B.Tech., AI&DS

SNO	COURSE	COURSE OUTCOMES	BLOOMS TAXONOMY
SEM I	HS3152:Professional English - I	**CO1:** To use appropriate words in a professional context.	K3
		CO2: To gain an understanding of basic grammatical structures and use them in the right context.	K2
		CO3: To read and infer the denotative and connotative meanings of technical texts.	K1
		CO4: To write definitions, descriptions, narrations, and essays on various topics.	K6
	MA3151:Matrices and Calculus	**CO1:** Use matrix algebra methods for solving practical problems.	K3
		CO2: Apply differential calculus tools in solving various application problems.	K3
		CO3: Use differential calculus concepts on functions of several variables.	K3
		CO4: Apply different methods of integration to solve practical problems.	K3
		CO5: Apply multiple integral concepts to solve problems related to areas, volumes, and other practical applications.	K3
	PH3151: Engineering Physics	**CO1:** Understand the importance of mechanics.	K2
		CO2: Express knowledge in electromagnetic waves.	K1
		CO3: Demonstrate a strong foundational knowledge in oscillations, optics, and lasers.	K2
		CO4: Understand the importance of quantum physics.	K2
		CO5: Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3
	CY3151: Engineering Chemistry	**CO1:** To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
		CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K1
		CO3: To apply the knowledge of phase rule and composites for material selection requirements.	K3
		CO4: To recommend suitable fuels for engineering processes and applications.	K5

		CO5: To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K1
	GE3151: Problem Solving and Python Programming	**CO1:** Develop algorithmic solutions to simple computational problems	K6
		CO2: Develop and execute simple Python programs.	K6
		CO3: Write simple Python programs using conditionals and loops for solving problems.	K6
		CO4: Decompose a Python program into functions.	K4
		CO5: Represent compound data using Python lists, tuples, dictionaries etc.	K3
		CO6: Read and write data from/to files in Python programs.	K1
	GE3171: Problem Solving and Python Programming Laboratory	**CO1:** Develop algorithmic solutions to simple computational problems	K6
		CO2: Develop and execute simple Python programs.	K6
		CO3: Implement programs in Python using conditionals and loops for solving problems.	K3
		CO4: Deploy functions to decompose a Python program.	K6
		CO5: Process compound data using Python data structures.	K3
		CO6: Utilize Python packages in developing software applications.	K3
	BS3171: Physics and Chemistry Laboratory	**CO1:** Understand the functioning of various physics laboratory equipment.	K2
		CO2: Use graphical models to analyze laboratory data.	K3
		CO3: Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
		CO4: Access, process and analyze scientific information.	K3
		CO5: Solve problems individually and collaboratively.	K4
	GE3172: English Laboratory	**CO1:** To listen to and comprehend general as well as complex academic information	K3
		CO2: To listen to and understand different points of view in a discussion	K2
		CO3: To speak fluently and accurately in formal and informal communicative contexts	K6
		CO4: :To describe products and processes and explain their uses and purposes clearly and accurately	K1
		CO5: To express their opinions effectively in both formal and informal discussions.	K1

SEM II	**HS3252 : Professional English - II**	**CO1:** To compare and contrast products and ideas in technical texts.	K2
		CO2: To identify and report cause and effects in events, industrial processes through technical texts	K1
		CO3: To analyse problems in order to arrive at feasible solutions and communicate them in the written format.	K4
		CO4: To present their ideas and opinions in a planned and logical manner	K3
		CO5: To draft effective resumes in the context of job search.	K6
	MA3251 : Statistics and Numerical Methods	**CO1:** Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
		CO2: Apply the basic concepts of classifications of design of experiments in the field of agriculture	K3
		CO3 : Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K5
		CO4: Understandthe knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K2
		CO5: Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
	PH3256 : Physics for Information Science	**CO1:** gain knowledge on classical and quantum electron theories, and energy band structures	K2
		CO2: acquire knowledge on basics of semiconductor physics and its applications in various devices	K1
		CO3:get knowledge on magnetic properties of materials and their applications in data storage,	K1
		CO4: have the necessary understanding on the functioning of optical materials for optoelectronics	K2
		CO5: understand the basics of quantum structures and their applications and basics of quantum computing	K2
	BE3251: Basic Electrical and Electronics Engineering	**CO1:** Compute the electric circuit parameters for simple problems	K2
		CO2: Explain the working principle and applications of electrical machines	K1
		CO3: Analyze the characteristics of analog electronic devices	K4
		CO4: Explain the basic concepts of digital electronics	K1
		CO5: Explain the operating principles of measuring instruments	K1

	GE3251 : Engineering Graphics	**CO1:** Use BIS conventions and specifications for engineering drawing.	K3
		CO2: Construct the conic curves, involutes and cycloid.	K6
		CO3: Solve practical problems involving projection of lines.	K5
		CO4: Draw the orthographic, isometric and perspective projections of simple solids.	K6KKK K6
		CO5: Draw the development of simple solids.	K6
	AD3251:Data Structures Design	**CO1:** explain abstract data types	K1
		CO2: design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K6
		CO3: design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K6
		CO4: model problems as graph problems and implement efficient graph algorithms to solve them	K6
	GE3271 : Engineering Practices Laboratory	**CO1:** Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K6
		CO2: Wire various electrical joints in common household electrical wire work.	K6
		CO3:Weld various joints in steel plates using arc welding work; Machine various simple processes	K6
		CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K6
	AD3271: Data Structures Design Laboratory	**CO1:** Implement ADTs (Abstract Data Types) as Python classes.	K4
		CO2: Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications.	K6
		CO3: Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting.	K6
		CO4: Model problems as graph problems and implement efficient graph algorithms to solve them	K6
	GE3272 : Communication Laboratory / Foreign Language	**CO1:** Speak effectively in group discussions held in a formal/semi formal contexts.	K1
		CO2: Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K2
		CO3: Write emails, letters and effective job applications	K2
		CO4: Write critical reports to convey data and information with clarity and precision	K2
		CO5: Give appropriate instructions and recommendations for safe execution of tasks	K2

SEM III	**MA3354: Discrete Mathematics**	**CO1:** Have knowledge of the concepts needed to test the logic of a program.	K1
		CO2: Have an understanding of identifying structures on many levels.	K2
		CO3: Be aware of a class of functions which transform a finite set into another finite set, relating to input and output functions in computer science.	K2
		CO4: Be aware of the counting principles	K2
		CO5: Be exposed to concepts and properties of algebraic structures such as groups, rings, and fields.	K2
	CS3351: Digital Principles And Computer Organization	**CO1:** Design various combinational digital circuits using logic gates	K6
		CO2: Design sequential circuits and analyze the design procedures	K6
		CO3: State the fundamentals of computer systems and analyze the execution of an instruction	K1
		CO4: Analyze different types of control design and identify hazards	K4
		CO5: Identify the characteristics of various memory systems and I/O communication	K1
	AD3391: Database Design And Management	**CO1:** Understand the database development life cycle and apply conceptual modeling	K1
		CO2: Apply SQL and programming in SQL to create, manipulate and query the database	K3
		CO3: Apply the conceptual-to-relational mapping and normalization to design relational database	K3
		CO4: Determine the serializability of any non-serial schedule using concurrency techniques	K4
		CO5: Apply the data model and querying in Object-relational and No-SQL databases	K3
	AD3351: Design And Analysis Of Algorithms	**CO1:** Analyze the efficiency of recursive and non-recursive algorithms mathematically	K4
		CO2: Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques	K4
		CO3: Implement and analyze the problems using dynamic programming and greedy algorithmic techniques.	K3
		CO4: Solve the problems using iterative improvement techniques for optimization	K3
		CO5: Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.	K5

	AD3301: Data Exploration And VisualizatioN	**CO1:** Understand the fundamentals of exploratory data analysis	K2
		CO2: Implement the data visualization using Matplotlib.	K3
		CO3: Perform univariate data exploration and analysis.	K3
		CO4: Apply bivariate data exploration and analysis.	K3
		CO5: Use Data exploration and visualization techniques for multivariate and time series data	K3
	AL3391: Artificial Intelligence	**CO1:** Explain intelligent agent frameworks	K1
		CO2: Apply problem solving techniques	K3
		CO3: Apply game playing and CSP techniques	K3
		CO4: Perform logical reasoning	K3
		CO5: Perform probabilistic reasoning under uncertainty	K3
	AD3381: Database Design And Management Laboratory	**CO1:** Understand the database development life cycle	K2
		CO2: Design relational database using conceptual-to-relational mapping, Normalization	K6
		CO3: Apply SQL for creation, manipulation and retrieval of data	K3
		CO4: Develop a database applications for real- time problems	K6
		CO5: Design and query object-relational databases	K6
	AD3311: Artificial Intelligence Laboratory	**CO1:** Design and implement search strategies	K6
		CO2: Implement game playing and CSP techniques	K3
		CO3: Develop logical reasoning systems	K6
		CO4: Develop probabilistic reasoning systems	K6
	GE3361: Professional Development	**CO1:** Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
		CO2: Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
		CO3: Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEM IV	**MA3391: Probability And Statistics**	**CO1:** Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
		CO2: Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
		CO3: Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
		CO4:Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.	K3
		CO5: Have the notion of sampling distributions and statistical techniques used in engineering and management problems.	K1
	AL3452: Operating Systems	**CO1:** Analyze various scheduling algorithms and process synchronization	K4
		CO2: Explain deadlock, prevention and avoidance algorithms.	K1
		CO3: Compare and contrast various memory management schemes.	K3
		CO4: Explain the functionality of file systems I/O systems, and Virtualization	K1
		CO5: Compare iOS and Android Operating Systems.	K4
	AL3451: Machine Learning	**CO1:** Explain the basic concepts of machine learning.	K1
		CO2: Construct supervised learning models.	K6
		CO3: Construct unsupervised learning algorithms.	K6
		CO4: Evaluate and compare different models	K5
	AD3491:Fundamentals Of Data Science And Analytics	**CO1:** Explain the data analytics pipeline	K1
		CO2: Describe and visualize data	K1
		CO3: Perform statistical inferences from data	K3
		CO4: Analyze the variance in the data	K4
		CO5: Build models for predictive analytics	K6
	CS3591: Computer Networks	**CO1:** Explain the basic layers and its functions in computer networks.	K1
		CO2:Understand the basics of how data flows from one node to another.	K2
		CO3: Analyze routing algorithms.	K4
		CO4:Describe protocols for various functions in the network	K1
		CO5: Analyze the working of various application layer protocols.	K4

	GE3451: Environmental Sciences And Sustainability	CO1:To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
		CO2: To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K1
		CO3:To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K1
		CO4:To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K1
		CO5:To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3
	AD3411: Data Science And Analytics Laboratory	**CO1:** Write python programs to handle data using Numpy and Pandas	K6
		CO2: Perform descriptive analytics	K3
		CO3: Perform data exploration using Matplotlib	K3
		CO4:Perform inferential data analytics	K3
		CO5: Build models of predictive analytics	K6
	AD3461: Machine Learning Laboratory	CO1:Apply suitable algorithms for selecting the appropriate features for analysis	K3
		CO2: Implement supervised machine learning algorithms on standard datasets and evaluate the performance.	K3
		CO3: Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance.	K3
		CO4:Build the graph based learning models for standard data sets.	K6
		CO5: Assess and compare the performance of different ML algorithms and select the suitable one based on the application.	K5