ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE (AI D)
COURSE OUTCOMES (CO'S)
AK20 REGULATION

COURSE NAME		COURSE OUTCOMES
Algebra and Calculus (20ABS9901)	CO1 :	Make use of matrix algebra techniques that is needed by engineers for practical application
	CO2:	Utilize mean value theorems to real life problems.
	CO3:	Interpret with functions of several variables which is useful in optimization. Variables which is useful in optimization.
	CO4:	Analyze 2-dimensional and 3- dimensional concepts in coordinate systems.
	CO5:	Utilize the concept of special functions.
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.
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
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
Problem Solving and Programming (20AES0501)	CO1:	Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2:	Able to know problem solving aspects, design and analysis of algorithm
	CO3:	Able to know flow control, input output and implementation functions
	CO4:	Able to solve computational problems using functions, array and pointers
	CO5:	Able to organise real world heterogeneous data and apply searching, sorting techniques with exception handling
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.
AppliedPhysics 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

COURSE NAME	COURSE OUTCOMES	
	CO4:	Analyze the conductivity of semiconductors
	CO5:	Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications
Problem SolvingAnd 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.
Probability And Statistics (20ABS9911)	CO1:	Interpret the characteristics through correlation and regression tools.
	CO2:	Solve the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
	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.
Numerical Methods (20ABS9921)	CO1:	Apply the concepts of Errors, Relative and Percentage Errors
	CO2:	Solve the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
	CO3:	Estimate Interpolation using the concepts of the Numerical Methods
	CO4:	Apply the concepts of Integration in Numerical Methods
	CO5:	Analyze the concepts of O.D.E on Numerical Methods
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
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.
Basic 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.
	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
Computational Lab (20ABS9918)	CO1:	Determine problems in linear algebra using MS-Excel's Tools.
	CO2:	Apply Central Tendency, Dispersion, Correlation and Regression analysis as basics of Statistics using Ms- Excel's Tools.
	CO3:	Utilize properties of probability distributions and to perform using Ms- Excel's Tools
	CO4:	Solving problems in Definite integrals numerically using Trapezoidal and Simpson's methods in Ms- Excel's Tools
	CO5:	Analyze Statistics to solve large samples and Small samples problems using Statistical Tools practicing in Ms- Excel's Tools.
Data	CO1:	Select the data structure appropriate for solving the problem

COURSE NAME	COURSE OUTCOMES	
Structures Lab (20AES0504)	CO2:	Implement searching and sorting algorithms
	CO3:	Design new data types
	CO4 :	Illustrate the working of stack and queue
	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.
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 and solve recurrence relations.
	CO5:	Apply Graph Theory in solving computer science problems
Digital Electronics& Microprocessors (20APC3001)	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 Microcontroller
	CO5:	Design application using 8051 Microcontroller
Database Management Systems (20APC3002)	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
Object Oriented Programming through JAVA (20APC3004)	CO1:	Understanding the Syntax, Semantics and features of Java Programming Language
	CO2:	To gain knowledge on Object Oriented Programming concepts
	CO3:	Raise Exceptions and handle exceptions
	CO4:	Analyze the method of creating Multi-threading programs.
	CO5:	Ability to create GUI applications & perform event handling
Computer Organization (20APC3006)	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 and Understand the importance of I/O devices and its interface circuits
	CO4:	Identify pipeline hazards and possible solutions to those hazards
	CO5:	Understand Scalable Architectures, Pipelining, Superscalar processors, multiprocessors
Database Management Systems Lab (20APC3003)	CO1:	Write SQL Queries
	CO2:	Implement PL/SQL programs
	CO3:	Design database for any real world problem
Object Oriented Programming through JAVA	CO1:	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java application

COURSE NAME	COURSE OUTCOMES	
Lab (20APC3004)	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
	CO5:	Ability to create GUI components and implementations
Computer Organization Lab (20APC3007)	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
Client Side Scripting (20ASC3001)	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 Of India (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
Formal Languages and Automata Theory (20APC3008)	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
Computer Networks (20APC3009)	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
Data warehousing and Mining (20APC3011)	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
Operating Systems (20APC3013)	CO1:	Distinguish between the different types of operating system environments.
	CO2:	Apply the concepts of process synchronization & CPU scheduling
	CO3:	Develop solutions to deadlock and memory management
	CO4:	Analyze various disk scheduling algorithms and file system interfaces
	CO5:	Analyze the various security issues and goals of protection
Managerial Economics And Financial	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.

COURSE NAME	COURSE OUTCOMES	
Analysis (20AHSMB01)	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.
Computer Networks Lab (20APC3010)	CO1:	Deal with Error detection/ correction techniques
	CO2:	Learn about Data link layer protocols
	CO3:	Learn about network layer protocols
	CO4:	Able to get knowledge about simulator
Data warehousing and Mining Lab (20APC3012)	CO1:	Learn how to use different data mining tools.
	CO2:	Learn to execute data mining tasks using a data mining toolkit (Orange data mining tool kit) and visualize the results.
	CO3:	Understanding linear regression model in the orange environment.
	CO4:	Demonstrate the working of algorithms for data mining tasks such association rule mining, classification and clustering.
	CO5:	Demonstrate the usage of Silhouettes.
OperatingSystems Lab (20APC3014)	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
Server Side Scripting (20ASC3002)	CO1:	Learn the installation guide of MYSQL,XAMPP5,APACHE and PHP
	CO2:	Able to design code for simple dynamic web pages
	CO3:	Design PHP and SQL/MySQL Integration.
	CO4:	Design Basic Projects
	CO5:	Able to provide protection to web server
Principles of Data Science (20APC3015)	CO1:	Recognize the different levels of Data Science concepts.
	CO2:	Analyze the basics of probability models for data exploration.
	CO3:	Analyze the basics of statistics models for data exploration.
	CO4:	Demonstrate the data using visualization techniques.
	CO5:	Design the suitable model for real time applications.
Artificial Intelligence (20APC3017)	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
Big Data Technologies (20APC3019)	CO1:	Understand the elements of Big data
	CO2:	Use different technologies to tame Big Data
	CO3:	Process Given data using Map Reduce
	CO4:	Test & Debug map reduce applications
	CO5:	Develop applications using Hive, NoSQL.
Deterministic and Stochastic Statistical	CO1:	Identify logical thinking to problem-solving in context.
	CO2:	Employ methods related to these concepts in a variety of data science applications.

Methods (20AOE9925)	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.
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.
Internet of Things (20AOE0552)	CO1:	Able to understand the applications of IOT
	CO2:	Able to understand build blocks of IOT
	CO3:	Apply IOT design methodologies
	CO4:	Able to understand the HADOOP and IEEE standard protocol
	CO5:	Able to understand the Zigbee devices
Design And Analysis of Algorithms (20APE3001)	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
Computer Graphics (20APE3002)	CO1:	Explain the basic concepts 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
ADHOC & SENSOR NETWORKS 20APE3003)	CO1:	List the design issues for Adhoc and sensor networks
	CO2:	Analyze the use of TCP in Wireless networks.
	CO3:	Justify the need for new MAC Protocols for Adhoc networks.
	CO4:	Extend the existing protocols to make them suitable for Adhoc Networks.
	CO5:	Evaluate the performance of Protocols in Adhoc and sensor networks. Design new Protocols for Adhoc and Sensor networks.
Artificial Intelligence Lab (20APC3018)	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)
Principles of Data Science Lab (20APC3016)	CO1:	Implement basic concepts of R Programming.
	CO2:	Implement the concepts of R script to extract the data from data frames and file operations.
	CO3:	Implement the various statistical techniques using R.
	CO4:	Extend the functionality of R by using Add-on packages.
	CO5:	Use R graphics and tables to visualize the results of various statistical operations on data.
Conversational AI / AI Chatbot (20ASC3003)	CO1:	Develop a fair understanding of AI applications and to know where and how to apply these tools to improve productivity.
	CO2:	Understand AI as a tool pretty much like they treat calculator as a tool for simple calculation
	CO3:	Apply methods for different training and testing assistance
	CO4:	Design classifier for voice assistants
	CO5:	Deploying Chatbot into the application

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.
Big Data Analytics (20APC3020)	CO1:	Understand the concepts and challenges of big data
	CO2:	Outline the operations viz. Collect, manage, store, query, and analyze various forms of big data.
	CO3:	Apply large-scale analytic tools to solve some of the open big data problems.
	CO4:	Analyze the impact of big data for business decisions and strategies.
	CO5:	Design different big data applications.
Machine Learning (20APC3022)	CO1:	Ability to understand what is learning and why it is essential to the design of intelligent machines.
	CO2:	Ability to design and implement various machine learning algorithms in a wide range of real-world applications.
	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
Cloud Computing (20APC3024)	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:	Demonstrate the map reducing programming model to process the Big Data along with Hadoop tools
	CO5:	Analyze authentication, confidentiality, privacy issues and disaster management
Software Engineering for AI (20APE3004)	CO1:	Understand the methods and issues in software engineering
	CO2:	Apply the principles of Artificial Intelligence for Software engineering
	CO3:	Design AI based software
	CO4:	Apply the algorithms of Machine learning in solving problems
	CO5:	Design Expert systems
Game Programming (20APE3005)	CO1:	Discuss the concepts of Game design and development.
	CO2:	Design the processes, and use mechanics for game development.
	CO3:	Explain the Core architectures of Game Programming.
	CO4:	Use Game programming platforms, frame works and engines.
	CO5:	Create interactive Games.
Introduction To NoSQL Database (20APE3006)	CO1:	Explain and compare different types of NoSQL Databases
	CO2:	Compare and contrast RDBMS with different NoSQL databases.
	CO3:	Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
	CO4:	Explain performance tune of Key-Value Pair NoSQL databases.
	CO5:	Apply NoSQL development tools on different types of NoSQL Databases
Big Data Analytics Lab (20APC3021)	CO1:	Configure Hadoop and Perform file management Task
	CO2:	Apply Map reduce programs to real-time issues like Word count, weather data set and sales of a company
	CO3:	Critically analyze huge data set using Hadoop distributed file systems and map reduce
	CO4:	Apply different data processing tools like pig, hive and spark

Machine Learning Lab (20APC3023)	CO1:	Implement procedures for the machine learning algorithms
	CO2:	Design Python programs for various Learning algorithms
	CO3:	Apply appropriate data sets to the Machine Learning algorithms
	CO4:	Identify and apply Machine Learning algorithms to solve real world problems
Cloud Computing Lab (20APC3025)	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.
Mobile Application Development (20ASC3004)	CO1:	Create data sharing with different applications and sending and intercepting SMS.
	CO2:	Develop applications using services and publishing android applications.
	CO3:	To demonstrate their skills of using Android software development tools
	CO4:	Develop mobile applications and publish in different mobile platforms
	CO5:	Use Android studio and iOS tools to develop mobile 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