



Shree Sathyam College of Engineering and Technology

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

NH-544, Salem - Coimbatore Highways, Kuppanur, Sankari Taluk, Salem - 637301, TamilNadu, India.

Email : principal@shreesathyam.edu.in Web : www.shreesathyam.edu.in Phone : 04283 - 244080

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

ANNA UNIVERSITY REGULATIONS: 2021

LIST OF COURSES

FIRST YEAR COURSES			
S.NO	NAAC CODE	SUBJECT CODE	SUBJECT NAME
01	C101	HS3152	PROFESSIONAL ENGLISH - I
02	C102	MA3151	MATRICES AND CALCULUS
03	C103	PH3151	ENGINEERING PHYSICS
04	C104	CY3151	ENGINEERING CHEMISTRY
05	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
06	C107	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
07	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY - (PHYSICS LABORATORY)
08	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY - (CHEMISTRY LABORATORY)
09	C109	GE3172	ENGLISH LABORATORY
10	C110	HS3252	PROFESSIONAL ENGLISH - II
11	C111	MA3251	STATISTICS AND NUMERICAL METHODS
12	C112	PH3256	PHYSICS FOR INFORMATION SCIENCE
13	C113	BE3251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	GE3251	ENGINEERING GRAPHICS
15	C115	AD3251	DATA STRUCTURES DESIGN



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16	C117	GE3271	ENGINEERING PRACTICES LABORATORY
17	C118	AD3271	DATA STRUCTURES DESIGN LABORATORY
18	C119	GE3272	COMMUNICATION LABORATORY / FOREIGN LANGUAGE
SECOND YEAR COURSES			
19	C201	MA3354	DISCRETE MATHEMATICS
20	C202	CS3351	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
21	C203	AD3391	DATA BASE DESIGN AND MANAGEMENT
22	C204	AD3351	DESIGN AND ANALYSIS OF ALGORITHMS
23	C205	AD3301	DATA EXPLORATION AND VISUALIZATION
24	C206	AL3391	ARTIFICIAL INTELLIGENCE
25	C207	AD3381	DATA BASE DESIGN AND MANAGEMENT LABORATORY
26	C208	AD3311	ARTIFICIAL INTELLIGENCE LABORATORY
27	C209	GE3361	PROFESSIONAL DEVELOPMENT
28	C210	MA3391	PROBABILITY AND STATISTICS
29	C211	AL3452	OPERATING SYSTEMS
30	C212	AL3451	MACHINE LEARNING
31	C213	AD3491	FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS
32	C214	CS3591	COMPUTER NETWORKS
33	C215	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
34	C216	AD3411	DATA SCIENCE AND ANALYTICS LABORATORY
35	C217	AD3461	MACHINE LEARNING LABORATORY
THIRD YEAR COURSES			



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36	C301	AD3501	DEEP LEARNING
37	C302	CW3551	DATA AND INFORMATION SECURITY
38	C303	CS3551	DISTRIBUTED COMPUTING
39	C304	CCS334	BIG DATA ANALYTICS
40	C305	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT
41	C306	CCS366	SOFTWARE TESTING AND AUTOMATION
42	C307	CCS331	3D PRINTING AND DESIG
43	C308	AD3512	DEEP LEARNING LABORATORY
44	C309	AD3512	SUMMER INTERNSHIP
45	C310	CS3691	EMBEDDED SYSTEMS AND IOT
FINAL YEAR COURSES			
46	C401	GE3791	HUMAN VALUES AND ETHICS
47	C402	AD3811	PROJECT WORK / INTERNSHIP



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

ANNA UNIVERSITY REGULATIONS: 2021

FIRST YEAR COURSES (I& II SEMESTER)

Course Outcomes (Cos) of the Artificial Intelligence And Data Science

C101	HS3152	Professional English - I
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C101.1	To use appropriate words in a professional context
C101.2	To gain understanding of basic grammatical structures and use them in right context.
C101.3	To read and infer the denotative and connotative meanings of technical texts
C101.4	To read and interpret information presented in tables, charts and other graphic forms

C102	MA3151	Matrices and Calculus
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C102.1	Use the matrix algebra methods for solving practical problems.
C102.2	Apply differential calculus tools in solving various application problems.
C102.3	Able to use differential calculus ideas on several variable functions.
C102.4	Apply different methods of integration in solving practical problems
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.



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C103	PH3151	Engineering Physics
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C103.1	Understand the importance of mechanics.
C103.2	Express their knowledge in electromagnetic waves.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands

C104	CY3151	Engineering Chemistry
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C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.
C104.4	To recommend suitable fuels for engineering processes and applications.
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.



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C105	GE3151	Problem Solving and Python Programming
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C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Develop and execute simple Python programs.
C105.3	Write simple Python programs using conditionals and looping for solving problems.
C105.4	Decompose a Python program into functions
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.
C105.6	Read and write data from/to files in Python programs.

C107	GE3171	Problem Solving and Python Programming Laboratory
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C107.1	Develop algorithmic solutions to simple computational problems
C107.2	Develop and execute simple Python programs.
C107.3	Implement programs in Python using conditionals and loops for solving problems.
C107.4	Deploy functions to decompose a Python program.
C107.5	Process compound data using Python data structures.
C107.6	Utilize Python packages in developing software applications.



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C108	BS3171	Physics and Chemistry Laboratory
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C108.1	Understand the functioning of various physics laboratory equipment.
C108.2	Use graphical models to analyze laboratory data.
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality
C108.4	Access, process and analyze scientific information.
C108.5	Solve problems individually and collaboratively.

C108.1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
C108.2	To determine the amount of metal ions through volumetric and spectroscopic techniques
C108.3	To analyse and determine the composition of alloys.
C108.4	To learn simple method of synthesis of nanoparticles
C108.5	To quantitatively analyse the impurities in solution by electro analytical techniques



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C109	GE3172	English Laboratory
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C109.1	To listen to and comprehend general as well as complex academic information
C109.2	To listen to and understand different points of view in a discussion
C109.3	To speak fluently and accurately in formal and informal communicative contexts
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately
C109.5	To express their opinions effectively in both formal and informal discussions

C110	HS3252	Professional English - II
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C110.1	To compare and contrast products and ideas in technical texts
C110.2	To identify and report cause and effects in events, industrial processes through technical texts
C110.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
C110.4	To present their ideas and opinions in a planned and logical manner
C110.5	To draft effective resumes in the context of job search.



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C111	MA3251	Statistics and Numerical Methods
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C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

C112	PH3256	Physics for Information Science
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C112.1	Gain knowledge on classical and quantum electron theories, and energy band structures
C112.2	Acquire knowledge on basics of semi conductor physics and its applications in various devices
C112.3	Get knowledge on magnetic properties of materials and their applications in data storage,
C112.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
C112.5	Understand the basics of quantum structures and their applications and basics of quantum computing



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C113	BE3251	Basic Electrical and Electronics Engineering
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C113.1	Compute the electric circuit parameters for simple problems
C113.2	Explain the working principle and applications of electrical machines
C113.3	Analyze the characteristics of analog electronic devices
C113.4	Explain the basic concepts of digital electronics
C113.5	Explain the operating principles of measuring instruments

C114	GE3251	Engineering Graphics
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C114.1	Use BIS conventions and specifications for engineering drawing.
C114.2	Construct the conic curves, involutes and cycloid.
C114.3	Solve practical problems involving projection of lines.
C114.4	Draw the orthographic, isometric and perspective projections of simple solids.
C114.5	Draw the development of simple solids.



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C115	AD3251	DATA STRUCTURES DESIGN
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C115.1	Explain abstract data types
C115.2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications
C115.3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting
C115.4	Model problems as graph problems and implement efficient graph algorithms to solve them

C117	GE3271	Engineering Practices Laboratory
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C117.1	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.
C117.2	Wire various electrical joints in common household electrical wire work.
C117.3	Weld 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 equipments; Make a tray out of metal sheet using sheet metal work.
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.



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C118	AD3271	DATA STRUCTURES DESIGN LABORATORY
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C118.1	Implement ADTs as Python classes
C118.2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications
C118.3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting
C118.4	Model problems as graph problems and implement efficient graph algorithms to solve them

C119	GE3272	Communication Laboratory / Foreign Language
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C119.1	Speak effectively in group discussions held in a formal/semi formal contexts
C119.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
C119.3	Write emails, letters and effective job applications.
C119.4	Write critical reports to convey data and information with clarity and precision
C119.5	Give appropriate instructions and recommendations for safe execution of tasks



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ANNA UNIVERSITY REGULATIONS: 2021

SECOND YEAR COURSES (III & IV SEMESTER)

Course Outcomes (Cos)

C201	MA3354	DISCRETE MATHEMATICS
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C201.1	Have knowledge of the concepts needed to test the logic of a program
C201.2	Have an understanding in identifying structures on many levels
C201.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science
C201.4	Be aware of the counting principles
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields

C202	CS3351	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
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C202.1	Design various combinational digital circuits using logic gates
C202.2	Design sequential circuits and analyze the design procedures
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction
C202.4	Analyze different types of control design and identify hazards
C202.5	Identify the characteristics of various memory systems and I/O communication



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C203	AD3391	DATA BASE DESIGN AND MANAGEMENT
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C203.1	Understand the database development life cycle and apply conceptual modeling
C203.2	Apply SQL and programming in SQL to create, manipulate and query the database
C203.3	Apply the conceptual – to - relational mapping and normalization to design relational database
C203.4	Determine the serializability of any non-serial schedule using concurrency techniques
C203.5	Apply the data model and querying in Object-relational and No-SQL databases.

C204	AD3351	DESIGN AND ANALYSIS OF ALGORITHMS
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C204.1	Analyze the efficiency of recursive and non-recursive algorithms mathematically
C204.2	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques
C204.3	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques.
C204.4	Solve the problems using iterative improvement techniques for optimization.
C204.5	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.



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C205	AD3301	DATAEXPLORATION AND VISUALIZATION
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C205.1	Understand the fundamentals of exploratory data analysis.
C205.2	Implement the data visualization using Mat plot lib.
C205.3	Perform univariate data exploration and analysis.
C205.4	Apply bivariate data exploration and analysis
C205.5	Use Data exploration and visualization techniques for multivariate and time series data.

C206	AL3391	ARTIFICIAL INTELLIGENCE
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C206.1	Explain intelligent agent frameworks
C206.2	Apply problem solving techniques
C206.3	Apply game playing and CSP techniques
C206.4	Perform logical reasoning
C206.5	Perform probabilistic reasoning under uncertainty



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C207	AD3381	DATA BASE DESIGN AND MANAGEMENT LABORATORY
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C207.1	Understand the data base development life cycle
C207.2	Design relational data base using conceptual – to –relational mapping, Normalization
C207.3	Apply SQL for creation, manipulation and retrieval of data
C207.4	Develop a database applications for real-time problems
C207.5	Design and query object-relational databases

C208	AD3311	ARTIFICIAL INTELLIGENCE LABORATORY
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C208.1	Design and implement search strategies
C208.2	Implement game playing and CSP techniques
C208.3	Develop logical reasoning systems
C208.4	Develop probabilistic reasoning systems



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C209	GE3361	PROFESSIONAL DEVELOPMENT
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C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

C210	MA3391	PROBABILITY AND STATISTICS
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C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
C210.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
C210.3	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C210.4	Apply the basic concepts of classifications of design of experiments in the field agriculture and statistical quality control.
C210.5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.



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C211	AL3452	OPERATINGSYSTEMS
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C211.1	Analyze various scheduling algorithms and process synchronization.
C211.2	Explain dead lock, prevention and avoidance algorithms.
C211.3	Compare and contrast various memory management schemes.
C211.4	Explain the functionality of file systems I/O systems, and Virtualization
C211.5	Compare iOS and Android Operating Systems

C212	AL3451	MACHINE LEARNING
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C212.1	Explain the basic concepts of machine learning
C212.2	Construct supervised learning models.
C212.3	Construct unsupervised learning algorithms.
C212.4	Evaluate and compare different models



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C213	AD3491	FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS
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C213.1	Explain the data analytics pipeline
C213.2	Describe and visualize data
C213.3	Perform statistical inferences from data
C213.4	Analyze the variance in the data
C213.5	Build models for predictive analytics

C214	CS3591	COMPUTER NETWORKS
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C214.1	Explain the basic layers and its functions in computer networks
C214.2	Understand the basics of how data flows from one node to another.
C214.3	Analyze routing algorithms.
C214.4	Describe protocols for various functions in the network.
C214.5	Analyze the working of various application a protocols.



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C215	GE3451	Environmental Sciences and Sustainability
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C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization

C216	AD3411	DATA SCIENCE AND ANALYTICS LABORATORY
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C216.1	Write python programs to handle data using Numpy and Pandas
C216.2	Perform descriptive analytics
C216.3	Perform data exploration using Mat plot lib
C216.4	Perform inferential data analytics
C216.5	Build models of predictive analytics



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C217	AD3461	MACHINE LEARNING LABORATORY
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C217.1	Apply suitable algorithms for selecting the appropriate features for analysis.
C217.2	Implement supervised machine learning algorithms on standard data sets and evaluate the performance.
C217.3	Apply unsupervised machine learning algorithms on standard data sets and evaluate the performance.
C217.4	Build the graph based learning models for standard data sets.
C217.5	Assess and compare the performance of different ML algorithms and select the suitable one based on the application.



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THIRD YEAR COURSES (V & VI SEMESTER)

Course Outcomes (Cos)

C301	AD3501	DEEP LEARNING
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C301.1	Explain the basics in deep neural networks
C301.2	Apply Convolution Neural Network for image processing
C301.3	Apply Recurrent Neural Network and its variants for text analysis
C301.4	Apply model evaluation for various applications
C301.5	Apply auto encoders and generative models for suitable applications

C302	CW3551	DATA AND INFORMATION SECURITY
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C302.1	Understand the basics of data and information security
C302.2	Understand the legal, ethical and professional issues in information security
C302.3	Understand the various authentication schemes to simulate different applications.
C302.4	Understand various security practices and system security standards
C302.5	Understand the Web security protocols for E-Commerce applications



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C303	CS3551	DISTRIBUTED COMPUTING
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C303.1	Explain the foundations of distributed systems (K2)
C303.2	Solve synchronization and state consistency problems (K3)
C303.3	Use resources haring techniques in distributed systems (K3)
C303.4	Apply the various programming techniques in industrial applications
C303.5	Explain the fundamentals of cloud computing (K2)

C304	CCS334	BIG DATA ANALYTICS
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C304.1	Describe big data and use cases from selected business domains.
C304.2	Explain No SQL big data management.
C304.3	Install, configure, and run Hadoop and HDFS.
C304.4	Perform map-reduce analytics using Hadoop.
C304.5	Use Hadoop – related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.



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C305	MX3084	Disaster Risk Reduction and Management
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C305.1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
C305.2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
C305.3	To develop disaster response skills by adopting relevant tools and technology
C305.4	Enhance awareness of institutional processes for Disaster response in the country
C305.5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

C306	CCS366	SOFTWARE TESTING AND AUTOMATION
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C306.1	Understand the basic concepts of software testing and the need for software testing
C306.2	Design Test planning and different activities involved in test planning
C306.3	Design effective test cases that can uncover critical defects in the application
C306.4	Carry out advanced types of testing
C306.5	Automate the software testing using Selenium and Testing.



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C307	CCS331	3D PRINTING AND DESIG
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C307.1	Outline and examine the basic concepts of 3D printing technology
C307.2	Outline 3D printing work flow
C307.3	Explain and categorise the concepts and working principles of 3D printing using inkjet technique
C307.4	Explain and categorise the working principles of 3D printing using laser technique
C307.5	Explain various method for designing and modeling for industrial applications

C308	AD3511	DEEP LEARNING LABORATORY
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C308.1	Apply deep neural network for simple problems (K3)
C308.2	Apply Convolution Neural Network for image processing(K3)
C308.3	Apply Recurrent Neural Network and its variants for text analysis (K3)
C308.4	Apply generative models for data augmentation(K3)
C308.5	Develop real – world solutions using suitable deep neural networks(K4)



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C309	AD3512	SUMMER INTERNSHIP
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C309.1	Industry Practices, Processes, Techniques ,technology, automation and other core aspects of software industry
C309.2	Analyze, Design solutions to complex business problems
C309.3	Build and deploy solutions for target platform
C309.4	Apply the concepts of design to gear boxes
C309.5	Preparation of Technical reports and presentation

C310	CS3691	EMBEDDED SYSTEMS AND IOT
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C310.1	Explain the architecture of embedded processors
C310.2	Write embedded C programs
C310.3	Design simple embedded applications.
C310.4	Compare the communication model sin IOT
C310.5	Design IoT applications using Arduino /Rasp berry Pi /open platform



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

ANNA UNIVERSITY REGULATIONS: 2021

FINAL YEAR COURSES (VII& VIII SEMESTER)

Course Outcomes (Cos)

C401	GE3791	HUMAN VALUES AND ETHICS
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C401.1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
C401.2	Practice democratic and scientific values in both their personal and professional life
C401.3	Find rational solutions to social problems.
C401.4	Behave in an ethical manner in society
C401.5	Practice critical thinking and the pursuit of truth.

C402	AD3811	PROJECT WORK / INTERNSHIP
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C402.1	Gain Domain knowledge and technical skill set required for solving industry/ research problems
C402.2	Provide solution architecture ,module level designs, algorithms
C402.3	Implement, test and deploy the solution for the target platform
C402.4	Prepare detailed technical report, demonstrate and present the work