR ENGINEERS (20AMC9901)	CO1	Explain about cells and their structure and function. Different types of cells and basics for classification of living organisms.
	CO2	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3	Brief about human physiology.

	CO4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms
	CO5	: Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.
III-II		
Artificial Intelligence 20APC0521	CO1	Understand the basic concepts of Artificial Intelligence
	CO2	Apply searching techniques for solving a problem
	CO3	Analyze the concepts of Reinforcement Learning
	CO4	Develop Natural Language Interface for Machines
	CO5	Understanding the concepts to design a robotics
Compiler Design (20apc0523)	CO1	Understand the basic structure of a compiler
	CO2	Use the tools related to compiler design effectively and efficiently
	CO3	Generate intermediate code
	CO4	Able to explain various data structures used in symbol tables
	CO5	Construct optimized code
Cloud Computing (20apc0528)	CO1	Understand the concept of cloud computing
	CO2	Ability to understand various service delivery models and Cloud Computing Architecture
	CO3	Analyze the need for virtualization in a cloud environment.
	CO4	Able to explain various data structures used in symbol tabl Demonstrate the map reducing programming model to process the Big Data along with Hadoop tools s
	CO5	Analyze authentication, confidentiality, privacy issues and disaster management
Machine Learning (20ape0504)	CO1	Ability to understand what is learning and why it is essential to the design of intelligent machines.
	CO2	Ability to understand various service delivery models and Cloud Computing Architecture Ability to design and implement various machine learning algorithms in a wide range of real-world applications e
	CO3	Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more
	CO4	Ability to demonstrate feature selection and dimensionality reduction
	CO5	Ability to solve decision making problems using SVM(Support Vector Machines) and graphical models
Real Time Operating Systems (20ape0505)	CO1	Characterize real-time systems and describe their functions.
	CO2	Design and implement a real-time system
	CO3	Apply formal methods to the analysis and design of real-time systems
	CO4	Apply formal methods for scheduling real-time systems
	CO5	Characterize and describe reliability and fault tolerance issues and approaches
Blockchain Technology (20ape0506)	CO1	Understand the basic concepts of blockchain and its applications.
	CO2	Make use of the specific mechanics of Ethereum
	CO3	Experiment with Smart contracts
	CO4	Develop Enterprise applications using Blockchain

	CO5	Create customized Blockchain solutions
Artificial Intelligence Laboratory (20apc0522)	CO1	Implement search algorithms.
	CO2	Solve Artificial Intelligence Problems
	CO3	Develop the solutions using Backtracking
	CO4	Design Chatbot
	CO5	Implement basic problems by using NLTK(Natural Language Tool Kit)
Compiler Design Lab (20apc0524)	CO1	Develop compiler tools
	CO2	Design simple compiler
	CO3	Develop program for solving parser problems
	CO4	Design lexical analyzer
	CO5	Able to use Lex and YACC tools for developing a scanner and a parser
Cloud Computing Laboratory (20apc0529)	CO1	Ability to understand various service delivery models of a cloud computing architecture.
	CO2	Summarize the Services and Platform of cloud.
	CO3	Configure various virtualization tools.
	CO4	Explore the future trends of cloud computing
	CO5	Develop Hadoop Applications
Soft Skills (20asa0502)	CO1	Recognize the importance of verbal and non verbal skills.
	CO2	Develop the interpersonal and intrapersonal skills.
	CO3	Apply grammatical structures to formulate sentences and correct word forms.
	CO4	Create trust among people and develop employability skills
	CO5	Identify and apply communication skills effectively for professional
Professional Ethics And Human Values (20AMC9904)	CO1	It ensures students sustained happiness through identifying the essentials of human values and skills..
	CO2	The students will understand the importance of Values and Ethics in their personal lives and professional careers
	CO3	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4	Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5	Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.