



PRATHYUSHA ENGINEERING COLLEGE
(An Autonomous Institution)
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA
SCIENCE
Course Outcomes
Regulation 2021

Course Name	Course Outcomes
SEMESTER I	
HS3152 PROFESSIONAL ENGLISH - I	CO1: Apply appropriate words in a professional context CO2: Apply the basic grammatic structures and use them in right context. CO3: Apply the denotative and connotative meanings of technical texts CO4: Write definitions, descriptions, narrations and essays on various topics CO5: Apply basic grammar principles and be able to synthesize and transform sentences.
MA3151 MATRICES AND CALCULUS	CO1: Apply the matrix algebra methods for solving practical problems. CO2: Apply differential calculus tools in solving various application problems. CO3: Apply the differential calculus ideas on several variable functions. CO4: Apply different methods of integration in solving practical problems. CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems
PH3151 ENGINEERING PHYSICS	CO1: Apply the basic concepts of mechanics and kinematics. CO2: Analyze electromagnetic waves and applications CO3: Apply the knowledge in oscillations, optics and laser CO4: Develop the prime significance in the concepts of quantum mechanics CO5: Apply the fundamental ideas on the applications of quantum mechanics
CY3151 ENGINEERING CHEMISTRY	CO1: Analyze the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. CO2: Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. CO3: Apply the knowledge of phase rule and composites for material selection requirements CO4: Apply suitable fuels for engineering processes and applications. CO5: Design different forms of energy resources and apply them for suitable applications in energy sectors.
GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING	CO1: Develop algorithmic solutions to simple computational problems. CO2: Develop and execute simple Python programs. CO3: Develop simple Python programs using conditionals and loops for solving problems CO4: Develop a Python program into functions. CO5: Develop compound data using Python lists, tuples, dictionaries etc. CO6: Apply statements to read and write data from/to files in Python programs

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<p style="text-align: center;">GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</p>	<p>CO1: Develop algorithmic solutions to simple computational problems CO2: Develop and execute simple Python programs. CO3: Develop programs in Python using conditionals and loops for solving problems. CO4: Apply functions to decompose a Python program. CO5: Design compound data using Python data structures. CO6: Apply Python packages in developing software applications.</p>
<p style="text-align: center;">BS3171 PHYSICS AND CHEMISTRY LABORATORY</p>	<p>CO1: Analyse the functioning of various physics laboratory equipment. CO2: Apply graphical models to analyze laboratory data. CO3: Develop mathematical models as a medium for quantitative reasoning and describing physical reality. CO4: Analyze, Access and process scientific information. CO5: Develop solutions for problems individually and collaboratively.</p>
<p style="text-align: center;">GE3172 ENGLISH LABORATORY</p>	<p>CO1: Apply general as well as complex academic information CO2: Analyse different points of view in a discussion CO3: Develop fluent and accurate in formal and informal communicative contexts CO4: Develop products and processes and explain their uses and purposes clearly and accurately CO5: Analyse opinions effectively in both formal and informal discussions</p>
SEMESTER II	
<p style="text-align: center;">HS3252 PROFESSIONAL ENGLISH - II</p>	<p>CO1: Analyze products and ideas in technical texts. CO2: Identify and report cause and effects in events, industrial processes through technical texts CO3: Analyze problems in order to arrive at feasible solutions and communicate them in the written format. CO4: Analyse ideas and opinions in a planned and logical manner CO5: Write effective resumes in the context of job search.</p>
<p style="text-align: center;">MA3251 STATISTICS AND NUMERICAL METHODS</p>	<p>CO1: Apply the concept of testing of hypothesis for small and large samples which play important role in real life problems. CO2: Design the experiments and analyze the data to carry out the experiments. CO3: Apply the basic concepts of solving algebraic and transcendental equations. CO4: Apply numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration. CO5: Apply the knowledge of various techniques and methods of solving ordinary differential equations.</p>

Course Name	Course Outcomes
PH3256 PHYSICS FOR INFORMATION SCIENCE	CO1: Apply knowledge on the fundamental electrical properties of materials. CO2: Apply the knowledge on basics of semiconductor. CO3: Analyze the sound knowledge of magnetic materials. CO4: Analyze the concepts of optical properties and its displays. CO5 :Identify the concepts of Nano, quantum computing devices.
BE3251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1: Compute the electric circuit parameters for simple problems. CO2: Analyze the working principle and applications of electrical machines CO3: Analyze the characteristics of analog electronic devices CO4: Apply the basic concepts of digital electronics CO5: Analyze the operating principles of measuring instruments
GE3251 ENGINEERING GRAPHICS	CO1: Apply BIS conventions and specifications for engineering drawing. CO2: Construct the conic curves, involutes and cycloid. CO3: Develop solution for practical problems involving projection of lines. CO4: Design the orthographic, isometric and perspective projections of simple solids. CO5: Analyze the development of simple solid.
AD3251 DATA STRUCTURES DESIGN	CO1: Explain abstract data types CO2:Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications CO3:Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting CO4:Model problems as graph problems and implement efficient graph algorithms to solve them
GE3271 ENGINEERING PRACTICES LABORATORY	CO1: Design pipeline 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. CO2: Apply various electrical joints in common household electrical wire work. CO3: Apply various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work. CO4: Design Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
AD3271 DATA STRUCTURES DESIGN LABORATORY	CO1: Implement ADTs as Python classes CO2:Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications CO3:Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting CO4:Model problems as graph problems and implement efficient graph algorithms to solve them

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<p>GE3272 COMMUNICATION LABORATORY</p>	<p>CO1: Apply the knowledge effectively in group discussions held in a formal/semi-formal context. CO2: Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions CO3: Write emails, letters and effective job applications. CO4: Analyze critical reports to convey data and information with clarity and precision CO5: Apply appropriate instructions and recommendations for safe execution of tasks.</p>
SEMESTER III	
<p>MA3354 DISCRETE MATHEMATICS</p>	<p>CO1: Apply the concepts needed to test the logic of a program CO2: Design structures on many levels. CO3: Analyze the class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. CO4: Develop the knowledge of the counting principles. CO5: Analyze the concepts and properties of algebraic structures such as groups, rings and fields</p>
<p>CS3351 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION</p>	<p>CO 1: Design various combinational digital circuits using logic gates. CO 2: Design sequential circuits and analyze the design procedures. CO 3: Identify the fundamentals of computer systems and analyze the execution of an instruction. CO 4: Analyze different types of control design and identify hazards. CO5: Identify the characteristics of various memory systems and I/O communication.</p>
<p>AD3391 DATABASE DESIGN AND MANAGEMENT</p>	<p>CO1: Understand the database development life cycle and apply conceptual modeling CO2: Apply SQL and programming in SQL to create, manipulate and query the database CO3: Apply the conceptual-to-relational mapping and normalization to design relational database CO4: Determine the serializability of any non-serial schedule using concurrency techniques CO5: Apply the data model and querying in Object-relational and No-SQL databases.</p>
<p>AD3351 DESIGN AND ANALYSIS OF ALGORITHMS</p>	<p>CO1: Analyze the efficiency of recursive and non-recursive algorithms mathematically CO2: Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques CO3: Implement and analyze the problems using dynamic programming and greedy algorithmic techniques. CO4: Solve the problems using iterative improvement techniques for optimization. CO5: Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques..</p>

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AD3301 DATA EXPLORATION AND VISUALIZATION	CO1: Understand the fundamentals of exploratory data analysis. CO2: Implement the data visualization using Matplotlib. CO3: Perform univariate data exploration and analysis. CO4: Apply bivariate data exploration and analysis. CO5: Use Data exploration and visualization techniques for multivariate and time series data.
AL3391 ARTIFICIAL INTELLIGENCE	CO1: Explain intelligent agent frameworks CO2: Apply problem solving techniques CO3: Apply game playing and CSP techniques CO4: Perform logical reasoning CO5: Perform probabilistic reasoning under uncertainty

AD3381 DATABASE DESIGN AND MANAGEMENT LABORATORY	CO1: Understand the database development life cycle CO2: Design relational database using conceptual-to-relational mapping, Normalization CO3: Apply SQL for creation, manipulation and retrieval of data CO4: Develop a database application for real-time problems CO5: Design and query object-relational databases
AD3311 ARTIFICIAL INTELLIGENCE LABORATORY	CO1: Design and implement search strategies CO2: Implement game playing and CSP techniques CO3: Develop logical reasoning systems CO4: Develop probabilistic reasoning systems
GE3361 PROFESSIONAL DEVELOPMENT	CO1: Apply MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements CO2: Apply MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding CO3: Apply MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.
SEMESTER 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. CO2: Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. CO3: Apply the concept of testing of hypothesis for small and large samples in real life problems. CO4: Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control. CO5: Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

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AL3452 OPERATING SYSTEMS	CO1: Analyze various scheduling algorithms and process synchronization. CO2: Explain deadlock, prevention and avoidance algorithms. CO3: Compare and contrast various memory management schemes. CO4: Explain the functionality of file systems I/O systems, and Virtualization CO5 : Compare iOS and Android Operating Systems.
AL3451 MACHINE LEARNING	CO1: Explain the basic concepts of machine learning. CO2: Construct supervised learning models. CO3: Construct unsupervised learning algorithms. CO4: Evaluate and compare different models
AD3491 FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS	CO1: Explain the data analytics pipeline CO2: Describe and visualize data CO3: Perform statistical inferences from data CO4: Analyze the variance in the data CO5 : Build models for predictive analytics
CS3591 COMPUTER NETWORKS	CO 1: Explain the basic layers and its functions in computer networks. CO 2: Understand the basics of how data flows from one node to another. CO 3: Analyze routing algorithms. CO 4: Describe protocols for various functions in the network. CO 5: Analyze the working of various application layer protocols.
GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	CO1: Identify and apply the functions of environment, ecosystems and biodiversity and their conservation. CO2: Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society. CO3: Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. CO4: Analyze the different goals of sustainable development and apply them for suitable technological advancement and societal development. CO5: Apply the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
AD3411 DATA SCIENCE AND ANALYTICS LABORATORY	CO1. Write python programs to handle data using Numpy and Pandas CO2. Perform descriptive analytics CO3. Perform data exploration using Matplotlib CO4. Perform inferential data analytics CO5. Build models of predictive analytics

<p style="text-align: center;">AD3461 MACHINE LEARNING LABORATORY</p>	<p>CO1: Apply suitable algorithms for selecting the appropriate features for analysis.</p> <p>CO2: Implement supervised machine learning algorithms on standard datasets and evaluate the performance.</p> <p>CO3: Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance.</p> <p>CO4: Build the graph based learning models for standard data sets.</p> <p>CO5: Assess and compare the performance of different ML algorithms and select the suitable one based on the application.</p>
<p>SEMESTER – V</p>	
<p style="text-align: center;">AD3501 DEEP LEARNING</p>	<p>CO1: Explain the basics in deep neural networks</p> <p>CO2: Apply Convolution Neural Network for image processing</p> <p>CO3: Apply Recurrent Neural Network and its variants for text analysis</p> <p>CO4: Apply model evaluation for various applications</p> <p>CO5: Apply auto encoders and generative models for suitable applications</p>

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CW3551 DATA AND INFORMATION SECURITY	CO1: Understand the basics of data and information security CO2: Understand the legal, ethical and professional issues in information security CO3: Understand the various authentication schemes to simulate different applications. CO4: Understand various security practices and system security standards CO5: Understand the Web security protocols for E-Commerce applications
CS3551 DISTRIBUTED COMPUTING	CO1: Discuss the foundations of distributed systems. CO2: Develop the solution for synchronization and state consistency problems. CO3 Apply resource sharing techniques in distributed systems. CO4: Apply working model of consensus and reliability of distributed systems. CO5: Discuss the fundamentals of cloud computing.
CCS334 BIG DATA ANALYTICS	CO1: Describe big data and use cases from selected business domains. CO2: Explain NoSQL big data management. CO3: Install, configure, and run Hadoop and HDFS. CO4: Perform map-reduce analytics using Hadoop. CO5: Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.
CCS335 CLOUD COMPUTING	CO1: Understand the design challenges in the cloud. CO2: Apply the concept of virtualization and its types. CO3: Experiment with virtualization of hardware resources and Docker. CO4: Develop and deploy services on the cloud and set up a cloud environment. CO5: Explain security challenges in the cloud environment.
CCW331 BUSINESS ANALYTICS	CO1: Explain the real world business problems and model with analytical solutions. CO2: Identify the business processes for extracting Business Intelligence CO3: Apply predictive analytics for business fore-casting CO4: Apply analytics for supply chain and logistics management CO5: Use analytics for marketing and sales.
MX3082 ELEMENTS OF LITERATURE	CO1: To make the students aware about the finer sensibilities of human existence through an art form. CO2: The students will learn to appreciate different forms of literature as suitable modes of expressing human experience.
SEMESTER VI	
CS3691 EMBEDDED SYSTEMS AND IOT	CO1: Explain the architecture of embedded processors. CO2: Write embedded C programs. CO3: Design simple embedded applications. CO4: Compare the communication models in IOT CO5: Design IoT applications using Arduino/Raspberry Pi /open platform.

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<p>OBT351 FOOD, NUTRITION AND HEALTH</p>	<p>CO1: To be able to understand the nutritional values of the various types of foods CO2: To be able to Analyze the role of food in the metabolic activity of the healthy diet CO3: To be able to Infer the BMI calculation and stress related diseases. CO4: To be able to Elaborate the independent decision on the choice of food to prevent life style disorders and diseases CO5: To be able to Assess about the food laws governance CO6: To be able to Compare junk, modified and super foods</p>
<p>CCS341 DATA WAREHOUSING</p>	<p>CO1: Design data warehouse architecture for various Problems CO2: Apply the OLAP Technology CO3: Analyze the partitioning strategy CO4: Critically analyze the differentiation of various schema for given problem CO5: Frame roles of process manager & system manager</p>
<p>CCS349 IMAGE AND VIDEO ANALYTICS</p>	<p>CO1: Understand the basics of image processing techniques for computer vision and video analysis. CO2: Explain the techniques used for image pre-processing. CO3: Develop various object detection techniques. CO4: Understand the various face recognition mechanisms. CO5: Elaborate on deep learning-based video analytics.</p>
<p>CCS362 SECURITY AND PRIVACY IN CLOUD</p>	<p>CO1: Understand the cloud concepts and fundamentals. CO2: Explain the security challenges in the cloud. CO3: Define cloud policy and Identity and Access Management. CO4: Understand various risks and audit and monitoring mechanisms in the cloud. CO5: Define the various architectural and design considerations for security in the cloud.</p>
<p>AD3002 HEALTH CARE ANALYTICS</p>	<p>CO1: Use machine learning and deep learning algorithms for health data analysis CO2: Apply the data management techniques for healthcare data CO3: Evaluate the need of healthcare data analysis in e-healthcare, telemedicine and other critical care applications CO4: Design health data analytics for real time applications CO5: Design emergency care system using health data analysis</p>
<p>MX3085 WELL-BEING WITH TRADITIONAL PRACTICES-YOGA, AYURVEDA AND SIDDHA</p>	<p>CO1: To enjoy life happily with fun filled new style activities that help to maintain health also CO2: To adapt a few lifestyle changes that will prevent many health disorders CO3: To be cool and handbill every emotion very smoothly in every walk of life CO4: To learn to eat cost effective but healthy foods that are rich in essential nutrients CO5: To develop immunity naturally that will improve resistance against many health disorders</p>

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SEMESTER VII	
GE3791 HUMAN VALUES AND ETHICS	CO1: Identify the importance of democratic, secular and scientific values in harmonious functioning of social life CO2: Practice democratic and scientific values in both their personal and professional life. CO3: Find rational solutions to social problems. CO4: Behave in an ethical manner in society CO5 : Practice critical thinking and the pursuit of truth.
GE3751 PRINCIPLES OF MANAGEMENT	CO1: Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling. CO2: Have same basic knowledge on international aspect of management. CO3: Ability to understand management concept of organizing. CO4: Ability to understand management concept of directing. CO5: Ability to understand management concept of controlling.
AI3021 IT IN AGRICULTURAL SYSTEM	CO1: The students shall be able to understand the applications of IT in remote sensing applications such as Drones etc. CO2: The students will be able to get a clear understanding of how a greenhouse can be automated and its advantages. CO3: The students will be able to apply IT principles and concepts for management of field operations. CO4: The students will get an understanding about weather models, their inputs and applications. CO5: The students will get an understanding of how IT can be used for e-governance in agriculture.
CBM333 ASSISTIVE TECHNOLOGY	CO1: Interpret the various mechanical techniques that will help in assisting the heart functions. CO2: Describe the underlying principles of hemodialyzer machine. CO3: Indicate the methodologies to assess the hearing loss. CO4: Evaluate the types of assistive devices for mobilization. CO5: Explain about TENS and biofeedback system.
OGI352 GEOGRAPHICAL INFORMATION SYSTEM	CO1 Have basic idea about the fundamentals of GIS. CO2 Understand the types of data models. CO3 Get knowledge about data input and topology CO4 Gain knowledge on data quality and standards CO5 Understand data management functions and data output

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SEMESTER VIII	
AD3811 PROJECT WORK / INTERNSHIP	CO1: Gain Domain knowledge and technical skill set required for solving industry / research problems CO2: Provide solution architecture, module level designs, algorithms CO3: Implement, test and deploy the solution for the target platform CO4: Prepare detailed technical report, demonstrate and present the work