GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY: NELLORE

(AUTONOMOUS)

NELLORE–524317 (A.P) INDIA

B.TECH IN COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

COURSE STRUCTURE AND SYLLABI UNDER RG 22 REGULATIONS

Vision & Mission

VISION

- To emerge as a premier department of Computer Science and Engineering in the domain of Data Science striving to produce competent young data scientists to serve the society with professional commitment and ethical values.

MISSION

- **M1**: Transforming learners into technically proficient engineers through innovative teaching learning methodologies enabling them to fulfil industrial requirements.
- **M2**: Inculcating discipline, ethical and professional values among the aspirants to become socially responsible engineers.
- **M3**: Exploring the potential of learners through integrity and professionalism to serve the needs of the society.
- **M4**: Engaging students in acquisition of core capabilities through learner-centric activities to offer sustainable solutions to real-time problems .

B. Tech CSE (DS) - PROGRAM OUTCOMES (PO's)	
A graduate of the Computer Science and Engineering (Data Science) Program will demonstrate:	
PO1:	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2:	**Problem analysis**: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3:	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4:	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5:	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6:	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7:	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8:	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9:	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10:	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11:	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12:	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. Tech CSE (DS) - PROGRAM EDUCATIONAL OBJECTIVES (PEO's)	
A graduate of Computer Science and Engineering (Data Science) will be able to:	
PEO 1	Contribute to the economic growth of the Country through a purposeful and productive interaction with their peers .
PEO 2	Successfully pursue higher studies in engineering or management courses .
PEO 3	Emerge as visionary leaders and entrepreneurs possessing leadership qualities and team building skills..
PEO 4	Exhibit core technical competencies to analyse and design viable solutions for problems with social responsibility and ethical standards..
B. Tech CSE (DS) - PROGRAM EDUCATIONAL OBJECTIVES (PSO's)	
A graduate of Computer Science and Engineering (Data Science) will be able to:	
PSO1	Apply the principles of Data Science, Data Management, Data Security and Visualization for Data Analysis and prediction.
PSO2	Utilize the knowledge of analytics, statistics and Machine Learning concepts to solve real time problems related to Data Analysis.

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3rd Mile, Bombay Highway, Gangavaram (V), Kovur(M), SPSR Nellore (Dt), Andhra Pradesh, India- 524137

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

Semester-3 (Theory-6, Lab-3, SC-1, MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	BSC	22A0016T	Probability & Statistics	3	0	0	3
2	PCC	22A0506T	Computer Organization	3	0	0	3
3	PCC	22A0507T	Object Oriented Programming through Java	3	0	0	3
4	ESC	22A0410T	Digital Electronics and Micro Processors	3	0	0	3
5	PCC	22A3201T	Mathematical Foundations of Data Science	3	0	0	3
6	HSC	22A0022T	Managerial Economics & Financial Accounting	3	0	0	3
7	PCC(Lab)	22A0509P	Object Oriented Programming through Java Lab	0	0	3	1.5
8	ESC(Lab)	22A0411P	Digital Electronics and Micro Processors Lab	0	0	3	1.5
9	PCC(Lab)	22A3202P	Mathematical Foundations of Data Science Lab	0	0	3	1.5
10	SC	22A3203	**Skill Oriented Course** Python Programming	1	0	2	2
11	MC	22A0030T	**Mandatory Course** Constitution of India	2	0	0	0
			Total credits				**24.5**

Category	Credits
Basic Science Course(BSC)	3
Professional Core Courses(PCC)	12
Engineering Science Courses(ESC)	4.5
Humanities and Social Science Course(HSC)	3
Skill Oriented Course(SC)	2
Total	24.5

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Semester-4(Theory-5, Lab-3, SC-1, MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
	BSC	22A0017T	Discrete Mathematical Structures	3	0	0	3
	PCC	22A0512T	Database Management Systems	3	0	0	3
	PCC	22A0513T	Operating Systems	3	0	0	3
	PCC	22A0514T	Data Warehousing and Mining	3	0	0	3
	HSC	22A0022T	Universal Human values	3	0	0	3
	PCC(LAB)	22A0515P	Database Management Systems Lab	0	0	3	1.5
	PCC(LAB)	22A0516P	Operating Systems Lab	0	0	3	1.5
	PCC(LAB)	22A0517P	Data Warehousing and Mining Lab	0	0	3	1.5
	SC	22A0518	**Skill Oriented Course** Basic web Design	1	0	2	2
	MC	22A0030T	**Mandatory Course** Environmental Science	2	0	0	0
Total credits							**21.5**

Category	**Credits**
Basic Science Course (BSC)	3
Humanities and Social Sciences Course (HSC)	3
Professional Core Course (PCC)	13.5
Skill oriented Course (SC)	2
Total	21.5

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Semester-5(Theory-5, Lab-2, SC-1, MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	PCC	22A0519T	Automata and Compiler Design	3	0	0	3
2	PCC	22A0520T	Computer Networks	3	0	0	3
3	PCC	22A0521T	Machine Learning	3	0	0	3
4	PEC	22A0522a 22A0522b 22A0522c	**Professional Elective-I:** 1. Object Oriented Analysis and Design 2. Virtual Reality 3. Software Engineering	3	0	0	3
5	OEC	22A0430T 22A0214Ta 22A0149T 22A0321Ta	**Open Elective-I:** 1. Principles of Communication Systems 2. Power Electronics 3. Building Materials 4. Automobile Engineering	3	0	0	3
6	PCC(Lab)	22A0523P	Computer Networks Lab	0	0	3	1.5
7	PCC(Lab)	22A0524P	Machine Learning Lab	0	0	3	1.5
8	SC	22A0525	**Skill Advanced Course:** Linux Programming	1	0	2	2
9	MC	22A0526	**Mandatory Course:** Design Thinking and Innovation	2	0	0	0
Community Service Project 2Months (Mandatory)after second year (to be evaluated during V semester)				0	0	0	1.5
			Total credits				**21.5**

Category	**Credits**
Professional Core Courses (PCC)	12
Professional Elective Courses (PEC)	3
Open Elective Courses (OEC)	3
Skill Advanced Course (SC)	2
Summer Internship	1.5
Total	21.5

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Semester-6(Theory-5,Lab-3,SC-1MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	PCC	22A0527T	Big Data Analytics	3	0	0	3
2	PCC	22A0528T	Data Visualization	3	0	0	3
3	PCC	22A0529T	Cloud Computing	3	0	0	3
4	PEC	22A0530a 22A0530b 22A0530c	**Professional Elective-II:** 1. No SQL 2. Soft Computing 3. Design Patterns		0	0	3
5	OEC	22A0431T 22A0213Ta 22A0150T 22A0327Tb	**Open Elective-II:** 1. Micro Controllers and Applications 2. Control Systems 3. Environmental Economics 4. Introduction to Composite Materials		0	0	3
6	PCC(Lab)	22A0531P	Big Data Analytics Lab	0	0	3	1.5
7	PCC(Lab)	22A0532P	Data Visualization Lab	0	0	3	1.5
8	PCC(Lab)	22A0533P	Cloud Computing Lab	0	0	3	1.5
9	SC	22A0029P	**Skill Oriented Course:** SoftSkills	1	0	2	2
10	MC	22A0032T	**Mandatory Course:** Research Methodology	2	0	0	0
				Total credits			**21.5**

Category	**Credits**
Professional Core Course (PCC)	13.5
Professional Elective Course (PEC)	3
Open Elective Course (OEC)	3
Skill Oriented Course (SC)	2
Industrial/Research Internship (Mandatory)2Months	-
Total	21.5

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Semester-7(Theory-6,SC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	HSC	22A0023T 22A0024T 22A0025T	**Humanity Science Elective – I:** 1. Management Science 2. Entrepreneurship and Innovation 3. Business Environment	3	0	0	3
2	PEC	22A0534a 22A0534b 22A0534c	**Professional Elective-III:** 1. Natural Language Processing 2. High Performance Computing 3. Distributed Database	3	0	0	3
3	PEC	22A0535a 22A0535b 22A0535c	**Professional Elective-IV:** 1. Block Chain Technology 2. Business Analytics 3. Deep Learning	3	0	0	3
4	PEC	22A0536a 22A0536b 22A0536c	**Professional Elective-V:** 1. Image Processing 2. Text Analytics 3. Full Stack Web Development	3	0	0	3
5	OEC	22A0241Ta 22A0432T 22A0151T 22A0327Tc	**Open Elective-III:** 1. Smart Grid 2. Basic VLSI Design 3. Disaster management 4. Measurements and Mechatronics	3	0	0	3
6	OEC	22A0232Ta 22A0433T 22A0152T 22A0331Tc	**Open Elective-IV:** 1. Electric Vehicles 2. Industrial Electronics 3. Construction Management 4. Introduction to Robotics	3	0	0	3
7	SC	22A0537	**Skill Advanced Course:** Mobile Application Development	1	0	2	2
Industrial / Research Internship 2 Months (Mandatory) after Third year (to be evaluated during VII semester)				0	0	0	3
				Total credits			**23**

Category	**Credits**
Professional Elective Courses (PEC)	9
Humanities and Social Science Course (HSC)	3
Open Elective Courses (OEC)	6
Skill Advanced Course (SC)	2

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Semester-8 (Project)							
	Category	**Course Code**	**Course Title**	**Hours per week**			**Credits**
						P	**C**
1	Major Project	22A3710	Project work/Internship in Industry	0	0	24	12
						Total credits	12

Types of Courses

Types of Courses	**Course Category**	**Code**	**Department**
Foundation	Engineering Sciences	ESC	24
	Basic Sciences	BSC	21
	Humanities & Social Sciences and Management	HSMC	13.5
Core	Professional Core	PCC	51
Project	Project & Internship (12)	PROJ	16.5
	Internship (4.5)		
Elective Courses	Professional Elective	PEC	15
	Open Elective (including 2 MOOCs)	OEC	12
Mandatory Courses	Mandatory	MC	-
	Skill Oriented Courses	SC	10
		Total Credits	163

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PROBABILITY AND STATISTICS
(Common to **CSE,AI&ML,DS,CS,CE**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0016T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	BSC

Course Objectives:

- Summarize the basic concepts of data science and its importance in engineering
- analyze the data quantitatively or categorically,
- measureofaverages,variability,adoptcorrelationmethodsandprincipleofleastsquares,regressionanalysis

Course Outcomes(CO):

On completion of this course, student will be able to:

- Definethetermstrial,events,samplespace,probability,andlawsofprobability,Makeuseofprobabilities of events infinite sample spaces from experiments,
- ApplyBaye'stheoremtorealtimeproblemsandexplainthenotionofrandomvariable, distribution functions and expected value.
- Apply BinomialandPoissondistributionsforrealdatatocomputeprobabilities, theoretical frequencies,interpretthepropertiesofnormaldistributionanditsapplications.
- Explaintheconceptofestimation,intervalestimationandconfidenceintervals
- Apply the concept of hypothesis testing for large samples.
- Apply the concept of testing hypothesis for small samples to draw the inferences and estimate the goodness of fit.

Syllabus		Total Hours:48
Module–I	**Descriptive Statistics**	**10 Hrs**
Statistics Introduction, Measures of Variability (dispersion) Skewness Kurtosis, correlation, correlation coefficient, rank correlation, principle of least squares, method of least squares, regression lines, regression coefficients and their properties.		
Module–II	**Probability**	**9Hrs**
Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties.		
Module–III	**Probability distributions**	**10Hrs**
Discrete distribution- Binomial, Poisson approximation to the binomial distribution and their properties.Continuous distribution: normal distribution and their properties. Normal approximation to Binomial Distribution. Uniform distribution		
Module–IV	**Estimation and Testing of hypothesis, large sample tests**	**9Hrs**
Estimation-parameters,statistics,samplingdistribution,pointestimation,Formulationofnullhypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions ,test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems.		

Module–V	Test of Significance	10Hrs
Student t-distribution (test for single mean, two means and paired t-test),testing of equality of variances(F-test), χ2-testforgoodnessoffit, χ2-test for independence of attributes.		
Text Books: 1. B.S.Grewal,"Higher Engineering Mathematics ",Khanna publishers. 2. Millerand Freunds, Probability and Statistics for Engineers,7/e,Pearson,2008. 3. Probability & Statistics by T.K.V.Iyengar, B.Krishna Gandhi ,S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.		
Reference Books: 1. B.V.Ramana,"Higher Engineering Mathematics",Mc Graw Hill publishers. 2. W.Feller,an Introduction to Probability Theory and its Applications,1/e,Wiley,1968. 3. Mathematical Foundations of Statistics byK.C.Kapoor& Gupta,S.Chand Publications.		
Web References: https://onlinecourses.nptel.ac.in/noc21_ma74/preview		

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COMPUTER ORGANIZATION

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0506T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Illustrate the fundamental concepts of computer organization.
- Determine the Machine Instructions, develop programs.
- Develop Arithmetic Operations on Integers and Floating Point Numbers.
- Demonstrate types of memories, use of I/O devices.
- Illustrate concepts of Pipelining, Large Computer Systems.

Course Outcomes(CO):

On completion of this course, student will be able to

- Determine the basic concepts of Computer Organization.
- Interpret the Machine Instructions and basic Input / Output Operations.
- Demonstrate Arithmetic Operations on signed and unsigned numbers, design of Control Unit.
- Differentiate types of memories and distinguish I/O Devices.
- Illustrate the concepts of Pipelining.
- Illustrate the concepts of Large Computer Systems

Syllabus		Total Hours:48
Module-I	**Basic Structure of Computers**	**9Hrs**

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Module-II	Machine Instructions and Programs	10Hrs

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines.

Module-III	Computer Arithmetic and Micro Programmed Control Unit	10Hrs

Computer Arithmetic: Addition and Subtraction, Multiplication algorithms, Division algorithms, Floating point arithmetic operations.
Micro Programmed Control Unit: Control memory, address sequencing, design of control unit.

Module-IV	The Memory System and Input / Output Organization	10Hrs

The Memory System: RAM, ROM, Cache Memory, Virtual Memory, And Secondary Storage.
Input / Output Organization: Accessing I/O Devices, Interrupts, Direct Memory Access, Buses, Standard I/O Interfaces.

Module-V	Pipelining, Large Computer Systems	9Hrs

Pipelining: Basic Concepts, Data Hazards, and Instruction Hazards.

Large Computer Systems: Forms of Parallel Processing, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Text Books:

1. Carl Hamacher, Zvonko Vranesic, SafwatZaky, "Computer Organization", 5th Edition, McGraw Hill Education, 2013.
2. M.Morris Mano, RajibMall, "Computer System Architecture", Revised Third Edition, Pearson Education India.

Reference Books:

1. Themes and Variations, Alan Clements, "Computer Organization and Architecture", CENGAGE Learning.
2. Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw Hill Education.

Web References:

https://archive.nptel.ac.in/courses/106/105/106105163/

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OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0507T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To understand object-oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems.
- To understand the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- Demonstrate on the multi-tasking by using multiple threads.
- To understand the design of Graphical User Interface using applets and swing controls.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the Object-Oriented Programming Principles to develop java programs.
- Apply code reusability through inheritance, packages and interfaces.
- Inspect Exception Handling and multi-threading mechanisms in real time applications.
- Develop applications by using I/O streams for better performance.
- Construct GUI based applications using applets, AWT and swings for internet and system-based applications.
- Compare AWT and Swing classes for GUI based applications.

Syllabus		Total Hours:48
Module-I	**Introduction**	**10Hrs**

Introduction: History and Evolution of Java, Java Buzzwords, Object Oriented Programming Principles, A first Simple Program, Data types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Classes, Objects, Methods, Constructors this key word, Garbage Collection, Parameter Passing, Method Overloading, Constructor Overloading. String handling methods.

Module-II	Inheritance, Packages & Interfaces	9Hrs

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, using final with inheritance.

Packages: Basics, finding packages and CLASSPATH, Access Protection, Importing packages.
Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Applying Interfaces.

Module-III	Exception handling & Multithreading	10Hrs

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.

Multithreading: The Java thread model, creating threads, Thread priorities, Synchronizing threads, Inter thread communication.

Module-IV	Stream based I/O & Applet	9Hrs

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, reading console Input and Writing Console Output, File class, Reading and Writing Files, Random access file operations Scanner class.

Applet: Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets

Module-V	Introducing AWT & Swings	10Hrs

Introducing AWT: AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Working with Color, Event Handling.

GUI Programming with Swings –Swing components and containers, layout managers, using a push button, jtextfield, jlabel.

Text Books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Core Java: An Integrated Approach – Dr R Nageswara Rao.

Reference Books:

1. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
2. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
3. Maurach's Beginning Java2 JDK 5, SPD.
4. Introduction to Java Programming 7/e, Brief version, Y.Daniel Liang, Pearson
5. Java How to Program, 7/E: Paul Deitel, Deitel & Associates, Inc

Web References:

https://onlinecourses.nptel.ac.in/noc22_cs47/preview

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DIGITAL ELECTRONICS AND MICROPROCESSORS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0410T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

This course will enable students to:

- To understand all the concepts of Logic Gates and Boolean Functions.
- To learn about Combinational Logic and Sequential Logic Circuits.
- To design logic circuits using Programmable Logic Devices.
- To understand basics of 8086 Microprocessor and 8051 Microcontroller.
- To understand architecture of 8086 Microprocessor and 8051 Microcontroller.
- To learn Assembly Language Programming of 8086 and 8051.

Course Outcomes(CO):

On completion of this course, student will be able to

- Differentiate various number systems and binary codes**.**
- Solve the Boolean Expressions using Boolean algebra and k-maps.
- Implement different combinational and Sequential circuits
- Explain the internal architecture and organization of the 8086 microprocessors.
- Demonstrate the assembly level language programming for 8086 and 8051.
- Describe the architecture, hardware details and memory organization of 8051 microcontroller.

Syllabus		Total Hours:48
Module-I	**Number Systems & Code Conversion**	**9 Hrs**

Number Systems & Code conversions, Boolean Algebra & Boolean properties, Logic Gates, Truth Tables, Universal Gates, Simplification of Boolean functions using Boolean properties, SOP and POS methods – Simplification of Boolean functions using K-maps, Signed and Unsigned Binary Numbers.

Module-II	Combinational Circuits	10Hrs

Combinational Logic Circuits: Adders & Subtractors, magnitude Comparators, Multiplexers, De-multiplexers, Encoders, Decoders, Programmable Logic Devices.

Module-III	Sequential Circuits	10Hrs

Sequential Logic Circuits: Compression between combinational & sequential circuits, Latches, SR Latch, Flipflops, SR Flipflop, JK Flip Flop, Master Slave JK, T Flip-Flops, D Flip Flop, Shift Registers, Types of Shift Registers, Counters, Synchronous Counters, Asynchronous Counters, Up-Down Counter

Module-IV	Microprocessors - I	9Hrs

8085 microprocessor, Block Diagram of 8085 Microprocessor, 8086 microprocessor, Functional Diagram, register organization 8086, Flag register of 8086 and its functions, Addressing modes of 8086, Pin diagram of 8086, Minimum mode & Maximum mode operation of 8086, Interrupts in 8086.

Module-V	**Microprocessors - II**	**10Hrs**

Instruction set of 8086, Assembler directives, Procedures and Macros, Simple programs involving arithmetic, logical, branch instructions, Ascending, Descending and Block move programs, String Manipulation Instructions. Functional Diagram of 8051, register organization 8051.

Text Books:

1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013
2. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, John Wiley & Sons, Ltd., 2007.

Reference Books:

1. Thomas L. Floyd, Digital Fundamentals – A Systems Approach, Pearson, 2013.
2. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 5th, Edition, 2004.
3. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition, 2006.
4. Advanced microprocessors and peripherals-A.K Ray and K.M.Bhurchandani, TMH, 2nd edition, 2006.

Web References:

https://onlinecourses.nptel.ac.in/noc22_ee55/preview

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MATHEMATICAL FOUDATIONS OF DATA SCIENCE
(only for DS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3201T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Explore the fundamental concepts required for Data science
- Explain the basic concepts of data science.
- To familiarize with Python libraries for Data Visualization.
- Elucidate various Machine Learning algorithms

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the basic concepts of Data Science.
- Learn about types of data and data preprocessing.
- Visualize the data using NumPy, Pandas and Matplotlib
- Solve decision making problems using k-NN, Naïve Bayes, SVM and Decision
- Demonstrate the way to use machine Learning algorithms using python

Syllabus		Total Hours:48
Module-I	**Introduction to Data science**	**10Hrs**

Introduction: What Is Data Science? How Does Data Science Relate to Other Fields? Data Science and Statistics, Computer Science, Engineering and Business Analytics.

Data Science, Social Science, and Computational Social Science, The Relationship between Data Science and Information Science, Information vs. Data, Skills for Data Science, Tools for Data Science.

Module-II	**Types of Data**	**9Hrs**

Data: Introduction, Data Types, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collections, Open Data, Social Media Data, Multimodal Data, Data Storage and Presentation.

Module-III	**Techniques and Introduction to Libraries**	**10Hrs**

Data: Data Pre-processing, Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization.

Introduction to NumPy, Pandas, Matplotlib, Exploratory Data Analysis (EDA), Descriptive Statistics, Basic tools (plots,graphs and summary statistics) of EDA.

Module-IV	**Machine Learning for Data Science-1**	**10Hrs**

Machine Learning for Data Science-1: Supervised machine learning algorithms: what is regression, simple linear regression, multiple regression and Logistic regression, classification algorithms: k-Nearest Neighbors, Naive Bayes, SVM

Module-V	**Machine Learning for Data Science-2**	**9Hrs**

Machine Learning for data Science-2: Unsupervised learning algorisms overview: what is clustering, types of clustering algorithms, hierarchical clustering, k means clustering, what is Association, Differences between supervised and un supervised learning algorithms

Text Books:

1. Chirag Shah, A Hands-On Introduction To Data Science, Cambridge University Press.
2. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.

Reference Books:

1. The Data Science Handbook, Field Cady, WILEY.
2. An Introduction to Data Science, Jeffrey M. Stanton, Jeffrey Stanton, 2012
3. Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from the Frontline. O'Reilly,2013.
4. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007
5. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi, Dr. Rupa Kumar Sharma.
6. Data Science from Scratch, First Principles with Python - Joel Grus, O'Reilly, FirstEdition.

Web References:

https://www.youtube.com/watch?v=F9BZ5JsnjYM

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0022T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	HSC

Course Objectives:

This course will enable students to:

- To understand the concepts of managerial economics and financial analysis this helps in optimal decision making in business environment.
- To have a thorough knowledge on the production theories and cost while dealing with the production and factors of production.
- To have a thorough knowledge regarding market structure and forms of business organizations in the market.
- To understand the concept of capital and capital budgeting in selecting the proposals.
- To have a thorough knowledge on recording, classifying and summarizing of transactions in preparing of final accounts.

Course Outcomes(CO):

On completion of this course, student will be able to

- Outline the Managerial Economic concepts for decision making and forward planning. Also know law of demand and its exceptions, to use different forecasting methods for predicting demand for various products and services.
- Assess the functional relationship between Production and factors of production and list out various costs associated with production and able to compute breakeven point to illustrate the various uses of breakeven analysis.
- Outline the different types of business organizations and provide a framework for analyzing money in its functions as a medium of exchange.
- Interpret various techniques for assessing the proposals of project for financial position of the business.
- Identify the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.

Syllabus		Total Hours:48
Module-I	**INTRODUCTION TO MANAGERIAL ECONOMICS &DEMAND**	**9 Hrs**

Managerial Economics – Definition – Nature & Scope - Contemporary importance of Managerial Economics - Demand Analysis - Concept of Demand - Demand Function - Law of Demand - Elasticity of Demand - Significance - Types of Elasticity - Measurement of Elasticity of Demand - Demand Forecasting - Factors governing Demand Forecasting - Methods of Demand Forecasting - Relationship of Managerial Economics with Financial Accounting and Management.

Module-II	**THEORY OF PRODUCTION AND COST ANALYSIS**	**9 Hrs**

Production Function – Least-cost combination - Short-run and Long-run Production Function - Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale - Cost concepts and Cost behavior - Break-Even Analysis (BEA) -

Determination of Break-Even Point (Simple Problems) - Managerial significance and limitations of Break-Even Analysis.		
Module-III	**INTRODUCTION TO MARKETS ANDFORMS OF BUSINESS ORGANIZTIONS**	**10 Hrs**
Market structures - Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition – Monopoly - Monopolistic Competition – Oligopoly - Price-Output Determination - Pricing Methods and Strategies - Forms of Business Organizations - Sole Proprietorship - Partnership - Joint Stock Companies - Public Sector Enterprises-.		
Module-IV	**CAPITAL AND CAPITAL BUDGETING**	**10 Hrs**
Concept of Capital - Significance - Types of Capital - Components of Working Capital Sources of Short-term and Long-term Capital - Estimating Working capital requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)		
Module-V	**INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS**	**10 Hrs**
Accounting Concepts and Conventions - Introduction Double-Entry Book Keeping, Journal, Ledger, and Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.		
Textbooks:		
1. Managerial Economics, PL Mehata, Sulthan Chand Publications		
Reference Books:		
1. Ahuja Hl “Managerial economics” 3 rd edition, Schand, ,2013 2. S.A. Siddiqui and A.S. Siddiqui: “Managerial Economics and Financial Analysis”, New Age International, 2013. 3. Joseph G. Nellis and David Parker: “Principles of Business Economics”, 2nd edition, Pearson, New Delhi. 4. Domnick Salvatore: “Managerial Economics in a Global Economy”, Cengage, 2013. 5. Managerial Economics, Varshney &Maheswari, Sultan Chand, 2013. 6. Managerial Economics and Financial Analysis, Aryasri, 4th edition, MGH, 2019		
Web References: https://nptel.ac.in/courses/110101005 https://onlinecourses.nptel.ac.in/noc23_mg65/preview		

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OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0509P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Practice object-oriented programs and build java applications.
- Implement java programs for establishing interfaces.
- Implement sample programs for developing reusable software components.
- Create database connectivity in java and implement GUI applications.

Course Outcomes(CO):

On completion of this course, student will be able to

- Recognize the Java programming environment.
- Develop efficient programs using multi threading.
- Design reliable programs using Java exception handling features.
- Extend the programming functionality supported by Java.
- Select appropriate programming constructs to solve a problem.
- Develop the programs in swings and mouse events.

Syllabus — **Total Hours:48**

List of Experiments

Experiment-1

a. Installation of Java software, study of any Integrated development environment, Use Eclipse or NetBeans platform and acquaint with the various menus. Create a test project, add a test class and run it.

See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

b. Write a to Java program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula.

Experiment- 2

a. Write a Java program find the factorial of given number
b. Write a Java program to find whether given number is prime or not
c. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a java program that uses both recursive and non-recursive functions.

Experiment-3

a. Write a Java program to find the sum of individual digits of a number

b. Write a java program for Arithmetic calculator using switch case menu

Experiment-4

a. Write a java program to multiply two given matrices.
b. Write a java program to implement method overloading and constructors overloading.
c. Write a java program to implement method overriding.

Experiment-5

a. Create a Java class called Student with the following details as variables within it.USN, Name, Branch, Phone. Write a Java program to create n Student objects and print the USN, Name, Branch, and Phone of these objects with suitable headings.
b. Write Java program on use of inheritance, preventing inheritance using final, abstract classes

Experiment-6

a. Write a Java program to implement exception handling.
b. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part where n is the sequence number of the part file.

Experiment-7

a. Write a java program that displays the number of characters, lines and words in a text file.
b. Write a java program that reads a file and displays the file on the screen with line number before each line

Experiment-8

Write a program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box

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Experiment-9

a. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
b. Write a java program that implements inter thread communication.

Experiment-10

a. Develop an applet in Java that displays a simple message.
b. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

Experiment-11

a. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear.
b. Develop a java application for simple calculator.

Experiment-12

a. Develop a Java application to demonstrate the mouse event handlers.
b. Develop a Java application by using Swings.

Reference Books:

1. P. J. Deitel, H. M. Deitel, “Java for Programmers”, Pearson Education, PHI, 4th Edition, 2007.
2. P. Radha Krishna, “Object Oriented Programming through Java”, Universities Press, 2nd Edition, 2007
3. Bruce Eckel, “Thinking in Java”, Pearson Education, 4th Edition, 2006.
4. 4. Sachin Malhotra, Saurabh Chaudhary, “Programming in Java”, Oxford University Press, 5th Edition, 2010

Web References:

1. www.niecdelhi.ac.in
2. https://www.linkedin.com/in/achin-jain-85061412
3. www.rank1infotech.com

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DIGITAL ELECTRONICS AND MICRO PROCESSORSLAB
(Common to **CSE, AI&ML, DS, CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0411P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

This course will enable students to:

- To understand all the concepts of Logic Gates and Boolean Functions.
- To learn about Combinational Logic and Sequential Logic Circuits.
- To design logic circuits using Programmable Logic Devices.
- To understand basics of 8086 Microprocessor
- To understand architecture of 8085 & 8086 Microprocessor
- To learn Assembly Language Programming of 8086.

Course Outcomes(CO):

On completion of this course, student will be able to

- Identify the various digital ICs and understand their operation.
- Use Boolean laws and K-map to simplify the digital circuits.
- Demonstrate the basic digital circuits and verify their operation.
- Interpret the hardware architecture and assembly language programming using MASM.
- Execute arithmetic and data transfer operations using MASM in 8086.
- Implement some basic operations using Aurdino on IoT development trainer kit.

Syllabus	Total Hours:48

List of Experiments:

DIGITAL ELECTRONICS:

Experiment-1

- Verification of Truth Table for AND, OR, NOT, NAND, NOR and EX-OR gates.

Experiment-2

- Realization of NOT, AND, OR, EX-OR gates with only NAND and only NOR gates.

Experiment-3

- Karnaugh map Reduction and Logic Circuit Implementation.

Experiment-4

- Verification of DeMorgan's Laws.

Experiment-5

- Implementation of Half-Adder and Half-Subtractor.
- Implementation of Full-Adder and Full-Subtractor.

Experiment-6

- Four Bit Binary Adder
- Four Bit Binary Subtractor using 1's and 2's Complement.

MICROPROCESSORS (8086 Assembly Language Programming)

Experiment-7

- 8 Bit Addition and Subtraction.
- 16 Bit Addition.

Experiment-8

- BCD Addition.
- BCD Subtraction.

Experiment-9

- 8 Bit Multiplication.
- 8 Bit Division.

Experiment-10

- Searching for an Element in an Array.
- Sorting in Ascending and Descending Orders.

Finding Largest and Smallest Elements from an Array.

Text Books:

1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013.
2. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, John Wiley & Sons, Ltd., 2007.
3. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Microprocessor and Microcontrollers,Oxford Publishers, 2010.
4. Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition, 2006.0

Reference Books:

1. Thomas L. Floyd, Digital Fundamentals – A Systems Approach, Pearson, 2013.
2. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 5th, Edition, 2004.
3. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition, 2006.
4. Kenneth. J. Ayala, The 8051 microcontroller, 3rd edition, Cengage Learning, 2010

Web References:

https://www.vlab.co.in/

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MATHEMATICAL FOUNDATION OF DATA SCIENCE LAB
(Only to **DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3202P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To train the students in solving computational problems
- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice

Course Outcomes(CO):

On completion of this course, student will be able to

- Analyze and manipulate Data using Pandas (L4)
- Creating static, animated, and interactive visualizations using Matplotlib. (L6)
- Apply appropriate data sets to the Machine Learning algorithms (L3)

Syllabus | **Total Hours:48**

List of Experiments

1. Write a program to demonstrate data visualization operations box plot and scatter plot using Matplotlib.
2. Write a program to demonstrate data visualization operations line chart and bar chart plots using Matplotlib.
3. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.
4. Write a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.
5. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be the input that to be written to the second file.
6. Write a program to demonstrate Regression analysis with residual plots on a given data set.
7. Write a program to demonstrate the working of the decision tree-based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
8. Write a program to implement the Naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions using Java/Python ML library classes.
10. Write a program to implement k-Means clustering algorithm to cluster the set of data stored in .CSV file. Compare the results of various “k” values for the quality of clustering

Text Books:

1. Chirag Shah, A Hands-On Introduction To Data Science, Cambridge University Press.
2. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
3. Data Science from Scratch, First Principles with Python - Joel Grus, O'Reilly, FirstEdition.

Reference Books:

1. The Data Science Handbook, Field Cady, WILEY.
2. An Introduction to Data Science, Jeffrey M. Stanton, Jeffrey Stanton, 2012
3. Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from the Frontline. O'Reilly,2013.
4. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007
5. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi, Dr. Rupa Kumar

a. Sharma.

Web References:

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PYTHON PROGRAMMING (SKILL)

(Only to **DS)**

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3205	**1:0:2:0**	**2**	**CIE:30 SEE:70**	**3 Hours**	**SC**

Course Objectives:

This course will enable students to:

- Acquire programming skill sincore Python
- To understand the importance of Object-oriented Programming
- Develop the skill of designing graphical-user interfaces (GUI) in Python.
- Develop the ability to write database applications in Python.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand various data types like lists, tuples, strings etc.
- Able to create practical and contemporary applications using Functions
- Explore the use of Object-oriented concepts to solve Real-life problems
- Utilize Python packages in developing software applications
- Solve mathematical problems using Python programming language

Syllabus | **Total Hours:48**

IntroductiontoPython: Features of Python, Data types,Operators,Inputandoutput,ControlStatements,Loopingstatements

Python Data Structures: Lists, Dictionaries, Tuples .

Strings: Creating strings and basic operations on strings, string testing methods.

Functions: Definingafunction-Callingafunction-Typesoffunctions-FunctionArguments-Anonymousfunctions-Globaland local variables

OOPSConcepts;Classesandobjects-Attributes-Inheritance-Overloading-Overriding-Datahiding

Modules and Packages: Standard modules-Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages

WorkingwithDatainPython: Printingonscreen-Readingdatafromkeyboard-Openingandclosingfile-Reading and writing files-Functions-Loading Data with Pandas Numpy

Tasks:

1. OPERATORS

a. Read a list of numbers and write a program to check whether a particular element is present or not using membership operators.

b. Read your name and age and write a program to display the year in which you will turn100years old.

c. Read radius and height of a cone and write a program to find the volume of a cone.

d. Write a program to compute distance between two point staking input from the user

2. CONTROLSTRUCTURES

a. Read your email id and write a program to display the no of vowels, consonants, digits and white spaces in it using if…elif…else statement.

b. Write a program to create and display a dictionary by storing the antonyms of words. Find the antonym of a particular word given by the user from the dictionary using while loop.

c. Write a Program to find the sum of a Series 1/1! + 2/2! + 3/3! + 4/4! +…….+ n/n!. (Input :n = 5,Output:2.70833)

d. In number theory, an abundant number or excessive number is a number for which the sum of its proper divisors is greater than the number itself. Write a program to find out, if the given number is abundant. (Input: 12, Sum of divisors of 12 = 1 + 2 + 3 + 4 + 6 = 16, sum of divisors 16 > originalnumber12)

3: LIST

a. Read a list of numbers and print the numbers divisible by x but not by y(Assumex =4and y=5).

b. Readalistofnumbersandprintthesumofoddintegersandevenintegersfromthelist.(Ex:[23,10,15,14, 63], odd numbers sum= 101, even numbers sum= 24)

c. Readalistofnumbersandprintnumberspresentinoddindexposition.(Ex:[10,25,30,47,56,84,96],Thenumbers in odd index position:25 47 84).

d. Readalistofnumbersandremovetheduplicatenumbersfromit.(Ex:Enteralistwithduplicateelements: 10 20 40 1050 30 20 10 80,The unique listis:[10,20, 30,40, 50,80])

4:TUPLE

a. Given a list of tuples. Write a program to find tuples which have all elements divisible by K from alist of tuples.test_list=[(6,24, 12),(60,12,6), (12,18, 21)],K= 6,Output:[(6,24, 12),(60,12,6)]

b. Given a list of tuples. Write a program to filter all uppercase characters tuples from given list oftuples.(Input:test_list=[(“GFG”,“IS”,“BEST”),(“GFg”,“AVERAGE”),(“GfG”,),(“Gfg”,“CS”)],Output:[(„GFG“,„IS“, „BEST“)]).

c. Given a tuple and a list as input ,write a program to count the occurrences of all items of the list in the tuple . (Input:tuple=('a', 'a', 'c','b', 'd'), list =['a', 'b'],Output: 3)

5: SET

a. Write a program to generate and print a dictionary that contain a number (between1andn)in the form (x, x*x).

b. Write a program to perform union, intersection and difference using Set A and Set B.

c. Writeaprogramtocountnumberofvowelsusingsetsingivenstring(Input:“HelloWorld”,Output:No. ofvowels:3)

d. Write a program to form concatenated string by tak in gun common characters from two strings using set concept(Input:S1 ="aacdb", S2 ="gafd", Output:"cbgf").

6:DICTIONARY

a.Write a program to do the following operations:

i. Create a empty dictionary with dict()method

ii. Add elements on eat a time

iii. Update existing keys value

iv. Access an element using a key and also get()method

v. Deleting a key value using del()method

b.Write a program to create a dictionary and apply the following methods:

i. pop()method

ii. pop item()method

iii. clear()method

c. Given a dictionary, write a program to find the sum of all items in the dictionary.

d. Write a program to merge two dictionaries using update()method.

7: STRINGS

a. Given a string, write aprogramtocheckifthestringissymmetricalandpalindromeornot.Astringis said to be symmetrical if both the halves of the string are the same and a string is said to be a palindrome string if one half of the string is the reverse of the other half or if a string appears same when read forward or backward.

b. Write a program to read a string and count the number of vowel letters and print all letters except 'e' and 's'.

c. Writeaprogramtoreadalineoftextandremovetheinitialwordfromgiventext.(Hint:Usesplit()method,Input :Indiaismycountry. Output:ismy country)

d. Write a program to read a string and count how many times each letter appears.(Histogram).

8:USERDEFINEDFUNCTIONS

a. Ageneratorisafunctionthatproducesasequenceofresultsinsteadofasinglevalue.Writeageneratorfunction for Fibonacci numbers upto n.

b. Write a function merge_ dict (dict1,dict2)to merge two Python dictionaries.

c. Write a fact()function to compute the factorial of a given positive number.

d. Given a list of n elements, write a linear_ search ()function to search a given element x in a list.

9:BUILT-INFUNCTIONS

a. Write a program to demonstrate the working of built-in statistical functions mean(),mode(),median()by importing statistics library.

b. Writeaprogramtodemonstratetheworkingofbuilt-intrignometricfunctionssin(),cos(),tan(),hypot(),degrees(),radians() by importing math module.

c. Writeaprogramtodemonstratetheworkingofbuilt-inLogarithmicandPowerfunctionsexp(),log(),log2(),log10(),pow() by importing math module.

d. Writeaprogramtodemonstratetheworkingofbuilt-innumericfunctionsceil(),floor(),fabs(),factorial(),gcd()by importing math module.

10.CLASSANDOBJECTS

a.WriteaprogramtocreateaBankAccountclass.Yourclassshouldsupportthefollowingmethodsfor

i) Deposit
ii) Withdraw
iii) Get Balanace
iv) Pin Change

b. Create a Savings Account class that behaves just like a Bank Account ,but also has an interest rate and a method that increasesthebalancebytheappropriateamountofinterest(Hint:useInheritance).

c.Writeaprogramtocreateanemployeeclassandstoretheemployeename,id, age, and salary using the constructor. Display the employee details by invoking employee_info() method and also using dictionary (dict).

d. Access modifiers in Python are used to modify the default scope of variables. Write a program to demonstrate the 3typesofaccessmodifiers: public, private and protected.

11.FILEHANDLING

a. .Writeaprogramtoreadafilenamefromtheuser,openthefile(sayfirstFile.txt)andthenperformthefollowing operations:

i. Count the sentences in the file.
ii. Count the words in the file.
iii. Count the characters in the file.

b. .Create an ewfile(Hello.txt) and copy the text to another file called target.txt. The target.txt file should store only lower-case alphabet sand display the number of lines copied.

c. WriteaPythonprogramtostoreNstudent'srecordscontainingname,rollnumber and branch. Print the given branch student's details only.

Reference Books:

1. Reema Thareja, "Python Programming - Using Problem Solving Approach", Oxford Press, 1stEdition, 2017.
2. Michael H Goldwasser, David Letscher, "Object Oriented Programming in Python", Prentice Hall, 1st Edition, 2007.
3. Yashavant Kanetkar, Aditya Kanetkar, "Let us Python", BPB publication, 1st Edition, 2019.
4. Ashok Kamthane, Amit Kamthane, "Programming and Problem Solving with Python", McGraw Hill Education (India) Private Limited, 2018.
5. Taneja Sheetal, Kumar Naveen, "Python Programming – A modular approach", Pearson, 2017

Web Reference:

1. https://realpython.com/python3-object-oriented-programming/
2. https://python.swaroopch.com/oop.html
3. https://python-textbok.readthedocs.io/en/1.0/Object_Oriented_Programming.html
4. https://www.programiz.com/python-programming/
5. https://www.geeksforgeeks.org/python-programming-language/

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CONSTITUION OF INDIA

(Common **to CSE, AI&ML, CS, DS, ECE, EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0030T	2:0:0:0	0	CIE:30	-	MC

Course Objectives:

This course will enable students to:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and Election Commission of India.
- To understand the central-state relation in financial and administrative control

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy

Syllabus		Total Hours:48
Module-I	**Introduction to Indian Constitution**	**10Hrs**
Introduction to Indian Constitution – Constitution -Meaning of the term - Indian Constitution Sources and constitutional history - Features– Citizenship – Preamble - Fundamental Rights and Duties - Directive Principles of State Policy.		
Module-II	Union Government and its Administration Structure of the Indian Union	**9 Hrs**
Union Government and its Administration Structure of the Indian Union - Federalism – Centre State relationship – President's Role, power and position - PM and Council of ministers - Cabinet and Central Secretariat –Lok Sabha - Rajya Sabha - The Supreme Court and High Court - Powers and Functions		
Module-III	**State Government and its Administration**	**10 Hrs**
State Government and its Administration - Governor - Role and Position -CM and Council of ministers - State Secretariat-Organization Structure and Functions.		
Module-IV	**Local Administration**	**10 Hrs**
Local Administration - District's Administration Head - Role and Importance - Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Panchayati Raj - Functions– PRI –Zilla Parishad - Elected officials and their roles – CEO, Zilla Parishad - Block level Organizational Hierarchy - (Different departments) - Village level - Role of Elected and Appointed officials - Importance of grass root democracy		
Module-V	**Election Commission**	**9 Hrs**
Election Commission - Election Commission- Role of Chief Election Commissioner and Election Commissionerate - State Election Commission -Functions of Commissions for the welfare of SC/ST/OBC and Women		

Textbooks:

1. Durga Das Basu, "Introduction to the Constitution of India", Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, "Indian Constitution", National Book Trust 3. R RGaur,RAsthana,GP

Reference Books:

1. H.M.Sreevai, "Constitutional Law of India", 4th edition in 3 volumes
2. J.A. Siwach, "Dynamics of Indian Government & Politics"
3. M.V. Pylee, "Indian Constitution", Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
3. J.C. Johri, Indian Government and Politics Hans
4. M.V. Pylee, "Indian Constitution)

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8 2. nptel.ac.in/courses/109104045/ 3. nptel.ac.in/courses/101104065/ 4. www.hss.iitb.ac.in/en/lecture- details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

Web References:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

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DISCRETE MATHEMATICAL STRUCTURES

(Common to **CSE,AI&ML,DS,CS,CE**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0017T	3:0:0:0	3	CIE:30 SEE:70	3Hours	BSC

Course Objectives:

- Introduce the concepts of mathematical logic and gain knowledge in sets, relations and functions
- Solve problems using counting techniques and combinations
- Introduce generating functions and recurrence relations.
- Use Graph Theory for solving real world problems

Course Outcomes(CO):

On completion of this course, student will be able to:

- Apply mathematical logic to solve problems.
- Understand the concepts and perform the operations related to sets, relations and functions.
- Gain the conceptual background needed and identify structures of algebraic nature.
- Apply basic counting techniques to solve combinatorial problems.
- Formulate problems and solve recurrence relations.
- Apply Graph Theory in solving computer science problems.

Syllabus		Total Hours:48
Module–I	**Mathematical Logic**	**10 Hrs**

Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, functionally complete set of connectives, Mathematical Induction.

Module–II	**Set Theory**	**10Hrs**

Basic Concepts of Set Theory, Relations and Ordering, The Principle of Inclusion-Exclusion, Pigeon hole principle and its application, Functions composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties.

Algebraic structures: Algebraic Systems-Examples and General Properties, Semigroups and Monoids, groups, sub groups, homomorphism, Isomorphism.

Module–III	**Elementary Combinatorics**	**9Hrs**

Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

Module–IV	**Recurrence Relations**	**9Hrs**

Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution, The Method of Characteristic roots, Solutions of homogeneous Recurrence Relations.

Module–V	**Graph Theory**	**10Hrs**

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

Text Books:

4. Joel. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists &Mathematicians, 2nd Edition, Pearson Education.
5. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2002.

Reference Books:

4. Kenneth H. Rosen, Discrete Mathematics and its ApplicationswithCombinatoricsandGraphTheory,7th Edition, McGraw Hill Education (India)Private Limited.
5. Graph Theory with Applications to Engineering and Computer Science by Narsingh Deo.

Web Reference:

http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf

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DATABASE MANAGEMENT SYSTEMS					
Course Code	**L:T:P:S**	**Credits**	**Exam Marks**	**Exam Duration**	**Course Type**
22A0512T	**3:0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**PCC**

Course Objectives:

This course will enable students to:

- To teach the role of database management system in an organization.
- To design databases using data modeling and Logical database design techniques.
- To construct database queries using relational algebra and calculus and SQL.
- To explore implementation issues in database transaction.
- To familiarize database security mechanisms.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the Basic Concepts of Database languages, Relational model, SQL.
- Choose the specific Data models for large enterprise database design.
- Analyze the data efficiently through SQL instructions.
- Apply Normal forms on database for eliminating the redundancy.
- Demonstrate the Basic Concepts of transaction management techniques.
- Apply concurrency control techniques for Database recovery.

Syllabus		**Total Hours:48**
Module-I	**Introduction to Database concepts and Modeling**	**10Hrs**

Conceptual Modeling Introduction: Introduction to Data bases, Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Database Systems architecture.

The Entity-Relationship Model: Overview of Database Design, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Conceptual Design with the ER Model.

Module-II	**Relational Model, Relational Algebra**	**9Hrs**

Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, querying relational data, Logical data base Design, Views.

Relational Algebra: Introduction to Relational algebra, selection and projection, set operations, renaming, joins, division.

Module-III	**SQL**	**10Hrs**

SQL: Basic form of SQL Query, DDL, DML queries, Views in SQL, Joins, Nested & Correlated queries, Operators, predefined functions, Aggregate Functions.

PL/SQL: Introduction, Functions & Procedures, Triggers, Cursors.

Module-IV	**Normalization**	**9Hrs**

Relational database design: Introduction, Functional Dependencies (FDs), Normalization for relational

databases: 1NF, 2NF, 3NF and BCNF, Basic definitions of Multi Valued Dependencies, 4NF and 5NF.

Module-V	**Transaction Management &Concurrency Control and Recovery**	**10Hrs**

Transaction Management: Transaction processing, Transaction Concept, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions.

Concurrency Control: Lock-Based Protocols, Timestamp- Based Protocols, Validation-Based Protocols, Multiple Granularity.

Recovery: Failure Classification, Recovery and Atomicity, Log-Based Recovery.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, 6th Edition, Tata McGraw-Hill Publishing Company,2017.
2. Raghu Ramakrishnan, Database Management System, 3rd Edition, Tata McGraw-Hill Publishing Company, 2014.

Reference Books:

1. Peter Rob, A.Ananda Rao, Corlos Coronel, Database Management Systems (for JNTU), Cengage Learning, 2011.
2. Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, Database System Implementation, 1st Edition, Pearson Education, United States, 2000.
3. E. Ramez and Navathe, Fundamental of Database Systems, 7th Edition, Pearson Education
4. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna Publishing House, 2016.
5. Carlos Coronel and Steven Morris, Database Systems: Design, Implementation, and Management, 12th edition, Cengage Learning,2016.
6. John V. ,Absolute beginner's guide to databases, Petersen, QUE

Web Reference:

https://www.coursera.org/learn/database-management
https://www.coursera.org/learn/sql-data-science
https://www.w3schools.com/sql/
https://www.youtube.com/watch?v=fHAfc7Hjq28&list=PLWPirh4EWFpGrpcMfZ6UcdI786QdtSxV8
https://www.youtube.com/watch?v=HwmEcudlv44&list=PL4OCRJojkV1jN-Ed6RkQpWfBvqe0utRd6
http://www.w3schools.in/dbms/
https://www.geeksforgeeks.org/dbms/
https://www.javatpoint.com/dbms-tutorial
https://www.edureka.co/blog/dbms-tutorial/

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OPERATING SYSTEMS
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0513T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Choose different Scheduling Algorithms.
- Solve Classic problems of synchronization.
- Apply various memory management techniques.
- Analyzing disk management functions and techniques.
- Implement files and directories.
- Analyze the Protection and Security mechanisms.

Course Outcomes(CO):

On completion of this course, student will be able to

- Illustrate the overall view of operating system structure. (L3)
- Analyze process scheduling algorithms and Synchronization methods. (L4)
- Solve Deadlock problems using various synchronization techniques. (L3)
- Apply memory management techniques in the design of operating systems (L3).
- Identify efficient file allocation methods for optimal disk utilization. (L3).
- Analyze Security and Protection Mechanism in Operating System (L4).

Syllabus		Total Hours:48
Module-I	**Operating Systems Overview and Structures**	**10Hrs**

Introduction, Operating System Operations, Types of Operating Systems, functions of Operating Systems, Operating System Services, System Calls, System Programs, Operating System Structure.

Module-II	Process Management and Synchronization	10 Hrs

Process Management: Process Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Thread Models, Implementing Threads in User Space and the Kernel.

Process Synchronization: Critical - Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization.

Module-III	Deadlocks and Memory Management	10Hrs

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Deadlock Detection, Recovery from Deadlock.

Memory Management: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual Memory Management, Page-Replacement Algorithms, Thrashing, Kernel memory allocation.

Module-IV	Mass – Storage Structure and File Systems	9Hrs

Mass – Storage Structure: Disk Structure, Disk Scheduling, RAID Structure.

File Systems: Files, Directory, File System Structure, File- System Implementation, Directory Implementation.

Module-V	System Protection, System Security	9 Hrs

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.
System Security: Introduction, Program threats, System and network threats.

Text Books:

3. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.
4. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (Topics: Distributed Systems)

Reference Books:

6. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
7. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGrawHill, 2012.
8. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009.
9. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004.

Web Reference:

https://nptel.ac.in/courses/106/106/106106144/
http://peterindia.net/OperatingSystems.html

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DATA WARE HOUSING & MINING					
Course Code	**L:T:P:S**	**Credits**	**Exam Marks**	**Exam Duration**	**Course Type**
22A3203T	**3:0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**PCC**

Course Objectives:

This course will enable students to:

- To know the basic concepts and principles of Data Warehouse.
- Study the Data Mining and Major Issues in Data Mining.
- Learn pre-processing techniques and Data Transformation.
- Study the performance of Frequent Item sets and Classification.
- Understand and compare different types of Cluster Analysis.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the basic concepts of data warehouse and data mining.
- Determine the Data Warehouse Design and Data Warehouse Schemas.
- Use the Data Mining Technologies and Major Issues in Data Mining
- Apply pre-processing techniques for data cleaning.
- Apply the Frequent Patterns and Classification Methods for item sets.
- Determine the performance of the different Cluster algorithms.

Syllabus		**Total Hours:48**
Module-I	**Data Warehousing and Online Analytical Processing**	**10 Hrs**
Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Schemas for Decision Support, Data Warehouse Implementation.		
Module-II	**Introduction to Data Mining**	**10Hrs**
Why Data Mining, What Kinds of Data Can Be Mined, What Kinds of Patterns Can Be Mined, Which Technologies Are Used, Major Issues in Data Mining.		
Module-III	**Data Preprocessing**	**9 Hrs**
Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.		
Module-IV	**Mining Frequent Patterns, Association rule mining and Classification**	**10Hrs**
Basic Concepts, Frequent Itemset Mining Methods, Classification: Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Support vector machine.		
Module-V	**Cluster Analysis**	**9 Hrs**
Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density-Based Methods, outlier analysis and detection methods.		

Text Books:

1. Data Mining: concepts and techniques / Jiawei Han, Micheline Kamber, Jian Pei. – 3rd ed.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

Reference Books:

1. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory & Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K. P. Soman, S. Diwakar, V. Ajay, PHI,2008.

Web Reference:
https://www.digimat.in/nptel/courses/video/106105174/L01.html

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UNIVERSAL HUMAN VALUES

(Common to **CSE, AI&ML, DS, CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0021T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	HSC

Course Objectives:

This course will enable students to:

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding(ordevelopingclarity)oftheharmonyinthehumanbeing,family,societyandnature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

Course Outcomes(CO):

On completion of this course, student will be able to

- Studentsareexpectedtobecomemoreawareofthemselves,andtheirsurroundings(family,society,nature)
- They would become more responsible in life, and in handling problems with sustainable solutions , while keep ing human relationships and human nature in mind.
- They would have better critical ability.
- They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
- It ishopedthattheywouldbeabletoapplywhattheyhavelearnttotheirownselfindifferentday-to-daysettingsinreal life, atleast a beginning would be made in this direction.

Syllabus		Total Hours:48
Module-I	**Course Introduction-Need, Basic Guidelines, Content and Process for Value Education**	**10Hrs**

PurposeandmotivationforthecourseandrecapitulationfromUniversalHumanValues-I
Self-Exploration–whatisit?-Itscontentandprocess;'NaturalAcceptance'andExperientialValidation-astheprocessforself-exploration
Continuous Happiness and Prosperity-A look at basic Human Aspirations
Rightunderstanding,RelationshipandPhysicalFacility-thebasicrequirementsforfulfilmentofaspirationsofeveryhumanbeingwiththeircorrectpriority
Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario
Method to fulfil the above human aspirations: understanding and living in harmony at various levels.
Includepracticesessionstodiscussnaturalacceptanceinhumanbeingastheinnateacceptanceforliving withresponsibility(livinginrelationship,harmonyandco-existence)ratherthanasarbitrarinessinchoicebasedonliking-disliking

Module-II	**Understanding Harmony in the Human Being-Harmony in Myself!**	**9Hrs**

Understandinghumanbeingasaco-existenceofthesentient'I'andthematerial'Body'
Understandingthe needsofSelf('I') and'Body'- happiness and physical facility Understanding the Body as an instrumentof'I' (Ibeing the doer,seerand enjoyer)Understandingthecharacteristicsandactivitiesof'I'andharmonyin'I'

UnderstandingtheharmonyofIwiththeBody:SanyamandHealth;correctappraisalofPhysicalneeds,meani

ngofProsperityindetail Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available tome.Identifyingfromone'sownlife.Differentiatebetweenprosperityandaccumulation.Discussprogramforensuringhealthvsdealingwithdisease		
Module-III	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship**	**10Hrs**
Understandingvaluesinhuman-humanrelationship;meaningofJustice(nineuniversalvaluesinrelationships)andprogramforitsfulfilmenttoensuremutualhappiness;TrustandRespectasthefoundationalvaluesofrelationship UnderstandingthemeaningofTrust;Differencebetweenintentionandcompetence UnderstandingthemeaningofRespect,Differencebetweenrespectanddifferentiation;theothersalient valuesinrelationship Understandingtheharmonyinthesociety(societybeinganextensionoffamily):Resolution,Prosperity,fearlessness(trust)andco-existenceascomprehensiveHumanGoals Visualizing a universal harmonious order in society-Undivided Society, Universal Order-from family to world family. Include practice sessions to reflecton relationships in family, hostel and institute as extended family, reallifeexamples,teacher-studentrelationship,goalofeducationetc.Gratitudeasauniversalvalueinrelationships.Discusswithscenarios.Elicitexamplesfromstudents'lives		
Module-IV	**Understand the Nature and Existence hole existence asCoexis**	**9Hrs**
Understanding the harmony in the Nature Interconnectednessandmutualfulfilmentamongthefourordersofnature-recyclabilityandself-regulationinnature UnderstandingExistenceasCo-existenceofmutuallyinteractingunitsinall-pervasivespace Holistic perception of harmony a tall levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film"Home"canbeused),pollution,depletionofresourcesandroleoftechnologyetc.		
Module-V	**Implications of the above Holistic Understanding of Harmony on Professional Ethics**	**10Hrs**
NaturalacceptanceofhumanvaluesDefinitivenessofEthicalHumaConduct BasisforHumanisticEducation,HumanisticConstitutionandHumanisticUniversalOrder Competence in professional ethics :a .Ability to utilize the professional competence for augment ting universal human orderb.Ability toidentifythescopeandcharacteristicsofpeoplefriendlyandeco-friendly production systems, c. Ability to identify and develop appropriate technologies and managemen patterns for above production systems. Casestudiesoftypicalholistictechnologies,managementmodelsandproductionsystemsStrategyfortransitionfromthepresentstatetoUniversalHumanOrder: a. Atthelevelofindividual:associallyandecologicallyresponsibleengineers,technologistsandmanagers b. At the level of society: as mutually enriching institutions and organizations Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessionseg. To discuss the conduct as an engineer or scientist etc.		

Text Books:

1. RRGaur,RAsthana,GPBagaria,"AFoundationCourseinHumanValuesandProfessionalEthics",2nd RevisedEdition,ExcelBooks,NewDelhi,2019.ISBN978-93-87034-47-1
2. R RGaur,RAsthana,GPBagaria,"Teachers'ManualforAFoundationCourseinHumanValues andProfessionalEthics",2nd RevisedEdition,ExcelBooks,NewDelhi,2019.ISBN978-93-87034-53-2

Reference Books:

1. JeevanVidya: EkParichaya, ANagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. A.N.Tripathi,"HumanValues",NewAgeIntl.Publishers,NewDelhi,2004.TheStoryofStuff(Book).
3. Mohandas Karamchand Gandhi"The Story of My Experiments with Truth"
4. E.FSchumacher."SmallisBeautiful"SlowisBeautiful–CecileAndrews
5. J C Kumarappa"Economy of Permanence"Pandit Sunderlal "Bharat Mein Angreji Raj"Dharampal,"Rediscovering India"
6. MohandasK.Gandhi,"HindSwarajorIndianHomeRule"IndiaWinsFreedom-MaulanaAbdulKalamAzadVivekananda-RomainRolland(English)Gandhi-RomainRolland(English)

Web Reference:

https://www.uhv.org.in/

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DATABASE MANAGEMENT SYSTEMSLAB
(Common to **CSE, AI&ML, CS, DS)**

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0515P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Illustratethedifferentissuesinvolvedinthedesignandimplementationofadatabasesystem.
- Use data manipulation language to query, update, and manage a database.
- Designandbuildasimpledatabasesystemanddemonstratecompetencewiththefundamentaltasksin volved with modelling, designing, and implementing a DBMS.

Course Outcomes(CO):

On completion of this course, student will be able to

- Apply database tools to perform various operations for the given database.
- Design database and retrieve information from database
- Develop ER diagrams and normalize the solution of a database.
- Implement the integrity constraints and PL/SQL programs to build efficient databases.
- Develop solutions for database applications using procedures and functions.
- Develop solutions for database applications using cursors and triggers.

Syllabus | **Total Hours:48**

1. Practice session: Students should be allowed to choose appropriate DBMS software, install it, configure it and start working on it. Create sample tables, execute some queries, use SQLPLUS features, and use PL/SQL features like cursors on sample database.
2. Draw E-R diagram for library management system
3. Draw E-R diagram for university management system
4. Draw E-R diagram for hospital management system
5. Implement all DDL Commands
6. Implement all DML Commands
7. Implement all TCLand DCL Commands
8. a) Createrelationshipbetweenthetables using Nested Queries
   b) Implement different types of joins on tables
9. Implement set operations on tables
10. Create a table and apply various key constraints.
11. Views–Create a Virtual table based on the result set of an SQL statement.
12. a)Write a PL/SQL program to swap two numbers.
    b) Write a PL/SQL program to find the largest of three numbers.
13. a) Write a PL/SQL program to find the total and average of 6 subjects and display the grade.
    b) Write a PL/SQL program to find the sum of digits in a given number.
14. a) Write a PL/SQL program to display the number in reverse order.
    b) Write a PL/SQL program to check whether the given number is prime or not.
    c) Write a PL/SQL program to find the factorial of a given number.
15. Wr it e PL/SQLprogramstoimplementproceduresand funct io ns.
16. Write a PL/SQL Program on cursors
17. Write a PL/SQL Program to implement triggers

Text Books:

1. Raghu Ramakrishnan, Johannes Gehrke, Jeff Derstadt, Scott Selikoff and Lin Zhu, Database Management Systems solutions manual, third Edition, 2013.

References:

1. RamezElmasri, Shamkant, B. Navathe, "Database Systems", Pearson Education, 6th Edition, 2013.
2. Peter Rob, Carles Coronel, "Database System Concepts", Cengage Learning, 7th Edition, 2008.

Web Reference:

http://www.scoopworld.in

http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php

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OPERATING SYSTEMSLAB
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0516P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

This course will enable students to:
Design and implement the concepts of operating systems such as

- CPU scheduling
- Process Management
- Memory Management
- File systems and deadlock handling using C language.

Course Outcomes (CO):

On completion of this course, student will be able to

- Analyze and simulate CPU Scheduling Algorithms.
- Solve process Synchronization problems using different algorithms.
- Apply algorithms to avoid deadlock problems.
- Implement memory management schemes and page replacement schemes.
- Analyze and simulate Disk Scheduling Algorithms.
- Simulate file allocation and organization techniques.

Syllabus | **Total Hours:48**

1. Write a C program to simulate the following non-pre-emptive CPU scheduling algorithms to find turnaround time and waiting time.
   a) FCFS b) SJF
2. Write a C program to simulate the following pre-emptive CPU scheduling algorithms to find turnaround time and waiting time.
   a) Round Robin b) Priority
3. Write a C program to simulate producer-consumer problem using semaphores
4. Write a C program to simulate the concept of Dining-Philosophers problem
5. Write a C program to simulate Banker's algorithm for the purpose of deadlock avoidance.
6. Write a C program to simulate page replacement algorithms
   a) FIFO b) LRU
7. Write a C program to simulate the following contiguous memory allocation techniques
   a) Worst-fit b) Best-fit c) First-fit
8. Write a C program to simulate page replacement algorithms
   a) Optimal b) LFU
9. Write a C program to simulate paging technique of memory management
10. Write a C program to simulate disk scheduling algorithms
    a) FCFS b) SCAN
11. Write a C program to simulate the following file organization techniques
    a) Single level directory b) Two level directory c) Hierarchical
12. Write a C program to simulate the following file allocation strategies.
    a) Sequential b) Indexed

Reference Books:

5. "Operating System Concepts", Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth Edition, John Wiley.
6. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition–2009, Pearson Education
7. "Modern Operating Systems", Andrew S Tanenbaum, Second Edition, PHI.
8. "Operating Systems", S.Haldar, A.A.Aravind, Pearson Education.
9. "Principles of Operating Systems", B.L.Stuart, Cengage learning, India Edition.2013-2014
10. "Operating Systems", A.S.Godbole, Second Edition, TMH.
11. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI

Web Reference:

https://www.cse.iitb.ac.in/~mythili/os/
http://peterindia.net/OperatingSystems.html

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DATA WAREHOUSING AND MINING LAB					
Course Code	**L:T:P:S**	**Credits**	**Exam Marks**	**Exam Duration**	**Course Type**
22A3204P	**0:0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**PCC**

Course Objectives:

This course will enable students to:

- Ability to build Data Warehouse and Explore WEKA
- Ability to perform data preprocessing techniques.
- Demonstrate performing association rule mining on data sets
- Ability to perform Association Rules
- Ability to perform classification and clustering on data sets

Course Outcomes(CO):

On completion of this course, student will be able to

- Apply to build Data Warehouse and Explore WEKA
- Apply the data preprocessing techniques for different item sets.
- Apply the data mining algorithms for data sets.
- Use the Association Rules for different data sets.
- Demonstrate the Decision Tree with an example.
- Use the classification and clustering on data sets.

Syllabus — **Total Hours:48**

1. Create an Employee Table with the help of Data Mining Tool WEKA.
2. Create a Weather Table with the help of Data Mining Tool WEKA.
3. Apply Pre-Processing techniques to the training data set of Weather Table
4. Apply Pre-Processing techniques to the training data set of Employee Table
5. Normalize Weather Table data using Knowledge Flow
6. Normalize Employee Table data using Knowledge Flow.
7. Finding Association Rules for marketing data.
8. Finding Association Rules for Banking data
9. Finding Association Rules for Employee data
10. Construct Decision Tree for Weather data
11. Write a procedure for clustering Employee data using Density Based Cluster Algorithm.
12. Write a procedure for Clustering Customer data using KMeans Algorithm.

Web Reference:

http://www.pentaho.com/

http://www.cs.waikato.ac.nz/ml/weka/

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Basic Web Design (SKILL)

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0511	1:0:2:0	2	CIE:30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- Learn website development using HTML, CSS, and JavaScript.
- Understand the concepts of responsive web development using the bootstrap framework
- Learn the frame concepts to the websites and interactive websites.
- Discover how development process to use Google Charts to provide a better way to visualize data on a website
- Learn Content Management Systems to speed the development process

Course Outcomes(CO):

On completion of this course, student will be able to

- Construct websites with valid HTML,CSS.
- Create responsive monitors.
- Develop websites using jQuery and bootstrap to provide interactivity and engaging user experiences
- Design and Develop JavaScript applications.
- Embed Google chart tools in a website for better visualization of data.
- Design and develop web applications using Content Management Systems like Word Press

Syllabus | **Total Hours:48**

List of Experiments

Module -1:

HTML: What is a browser, Internet concepts, Introduction to HTML, Basic structure of HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, and Line Breaks HTML Tags.

Experiment-1 Design HTML page to display different heading tags and scroll college name as a message.

Module-2:

Introduction to elements of HTML, Working with Text, Lists, Hyperlinks, Images, Multimedia.

Experiment-2 Design HTML page to display the list of departments in college by using ordered and unordered list.

Module-3:

HTML(continued):HTML Tables

Experiment-3 Design HTML page to display Class Timetable

Module-4:
HTML Frames and Frameset.

Experiment-4 Design college website.

Module-5:
HTML Form Elements.

Experiment-5 Design a Student Registration web page using forms.

Module-6:
Cascading Style Sheets(CSS):CSS Properties, Types of CSS, Selectors, box model ,Pseudo-elements, z-index

Experiment-6 Apply CSS on student registration form.

Module - 7:
Bootstrap - CSS Framework: Layouts (Containers, Grid system), Forms, Other Components

Experiment-7 Style the student registration Form designed in Module-5still more beautiful using Bootstrap CSS (Re-size browser and check how the webpage displays in mobile resolution).

Module - 8:
HTTP & Browser Developer Tools: Understand HTTP Headers (Request & Response Headers), URL & its Anatomy, Developer Tools: Elements/Inspector, Console, Network, Sources, performance, Application Storage.

Experiment-8 Analyze various HTTP requests (initiators, timing diagrams, responses) and identify problems

Module-9:
JavaScript: Variables, Data Types, Operators.

Experiment-9 Design a simple JavaScript program to perform arithmetic operations.

Module-10:
JavaScript objects, conditions, loops and functions.

Experiment-10 Write JavaScript to find the factorial of a given number and generate the Fibonacci series (Recursive and non-Recursive).

Module-11:
JavaScript arrays and pop-up box.

Experiment-11 Validate all Fields and Submit the student registration Form designed in Module-5

Reference Books:

1. Deitel and Deitel and Nieto, ―Internet and World Wide Web-How to Program, PrenticeHall, 5th Edition,2011.
2. Web Technologies, Uttam K.Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
3. Stephen Wynkoop and John Burke―Running a Perfect Website‖,QUE,2nd Edition,1999.
4. Jeffrey C and Jackson, ―Web Technologies A Computer Science Perspective Pearson Education, 2011.
5. Gopalan N.P. and Akilandeswari J.,―WebTechnology,PrenticeHallofIndia,2011.

Web References:

1. HTML:https://html.spec.whatwg.org/multipage/
2. HTML:https://developer.mozilla.org/en-US/docs/Glossary/HTML5
3. CSS:https://www.w3.org/Style/CSS/
4. Bootstrap-CSSFramework:https://getbootstrap.com/
5. Browser Developer Tools:https://developer.mozilla.org/enUS/docs/Learn/Common_questions/What_are_browser_developer_tools
6. Javascript:https://developer.mozilla.org/en-US/docs/Web/JavaScript
7. JQuery:https://jquery.com
8. GoogleCharts:https://developers.google.com/chart
9. Wordpress:https://wordpress.com

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ENVIRONMENTAL SCIENCE

(Common to **CSE, AI&ML, CS, DS, ECE, EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0028T	2:0:0:0	0	CIE:30	-	MC

Course Objectives:

This course will enable students to:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life.
- To save earth from the inventions by the engineers.

Course Outcomes(CO):

On completion of this course, student will be able to

- Recognize the knowledge about environment, natural resources and different techniques involved in its conservation.
- Describe the information about different eco-systems and its functions.
- Explain the different types of bio-diversity along with values and conservation methods.
- Predict various environmental pollutions and able to design the environmental friendly process in engineering.
- Apply the sustainable development concepts in life, society and industry.

Syllabus		Total Hours:48
Module-I	**Multidisciplinary Nature of Environmental Studies and Natural Resources**	**10Hrs**

Definitions, components of Environment, Scope and Importance –Need for Public Awareness Renewable and non-renewable resources –Forest resources – Use and over – exploitation, deforestation, – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Module-II	Ecosystems	9Hrs

Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers– Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem

a. Grassland ecosystem.
b. Desert ecosystem

Module-III	Biodiversity And Its Conservation	10Hrs

Introduction Definition: genetic, species and ecosystem diversity – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values — India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching, Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module-IV	Environmental Pollution	9Hrs

Definition, Cause, effects and control measures of:

1. air pollution
2. water pollution
3. noise pollution

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes

Module-V	**Social Issues and The Environment**	**10Hrs**

From Unsustainable to Sustainable development – Urban problems related to energy –Environment Protection Act. – Air (Prevention and Control of Pollution) act

Definition, Cause, effects and control measures of:Global warming, Acid rain, Ozone layer depletion

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain –Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses- Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies- Kaushik &Kaushik, New Age Publishers.

Reference Books:

1. Environmental studies- R.Rajagopalan, Oxford University Press
2. Comprehensive Environmental studies- J.P.Sharma, Laxmi publications.

Web Reference:

https://www.environmentalscience.org/

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AUTOMATA AND COMPILER DESIGN					
Course Code	**L:T:P:S**	**Credits**	**Exam Marks**	**Exam Duration**	**Course Type**
22A0519T	**3: 0:0:0**	**3**	**CIE:30SEE:70**	**3Hours**	**PCC**

Course Objectives:

This course will enable students :

- Understand formal definitions of machine models
- To illustrate finite state machines to solve problems in computing
- Understanding of formal grammars
- To explain the hierarchy of problems arising in the computer sciences.
- Understanding of undecidable problems

Course Outcomes(CO):

On completion of this course, student will be able to:

- Understand the fundamental concepts of Formal Languages and Automata
- Apply the knowledge of Automata Theory, Grammars & Regular Expressions for solving various problems.
- Design of Context Free Grammar for formal language
- Construct push down automaton for the given language
- Make use of Turing machine concept to solve the simple problems
- Explain decidability or undecidability of various problems

Syllabus		**Total Hours:48**
MODULE-I	**Finite Automata**	**10Hrs**

Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automaton, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with Є-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

MODULE -II	**Regular Expressions**	**9Hrs**

Regular Expressions, Equivalence of two Regular Expressions, Finite Automata and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Grammars, Classification of Grammars-Chomsky Hierarchy, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

MODULE -III	**Context Free Grammars**	**10Hrs**

Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E-Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

MODULE -IV	**Introduction To Compiling**	**9Hrs**

Introduction To Compiling: Overview of Compilers, Phases of a Compiler.

Lexical Analysis: The Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The lexical analyzer generator Lex, Design of a Lexical Analyzer generator

MODULE -V	**Syntax Analysis**	**10Hrs**

Syntax Analysis: The role of the Parser, First and Follow, Predictive Parsing, LR Parsers-SLR, Canonical LR, LALR, Parser Generator(YACC).

Syntax-Directed Definition, S-Attributed SDD, L-Attributed SDD, Translation Schemes, three address code,

Principle Sources Of Code Optimizations, Issues Code generation

Text Books:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.

Reference Books:

1. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.
2. Introduction to Automata Theory, Formal Languages and Computation, ShyamalenduKandar, Pearson, 2013.

Web Reference:

https://www.iare.ac.in/sites/default/files/PPT/ACD%20PPTS_0.pdf

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COMPUTER NETWORKS

(Common **to CSE, AI&ML, CS, DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0520T	3: 0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students:

- Determine the basic concepts of Computer Networks.
- Determine the layered approach for design of computer networks
- Distinguish OSI and TCP/IP reference models
- Predict the network path used in Internet environment
- Use the format of headers of IP, TCP and UDP
- Illustrate the concepts of application layer, network security fundamentals.

Course Outcomes(CO):

On completion of this course, student will be able to:

- Use the software and hardware components of a computer network (L3)
- Apply the reference model of a computer network(L3)
- Solve the error correction and detection in existing protocols(L3)
- Predict path for routing, and congestion control algorithms(L3)
- Determine the functionality of TCP and UDP(L3)
- Use the appropriate application layer applications(L3)

Syllabus		Total Hours:48
Module-I	**The Internet and the Reference Models**	**10Hrs**

Introduction: Computer Network, Network Topologies, types of networks, Reference models- The OSI Reference Model the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models.

Physical Layer –Introduction to physical layer, Guided Media- Twisted-pair cable, Coaxial cable, Fiber optic cable, Unguided media: Wireless-Radio waves, microwaves, infrared.

Module-II	The Data Link Layer	9Hrs

The Data Link Layer:Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

Module-III	The Network Layer	10Hrs

The Network Layer: Network Layer design issues, Routing algorithms, Congestion control and Internetworking, Network layer in internet.

Module-IV	Transport Layer	9Hrs

Transport Layer: Transport layer services, service primitives, Elements of transport protocols**,** The Internet Transport Protocols: TCP/IP, UDP.

Module-V	The Application Layer and Network security	10Hrs

The Application Layer: DNS, SMTP, FTP, Email and security, network security.

Text Books:

1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

Reference Books:

1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016.

Web Reference:

1. https://nptel.ac.in/courses/106105183/25
2. http://www.nptelvideos.in/2012/11/computer-networks.html
3. https://nptel.ac.in/courses/106105183/3

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MACHINELEARNING
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0528T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Understand basic concepts of Machine Learning
- Study different learning algorithms
- Illustrate evaluation of learning algorithms

Course Outcomes(CO):

On completion of this course, student will be able to

- Interpret the basic concepts of Human Learning, Machine Learning, Building and Evaluating a Model, Classification, Regression and Clustering
- Building, training and evaluating a Model
- Apply different Classification algorithms to real world problems
- Apply different Regression techniques to real world problems
- Apply Partitioning Methods of Clustering to real world problems
- Apply Density-based methods of Clustering to real world Scenarios

Syllabus		Total Hours:48
Module-I	**Introduction – Human Learning & Machine Learning**	**10Hrs**

Human Learning, Types of Human Learning, Machine Learning, Types of Machine Learning, Applications of Machine Learning, Issues in Machine Learning.

Basic types of Data in Machine Learning, Data Preprocessing : Data Cleaning, Data transformation and Data Reduction

Module-II	Modeling and Evaluation	9Hrs

Introduction, selecting a Model, training a Model, Model Representation and Interpretability, Evaluating Performance of a Model, Improving Performance of a Model

Module-III	Supervised Learning :Classification	10Hrs

Classification – Methods of Classification : Classification model, Classification Learning Steps, Classification by Decision tree Induction, Classification by Back propagation, K-Nearest Neighbor Classification, Random Forest Algorithm, Naïve Baye's Classification

Module-IV	Supervised Learning : Regression	10Hrs

Regression – Assumptions in Regression Analysis, Types of Regression: Simple Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression, Curve Fitting- Method of Least Squares.

Module-V	Unsupervised Learning : Clustering	9Hrs

Clustering- Different types of clustering techniques, Partitioning Methods: K-Means Algorithm, K-Medoid's algorithm, Hierarchical Clustering Methods, Density based Clustering Methods- DBSCAN, DENCLUE, OPTICS

Text Books:

1. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson, 2019..

Reference Books:

1. EthernAlpaydin, "Introduction to Machine Learning", MIT Press, 2004.
2. Stephen Marsland, "Machine Learning -An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.
3. Andreas C. Müller and Sarah Guido "Introduction to Machine Learning with Python: A Guide for Data Scientists", Oreilly.

Web References:

1. Andrew Ng, "Machine Learning Yearning"
2. https://www.deeplearning.ai/machine-learning-
3. https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html

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OBJECT ORIENTED ANALYSIS AND DESIGN
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0522a	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Understand the concepts of object oriented system
- Unified approach,& Understand object oriented system development methodologies. & Demonstrate UML diagrams
- Model user interface and map object oriented system to relational system

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the concepts of object model.
- Identify the classes and vocabulary of the problem domain.
- Illustrate the importance of modeling and software development life cycle.
- Draw the class and object diagrams for various applications.
- Apply the basics of behavioral modeling to behavioral diagrams.
- Model the various components and deployment diagram for the applications.

Syllabus		Total Hours:48
Module-I	**Introduction & Asymptotic Notations**	**9Hrs**

Introduction to Object Model: Introduction to object oriented analysis and Design, Iterative development and the Unified Process (UP), UP phases: Inception, Elaboration, Construction and Transition, Object-oriented metrics,the Evaluation of Object Model, Foundation of Object Model, Elements of object Model, Applying object Model.

Module-II	Classes and Objects	10Hrs

Classes and Objects: The Nature of an Object, Relationships among Objects, The Nature of a Class, Relationships among Classes, The Interplay of Classes and Objects, The Importance of Proper Classification, Identifying Classes and Objects, Key Abstractions and Mechanisms.

Module-III	Introduction to UML	9Hrs

Introduction to UML: The importance of modeling, Principles of modeling, Object oriented modeling, why model, Conceptual model of UML, Architecture, Software Development Life Cycle.

Module-IV	Structural Modeling	10Hrs

Basic Structural Modelling: Classes, Relationships, Common Mechanisms, and diagrams, class diagrams.

Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

Module-V	Behavioral Modeling	10Hrs

Basic Behavioral Modeling: Interactions, Interaction diagrams, use cases, Use case diagrams, Activity Diagrams, Sequence Diagrams, Collaboration and Deployment diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, time and space, state chart diagrams

Text Books:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, PEARSON, 3rd edition, 2013.
2. The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, PEARSON 12th Impression, 2012

Reference Books:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning

Web Reference:

1. https://www.youtube.com/watch?v=VnVHgj6OPrQ&list=PLAXUYU7PbJhhH0iWvtyD_J2L8mv15pchq

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VIRTUAL REALITY
(only to DS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0522b	3:0:0:0	3	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

This course will enable students to:

- To Learn The Virtual Reality And Virtual Environments.
- To Learn The 3d User Interface Input Hardware.
- To Learn The Software Technologies.
- Study The Performance Of 3d Interaction Techniques
- Understand The Augmented And Mixed Reality.

Course Outcomes(CO):

On Completion Of This Course, Student Will Be Able To

- Understand The Basic Concepts Of Virtual Reality And Virtual Environments.
- Determine the 3d User Interface Input Hardware.
- Use The Software Technologies In VR Environment.
- Determine The 3d Interaction Techniques In Virtual Reality Applications .
- Analyze The Models Augmented And Mixed Reality.
- Analyze The Performance Of The Augmented Reality Methods.

Syllabus		Total Hours:45
Module-I	**Virtual Reality And Virtual Environments**	**8Hrs**

VIRTUAL REALITY AND VIRTUAL ENVIRONMENTS: The historical development of VR: Scientific landmarks Computer Graphics, Real-time computer graphics, Flight simulation, Virtual environments, Requirements for VR, benefits of Virtual reality. HARDWARE TECHNOLOGIES FOR 3D USER.

Module-II	**3D USER INTERFACE INPUT HARDWARE**	**8Hrs**

3D USER INTERFACE INPUT HARDWARE: Input device characteristics, Desktop input devices, Tracking Devices, 3D Mice, Special Purpose Input Devices, Direct Human Input..

Module-III	**SOFTWARE TECHNOLOGIES**	**8Hrs**

SOFTWARE TECHNOLOGIES: Database - World Space, World Coordinate, World Environment, Objects - Geometry, Position / Orientation, Hierarchy, Bounding Volume, Scripts and other attributes, VR Environment - VR Database, Tessellated Data, LODs, Cullers and Occluders, Lights and Cameras, Scripts, Interaction – Simple.

Module-IV	**3D INTERACTION TECHNIQUES**	**8Hrs**

3D INTERACTION TECHNIQUES: 3D Manipulation tasks, Manipulation Techniques and Input Devices, Interaction Techniques for 3D Manipulation, Deign Guidelines - 3D Travel Tasks. VIRTUAL REALITY APPLICATIONS: Engineering, Architecture, Education, Medicine, Entertainment, Science, Training.

Module-V	**AUGMENTED AND MIXED REALITY**	**10Hrs**

Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality.

Text Books:

1. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications: Foundations of Effective Design", Morgan Kaufmann, 2009.

2. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

3. Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice",Addison Wesley, USA, 2005.

4. Oliver Bimber and Ramesh Raskar, "Spatial Augmented Reality: Meging Real and Virtual Worlds", 2005.

5. Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", Wiley Interscience, India, 2003.

6. John Vince, "Virtual Reality Systems", Addison Wesley, 1995.

Reference Books:

1. Howard Rheingold, "Virtual Reality: The Revolutionary Technology and how it Promises to Transform Society", Simon and Schuster, 1991.

2. William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002

3. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013

Web Reference:

1.https://elearn.nptel.ac.in/shop/iit-workshops/completed/foundation-course-on-virtual-reality-and-augmented-reality/
2.https://www.youtube.com/watch?v=zLMgdYI82IE
3.https://www.youtube.com/watch?v=MGuSTAqlZ9Q

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SOFTWARE ENGINEERING

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0508T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To learn the basic concepts of software engineering and life cycle models.
- To understand the requirements engineering and agile models.
- To interpret the basic concepts of software design
- To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
- To understand the basic concepts in risk management and reengineering.

Course Outcomes (CO):

On completion of this course, student will be able to

- Use software life cycle activities for process models (L3).
- Use software requirements specifications for given problems (L3).
- Apply design concepts, component Level and user interface design for a given problems(l3)
- Apply various test cases for a given problems (L3).
- Apply quality management concepts at the application level. (L3)
- Determine risk management plans and implementation(l3)

Syllabus		Total Hours:48
Module-I	**Software, Software Engineering and Software Process**	**10 Hrs**

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, project scheduling, Organization and team structure, risk management.

Module-II	Requirements Engineering and Agile Models	9 Hrs

The Nature of software, The unique nature of web apps, The software myths

Requirements Engineering: Functional and non-functional requirements, the software requirements document, Requirements specification, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management

Agile development model: What is agility, what is an agile process, XP, Agile process models, CMMI

Module-III	Design Concepts, Component Level and User Interface Design	9 Hrs

Design Concepts: Good Software Design, Cohesion and coupling, The design Process, Design concepts, design models

Component Level Design: Introduction to components, designing class-based components

User Interface Design: Golden rules, User Interface analysis and design

Module-IV	Software Testing Strategies, Project Metrics and Quality Management	10 Hrs
Software Testing Strategies: coding standards and guidelines, code review, testing, types of testing. **Process and project metrics**: software measurement, A framework for product metrics. **Quality Management:** Quality, Software quality**,** metrics for software quality, software quality assurance.		
Module-V	**Risk Management and Reengineering**	**10 Hrs**
Risk Management: Risk identification, Risk projection, risk refinement, RMMM **Maintenance and reengineering:** Software maintenance, reengineering, reverse engineering and forward engineering **Case Study:** Implementation of safe home system using software engineering principles.		
Text Books: 1. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill. 2. Somerville, "Software Engineering", Pearson 2.		
Reference Books: 1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018. 2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill. 3. Jalote Pankaj, "An integrated approach to Software Engineering", Narosa.		
Web Reference: https://nptel.ac.in/courses/106/105/106105182/ http://peterindia.net/SoftwareDevelopment.html		

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PRINCIPLES OF COMMUNICATION SYSTEMS
(Common to **CSE, AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0430T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To understand the concept of various modulation schemes and multiplexing.
- To apply the concept of various modulation schemes to solve engineering problems.
- To analyze various modulation schemes.
- To evaluate various modulation scheme in real time applications.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the concept of various modulation schemes.
- Understand the concept of Different multiplexing techniques.
- Apply the concept of various modulation schemes to solve engineering problems.
- Analyze various modulation schemes.
- Evaluate various modulation schemes in real time applications.
- Understand the concept of various Communication systems.

Syllabus		Total Hours:48
Module-I	**Amplitude Modulation**	**10Hrs**

Amplitude Modulation: Introduction to Noise and Fourier Transform. An overview of Electronic Communication Systems. Need for Frequency Translation
Amplitude Modulation: DSB-FC, DSB-SC, SSB-SC and VSB, Radio Transmitter and Receiver. Theta notation (Θ), Mathematical analysis of non-Recursive and recursive Algorithms with Examples.

Module-II	Frequency Modulation	9Hrs

Frequency Modulation: Introduction to Angle Modulation, Tone modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulation and Demodulation. Stereophonic FM Broadcasting.

Module-III	Pulse Modulation	10Hrs

Pulse Modulation: Sampling Theorem- Low pass and Band pass Signals. Pulse Amplitude Modulation and Concept of Time Division Multiplexing and Frequency Division Multiplexing. Pulse Width Modulation. Digital Representation of Analog Signals

Module-IV	Digital Modulation	9Hrs

Digital Modulation: Binary Amplitude Shift Keying, Binary Phase Shift Keying and Quadrature Phase Shift Keying, Binary Frequency Shift Keying. Regenerative Repeater, M-ary and comparison

Module-V	NP-Complete and NP-Hard problems	10Hrs

Communication Systems: Satellite, RADAR, Optical, Micro wave communication, Mobile and Computer Communication (Block diagram approach only).

Text Books:

1. Herbert Taub, Donald L Schilling and Goutam Saha, “Principles of Communication Systems”, 3 rd Edition, Tata McGraw-Hill Publishing Company Ltd., 2008.

Reference Books:

1. B. P. Lathi, Zhi Ding and Hari M. Gupta, “Modern Digital and Analog Communication Systems”, 4th Edition, Oxford University Press, 2017.
2. K. Sam Shanmugam “Digital and Analog Communication Systems”, Wiley India Edition, 2008.

Web References:

https://onlinecourses.nptel.ac.in/noc22_ee05/preview

https://archive.nptel.ac.in/courses/108/104/108104091/

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POWER ELECTRONICS
(Common to **CSE,AI&ML,DS,CS)**

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0214T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

The objectives of the course are to make the students learn about:

- Get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
- Understand the characteristics of AC to DC converters.
- Understand about the practical applications Electronics in industries

Course Outcomes(CO):

On completion of this course, student will be able to

- basic concepts of diode and transistor and its operation
- basic operating principles of power semiconductor switching devices.
- the operation of power electronic converters, inverters, AC voltage controllers, and cycloconverter
- How to apply the learnt principles and methods to practical applications.

Syllabus		Total Hours:48
Module-I	**POWER SEMI CONDUCTOR DEVICES -I**	**9Hrs**

Classification of Switching Devices Based on Frequency and Power Handling Capacity, Thyristors – Silicon Controlled Rectifiers (SCR's) – TRIACs, GTOs - Characteristics and Principles of Operation and other Thyristors.

Module-II	POWER SEMI CONDUCTOR DEVICES-II	10Hrs

BJT – Power Transistor - Power MOSFET – Power IGBT – Static Characteristics – Turn on and Turn Off Methods SCR- Dynamic Characteristics of SCR - Two Transistor Analogy – Triggering Circuits-Series and Parallel Connections of SCR's – Specifications and Ratings of SCR's, BJT, IGBT

Module-III	PHASE CONTROLLED CONVERTERS	9Hrs

Phase Control Technique – Single Phase Line Commutated Converters – Mid Point and Bridge Connections – Half Controlled Converters, Fully Controlled Converters with Resistive, RL Loads and RLE Load– Derivation of Average Load Voltage and Current – Effect of Source Inductance – Numerical Problems.

Module-IV	INVERTERS	10Hrs

Inverters – Single Phase Inverter – Basic Series Inverter – Basic Parallel Capacitor Inverter Bridge Inverter – Waveforms – Simple Forced Commutation Circuits for Bridge Inverters – Single Phase Half and Full Bridge Inverters-Pulse Width Modulation Control-Harmonic Reduction Techniques-Voltage Control Techniques for Inverters – Numerical Problems,

Module-V	AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS	10Hrs

AC Voltage Controllers – Single Phase Two SCR's in Anti Parallel – With R and RL Loads – Modes of Operation of TRIAC – TRIAC with R– Derivation of RMS Load Voltage, Current and Power Factor Wave Forms – Firing Circuits -Numerical Problems

Cyclo Converters – Single Phase Mid-Point Cycloconverters with Resistive and Inductive Load (Principle of Operation only) – Bridge Configuration of Single Phase Cycloconverter (Principle of Operation only) – Waveforms

Text Books:

1. Power Electronics, M. D. Singh and K. B. Khanchandani, Mc Graw Hill Education (India) Pvt. Ltd., 2nd Edition, 2007, 23rd Reprint 2015.
2. Power Electronics: Circuits, Devices and Applications, Muhammad H. Rashid, Pearson, 3rdEdition, 2014, 2nd Impression 2015

Reference Books:

1. Power Electronics, K. R. Varmah, Chikku Abraham, CENGAGE Learning, 1st Edition, 2016.
2. Power Electronics, P. S. Bimbhra, Khanna Publishers, 2012.
3. Power Electronics: Devices, Circuits, and Industrial Applications, V. R. Moorthi, OXFORD University Press, 1st Edition, 2005, 12th Impression 2012

Web References:

https://nptel.ac.in/courses/108105066
https://archive.nptel.ac.in/courses/108/102/108102145/

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BUILDING MATERIALS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0149T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

To identify the traditional materials that is used for building constructions.

- To explain basic concepts of building components such as stair case and masonry
- To know the causes of dampness in structures and its preventive measures
- To understand the building rules, building bye laws and acoustics of building

Course Outcomes(CO):

On completion of this course, student will be able to

- To understand the characteristics of different building materials
- Differentiate brick masonry, stone masonry construction and bonds used in construction of walls of buildings
- To know about the causes of dampness in buildings and its ill effects
- To understand the principles of planning in buildings
- Describe capable of understanding building rules and knowledge about, bye-laws and building elements.

Syllabus		Total Hours:48
Module-I	**MATERIALS**	**9Hrs**
Traditional materials: Stones- Types of stone masonry -Brick-types of brick masonry- lime Cement – Timber – Seasoning of timber - their uses in building works		
Module-II	**BUILDING COMPONENTS**	**9Hrs**
Lintels, Arches and Vaults – Staircases, Lifts – Types. Different types of flooring-Concrete, Mosaic, Terrazzo floors; Different types of roofs- Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs - King and Queen Post Trusses. Doors & Windows- Types and Specifications		
Module-III	**DAMPNESS**	**10Hrs**
Dampness and its prevention: Cause of dampness- ill effects of dampness-requirements of an ideal material for damp proofing-materials for damp proofing –methods of damp proofing.		
Module-IV	**BUILDING PLANNING**	**10Hrs**
Elements of building planning- basic requirements-orientation-planning for energy efficiency-planning based on utility-other requirements		
Module-V	**BUILDING RULES AND BYE-LAWS**	**10Hrs**
Zoning regulations; Regulations regarding layouts or subdivisions; Building regulations; Rules for special type of buildings; Calculation of plinth, floor and carpet area; Floor space index. Building Information System.		

Text Books:

1. Building Drawing by M.G. Shah, C.M. Kale and S.Y. Patki, Tata McGraw-Hill, New
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, ‚Building Construction' - Laxmi Publications (P) Ltd., New Delhi

Reference Books:

1. Building Materials, S. K. Duggal, New Age International Publications.
2. N. Kumaraswamy, A. Kameswara Rao, building planning and drawing, 7th Ed, Charotar

Web Reference:

1. http://nptel.ac.in/courses/105104103/
2. http://www.academicpub.org/jwrhe/
3. http://www.peo.on.ca/index.php/ci_id/21843/la_id/1

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AUTOMOBILE ENGINEERING

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0321Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students:

- Impart the knowledge of vehicle structure and its components.
- Demonstrate various components of petrol engines and diesel engines.
- Trains about the various electrical system, circuits, and testing of automobiles.
- Explain the concepts of steering, suspension and braking system in automobile.

Course Outcomes(CO):

On completion of this course, student will be able to

- Identify different parts of automobile
- Explain the working of various parts like engine and brakes
- Describe the working of steering and the suspension systems.
- Summarize the wheels and tires
- Outline the future developments in the automobile industry

Syllabus		Total Hours:48
Module-I	**Introduction to vehicle structure and engine components**	**9Hrs**

Vehicle construction - Chassis and body - Specifications - Engine - Types - Construction - Location of engine - Cylinder arrangement - Construction details - Cylinder block - Cylinder head - Cylinder liners - Piston – piston rings - Piston pin - Connecting rod - Crankshaft - Valves. Lubrication system - Types - Oil pumps - Filters. Crankcase ventilation

Module-II	Ignition and fuel supply systems	10Hrs

Ignition system - Coil and Magneto - Spark plug - Distributor – Electronic ignition system - Fuel system - Carburetor - Fuel pumps - Fuel injection systems - Mono point and Multi point – Unit Injector – Nozzle types - Electronic Fuel Injection system (EFI) – GDI, MPFI, DTSI.

Module-III	Steering and suspension system	9Hrs

Principle of steering - Steering Geometry and wheel alignment - Steering linkages – Steering gearboxes - Power steering - front axle - Suspension system - Independent and Solid axle – coil, leaf spring and air suspensions - torsion bar - shock absorbers.

Module-IV	Wheels, Tyres and Braking System	10Hrs

Wheels and Tyres - Construction - Type and specification - Tyre wear and causes - Brakes - Needs – Classification –Drum and Disc Mechanical - Hydraulic and pneumatic - Vacuum assist – Retarders – Anti-lock Braking System(ABS).

Module-V	Automobile electrical systems and advances in automobile engineering	10Hrs

Battery-General electrical circuits- Active Suspension System (ASS) - Electronic Brake Distribution (EBD) – Electronic Stability Program(ESP), Traction Control System (TCS) - Global Positioning System (GPS), Hybrid vehicle, Fuel Cell.

Text Books:

1. Kirpal Singh, Automobile Engineering, Vol.1&2, Standard Publications, 13/e, 2020.
2. William.Crouse, Automotive Mechanics, 10/e, McGraw-Hill, 2006.
3. David A. Corolla, Automotive Engineering: Powertrain, Chassis System and Vehicle Body, Butterworth-Heinemann Publishing Ltd, 2009.
4. Richard Stone, Jeffrey K. Ball, Automotive Engineering Fundamentals" SAE International, 2004

Reference Books:

1. Bosch, Automotive Hand Book, 6/e, SAE Publications, 2007.
2. K. Newton and W. Steeds, The motor vehicle, 13/e, Butterworth-Heinemann Publishing Ltd, 1989.

1. Joseph Heitner, Automotive Mechanics Principles and Practices, 2/e, CBS publishing 2004 .

Web References:

https://archive.nptel.ac.in/courses/107/106/107106088/

https://nptel.ac.in/courses/107106088

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COMPUTERNETWORKSLAB
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0523P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Understand the basic concepts of Computer Networks
- Understand the functionalities of various layers of OSI model
- Apply the data link layer framing mechanisms
- Apply the error detection mechanisms
- Implement the routing protocols.

Course Outcomes(CO):

On completion of this course, student will be able to

- Use the basic components of a Computer Networks (L3)
- Determine different hardware devices in computer networks(L3)
- Determine the data link layer framing mechanisms(L3)
- Use the error detection mechanisms(L3)
- Apply the shortest routing protocols to transmit data(L3)
- Determine spanning tree for a subnet(L3)

Syllabus | **Total Hours:48**

List of Experiments

1. Explain the basic networking commands.
2. Study of network devices such as repeaters, hub, switch, bridge, router and gateway
3. Implement the data link layer framing method as character count
4. Implement the data link layer framing method as character stuffing
5. Implement the data link layer framing method as bit stuffing
6. Implement on a data set of characters the CRC polynomials CRC 12
7. Implement Dijkstra's algorithm to compute the shortest path through a graph
8. Obtain hierarchical table by taking an example subnet graph with weights indicating delay between nodes
9. Obtain Routing table at each node using distance vector routing algorithm
10. Find minimum cost and minimum spanning tree for a given subnet of hosts

Text Books:

1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

Reference Books:

1. Forouzan, Data communications and Networking, 5th Edition, McGraw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016.

Web Reference:

1. https://nptel.ac.in/courses/106105183/25
2. http://www.nptelvideos.in/2012/11/computer-networks.html
3. https://nptel.ac.in/courses/106105183/3

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MECHINE LEARNING LAB

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0532P	**0:0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**PCC**

Course Objectives:

This course will enable students to:

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the Mathematical and statistical prospective of machine learning algorithms through python programming
- Appreciate the importance of visualization in the data analytics solution
- Derive insights using Machine learning algorithms

Syllabus — **Total Hours:48**

List of Experiments

Experiment 1: Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

Experiment 2: For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

Experiment 3: Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

Experiment 4: Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.

Experiment 5: Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Experiment 6: Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

Experiment 7: Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

Experiment 8: Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Experiment 9: Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

Experiment 10: Implement parametric and non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Reference Book:

1. Python Machine Learning Workbook for beginners, AI Publishing, 2020

Web Reference:

https://www.udemy.com/course/machinelearning/

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LINUX PROGRAMMING (SKILL)
(Common to **DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0518	1:0:2:0	2	CIE:30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- Analyze the Linux utilities and Linux environment.
- Learn the fundamentals of shell scripting/programming.
- Understand system administration processes by providing a hands-on experience.

Course Outcomes (CO):

On completion of this course, student will be able to

CO1: Understand the Basic commands and utilities in Linux Environment
CO2: Identify and use Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security.
CO3: Analyze the Linux utilities and Linux environment.
CO4: Use shell script to automate different tasks as Linux.
CO5: Illustrate file processing operations such as standard I/O and formatted I/O.
CO6: Develop various client server applications using TCP or UDP protocols.

Syllabus — **Total Hours:48**

Introduction to Linux/Unix:- Architecture of Unix, Features of Unix , Unix Commands – man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, : User and session management commands: useradd, groupadd, userdel, groupdel.

Linux/Unix Utilities:- Introduction to unix file system, file handling utilities, vi editor, Text processing utilities and backup utilities: commands to be covered are tail, head, sort, nl, uniq, sed, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr and awk.
Unix Session, Standard Streams, Redirection, Pipes.

Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files

Shell Programming:
Introduction to shells, Variables, input and output, Environment variables, Basic script concepts, Expressions, Decision making and repetition etc.

Socket programming: Client Sever Implementation Using Sockets and Shared Memory

Task 1: Study and Practice on various commands like man, echo, printf, clear, script, passwd, cal,uname, who, date, tty, stty, pwd, who,.

Task 2: Study and Practice on various commands like cd, mkdir, rmdir cp, mv, ln, rm, unlink, du, df, mount, umount, find, unmask, ulimit, ps.

Task 3: Study and Practice on various commands like tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr.

Task 4:

Session-1

a) Log into the system
b) Use vi editor to create a file called myfile.txt which contains some text.
c) Correct typing errors during creation.
d) Save the file
e) logout of the system

Session-2

a) Log into the system
b) open the file created in session 1
c) Add some text
d) Change some text
e) Delete some text
f) Save the Changes
g) Logout of the system

Task 5:

a) Login to the system
b) Use the appropriate command to determine your login shell
c) Use the /etc/passwd file to verify the result of step b.
d) Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
e) Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

Task 6:

a) Log into the system
b) Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields.

1425	Ravi	15.65
4320	Ramu	26.27
6830	Sita	36.15
1450	Raju	21.86

c) Use the cat command to display the file, mytable.
d) Use the vi command to correct any errors in the file, mytable.
e) Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)
f) Print the file mytable
g) Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)
h) Print the new file, mytable
i) Logout of the system.

Task 7:

a) Write a sed command that deletes the first character in each line in a file.
b) Write a sed command that deletes the character before the last character in each line in a file.
c) Write a sed command that swaps the first and second words in each line in a file.

Task 8:

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments toit.

Task 9:

1. Write a program to generate Fibonacci series
2. Write a program to check whether given string is palindrome or not
3. Write a shell script to find factorial of a given integer.

Task 10:

1. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
2. Write a shell script to list all of the directory files in a directory

Task 11:

1. Write an awk script to count the number of lines in a file that do not contain vowels.
2. Write an awk script to find the number of characters, words and lines in a file.
3. Write an awk script to calculate average marks of each student.
4. Write an awk script to replace a string in a file.

Task 12:

Simulate the following commands

a) Simulate cat command b) Simulate cp command

Task 13:

2. Write client and server programs (using java) for interaction between server and client processes using Unix domain sockets.
3. Write client and server programs (using java) for interaction between server and client processes using Internet domain sockets.

Reference Books:

1. Sumitabha Das, "Your Unix The Ultimate Guide", Tata McGraw-Hill, New Delhi, India, 2007.
2. B. A. Forouzan and R. F. Gilberg, "Unix and Shell Programming", Cengage Learning.
3. Robert Love, "Linux System Programming", O'Reilly, SPD.
4. Stephen G. Kochan, Patrick Wood, "Unix Shell Programming", Sams publications, 3rd Edition, 2007.
5. T. Chan, "Unix System Programming using C++", Prentice Hall India, 1999.

Web Reference:

https://www.simplilearn.com/linux-programming-for-beginners-article

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Design Thinking and Innovation
(Common to All)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0526	2: 0:0:0	0	CIE:30	-	MC

Course Objectives:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes(CO):

On completion of this course, student will be able to:

- Define the concepts related to design thinking.
- Explain the fundamentals of Design Thinking and innovation
- Apply the design thinking techniques for solving problems in various sectors.
- Analyze to work in a multidisciplinary environment
- Evaluate the value of creativity
- Formulate specific problem statements of real time issues

Syllabus		Total Hours:48
Module-I	**Introduction to Design Thinking**	**9Hrs**

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

Module -II	Design Thinking Process	9Hrs

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brain storming, product development Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

Module -III	Innovation	10Hrs

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity. Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

Module -IV	Product Design	10Hrs

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies. Activity: Importance of modelling, how to set specifications, Explaining their own product design.

Module -V	Design Thinking in Business Processes	10Hrs

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme

competition, Standardization. Design thinking to meet corporate needs.

Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes. Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Text Books:

1. Change by design, Tim Brown, Harper Bollins (2009)
2. Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons

Reference Books:

1. Design Thinking in the Classroom by David Lee, Ulysses press
2. Design the Future, by Shrrutin N Shetty, Norton Press
3. Universal principles of design- William lidwell, kritinaholden, Jill butter.
4. The era of open innovation – chesbrough.H

Web Reference:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview

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BIG DATA ANALYTICS
(Common to **CSE, AI&ML, DS, CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0534c	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

- Understand the basic concepts and importance of Big Data
- Familiarize with the installation of Hadoop and how to analyze the Big Data
- Understand the design concepts of HDFS
- Provide good insight for developing a MapReduce applications
- Understand Hadoop environment.
- Explore the concepts of Pig, Hive, Spark and HBase

Course Outcomes(CO):

After the completion of the course students will able to
CO1: Understand the concepts and tools of big data.
CO2: Analyzing the Data with Hadoop
CO3: Develop MapReduce application
CO4: Illustrate the Anatomy of MapReduce and Hadoop environment
Determine why existing technologies are inadequate to analyze the large data
CO5: Apply large-scale analytic tools to solve some of the open big data problems.
CO6: Analyze analytic tools

Syllabus		Total Hours:48
Module-I	**Introduction to Big Data**	**10Hrs**

Introduction to Big Data: Big data fundamentals, importance of big data, Structuring Big Data, Big Data Analytics, Meet Hadoop: Data, Data Storage and Analysis, History of Apache Hadoop, Hadoop Ecosystem, Installation of Hadoop, Analyzing the Data with Hadoop, Scaling Out.

Module-II	HDFS and MapReduce	9Hrs

HDFS: HDFS Concepts, HDFS Architecture, The Command-Line Interface, Data flow: Anatomy of a file read and Anatomy of a file write.

MapReduce: Developing a MapReduce application: The Configuration API, setting up the Development Environment, Running Locally on Test Data, Running on a Cluster.

Module-III	How MapReduce Works and Hadoop Environment	10Hrs

How MapReduce Works: Anatomy of a MapReduceJob Run, Failures, Shuffle and Sort.
Hadoop Environment: Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration.

Module-IV	Data Analyzation using Pig as a tool	9Hrs

Pig: Pig Concepts**,** Apache Pig Architecture, Installing and Running Pig,Comparison with Databases, Pig Latin, UserDefined Functions, Data Processing Operators.

Module-V	Open source tools for Big Data: Hive, Spark and HBase	10Hrs

Hive: Hive concepts, Hive Architecture, Installing Hive, Comparison with traditional Databases, HiveQL, Tables, Querying Data.
Spark: Spark Concepts, Architecture of Spark, Installing Spark, Anatomy of a Spark Job Run.
HBase: Introduction to HBase, HBase Architecture, Installation.

Text Books:

1. Tom White, "Hadoop: The Definitive Guide"Fourth Edition, O'Reilly Media, 2015.
2. Big Data Black Book, DT Editorial services, Dreamtech Press
3. Big Data, Big Analytics: Emerging business intelligence and analytic trends for today's businesses, Michael Minnelli, Michelle Chambers, and Amiga Dhiraj, Wiley Cio Series

Reference Books:

1. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden,Big Data Glossary, O'Reilly, 2011.
2. Michael Berthold, David J.Hand, Intelligent Data Analysis, Springer, 2007.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos,Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets Cambridge University Press, 2012

Web References:

https://onlinecourses.swayam2.ac.in/arp19_ap60/preview

https://www.shiksha.com/online-courses/big-data-analytics-courses-certification-training-by-nptel-st601-tg91

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DATA VISUALIZATION
(Only to **DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3206T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:
- Familiarize with data visualization concepts
- Learn the data visualization principles
- Learn the concepts of plots
- Learn the concepts of data visualization via kernel machines
- Familiarize the data visualization for applications

Course Outcomes (CO):

On completion of this course, student will be able to
- Understand the data visualization concepts (L2).
- Apply various graphs and plots for data visualization (L3).
- Apply the matrix visualization for cluster analysis (L3)
- Analyze the kernel Machine in cluster analysis (L4).
- Apply various operations for genetic algorithms (L3).
- Illustrate the data visualization techniques for applications (L2).

Syllabus		Total Hours:48
Module-I	**Data Visualization**	**9Hrs**

Data Visualization: Introduction,A Brief History of Data Visualization, Good Graphics - Scientific Design Choices in Data Visualization, Static Graphics- Complete Plots, Customization, Data Visualization Through Their Graph Representations, High-dimensional Data Visualization, Linked Data Views.

Module-II	**Methodologies-I**	**10Hrs**

Methodologies-I: Interactive Linked Micro Map Plots for the Display of Geographically Referenced Statistical Data, Manual Controls.

Regression by Parts: Fitting Visually Interpretable Models with guide, Smoothing Techniques for Visualization

Module-III	**Methodologies-II**	**9Hrs**

Methodologies-II: Visualizing Cluster Analysis and Finite Mixture Models, Mosaic Plots and Their Variants, Matrix Visualization, Visualization in Bayesian Data Analysis.

Module-IV	**Data Visualization via Kernel Machine**	**10Hrs**

Data Visualization via Kernel Machine: Introduction, Kernel Principal Component Analysis, Kernel Canonical Correlation Analysis, Kernel Cluster Analysis

Module-V	Applications	10Hrs

Applications: Visualization for Genetic Network Reconstruction, Visualization and Analysis of Medical Images, Visualizing Functional Data with an Application to eBay's Online Auctions

Text Books:

1. Handbook of Data Visualization – Chun-houh Chen ,Wolfgang Härdle ,Antony Unwin – 3

Reference Books:

1. Better data visualizations- A gude for scholars, researchers and wonks-Jonathan schwabish-Columbia university Press
2. Visualizing data-O'Relly

Web Reference:

https://elearn.nptel.ac.in/shop/iit-workshops/completed/data-visualization-with-r/

https://www.youtube.com/watch?v=UjYzNhBVIvY

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CLOUD COMPUTING
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0529T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and familiar with the lead players in cloud.
- To understand the features of cloud simulator and apply different cloud programming model
- To design of cloud Services and explore the trusted cloud Computing system

Course Outcomes(CO):

On completion of this course, student will be able to

CO1: To Understand the basic concepts about cloud computing vision and its developments and gain the **Knowledge** of virtualization technology.
CO2: Analyze the concepts of cloud services and the deployment models.
CO3: Choose among various cloud technologies for implementing applications(GAE,Open stack, etc.)
CO4: Construct the virtual machines by using VMware simulator.
CO5: Build scientific applications by using Cloud environment.
CO6: Develop Business and Consumer Applications.

Syllabus		Total Hours:48
Module-I	**Basics of Cloud Computing**	**10Hrs**

Introduction to Cloud: Introduction to Cloud, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Elasticity in Cloud, On-demand Provisioning.

Virtualization: Introduction, Characteristics of Virtualized Environment, Taxonomy of Virtualization Techniques, Virtualization, and Cloud computing.

Module-II	Cloud Architecture, Models and Security	9Hrs

Cloud Computing Architecture: Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds.

Cloud Deployment Model: Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud.

Module-III	Cloud Technologies and Advancements	10Hrs

Apache Hadoop, MapReduce, Hadoop Cluster setup, Virtual Box, Google App Engine, Programming Environment for Google App Engine – Open Stack

Module-IV	VMware Simulator	9Hrs

VMWare: Basics of VMWare, Advantages of VMware virtualization, create a new virtual machine on local host, cloning virtual machines, virtualize a physical machine, starting and

stopping a virtual machine.

Module-V	Cloud Applications	10Hrs

Cloud Applications: Scientific Applications – Health Care, Geoscience.

Business And Consumer Applications - CRM and ERP, Social Networking, Media Applications, and Multiplayer Online Gaming.

Text Books:

1. Mastering Cloud Computing by RajkumarBuyya, Christian Vecchiola, S.Thamarai Selvi from TMH 2013.
2. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
3. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010.

Reference Books:

1. Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern Halper, Wiley Publishing, Inc, 2010
2. Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc. 2011
3. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O 'Reilly, SPD, rp2011.
5. Essentials of Cloud Computing by K. Chandrasekaran. CRC Press. Cloud computing A Hands-On Approach by ArshdeepBahga and Vijay Madisetti.

Web Reference:

1. https://nptel.ac.in/courses
2. https://freevideolectures.com/university/iitm

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No SQL

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0522c	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

- Discuss the history unstructured data
- To know non-relational databases and their importance in Data science.
- Understand the differences between Relational and NoSQL databases
- To explore the several types of NoSQL databases and understand the role in Big Data

Course Outcomes(CO):

On completion of this course, student will be able to

- Explain and compare different types of NoSQL Databases
- Compare and contrast RDBMS with different NoSQL databases.
- Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
- Explain performance tune of Key-Value Pair NoSQL databases.
- Explain performance tune of Column-oriented and Graph NoSQL databases
- Apply Nosql development tools on different types of NoSQL Databases.

Syllabus		Total Hours:48
Module-I	**Overview and history of NoSQL Databases**	**8Hrs**

Definition of the four types of NoSQL databases. The value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The emergence of NoSQL, Key Points.

Module-II	**RDBMS Vs NoSQL**	**8Hrs**

Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregated-Oriented Databases, Replication and Sharding, MapReduce on databases, Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication

Module-III	**Document Databases**	**8Hrs**

No-SQL Key-Value Databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analysis or Real Time Analytics.

Module-IV	**Column Oriented Databases**	**12Hrs**

Column-oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.

Module-V	**Key Value Databases**	**12Hrs**

NoSQL Key-Value databases using Riak, Key-Value Databases, Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets, Firebase- Cloud hosted NoSQL Database, Graph NoSQL databases using Neo4j, NoSQL database development tools and programming languages, Graph Databases features, consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases.

Text Books:

1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications, 1st Edition 2019.

Reference Books:

1. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence Paperback – Illustrated, 8 August 2012 by Martin Fowler (Author), Pramod Sadalage (Author)

Web **References:**

1. https://www.ibm.com/cloud/learn/nosql-databases
2. https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp
3. https://www.geeksforgeeks.org/introduction-to-nosql/
4. https://www.javatpoint.com/nosql-databa

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SOFT COMPUTING
(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530b	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- Familiarize with soft computing concepts
- Introduce and use the idea of Feed forward Neural Networks
- Learn the concepts of Unsupervised Learning and Associate Models
- Familiarize the Classical Sets and Fuzzy Sets
- Learn the concepts of Genetic algorithm and its applications

Course Outcomes(CO):

On completion of this course, student will be able to

- Show the difference between Conventional Artificial Intelligence to Computational Intelligence(L3).
- Illustrate Perceptions (L3).
- Use unsupervised learning algorithms (L3).
- Understand fuzzy logic and reasoning to handle and solve engineering problems (L3)
- Apply various operations of genetic algorithms (L3).
- Use the soft computing techniques for applications (L3).

Syllabus		Total Hours:48
Module-I	**Introduction to soft computing and fundamentals of Artificial Neural Networks**	**10Hrs**

Introduction: Introduction to soft computing, Evolutionary Computing, hard versus soft computing, soft computing methods, Recent trends in soft computing

Fundamentals of Artificial Neural Networks: Model of Biological Neuron, Mathematical Model of Neuron, ANN Architecture, Learning Rules, Learning Paradigms, Perceptron Network.

Module-II	Feed forward Neural Network	9Hrs

Feed forward Neural Network: Introduction, Back Propagation Network, Parameter Selection in BPN, Merits and Demerits of Back Propagation, Variants of Back Propagation, Applications of BPN, Radial Basis Function.

Module-III	Unsupervised Learning and Associate Models	9Hrs

Unsupervised Learning: Introduction, Winner-Takes-All Network, Learning Vector Quantization, Self-organization Map, Adaptive Resonance Theory, Neocognitron, Applications of Unsupervised Learning

Associate Models: Hopfield Network, Boltzmann Network, Simulated Annealing, Applications of Networks.

Module-IV	Classical Sets and Fuzzy Sets	10Hrs
Classical Sets and Fuzzy Sets: Crisp Sets, Fuzzy Sets: History and Origin. **Fuzzy Sets:** Basic Concepts, Paradigm Shift Representations of Fuzzy Sets, Alpha-cuts, Basic Operations on Fuzzy Sets, Fuzzy Complements, Intersections, and Unions, Extension Principle for Fuzzy Sets, Operations on Intuitionistic Fuzzy Sets, Fuzzy Relations.		
Module-V	**Genetic Algorithms and Applications of Soft Computing Techniques**	**10Hrs**
Genetic Algorithms: History of Evolutionary Computing, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function. **Applications of Soft Computing Techniques**: Pattern recognition, Image Processing, Soft Computing in Mobile Ad hoc Network, Soft Computing in Software Engineering.		

Text Books:

3. Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning

Reference Books:

1. S. N. Sivanandam& S. N. Deepa, "Principles of Soft Computing", 2nd edition, Wiley India, 2008.
2. David E. Goldberg, "Genetic Algorithms-In Search, optimization and Machine learning", Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", Pearson Education, 2004.
4. G.J. Klir& B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
5. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
6. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw- Hill International editions, 1995

Web Reference:

1. https://nptel.ac.in/courses/106105173
2. https://elearn.nptel.ac.in/shop/nptel/introduction-to-soft- computing/

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DESIGN PATTERNS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530c	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- To understand design patterns and their underlying object-oriented concepts.
- To understand implementation of design patterns and providing solutions to real world software design problems.
- To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

Course Outcomes(CO):

On completion of this course, student will be able to

- Know the underlying object-oriented principles of design patterns.
- Understand the context in which the pattern can be applied.
- Understand how the application of a pattern affects the system quality and its tradeoffs.

Syllabus		Total Hours:48
Module-I	**Introduction to Design Patterns**	**10Hrs**

Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

Module-II	Designing A Document Editor	9Hrs

Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Module-III	Structural Patterns	10Hrs

Structural Patterns-1: Adapter, Bridge, Composite.

Structural Patterns-2: Decorator, Facade, Flyweight, Proxy, Discuss of Structural Patterns

Module-IV	Behavioral Patterns	9Hrs

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns-2: Mediator, Memento, Observer.

Module-V	Behavioral Patterns	10Hrs

Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns.

Text Books:

1. Design Patterns By Erich Gamma, Pearson Education

Reference Books:

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway, Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons

Web References:

https://elearn.nptel.ac.in/shop/iit-workshops/completed/cloud-architecture-design-patterns-pc-on-cloud/
https://www.youtube.com/watch?v=1xUz1fp23TQ

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MICRO CONTROLLERS AND APPLICATIONS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0431T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Describe the Architecture of 8051 Microcontroller and Interfacing of 8051 to external memory.
- Write 8051 Assembly level programs using 8051 instructions set.
- Describe the Interrupt system, operation of Timers/Counters and Serial port of 8051.
- Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the importance of Microcontroller
- Acquire the knowledge of Architecture of 8051 Microcontroller.
- Apply and Interface simple switches, simple LEDs, ADC 0804, LCD and StepperMotor to using 8051 I/O ports.
- Develop the 8051 Assembly level programs using 8051 instructions set.
- Design the Interrupt system
- Understand the operation of Timers/Counters and Serial port of 8051.

Syllabus		Total Hours:48
Module-I	**8051 Microcontroller**	**10Hrs**

8051 Microcontroller: Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, Pin diagram, I/O ports functions, Internal Memory organization. External Memory (ROM & RAM) interfacing.

Module-II	**Addressing Modes**	**9Hrs**

Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions.

Module-III	**8051 Stack, Stack and Subroutine instructions**	**9Hrs**

8051 Stack, Stack and Subroutine instructions: Simple Assembly language program examples to use subroutine instructions.8051 Timers and Counters – Operation and Assembly language programming to generate a pulse using Mode-1 and a square wave using Mode- 2 on a port pin.

Module-IV	**8051 Serial Communication**	**10Hrs**

8051 Serial Communication- Basics of Serial Data Communication, RS- 232 standard, 9 pin RS232 signals, Simple Serial Port programming in Assembly and C to transmit a message and to receive data serially.8051 Interrupts. 8051 Assembly language programming to generate an external interrupt using a switch.

Module-V		10Hrs
8051 C programming to generate a square waveform on a port pin using a Timer interrupt. Interfacing 8051 to ADC-0804, DAC, LCD and Interfacing with relays and Opto isolators, Stepper Motor Interfacing, DC motor interfacing, PWM generation using 8051.		

Text Books:

1. Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; "The 8051 Microcontroller and Embedded Systems – using assembly and C", PHI, 2006 / Pearson, 2006.
2. Kenneth J. Ayala, "The 8051 Microcontroller", 3rd Edition, Thomson/Cengage Learning

Reference Books:

1. Manish K Patel, "The 8051 Microcontroller Based Embedded Systems", McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2. Raj Kamal, "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005. Wayne Wolf, FPGA based system design, Prentice hall, 2004.

Web References:

https://nptel.ac.in/courses/117104072

https://onlinecourses.nptel.ac.in/noc22_ee12/preview

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CONTROL SYSTEMS

(Common to **CSE,AI&ML,DS,CS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0213Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Merits and demerits of open loop and closed loop systems; the effects of feedback
- The use of block diagram algebra and Mason's gain formula
- Transient and steady state responses, time domain specifications
- Frequency domain specifications, Bode diagrams and Nyquist plots
- The fundamental aspects of modern control

Course Outcomes(CO):

On completion of this course, student will be able to

- Evaluate the effective transfer function of a system from (i) block diagram reduction techniques (ii) Mason's gain formula
- Compute the steady state errors and transient response characteristics
- Determine the absolute stability and relative stability of a system
- Design a compensator to accomplish desired performance
- Derive state space model of a given physical system and solve the state equation

Syllabus		Total Hours:48
Module-I	**INTRODUCTION**	**10Hrs**

Open Loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback Characteristics, Effects of positive and negative feedback. Mathematical models – Differential equations of Translational and Rotational mechanical systems, and Electrical Systems, Block diagram reduction methods – Signal flow graph - Reduction using Mason's gain formula. Transfer Function of DC Servo motor - AC Servo motor - Synchro transmitter and Receiver.

Module-II	TIME RESPONSE ANALYSIS	9Hrs

Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants

Module-III	STABILITY	9Hrs

The concept of stability – Routh's stability criterion – Stability and conditional stability – limitations of Routh's stability. The root locus concept - construction of root loci effects of adding poles and zeros to G(s)H(s) on the root loci.

Module-IV	FREQUENCY RESPONSE ANALYSIS	10Hrs

Introduction, Frequency domain specifications-Bode Diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram Stability Analysis from Bode Plots. Polar Plots- Phase margin and Gain Margin-Stability Analysis.

Module-V	STATE SPACE ANALYSIS	10Hrs

Concepts of state, state variables and state model, derivation of state models from differential equations. Transfer function models. Block diagrams. Diagonalization. Solving the Time invariant state Equations- State Transition Matrix and its Properties. System response through State Space models. The concepts of controllability and observability

Text Books:

1. Modern Control Engineering, Katsuhiko Ogata, PEARSON, 1st Impression 2015.
2. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International Publishers, 5th edition, 2007, Reprint 2012.

Reference Books:

1. Automatic Control Systems, Farid Golnaraghi and Benjamin. C. Kuo, WILEY, 9th Edition, 2010.
2. Control Systems, Dhanesh N. Manik, CENGAGE Learning, 2012.
3. John J D'Azzo and C. H. Houpis , "Linear Control System Analysis and Design: Conventional and Modern", McGraw - Hill Book Company, 1988.

Web References:

https://archive.nptel.ac.in/courses/107/106/107106081/

https://onlinecourses.nptel.ac.in/noc20_ee90/preview

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ENVIRONMENTAL ECONOMICS

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0150T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To impart knowledge on sustainable development and economics of energy
- To teach regarding environmental degradation and economic analysis of degradation
- To inculcate the knowledge of economics of pollution and their management
- To demonstrate the understanding of cost benefit analysis of environmental resources
- To make the students to understand principles of economics of biodiversity

Course Outcomes(CO):

On completion of this course, student will be able to

- The information on sustainable development and economics of energy
- The information regarding environmental degradation and economic analysis of degradation
- The identification of economics of pollution and their management
- The cost benefit analysis of environmental resources
- The principles of economics of biodiversity

Syllabus		Total Hours:48
Module-I	**SUSTAINABLE DEVELOPMENT**	**9Hrs**

Introduction to sustainable development - Economy-Environment interlinkages - Meaning of sustainable development - Limits to growth and the environmental Kuznets curve – The sustainability debate - Issues of energy and the economics of energy.

Module-II	**ENVIRONMENTAL DEGRADATION**	**9Hrs**

Economic significance and causes of environmental degradation - The concepts of policy failure, externality and market failure - Economic analysis of environmental degradation – Equi –marginal principle.

Module-III	**ECONOMICS OF POLLUTION**	**10Hrs**

Economics of optimal pollution, regulation, monitoring and enforcement - Managing pollution using existing markets: Bargaining solutions – Managing pollution through market intervention: Taxes, subsidies and permits.

Module-IV	**COST – BENEFIT ANALYSIS**	**10Hrs**

Cost – Benefit Analysis: Economic value of environmental resources and environmental damage - Concept of Total Economic Value - Alternative approaches to valuation – Cost-benefit analysis and discounting.

Module-V	**ECONOMICS OF BIODIVERSITY**	**10Hrs**

Economics of biodiversity: Economics of biodiversity conservation - Valuing individual species and diversity of species -Policy responses at national and international levels. Economics of Climate Change – stern Report

Text Books:

1. An Introduction to Environmental Economics by N. Hanley, J. Shogren and B. White Oxford University Press.(2001)
2. Blueprint for a Green Economy by D.W. Pearce, A. Markandya and E.B. Barbier Earthscan, London.(1989)

Reference Books:

1. Environmental Economics: An Elementary Introduction by R.K. Turner, D.W. Pearce and I. Bateman Harvester Wheatsheaft, London. (1994),
2. Economics of Natural Resources and the Environment by D.W. Pearce and R.K. Turner Harvester Wheat sheaf, London. (1990),

Web Reference:

1. https://nptel.ac.in/courses/109107171

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INTRODUCTION TO COMPOSITE MATERIALS

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0327Tb	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites.
- To know the testing methods related to composite materials.

Course Outcomes(CO):

To provide knowledge on characteristics of composites

- To get knowledge on manufacturing and testing methods and mechanical behaviour of composites.
- To get the exposure of different materials.

Syllabus		Total Hours:48
Module-I	**Introduction**	**10Hrs**
Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.		
Module-II	**Manufacturing Methods**	**9Hrs**
Hand and spray lay - up, injection molding, resin injection,filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.		
Module-III	**Mechanical Properties**	**9Hrs**
Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements –Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.		
Module-IV	**Laminates**	**10Hrs**
Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Crossply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygrothermal Stresses.		
Module-V	**Joining Methods and Failure Theories**	**10Hrs**
Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.		

Text Books:

1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York 2. B.T. Astrom, (1997),
2. Manufacturing of Polymer Composites, Chapman & Hall
3. Composite materials by J.N.Reddy

Reference Books:

1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology,CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.

Web Reference:

https://en.wikipedia.org/wiki/Composite_material

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BIG DATA ANALYTICS LAB
Department of Computer Science and Engineering (Data Science)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3205P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Get familiar with Hadoop distributions, configuring Hadoop and performing File management tasks
- Experiment MapReduce in Hadoop frameworks
- Implement MapReduce programs in variety applications
- Explore MapReduce support for debugging
- Understand different approaches for building Hadoop MapReduce programs for realtime application

Course Outcomes(CO):

On completion of this course, student will be able to

CO1.Use Hadoop and perform File Management Tasks
CO2.Apply MapReduce programs to real time issues like word count, weather dataset and sales of a company
CO3. analyze huge data set using Hadoop distributed file systems and MapReduce
CO4. Apply data processing tool Pig
CO5. Apply data processing tool Hive
CO6. Apply data processing tool Spark

Syllabus | **Total Hours:48**

1. Install Apache Hadoop
2. Develop a MapReduce program to calculate the frequency of a given word in agiven file.
3. Develop a MapReduce program to find the maximum temperature in each year.
4. Develop a MapReduce program to find the grades of students.
5. Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.
6. Develop a MapReduce to analyze weather data set and print whether the day is shinny or cool day.
7. Develop a MapReduce program to find the number of products sold in each country by considering sales data containing fields like

Tranctio n_Date	Pro duct	Pri ce	Payment _Type	Na me	Ci ty	St ate	Cou ntry	Account_ Created	Last_ Login	Latit ude	Longi tude

8. XYZ.com is an online music website where users listen to various tracks, the data gets collected which is given below. The data is coming in log files and looks like as shown below

UserId	TrackId	Shared	Radio	Skip
111115	222	0	1	0
111113	225	1	0	0
111117	223	0	1	1
111115	225	1	0	0

Write a MapReduce program to get the following

- Number of unique listeners
- Number of times the track was shared with others
- Number of times the track was listened to on the radio
- Number of times the track was listened to in total
- Number of times the track was skipped on the radio

9. Develop a Map Reduce program to analyze Titanic ship data and to find the average age of the people (both male and female) who died in the tragedy. How many persons are survived in each class.

The titanic data will be..

Column 1 :PassengerI d	Column 2 : Survived (survived=0 &died=1)
Column 3 :Pclass	Column 4 : Name
Column 5 : Sex	Column 6 : Age
Column 7 :SibSp	Column 8 :Parch
Column 9 : Ticket	Column 10 : Fare
Column 11 :Cabin	Column 12 : Embarked

10. Develop a program to calculate the maximum recorded temperature by yearwise for the weather dataset in Pig Latin

11. Write queries to sort and aggregate the data in a table using HiveQL.

12. Develop a Java application to find the maximum temperature using Spark

Text Book(s):

1. Tom White, "Hadoop: The Definitive Guide" Fourth Edition, O'reilly Media, 2015.

Reference Book(s):

1. Glenn J. Myatt, Making Sense of Data , John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
2. Michael Berthold, David J.Hand, Intelligent Data Analysis, Spingers, 2007.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, Uderstanding Big Data : Analytics for Enterprise Class Hadoop and Streaming Data, McGrawHill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David UIIman, Mining of Massive Datasets Cambridge University Press, 2012.

Web Reference:

https://www.ibm.com/analytics/big-data-analytics#:~:text=Big%20data%20analytics%20is%20the,sizes%20from%20terabytes%20to%20

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DATA VISUALIZATIONLAB
(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3207P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Familiarize with data visualization concepts
- Learn the data visualization principles
- Learn the concepts of plots
- Learn the concepts of data visualization via kernel machines
- Familiarize the data visualization for applications

Course Outcomes (CO):

On completion of this course, student will be able to

- Understand the data visualization concepts (L2).
- Apply various graphs and plots for data visualization (L3).
- Apply the matrix visualization for cluster analysis (L3)
- Analyze the kernel Machine in cluster analysis (L4).
- Apply various operations for genetic algorithms (L3).
- Illustrate the data visualization techniques for applications (L2).

Syllabus	Total Hours:48

1: Introduction to R
   a. Overview of R and Rstudio
   b. R syntax and Basic Operations
   c. Managing and navigating the R Environment

2: Data structures in R
- Vectors: a. Creation
   b. Indexing
   c. Basic arithmetic operations

3: Data Frames in R
   a. Creating
   b.Subsetting
   c. Manipulating

4: Data Manipulation in R
   a. Data import and Export in R
   b. Cleaning and Preprocessing data
   c. Manipulating data using functions from package like dplyr

5: Basic statistical operations
   a. Descriptive statistics (Mean, Median, Variance)
   b. Probability distributions in R
   c. Hypothesis testing (t-testing, chi-square tests)

6: Data Visualization in R

a. Introduction to basic plotting functions in R(plot, hist, boxplot)
b. Customizing plots (adding title, lables, legends)
c. Visualization methods-(categorical and continuous variables

7: Write a R program to display first 10 Fibonacci numbers
8: Write a R program to print the numbers from 1-100 and print “gist” for multiple of 3 print “GIST” for multiple of 5 and print “gist GIST” for multiple of both
9: Write a R program to create a data frame which contains details of 10 employees and display and summary of data

Reference Books:

1. Better data visualizations- A gude for scholars, researchers and wonks-Jonathan schwabish-Columbia university Press

Visualizing data-O’ Relly

Web Reference:

https://www.tableau.com/learn/articles/data-visualization

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CLOUD COMPUTING LAB

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0533P	0:0:3:0	1.5	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- Understand transfer of file form one virtual machine to another
- To learn to implement and use parallel programming using Hadoop

Course Outcomes(CO):

On completion of this course, student will be able to

CO1: Configure various virtualization tools such as Virtual Box, VMware workstation.

CO2: Design and deploy a web application in a PaaS environment.

CO3: Learn how to simulate a cloud environment to implement new schedulers.

CO4: Install and use a generic cloud environment that can be used as a private cloud.

CO5: Manipulate large data sets in a parallel environment.

Syllabus | **Total Hours:48**

List of Experiments

1. Install Virtual Box/VMware Workstation with different flavors of Linux or windows OS on top of windows operating systems.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count

Reference:

GoogleCloud Computing Foundations Course - Course (nptel.ac.in)

Web References:

1. https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html
2. http://code.google.com/appengine/downloads.html
3. http://code.google.com/appengine/downloads.html

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SOFT SKILLS
(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0029P	1:0:2:0	2	CIE:30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- To encourage all round development of the students by focusing on soft skills.
- To make the students aware of critical thinking and problem-solving skills.
- To develop leadership skills and organizational skills through group activities.
- To function effectively with heterogeneous teams.

Course Outcomes(CO):

On completion of this course, student will be able to

- Memorize various elements of effective communicative skills.
- Interpret people at the emotional level through emotional intelligence.
- Apply critical thinking skills in problem solving.
- Analyze the needs of an organization for team building.
- Judge the situation and take necessary decisions as a leader.
- Develop social and work-life skills as well as personal and emotional well-being.

Syllabus		Total Hours:48
Module-I	**Soft Skills & Communication Skills**	**10Hrs**

Introduction, meaning, significance of soft skills –Vital Components of communication skills - Inter-personal skills - Verbal and Non-verbal Communication.

Activities: Narration about self- strengths and weaknesses- clarity of thought - Interpersonal Skills- Group Discussion – Debate – Mutual Understanding - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic. Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- Negotiation skills – Role Play- Non-verbal communication – Public speaking – Mock interviews – Anchoring Skills.

Module-II	**Critical Thinking**	**9Hrs**

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking.

Activities: Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis.

Module-III	**Problem Solving & Decision Making**	**10Hrs**

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Methods of decision making – Effective decision making in teams – Methods & Styles.

Activities: Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and

organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion.

Module-IV	Emotional Intelligence & Stress Management	9Hrs

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.

Activities: Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, and sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates.

Module-V	Leadership Skills	10Hrs

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk Taking - Team Building - Time Management.

Activities: Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc.

Text Books:

1. Personality Development and Soft Skills (English, Paperback, Mitra Barun K.Publisher: Oxford University Press; Pap/Cdr edition (July 22, 2012)
2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr Shikha Kapoor Publisher : I K International Publishing House; 0 edition (February 28, 2018)

Reference Books:

1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018.
2. Soft Skills By Alex K. Published by S.Chand
3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.
4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books
5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press .
6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher: Vayu Education of India

Web Reference:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc

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RESEARCH METHODOLOGY

(Common **to CSE, AI&ML, CS, DS, ECE,EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0032T	**2:0:0:0**	**0**	**CIE:30**	**-**	**MC**

Course Objectives:

This course will enable students to:

- To understand the basic concepts of research and research problem
- To make the students learn about various types of data collection and sampling
- Design to enable them to know the method of statistical evaluation
- To make the students understand various testing tools in research
- To make the student learn how to write a research report
- • To create awareness on ethical issues n research

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand basic concepts and its methodologies
- Understand the concept of sampling and sampling design
- Design survey questionnaires for different kinds of research
- Read. comprehend and explain research articles in their academic discipline
- Analyze various types of testing tools used in research
- Design a research paper without any ethical issues

Syllabus		**Total Hours:48**
Module-I	**INTRODUCTION TORESEARCHMETHODOLOGY**	**10Hrs**

Meaning of Research – Objectives of Research – Types of Research – Research Approaches – Guidelines for Selecting and Defining a Research Problem – Research Design – Concepts related to Research Design – Basic Principles of Experimental Design.

Learning Outcomes: After completion of this unit student will

- Understand the concept of research and its process
- Explain various types of research
- Know the steps involved in research design

Understand the different research approaches

Module-II	**SAMPLING AND DATA COLLECTION METHODS**	**9Hrs**

Sampling Design – steps in Sampling Design –Characteristics of a Good Sample Design – Random Sampling Design. Measurement and Scaling Techniques-Errors in Measurement – Tests of Sound Measurement – Scaling and Scale Construction Techniques – Time Series Analysis – Interpolation and Extrapolation. Data Collection Methods – Primary Data – Secondary data – Questionnaire Survey and Interviews.

Learning Outcomes: After completion of this unit student will

- Understand the concept of sampling and sampling design
- Explain various techniques in measurement and scaling
- Learn various methods of data collection
- Design survey questionnaires for different kinds of research
- Analyze the questionnaires

Module-III	CORRELATION	10Hrs

Correlation and Regression Analysis – Method of Least Squares – Regression vs Correlation – Correlation vs Determination – Types of Correlations and Their Applications

Learning Outcomes: After completion of this unit student will

- Know the association of two variables
- Understand the importance of correlation and regression
- Compare and contrast correlation and regression
- Learn various types of correlation
- Apply the knowledge of Correlation & Regression Analysis to get the results

Module-IV	STATISTICAL INFERENCE	9Hrs

Statistical Inference: Tests of Hypothesis – Parametric vs Non-parametric Tests – Hypothesis Testing Procedure – Sampling Theory – Sampling Distribution – Chi-square Test – Analysis of variance and Co-variance – Multivariate Analysis

Learning Outcomes: After completion of this unit student will

- Know the statistical inference
- Understand the hypothesis testing procedure
- Compare and contrast Parametric and Non-parametric Tests
- Understand the use of chi-square test in investigating the distribution of categorical
- Variables Analyze the significance of variance and covariance

Module-V	REPORT WRITING	10Hrs

Report Writing and Professional Ethics: Interpretation of Data – Report Writing – Layout of a Research Paper – Techniques of Interpretation- Making Scientific Presentations in Conferences and Seminars – Professional Ethics in Research

Learning Outcomes: After completion of this unit student will

- Learn about report writing
- Understand how to write research paper
- Explain various techniques of interpretation
- Understand the importance of professional ethics in research
- Design a scientific paper to present in the conferences/seminars

Text Books:

1. C.R.Kothari, "Research Methodology: Methods and Techniques",2nd edition, New Age International Publishers.
2. A Step by Step Guide for Beginners, "Research Methodology": Ranjit Kumar, Sage Publications

Reference Books:

1. P.Narayana Reddy and G.V.R.K.Acharyulu, "Research Methodology and Statistical Tools", 1st Edition, Excel Books, New Delhi.
2. Donald R. "Business Research Methods", Cooper & Pamela S Schindler, 9th edition.
3. 3. S C Gupta, "Fundamentals of Statistics", 7th edition Himalaya Publications

Web Reference:

https://onlinecourses.swayam2.ac.in/cec20_hs17/preview

https://onlinecourses.nptel.ac.in/noc22_ge08/preview

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MANAGEMENT SCIENCE					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0023T	**3:0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**HS**

CourseObjectives:

1. To provide fundamental knowledge on Management, Administration, Organization &its concepts.
2. To make the students understand the role of management in Production
3. To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training &Development, job evaluation and Meritrating concepts.
4. TocreateawarenessonidentifyStrategicManagementareas&thePERT/CPMforbetterProjectManagement.
5. To make the students aware of the contemporary issues in management.

CourseOutcomes(CO):

On completion of this course, student will be able to

- Understand the concepts &principles of management and designs of organizationin a practical world(L2)
- ApplytheknowledgeofWork-studyprinciples&QualityControltechniquesinindustry(L3)
- Analyze the concepts of HRM in Recruitment , Selection and Training&Development.(L4)
- Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time&cost of project &to analyze the business through SWOT.(L3)
- Create Modern technology in management science.(L3)

Syllabus		**Total Hours:48**
Module-I	**INTRODUCTIONTOMANAGEMENT**	**10 Hrs**

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles -Eltan Mayo's Human relations - Systems Theory - Organizational Designs - Line organization -Line&StaffOrganization-FunctionalOrganization-MatrixOrganization-ProjectOrganization-CommitteeformofOrganization-SocialresponsibilitiesofManagement.

Module-II	**OPERATIONSMANAGEMENT**	**10Hrs**

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production),Work Study-Statistical Quality Control-Deming 's contribution to Quality .Material Management - Objectives - Inventory-Functions - Types, Inventory

Techniques - EOQ-ABC Analysis - Purchase Procedure and Stores Management - Marketing Management - Concept -Meaning-Nature-FunctionsofMarketing-MarketingMix-ChannelsofDistribution-AdvertisementandSalesPromotion-MarketingStrategiesbasedonProductLifeCycle.

Module-III	**HUMANRESOURCESMANAGEMENT**	**10Hrs**

HRM - Definition and Meaning – Nature - Managerial and Operative functions - Evolution of HRM - Job Analysis - Human Resource Planning(HRP)- Employee Recruitment-Sources of Recruitment- Employee Selection -Process and Tests in Employee Selection -EmployeeTrainingandDevelopment-On-the-job&Off-the-jobtrainingmethods-PerformanceAppraisal Concept- Methods of Performance Appraisal – Placement- Employee Induction –Wage and Salary Administration.

Module-IV	**STRATEGIC&PROJECTMANAGEMENT**	**10Hrs**

Definition&Meaning-Settingof Vision -Mission -Goals -CorporatePlanningProcess-Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis -ProjectManagement-NetworkAnalysis-ProgramEvaluationandReviewTechnique(PERT) - Critical Path Method (CPM)Identifying Critical Path - Probability of Completing theprojectwithingiventime-ProjectCost-Analysis-ProjectCrashing(Simpleproblems).

Module-V	**CONTEMPORARYISSUESINMANAGEMENT**	**8 Hrs**

Theconceptof ManagementInformationSystem (MIS)-MaterialsRequirementPlanning(MRP)-CustomerRelationsManagement (CRM)-Total QualityManagement(TQM)-SixSigmaConcept-SupplyChainManagement (SCM)-EnterpriseResourcePlanning(ERP)-PerformanceManagement-BusinessProcessOutsourcing(BPO)-BusinessProcessRe-engineeringandBench Marking-BalancedScore Card-KnowledgeManagement.

Course Outcomes(CO):

On completion of this course, studentwillbeableto

- Understand the concept s& principles of management and designs of organization in a practical world(L2)
- ApplytheknowledgeofWork-studyprinciples&QualityControltechniquesinindustry(L3)
- Analyze the concepts of HR Min Recruitment, Selection and Training&Development. (L4)
- Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time&cost of project &to analyze the business through SWOT. (L3)
- Create Modern technology in management science. (L3)

Textbooks:

1. A.RAryasri,"ManagementScience",TMH,2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,NewDelhi,2012.

ReferenceBooks:

1. Koontz&Weihrich,"EssentialsofManagement",6th edition,TMH,2005.
2. ThomasN.Duening&JohnM.Ivancevich,"ManagementPrinciplesandGuidelines",Biztantra.
3. KanishkaBedi,"ProductionandOperationsManagement",OxfordUniversityPress,2004.
4. SamuelC.Certo,"ModernManagement",9th edition,PHI,2005

Web Reference:

https://pubsonline.informs.org/journal/mnsc

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ENTREPRENEURSHIP & INNOVATION (Common to All)					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0024T	**3:1:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**HS**

Course Objectives:

1. To make the student understand about Entrepreneurship
2. Toenablethestudentinknowingvarioussourcesofgeneratingnewideasinsetting upof New enterprise
3. To facilitate the student in knowing various sources of finance in starting up of a business
4. Toimpartknowledgeaboutvariousgovernmentsourceswhichprovidefinancial assistance to entrepreneurs/ women entrepreneurs
5. To encourage the student in creating and designing business plans

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the concept of Entrepreneurship and challenges in the world of competition. (L2)
- Apply the Knowledge in generating ideas for New Ventures. (L3)
- Analyzevarioussourcesoffinanceandsubsidiestoentrepreneur/womenEntrepreneurs. (L4)
- Evaluate the role of central government and state government in promoting entrepreneurship. (L3)
- Create and design business plan structure through incubations. (L3)

Syllabus		**Total Hours: 48**
Module-I	**INTRODUCTION TO ENTREPRENEURSHIP**	**10Hrs**

Entrepreneurship-Concept,knowledgeandskillsrequirement-Characteristicsofsuccessfulentrepreneurs-Entrepreneurshipprocess-Factorsimpactingemergenceofentrepreneurship-DifferencesbetweenEntrepreneurandIntrapreneur-Understandingindividualentrepreneurialmindsetandpersonality-RecenttrendsinEntrepreneurship.

Module-II	**STARTING UP NEW VENTURE**	**10Hrs**

Starting the New Venture - Generating business idea – Sources of new ideas & methods of generatingideas-Opportunityrecognition-Feasibilitystudy-Marketfeasibility,technical/operationalfeasibility - Financial feasibility - Drawing business plan - Preparing project report – Presenting business plan to investors.

Module-III	**SOURCES OF FINANACE**	**9 Hrs**

Sources of finance - Various sources of Finance available - long term sources - Short term sources -Institutional Finance – Commercial Banks, SFC's in India- NBFC's in India – their way of financing in India for small and medium business -Entrepreneurship development programs in India – The entrepreneurial journey- Institutions in aid of entrepreneurship development

Module-IV	**WOMEN ENTREPRENEURSHIP**	**9 Hrs**

WomenEntrepreneurship-EntrepreneurshipDevelopmentandGovernment-RoleofCentralGovernment and State Government in promoting women Entrepreneurship -

Introduction to various incentives, subsidies and grants – Export- oriented Units - Fiscal and Tax concessions available –Women entrepreneurship - Role and importance - Growth of women entrepreneurship in India-Issues &Challenges-Entrepreneurial motivations.

Module-V	**INTRODUCTION TO INCUBATION & INNOVATION**	**10 Hrs**

Fundamentals of Business Incubation - Principles and good practices of business incubation- Process of business incubation – Types, Advantages and Disadvantages of incubation.
Innovation Meaning & Definition - Forms of innovation - Innovation, features and characteristics - Factors initiating innovations - Innovation process and its stages.

Textbooks:

DFKuratkoandTVRao,"Entrepreneurship**"**-ASouth-AsianPerspective–CengageLearning,2012.(ForPPT,CaseSolutions Facultymayvisit:login.cengage.com)
NandanH,"FundamentalsofEntrepreneurship",PHI,2013

ReferenceBooks:

1. VasantDesai, "Smal lScale Industries and Entrepreneurship", HimalayaPublishing2012.
2. RajeevRoy"Entrepreneurship",2nd Edition, Oxford, 2012.
3. B.JanakiramandM.Rizwana"EntrepreneurshipDevelopment:Text&Cases",ExcelBooks,2011.
4. Stuart Read, Effectual "Entrepreneurship", Routledge, 2013.

Web Reference:
https://digitalleadership.com/blog/the-innovation-entrepreneurship-relationship/#

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BUSINESS ENVIRONMENT

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
22A0025T	3:1:0:0	3	CIE:30 SEE:70	3 Hours	HS

Course Objectives:

- To make the student understand about the business environment.
- To enable them in knowing the importance of fiscal and monitory policy.
- To facilitate them in understanding the export policy of the country.
- Impart knowledge about the functioning and role of WTO.
- Encourage the student in knowing the structure of stock market.

CourseOutcomes(CO):

On completion of this course, student will be able to

- Understand various types of business environment. (L2)
- Evaluate fiscal and monitory policy (L3)
- Analyze India's Trade Policy(L4)
- Understand the role of WTO(L2)
- Apply the knowledge of Money markets in future investment(L3)

Syllabus		Total Hours:48
Module-I	**AN OVERVIEW OF BUSINESS ENVIRONMENT**	**10Hrs**

Overview of Business Environment – Types of Environments - Internal & External -Microand Macro environment- Competitive structure of industries - Environmental analysis - Scopeofbusiness-Characteristicsofbusiness-Process&limitationsofenvironmentalanalysis.

Module-II	**FISCALPOLICY & MONETARY POLICY**	**10 Hrs**

FISCALPOLICY-PublicRevenues-PublicExpenditure-PublicdebtDevelopmentactivities financed by public expenditure - Evaluation of recent fiscal policy of Government ofIndia - Highlights of Budget - MONETARY POLICY - Demand and Supply of Money – RBI - Objectivesofmonetaryandcreditpolicy-Recenttrends-RoleofFinanceCommission.

Module-III	**INDIA'S TRADE POLICY & BALANCE OFPAYMENTS**	**10 Hrs**

INDIA'S TRADE POLICY - Magnitude and direction of Indian International Trade - Bilateraland Multilateral Trade Agreements - EXIM policy and role of EXIM bank - BALANCE OFPAYMENTS–Structure&Majorcomponents-CausesforDisequilibriuminBalanceofPayments-Correctionmeasures – WTO - Nature and Scope - Organization and Structure - Roleand functions of WTO in promoting world trade

Module-IV	**MONEYMARKETSANDCAPITALMARKETS**	**10 Hrs**

Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets -Reforms and recent development– SEBI - Stock Exchanges - Investor protection and role of SEBI.

Module-V	**INTRODUCTION TO INFLATION**	**8 Hrs**

Inflation – Meaning & Definition – Causes – Effects – Types – Advantages & Disadvantages Deflation – Meaning & Definition - Causes & Effects.

Textbooks:

1. FrancisCherunilam(2009),"InternationalBusiness":TextandCases,PrenticeHallo fIndia.
2. K.Aswathappa,"EssentialsofBusinessEnvironment":TextsandCases&Exercises 13thRevisedEdition.HPH2016.

ReferenceBooks:

1. K.V.Sivayya,V.B.MDas(2009),Indian Industrial Economy, Sultan Chand Publishers, NewDelhi,India.
2. Sundaram, Black(2009) ,International Business Environment Text and Cases, Prentice Hall of India, NewDelhi, India.
3. Chari.S.N (2009),International Business, Wiley India.
4. E.Bhattacharya(2009),InternationalBusiness,ExcelPublications,NewDelhi.

Web Reference:
https://www.toppr.com/guides/business-environment/#:~:text=Definition%20of%20Business%20Environment%20is,trends%2C%20economic%20changes%2C%20etc.

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NATURAL LANGUAGE PROCESSING
(Common to CSE,AI&ML,DS,CS,CE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0527T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students :

- Explain and apply fundamental algorithms and techniques in the area of natural language processing (NLP)
- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

Course Outcomes(CO):

On completion of this course, student will be able to:

- Understand the logic behind Natural languages
- Understand the significance of syntax and semantics of natural languages
- Process the Natural languages
- Verify the syntax and semantics of languages
- Design new natural languages

Syllabus		Total Hours:43
MODULE -I	**INTRODUCTION TO NATURAL LANGUAGE PROCESSING**	**8Hrs**

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

MODULE -II	GRAMMARS AND PARSING	8Hrs

Grammars and Parsing- Top- Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayes Rule, Shannon game, Entropy and Cross Entropy

MODULE -III	GRAMMARS FOR NATURAL LANGUAGE PROCESSING	9Hrs

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

MODULE -IV	INTERPRETATION AND MODELLING	9Hrs

Semantic Interpretation-Semantic & Logical form, Word senses & ambiguity, the basic logical form language, encoding ambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts &embedded sentences, Defining semantics structure model theory. Language Modelling-Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model

Adaption, Types of Language Models, Language-Specific Modelling Problems, Multilingual and Cross lingual Language Modelling.

MODULE -V	MACHINE TRANSLATION AND MULTILINGUAL INFORMATION	9Hrs

Machine Translation Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusaraka Output, Language Bridges. Multilingual Information Retrieval - Introduction, Document Pre-processing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources. Multilingual Automatic Summarization - Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets

Text Books:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory to Practice-Daniel M.Bikel and ImedZitouni, Pearson Publications.
3. Natural Language Processing, A paninian perspective, Akshar Bharathi, Vineet Chaitanya, Prentice –Hall of India.

Reference Books:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press,1999.

Web Reference:

http://peterindia.net/AILinks.html

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HIGH PERFORMANCE COMPUTING

(Common to AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3305T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

1. Learn concepts of parallel processing as it pertains to high-performance computing.
2. Solve problems a raised in Parallel Processing.
3. Design and analyze parallel programs on high performance computing resources using parallel programming paradigms

Course Outcomes(CO):

On completion of this course, student will be able to

- Distinguish different Parallel Processing Computers.
- Analyze the computational speed and performance of parallel programming using message passing paradigm using open-source APIs.
- Apply Pipeline and Synchronization techniques in different parallel processing platforms.
- Solve Load Balancing Problems.
- Utilize techniques to automatically implement, optimize, and adapt programs to different platforms
- Solve Performance issues in Parallel Processing

Syllabus		Total Hours:48
Module-I	**Parallel Computers**	**9 Hrs**
The Demand for Computational Speed, Potential for Increased Computational Speed, Types of Parallel Computers, Cluster Computing.		
Module-II	**Message Passing Computing**	**10 Hrs**
Basics of Message - Passing Programming, using a Cluster of Computers, Evaluating Parallel Programs, Debugging and Evaluating Parallel Programs Empirically.		
Module-III	**Pipelined Computations and Synchronous Computations**	**9 Hrs**
Pipeline Techniques, Computing Platform for Pipelined Applications, Pipeline Program Examples, Synchronization, Synchronization Computations, Synchronous Iteration Program Examples.		
Module-IV	**Load Balancing and Termination Detection**	**10Hrs**
Load Balancing, Dynamic Load Balancing, Distributed Termination Detection Algorithms, Program Example.		
Module-V	**Programming with Shared Memory**	**10Hrs**

Shared Memory Multiprocessors, Constructs for Specify Parallelism, Sharing Data, Parallel Programming Languages and Constructs, Performance Issues.

Text Books:

1. Parallel Programming: Techniques and Applications using Networked Work-stations and Parallel Computers" (2nd ed.) by B. Wilkinson and M. Allen, Prentice Hall.

Reference Books:

1. An Introduction to Parallel Computing: Design and Analysis of Algorithms, Second Edition - A.Grama, A. Gupta, G. Karypis and V. Kumar, Pearson.

Web Reference:

https://nptel.ac.in/courses/112105293
https://archive.nptel.ac.in/courses/112/105/112105293/

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DISTRIBUTED DATABASES
(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3207T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students:

- To teach the role of distributed databases in real life.
- To basic principles and implementation techniques of distributed database systems.
- To teach the importance of distributed database systems in concurrency control.
- To understand the broad concepts of distributed transaction process
- To familiarize how current database products implement database distribution including query optimization.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand distributed database design concepts(L1)
- Use query processing and decomposition mechanisms (L2).
- Understand the concepts of concurrency control in distributed databases (L2)
- Use the parallel database system concepts(L3)
- Understand the distributed database reliability (L2).
- Understand the various issues in distributed object management(L2).

Syllabus		Total Hours:48
Module-I	**Distributed DBMS Architecture and Design**	**10Hrs**

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS.

Distributed Database Design: Top-Down Design Process, Distribution Design issues, Fragmentation, Allocation.

Module-II	Query processing decomposition and Optimization	9Hrs

Overview of Query Processing: Query processing problem, Query processing objectives, characterization of query processors, layers of query processing-query decomposition, localization of distributed data.

Optimization of Distributed Queries: Query optimization, centralized query optimization, distributed query optimization.

Module-III	Transaction Management and concurrency control	9Hrs

Introduction to Transaction Management: Definition, properties of transaction, types of transactions,

Distributed Concurrency Control: Serializability Theory, Taxonomy of Concurrency Control Mechanisms. Locking-Based Concurrency Control Algorithms, Timestamp-Based Concurrency Control Algorithms, Deadlock Management.

Module-IV	**Distributed DBMS Reliability**	**10Hrs**

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

Module-V	**Distributed object Database Management Systems and Web Data Management**	**10Hrs**

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Web Data Management : Web Graph Management, Web Search, Web Querying,

Text Books:

1. M. Tamer OZSU and PatuckValduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

Reference Books:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

Web Reference:

https://www.youtube.com/watch?v=qMjCliHkdZk

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Block Chain Technology

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0535a	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- Illustrate the fundamental concepts of black chain.
- Determine the crypto currency primitives.
- Compare and contrast the bit coins and Crypto currency
- Illustrate the different security features

Course Outcomes(CO):

On completion of this course, student will be able to

- Describe the basic concepts and technology used for block chain.
- Describe the primitives of the distributed computing and cryptography related to block chain.
- Illustrate the concepts of Bit coin and their usage.
- Implement Ethereum block chain contract.
- Apply security features in blockchain technologies.
- Use smart contract in real world applications.

Syllabus		**Total Hours:48**
Module-I	**Introduction**	**9Hrs**
Need for Distributed Record Keeping, Modeling faults and adversaries, Byzantine Generals problem, Consensus algorithms and their scalability problems, Nakamoto's concept with Block chain based crypto currency, Technologies Borrowed in Block chain – hash pointers, consensus, byzantine fault-tolerant distributed computing, digital cash etc		
Module-II	Basic Distributed Computing & Crypto primitives:	**10Hrs**
Atomic Broadcast, Consensus, Byzantine Models of fault tolerance, Hash functions, Puzzle friendly Hash, Collison resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge systems		
Module-III	Bitcoin basics	**10Hrs**
Bitcoin blockchain, Challenges and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use		
Module-IV	Ethereum basics:	**10Hrs**
Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts, Writing smart contracts using Solidity & JavaScript		
Module-V	Privacy, Security issues in Block chain:	**9Hrs**
Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Block chains: Sybil attacks, selfish mining, 51% attacks advent of algorand; Sharding based consensus algorithms to prevent these attacks		

Text Books:

1. Josh Thompson, 'Block chain: The Block chain for Beginnings, Guild to Block chain Technology and Block chain Programming', Create Space Independent Publishing Platform, 2017.
2. Narayanan, Bonneau, Felten, Miller and Gold feder, "Bitcoin and Crypto currency Technologies – A Comprehensive Introduction", Princeton University Press.

Reference Books:

1. Imran Bashir, "Mastering Block chain: Distributed ledger technology, decentralization, and smart contracts explained", Packt Publishing.

2. Merunas Grincalaitis, "Mastering Ethereum: Implement Advanced Block chain Applications Using Ethereum-supported Tools, Services, and Protocols", Packet Publishing.

Web References:

1. https://onlinecourses.nptel.ac.in/noc22_cs44/preview
2. **https://nptel.ac.in/courses/106104220**

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Business Analytics

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
	4: 0:0:0	4	CIE: 30 SEE:70	3 Hours	Honours

Course Objectives:

- **To learn the Introduction to Data mining and R Basic Statistical Techniques.**
- **To learn the Data Preparation and Exploration Visualization Techniques**
- **To learn the Introduction to Supervised Learning Methods.**
- **Study the performance of Classification & Regression.**
- **Study the performance of Logistic Regression Artificial Neural Networks.**

Course Outcomes (COS):

After completion of the course, students will be able to:

- Understand the basic concepts of Data mining and R Basic Statistical Techniques.
- Determine the Data Preparation and Exploration Visualization Techniques.
- Determine the Supervised Learning Methods.
- Analyze the Classification & Regression in Business Analytics.
- Analyze the Logistic Regression Artificial Neural Networks.
- Analyze the Wrap Up Artificial Neural Networks Discriminate Analysis

Syllabus		Total Hours:48
Module- I	**Introduction to Data mining and R Basic Statistical Techniques.**	**12 Hrs**
General Overview of Data Mining and its Components Introduction and Data Mining Process Introduction to R Basic Statistical Techniques. Data Preparation and Exploration Visualization Techniques		
Module-II	**Data Preparation and Exploration Visualization Techniques**	**9 Hrs**
Data Preparation and Exploration Visualization Techniques Dimension Reduction Techniques Principal Component Analysis. Performance Metrics and Assessment Performance Metrics for Prediction and Classification.		
Module-III	**Introduction to Supervised LearningMethods**	**9 Hrs**
Supervised Learning Methods Multiple Linear Regression. Supervised Learning Methods NaÃ¯ve Bayes.		
Module-IV	**Classification & Regression**	**9 Hrs**
SupervisedLearningMethodsClassification&RegressionTrees.SupervisedLearning Methods Logistic Regression.		
Module-V	**Logistic Regression Artificial Neural Networks**	**9 Hrs**
Supervised Learning Methods Logistic Regression Artificial Neural Networks. Supervised Learning Methods and Wrap Up Artificial Neural Networks Discriminant Analysis.		

Textbooks:

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services(2015)
Reference Books: 1.DataMiningforBusinessIntelligence:Concepts,Techniques,andApplicationsinMicrosoft Office Excel with XLMiner by Shmueli, G., Patel, N. R., & Bruce, P.C.(2010)
Web Reference: https://archive.nptel.ac.in/courses/110/105/110105089/ https://nptel.ac.in/courses/110107092 https://onlinecourses.nptel.ac.in/noc22_mg11/preview

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DEEP LEARNING

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0535b	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- Demonstrate the major technology trends driving Deep Learning
- Build, train, and apply fully connected deep neural networks
- Implement efficient neural networks
- Analyze the key parameters and hyper parameters in a neural network's architecture

Course Outcomes(CO):

On completion of this course, student will be able to

- Apply Mathematical Operations on Neural Network. (L3)
- Choose proper Hyperparameters. (L4)
- Examine architecture of Deep Neural Network. (L3)
- Apply Convolutional Neural Networks in Image Classifications. (L3)
- Use RNN and LSTMs in Real time applications. (L3)
- Analyze different types of Autoencoders. (L4).

Syllabus		Total Hours:48
Module-I	**Linear Algebra**	**10Hrs**

Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.

Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

Module-II	Fundamentals of Neural Networks and Deep Learning	9Hrs

Neural Networks, Training Neural Networks, Activation Functions, Loss Functions, Hyper parameters, Building blocks of Deep Neural Networks.

Module-III	Convolutional Networks	10Hrs

The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks..

Module-IV	Recurrent and Recursive Neural Networks	9Hrs

Recurrent Neural Network: Modelling Time Dimension, 3D Volumetric Input, General Recursive Neural Network Architecture, LSTM Networks, Applications.

Recursive Neural Network: Architecture, Varieties of RNN, Applications of RNN.

Module-V	Autoencoders	10Hrs
Under complete Auto encoders, Regularized Auto encoders, Representational Power, Layer Size and Depth, Stochastic Encoders and Decoders, Denoising Auto encoders.		

Text Book:

1. Ian Good fellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press,2016.
2. Josh Patterson and Adam Gibson, "Deep learning: A practitioner's approach", O'Reilly Media, First Edition, 2017

Reference Books:

1. Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O'Reilly, Shroff Publishers, 2019.
2. Deep learning Cook Book, Practical recipes to get started Quickly, DouweOsinga, O'Reilly, Shroff Publishers, 2019.

Web Reference:

1. https://keras.io/datasets/
2. http://deeplearning.net/tutorial/deeplearning.pdf
3. https://arxiv.org/pdf/1404.7828v4.pdf
4. https://www.cse.iitm.ac.in/~miteshk/CS7015.html
5. https://www.deeplearningbook.org
6. https://nptel.ac.in/courses/106105215

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IMAGE PROCESSING

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0535b	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts. The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Course Outcomes(CO):

On completion of this course, student will be able to

- CO1: Demonstrate the knowledge of the fundamental concepts of a image processing system.
- CO2 : Analyze images in the frequency domain using various transforms.
- CO3 : Evaluate the techniques for image enhancement and image restoration.
- CO4 : Interpret image segmentation and representation techniques.
- CO5:. Categorize various compression techniques.
- CO6 : Interpret Image compression standards

Syllabus		Total Hours:48
Module-I	**Basics to Image Processing**	**10Hrs**
Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD		
Module-II	Image Enhancement	**9Hrs**
Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.		
Module-III	**Image Restoration**	**10Hrs**
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.		
Module-IV	Image Segmentation	**9Hrs**
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.		
Module-V	**Image segmentation**	**10Hrs**
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.		

Text Book:

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2nd Ed, 2004

Reference Books:

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wilely, 3rd Edition, 2004.

Web References:

https://archive.nptel.ac.in/courses/117/105/117105135/

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TEXT ANALYTICS

(Common to CSE,AI&ML,DS,CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
	4: 0:0:0	4	CIE: 30 SEE:70	3 Hours	Honours

Course Objectives:

- To learn the Introduction to NLP.
- To learn the Syntactic Analysis.
- To learn the Semantic Analysis.
- Study the performance of Sequence Parsing with Recurrent networks.
- Study the performance of Sentiment Classification, Dialog Systems and Chatbots

Course Outcomes (COS):

After Completion Of The Course, Students Will Be Able To:

- Understand The Basics Of Natural Language Processing.
- Analyze The Text Syntactically.
- Analyze The Text Content Semantically.
- Outline The Sequence Parsing with recurrent networks.
- Analyze The Sequence Parsing with Recurrent networks.
- Analyze The Sentiment Classification, Dialog Systems and Chatbots.

Syllabus	Total Hours:48

Module- I	Introduction to NLP	12 Hrs

Introduction to NLP, Regular Expressions, Words, Corpora, Text Normalization, Minimum Edit distance, Ngram LanguageModels, Evaluating Language Models.

Module-II	Syntactic Analysis	9 Hrs

SYNTACTIC ANALYSIS : English Word Classes, The Penn Treebank Part-of-Speech Tagset, Part-of-Speech Tagging, HMM Part- of-Speech Tagging, Maximum Entropy Markov Models Grammar Rules for English, Treebanks, Grammar Equivalence and Normal form, Lexicalized Grammar

Module-III	Semantic Analysis	9 Hrs

SemanticAnalysis:RepresentationofSentenceMeaning,ComputationalDesiderataforRepresentations,Mo del-TheoreticSemantics,First-OrderLogic,EventandStateRepresentations,Description Logics, Semanticroles, Semanticrole labeling

Module-IV	Sequence Parsing With Recurrent networks	9 Hrs

Sequence Parsing WithRecurrentnetworks:SimpleRecurrentNetworks,ApplicationsofRNNs,
Deep Networks: Stacked and Bidirectional RNNs, Managing Context in RNNs: LSTMs and GRUs, Words, Characters and Byte-Pairs

Module-V	Case Study	9 Hrs

Case Study: Sentiment Classification, Dialog Systems and Chatbots

Textbooks:

1.Dan Jurafsky and James H.Martin. Speech and Language Processing (3rded.draft),2019.

Reference Books:

1. Steven Bird, Ewan Klein, and Edward Loper, Natural Language Processing with Python, First Edition, O'reilly,2009
2. YoavGoldberg,UniversityofToronto,NeuralNetworkMethodsforNaturallanguagePro-cessing, Morgan&Claypool,2017
3. Christopher D.Manning, and Hinrich Schütze. Foundations of statistical natural language processing. First Edition, MITpress,1999

Web Reference:

1. https://www.youtube.com/watch?v=Uqs0GewlMkQ
2. https://archive.nptel.ac.in/courses/110/107/110107129/
3. https://www.youtube.com/watch?v=PVrVuWK8P-E

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FULL STACK WEB DEVELOPMENT
(Common **to CSE, AI&ML, CS, DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0536b	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- To become knowledgeable about the most recent web development technologies.
- Idea for creating two tier and three tier architectural web applications.
- Design and analyze real time web applications.
- Constructing suitable client and server-side applications.
- To learn core concept of both front end and back end programming.

Course Outcomes(CO):

On completion of this course, student will be able to

- Summarize the knowledge on front end and back-end Tools (L2)
- Develop a fully functioning website on a web server. (L3)
- Use code packages based on their documentation to produce working results in a project. (L3)
- Construct web pages functioning from external data. (L3)
- Implement web application that employing efficient database access. (L3)

Syllabus		**Total Hours:48**
Module-I	**Web Development Basics**	**10Hrs**

Web Development Basics: Web development Basics - HTML & Web servers Shell - UNIX CLI Version control - Git &GitHub HTML, CSS

Module-II	**Frontend Development**	**9Hrs**

Frontend Development: JavaScript basics OOPS Aspects of JavaScript Memory usage and Functions in JS AJAX for data exchange with server jQuery Framework jQuery events, UI components etc. JSON data format.

Module-III	**REACT JS**	**10Hrs**

REACT JS: Introduction to React, React Router and Single Page Applications React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication.

Module-IV	**Architecture Requirements and Designing**	**9Hrs**

Java Web Development: JAVA PROGRAMMING BASICS, Model View Controller (MVC) Pattern, MVC Architecture using Spring RESTful API using Spring Framework, Buildingan application using Maven

Module-V	**Databases & Deployment**	**10Hrs**

Databases & Deployment: Relational schemas and normalization Structured Query Language (SQL) Data persistence using Spring JDBC Agile development principles.

Text Books:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett ProfessionalJavaScript for Web Developers Book by Nicholas C. Zakas
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-byStep Guide to CreatingDynamic Websites by Robin Nixon
3. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 BYAZAT MARDAN

Reference Books:

1. Full-Stack JavaScript Development by Eric Bush.
2. Mastering Full Stack React Web Development Paperback – April 28, 2017 by TomaszDyl , Kamil Przeorski , Maciej Czarnecki

Web References:

https://www.udemy.com/course/the-complete-web-development-2020

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SMART GRID

(Common **to CSE, AI&ML, CS, DS, ECE,EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0241Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

Student will be able to

- Overview of the technologies required for the smart grid
- Switching techniques and different means for data communication
- Standards for information exchange and smart metering
- Methods used for information security on smart grid
- Smart metering and protocols for smart metering
- Power quality management with upgraded technologies.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the concepts and design of Smart grid.
- Understand the various communication technologies in smart grid.
- Understand the various measurement technologies in smart grid.
- Understand the analysis and stability of smart grid.
- Learn the renewable energy resources and storages integrated with smart grid.
- familiarize the high performance computing for Smart Grid applications

Syllabus		Total Hours: 48
Module-I	**INTRODUCTION TO SMART GRID**	**10 Hrs**

Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and benefits, Difference between conventional & Smart Grid, Concept of Resilient &Self-Healing Grid, Present development & International policies in Smart Grid, Diverse perspectives from experts and global Smart Grid initiatives

Module-II	**SMART GRID TECHNOLOGIES**	**8 Hrs**

Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation ,Transmission systems: EMS, FACTS and HVDC, Wide area monitoring, Protection and control, Distribution systems: DMS, Volt/VAR control, Fault Detection, Isolation and service restoration, Outage management, High Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV).

Module–III	**SMART METERS**	**10 Hrs**

Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit(PMU),

Intelligent Electronic Devices(IED) & their application for monitoring & protection.		
Module-IV	**POWER QUALITY MANAGEMENT IN SMART GRID**	**10 Hrs**
Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.		
Module–V	**HIGH PERFORMANCE COMPUTING**	**10 Hrs**
Local Area Network (LAN), House Area Network (HAN), Wide Area Network (WAN),Broadband over Power line (BPL), IP based Protocols, Basics of Web Service and CLOUD Computing to make Smart Grids smarter, Cyber Security for Smart Grid.		

Textbooks:

1. Smart Grid, Janaka Ekanayake, Liyanage, Wu, Akihiko Yokoyama, Jenkins, Wiley Publications, 2012, Reprint 2015.
2. Smart Grid: Fundamentals of Design and Analysis, James Momoh, Wiley, IEEE Press., 2012, Reprint 2016.

Reference Books:

1. The Smart Grid – Enabling Energy efficiency and demand response, Clark W. Gellings, P.E., CRC Press, Taylor & Francis group, First Indian Reprint. 2015.
2. Smart Grid – Applications, Communications, and Security Edited by Lars Torsten Berger, Krzysztof Iniewski, WILEY, 2012, Reprint 2015.
3. Practical Electrical Network Automation and Communication Systems, Cobus Strauss, ELSVIER, 2003

Web References:

https://onlinecourses.nptel.ac.in/noc22_ee82/preview

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BASIC VLSI DESIGN
(Common**to CSE, AI&ML, CS, DS, ECE, EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0432T	3:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

- To give exposure to different steps involved in fabrication Process of PMOS & NMOS transistors, CMOS & BICOM Inverters.
- To provide knowledge on electrical properties of MOS & BICMOS devices to analyze the behaviour of inverters designed with various loads.
- To provide knowledge on Basic Circuit Concepts of VLSI Design
- To apply the design Rules and draw layout of a given logic circuit and basic circuit concepts to MOS circuits.
- To Apply the design for testability methods for combinational & sequential CMOS circuits

Course Outcomes:

After the completion of the course students will able to:

- Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
- Understand the concept of Basic Electrical Properties of MOS/Bi-CMOS Devices
- Apply the basic circuit concepts to MOS circuits.
- Understand the concept of Scaling of MOS circuits and Limitations of Scaling
- Apply the design Rules to draw the Stick diagram &layout of a given logic circuit.
- Interpret the need for testability and testing methods in VLSI.

Syllabus		**Total Hours: 48**
Module–I:	**Introduction to Fabrication Process**	**10 Hrs**

Introduction: Brief Introduction to IC technology, Moore's Law, Different modes MOSFET operation, Fabrication Process of PMOS, NMOS, CMOS & Bi-CMOS devices, Comparison between CMOS and Bi-polar Technologies.

Fabrication Steps: Wafer Preparation, Oxidation, Photolithography, Etching, Ion Implantations, Metallization, Testing.

Module– II	**Basic Electrical Properties of MOS/BiCMOS devices**	**10 Hrs**

Basic Electrical Properties: Ids Vs Vds relationships, MOS transistor Threshold Voltage-VT, figure of merit-ω0, Trans-conductance - gm, Output conductance-gds, Pass transistor logic, NMOS Inverter, Pull-up to Pull-down Ratio for NMOS inverter driven by another NMOS inverter, and through one or more pass transistors Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Module– III	**Basic Circuit Concepts**	**9 Hrs**

Basic Circuit Concepts: Sheet Resistance Rs and concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out

Module– IV	VLSI Circuit Design Processes	10 Hrs
VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda(λ)-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters Logic Gates and Various MOS Circuits. Scaling of MOS circuits, Limitations of Scaling.		
Module– V	**CMOS Testing**	**9 Hrs**
CAD Tools for Design and Simulation, Aspects of Design Tools, Design for Testability, Testing Combinational Logic, Testing Sequential Logic, Practical Design for Test (OFT) Guidelines, Scan Design Techniques, Built-In-Self-Test (BIST), Future Trends.		

Text Books:

1. Kamran Eshraghian, "Essentials of VLSI Circuits and Systems", Douglas and A. Pucknell and SholehEshraghian, Prentice-Hall of India Private Limited, 2005 Edition.
2. Behzad Razavi , "Design of Analog CMOS Integrated Circuits", McGraw Hill, 2003
3. Modern VLSI Design – Wayne Wolf, 3 Ed., 1997, Pearson Education.

References Books:

1. Jan M. Rabaey, "Digital Integrated Circuits", AnanthaChandrakasan and Borivoje Nikolic, Prentice-Hall of India Pvt.Ltd, 2nd edition, 2009.
2. John P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, reprint 2009
3. CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.

Web References:

https://nptel.ac.in/courses/117106092

https://www.digimat.in/nptel/courses/video/108107129/L01.html

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DISASTERMANAGEMENT

(Common **to CSE, AI&ML, CS, DS, ECE,EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0151T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

- Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
- Develop an awareness of the chronological phases of natural disaster response and refugee relief operations
- Describe the three planning strategies useful in mitigation
- Describe public awareness and economic incentive possibilities
- Understand the tools of post-disaster management

Course Outcomes:

On completion of this course, student will be able to

- To know about the natural hazards and its management
- To know about the fire hazards and solid waste management
- To understand about the emerging infectious diseases and aids their management
- To know about the regulations of building codes and land use planning related to risk and vulnerability.
- To impart the education related to risk reduction in schools and communities

Syllabus		Total Hours: 48
Module-I	**NATURAL HAZARDS AND DISASTER MANAGEMENT**	**9 Hrs**

Introduction of DM – Inter disciplinary -nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides

Module-II	MAN MADE DISASTER	9 Hrs

Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrotirism - threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

Module–III	RISK AND VULNERABILITY	10 Hrs

Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

Module –IV	ROLE OF TECHNOLOGY IN DISASTER MANAGEMENTS	10 Hrs
Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.		
Module–V	**EDUCATION AND COMMUNITY PREPAREDNESS**	**10 Hrs**
Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.		

Text Books:

1. Rajib shah & R R Krishnamurthy "Disaster Management" – Global Challenges and Local Solutions' Universities press. (2009),
2. Tushar Bhattacharya, "Disaster Science & Management" Tata McGraw Hill Education Pvt. Ltd., New Delhi

Reference Books:

1. Harsh. K . Gupta "Disaster Management edited", Universities press, 2003.

Web Reference:

1. https://www.youtube.com/watch?v=DExlZTfKZAM&list=PLC4PaTsQiLcbejXqJR7S59Ohk2OK1rgEG

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MEASUREMENTS AND MECHATRONICS
(Common **to CSE, AI&ML, CS, DS, ECE, EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0327Tc	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

- To instruct the principles of interchangeable manufacture.
- To introduce basic principles of mechanical measurements.
- To impart knowledge on mechatronics systems.

Course Outcomes:

Upon successful completion of the course, the students will be able to

- design the limit gauges for interchangeable manufacture.
- apply the basic principles of mechanical measurements for engineering practice.
- illustrate the role of mechatronics systems in manufacturing.
- explain principles of mechanical, hydraulic, pneumatic and electrical actuating systems.

Syllabus		Total Hours: 48
Module-I	**Limtis& Fits**	**10 Hrs**

Introduction, terminology pertaining to limits and fits – unilateral and bilateral tolerance system, hole and shaft basis systems – Interchangeability, deterministic & statistical tolerance, selective assembly. International Standard system of limits and fits

Limit Gauges: Taylor's principle – Classification and design of limit gauges.

Module-II	**Linear and Angular Measurements**	**10Hrs**

Line and end standards, slip gauges and length bars. bevel protractor – angle slip gauges – spirit levels and auto collimator.

Interferometry Applied to Measurement: NPL flatness interferometer and NPL gauge interferometer.

Surface Roughness Measurement: Differences between surface roughness and surface waviness- Numerical assessment of surface finish – CLA, R.M.S, Rz values, Methods of measurement of surface finish – Profilograph, Talysurf

Module-III	**Mechanical Measurements**	**10Hrs**

Introduction to measurement: Elements of generalized measurement system
Displacement Measurement- Linear Variable Differential Transformer (LVDT), encoders, potentiometers.
Temperature Measurement - Pyrometers, Resistance Temperature Detector (RTD)
Strain Measurement-Electrical strain gauge – gauge factor – method of usage of resistance strain gauge

Module-IV	Mechatronics Systems	10 Hrs
Mechatronics systems- Elements of mechatronics system, mechatronics design process, system - measurement systems, control systems, programmable logic controllers, case studies of mechatronic systems		
Module-V	**Actuating Systems:**	**8Hrs**
Hydraulic and pneumatic actuating systems - fluid systems, hydraulic systems, and pneumatic systems, components, control valves. mechanical actuating systems and electrical actuating systems – basic principles and elements.		

Textbooks:

1. R.K. Jain, "Engineering Metrology", Khanna Publishers.
2. BeckWith, Marangoni, Linehard, " Mechanical Measurements", 6th edition,PHI / PE.
3. W. Bolton , "Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg.", 4th Edition, Pearson, 2012.

Reference Books:

1. IC Guptha,"Engineering Metrology ",Danpath Rai Publications.
2. Doeblin Earnest. O. Adaptation by Manik and Dhanesh,"Measurement Systems: Application and Design", Tata Mc Graw Hill Publications.

Web Reference:

https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SPR1304.pdf

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ELECTRIC VEHICLES
(Common to all Except EEE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0232Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

- Understand to Provide good foundation on hybrid and electrical vehicles.
- Understand To address the underlying concepts and methods behind power transmission in hybrid and electrical vehicles
- Familiarize energy storage systems for electrical and hybrid transportation
- Design and develop basic schemes of electric vehicles and hybrid electric vehicles.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the working of hybrid and electric vehicles
- Apply a suitable drive scheme for developing an hybrid and electric vehicles depending on resources
- Develop the electric propulsion unit and its control for application of electric vehicles.
- Understand the proper energy storage systems for vehicle applications
- Design and develop basic schemes of electric vehicles and hybrid electric vehicles

Syllabus		Total Hours:48
Module–I	**Electric Vehicle Propulsion and Energy Sources**	**10 Hrs**

Introduction to electric vehicles, vehicle mechanics - kinetics and dynamics, roadway fundamentals propulsion system design - force velocity characteristics, calculation of tractive power and energy required, electric vehicle power source - battery capacity, state of charge and discharge, specific energy, specific power, Ragone plot. battery modeling - run time battery model, first principle model, battery management system- soc measurement, battery cell balancing. Traction batteries - nickel metal hydride battery, Li-Ion, Lipolymer battery.

Module–II	**Electric Vehicle Power Plant and Drives**	**10Hrs**

Introduction electric vehicle power plants. Induction machines, permanent magnet machines, switch reluctance machines. Power electronic converters-DC/DC converters - buck boost converter, isolated DC/DC converter. Two quadrant chopper and switching modes. AC drives PWM, current control method. Switch reluctance machine drives - voltage control, current control.

Module–III	**Hybrid And Electric Drive Trains**	**9Hrs**

Introduction hybrid electric vehicles, history and social importance, impact of modern drive trains in energy supplies. Hybrid traction and electric traction. Hybrid and electric drive train topologies. Power flow control and energy efficiency analysis, configuration and control of DC motor drives and induction motor drives, permanent magnet motor drives, switch reluctance motor drives, drive system efficiency.

Module–IV	Electric and Hybrid Vehicles - Case Studies	9 Hrs
Parallel hybrid, series hybrid -charge sustaining, charge depleting. Hybrid vehicle case study – Toyota Prius, Honda Insight, Chevrolet Volt. 42 V system for traction applications. Lightly hybridized vehicles and low voltage systems. Electric vehicle case study - GM EV1, Nissan Leaf, Mitsubishi Miev. Hybrid electric heavy-duty vehicles, fuel cell heavy duty vehicles.		
Module–V	**Electric And Hybrid Vehicle Design**	**10Hrs**
Introduction to hybrid vehicle design. Matching the electric machine and the internal combustion engine. Sizing of propulsion motor, power electronics, drive system. Selection of energy storage technology, communications, supporting subsystem. Energy management strategies in hybrid and electric vehicles - energy management strategies- classification, comparison, implementation.		

Text Books:

1. Iqbal Hussein, "Electric and Hybrid Vehicles: Design Fundamentals", 2nd edition, CRC Press, 2003.
2. Amir Khajepour, M. Saber Fallah, Avesta Goodarzi, "Electric and Hybrid Vehicles: Technologies, Modeling and Control - A Mechatronic Approach", illustrated edition, John Wiley & Sons, 2014.
3. Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 2004.

Reference Books:

1. James Larminie, John Lowry, "Electric Vehicle Technology", Explained, Wiley, 2003.
2. John G. Hayes, G. Abas Goodarzi, "Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles", 1st edition, WileyBlackwell, 2018.

Web References:

https://onlinecourses.nptel.ac.in/noc23_ee01/preview

https://onlinecourses.nptel.ac.in/noc21_ee112/preview

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INDUSTRIAL ELECTRONICS
Common to (EEE,CSE, AI&ML, IT, CS, DS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0433T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Describe semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
- Understand the characteristics of AC to DC converters.
- Understand about the practical applications Electronics in industries.
- Describe the ultrasonic and its application.

Course Outcomes (CO):

On completion of this course, student will be able to

- Understand the semi-conductor devices and their switching characteristics.
- Apply the Ultrasonic waves with different applications.
- Understand the working of Transistor and its different configurations.
- Analyze the thermal effects of ultrasonic, soldering and welding by ultrasonic, ultrasonic Drying in the industry; interpret the characteristics of AC to DC converters.
- Develop the practical applications Electronics in industries.
- Apply the process of Resistance welding, Induction heating and Dielectric heating in the industry.

Syllabus		Total Hours:48
Module-I	**Scope of industrial Electronics**	**10 Hrs**

Scope of industrial Electronics, Semiconductors, Merits of semiconductors, crystalline structure, Intrinsic semiconductors, Extrinsic semiconductors, current flow in semiconductor, Open circuited p-n junction, Diode resistance, Zener diode, Photo conductors and junction photo diodes, Photo voltaic effect, Light emitting diodes(LED).

Module-II	Junction Transistor	9 Hrs

Introduction, The junction transistor, Conventions for polarities of voltages and currents, Open circuited transistor, Transistor biased in the active region, Current components in transistors, Currents in a transistor, Emitter efficiency, Transport factor and transistor-α, Dynamic emitter resistance, Transistor as an amplifier, Transistor construction, Letter symbols for semiconductor Devices, Characteristic curves of junction transistor in common configuration, static characteristic curves of PNP junction transistor in common emitter configuration, The transistor in common collector Configuration.

Module-III	AC to DC converters	10 Hrs

AC to DC converters- Introduction, Classification of Rectifiers, Half wave Rectifiers, Full wave Rectifiers, Comparison of Half wave and full wave rectifiers, Bridge Rectifiers, Bridge Rectifier

meter, Voltage multiplying Rectifier circuits, Capacitor filter, LC Filter, Metal Rectifiers, Regulated Power Supplies, Classification of Voltage Regulators, Short period Accuracy of Regulators, Long period .Accuracy of Voltage Regulator, Principle of automatic voltage Regulator, Simple D.C. Voltage stabilizer using Zener diode, D.C. Voltage Regulators, Series Voltage Regulators, Complete series voltage regulator circuit, Simple series voltage regulator.

Module-IV	Resistance welding controls	10 Hrs

Resistance welding controls: Introduction, Resistance welding process, Basic Circuit for A.C. resistance welding, Types of Resistance welding, electronic welding control used in Resistance welding, Energy storage welding. Induction heating: Principle of induction heating, Theory of Induction heating merits of induction heating, Application of induction heating, High frequency power source of induction heating. Dielectric heating: Principle of dielectric heating, theory of dielectric heating, dielectric properties of typical materials, electrodes used in dielectric heating, method of coupling of electrodes to the R.F. generator, Thermal losses in Dielectric heating, Applications.

Module-V	Ultrasonics	9 Hrs

Ultrasonics: Introduction, Generation of Ultrasonic waves, Application of Ultrasonic waves, Ultrasonic stroboscope, ultrasonic as means of communication, ultrasonic flaw detection, Optical image on non-homogeneities, ultrasonic study of structure of matter, Dispersive study of structure of matter, Dispersive and colloidal effect of Ultrasonic, Coagulating action of Ultrasonic, separation of mixtures by ultrasonic waves, cutting and machining of hard materials by ultrasonic vibrations, Degassing of liquids by ultrasonic waves, Physio-chemical effects of ultrasonics, chemical effects of ultrasonics, Thermal effects of ultrasonics, soldering and welding by ultrasonics, Ultrasonic Drying

Text Books:

1. Fundamentals of Industrial Electronics, Bogdan M Wilamowski, J David irwin, 2nd Edition, 2011.
2. Industrial and Power Electronics – G. K. Mithal and Maneesha Gupta, Khanna Publishers, 19th Ed., 2003.
3. Integrated Electronics – J. Millman and C.C Halkias, McGraw Hill, 1972.

References:

1. Electronic Devices and circuits – Theodore. H. Bogart, Pearson Education, 6th Edn., 2003.
2. Integrated Circuits and Semiconductor Devices – Deboo and Burroughs, ISE

Web References:

https://onlinecourses.nptel.ac.in/noc21_ee01/preview

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CONSTRUCTION MANAGEMENT
(ME, CSE, AI&ML, CS, DS, ECE, EEE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0152T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To make the student familiar with various construction activities, preparing construction schedule and maintaining documents and records of those activities
- To teach the students about various terms and technologies involved in earthwork of construction activities
- To make the students familiar with concepts involved in project management like bar charts and milestone charts
- To teach the students the concepts of time estimates involved in CPM and PERT , float and slack, critical path calculations

Course Outcomes (CO):

On completion of this course, student will be able to

- Identify the various construction activities like preparing construction schedule and maintaining documents and records of those activities
- Understand the concepts and techniques involved in earthwork activities
- To understand about the emerging infectious diseases and aids their management
- Understand the steps involved in developing a project scheduling and management and the application of bar charts and milestone charts.
- Understand the various elements of a network diagram like event, activity and dummy.
- Understand the concepts of calculation of time estimates of CPM and PERT

Syllabus		Total Hours:48
Module-I	**FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY**	**9 Hrs**

Definitions and Discussion – Construction Activities –Construction Processes -Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations.

Module-II	**EARTHWORK**	**9 Hrs**

Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging.Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting

Module-III	PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS	10 Hrs
Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts		
Module-IV	**ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK**	**10 Hrs**
Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems.		
Module-V	**PERT AND CPM**	**10Hrs**
Time estimates – Frequency distribution – Mean, variance and standard deviation-Expected time Problems -Earliest expected time – Formulation for TE - Latest allowable occurrence time – Formulation for TL - Combined tabular computations for TE and TL problems Introduction - Slack – Critical path-Illustrative examples Problems.		

Text Books:

1. Construction project management by Jha ,Pearson publications, New Delhi 2nd Edition 2015
2. Construction Technology by SubirK.Sarkar and Subhajit Saraswati – Oxford Higher Education Univ.Press, Delhi 2008 edition
3. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi 2022 edition Delhi

Reference Books:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Total Project management, the Indian context- by : P.K.JOY- Mac Millan Publishers India Limited.

Web Reference:

1. **https://nptel.ac.in/courses/105104161**

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Introduction to Robotics					
Course Code	**L:T:P:S**	**Credits**	**Exam Marks**	**Exam Duration**	**Course Type**
22A0331Tc	**3:0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**PEC**

Course Objectives:

The objectives of this course are Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.

Course Outcomes (CO):

After the completion of the course students will able to

1. List and explain the basic elements of industrial robots
2. Analyze robot kinematics and its control methods.
3. Classify the various sensors used in robots for better performance.
4. Summarize various industrial and non-industrial applications of robots

Syllabus		**Total Hours:48**
Module-I	**ROBOT BASICS**	**10 Hrs**

Automation and Robotics: Robot-Basic concepts, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylinder, polar and articulate. Robot wrist mechanism, Precision, accuracy, repeatability, work and volume of robot.

Module-II	**ROBOT ELEMENTS**	**10 Hrs**

End effectors-Classification- Types of Mechanical actuation, Gripper design, Robot drive system Types, Position and velocity feedback devices-Robot joints and links-Types, Motion interpolation

Module-III	**ROBOT KINEMATICS AND CONTROL**	**9 Hrs**

Robot kinematics – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation-Scaling, Rotation, Translation Homogeneous transformation. Control of robot manipulators – Point to point, Continuous Path Control, Robot programming

Module-IV	**ROBOT SENSORS**	**9 Hrs**

Sensors in robot – Touch sensors -Tactile sensor – Proximity and range sensors. Force sensor-Light sensors, Pressure sensors, Introduction to Machine Vision and Artificial Intelligence.

Module-V	ROBOT APPLICATIONS	10 Hrs

Industrial applications of robots-Medical, Household, Entertainment, Space, Underwater, Defense, Disaster management. Applications, Micro and Nanorobots, Future Applications.

Text Books:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel, Nicholas G Odrey, "Industrial Robotics Technology,
2. Programming and Applications", Tata –McGraw Hill Pub. Co., 2008.
3. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing Company Limited, 2010.

Reference Books:

1. Klafter.R.D, Chmielewski.T.A, and Noggin's., "Robot Engineering: An Integrated Approach"', Prentice Hall of India Pvt. Ltd., 1994.
2. Fu.K.S, Gonzalez.R.C&Lee.C.S.G, "Robotics control, sensing, vision and intelligence", Tata-McGraw Hill Pub. Co., 2008
3. Yu. "Industrial Robotics", MIR Publishers Moscow, 1985

Web References:

https://onlinecourses.nptel.ac.in/noc20_de11/preview

https://onlinecourses.nptel.ac.in/noc22_de11/preview

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Mobile Application Development

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0537	1: 0:2:0	2	CIE: 30SEE:70	3Hours	SC

Course Objectives:

This course will enable students :

- To understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android applications
- To understand fundamentals of android programming

Course Outcomes(CO):

On completion of this course, student will be able to:

- Define Android OS, gradle, Android Studio.
- Construct mobile application on physical device and emulator
- Develop mobile applications with various widgets
- Design mobile applications with various layouts
- Build mobile application along with Media
- Design and develop menus in mobile applications

Syllabus | **Total Hours:48**

Introduction to Android: Introduction**,** Understanding the Android Software Stack, installing the Android, Creating Android Virtual Devices, Creating the First Android Project, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset

Task 1: Set Up Mobile Development Environment using Android

Task 2: Create "Hello World" Application

1. Create a new Android Project
2. Run "Hello World" on the Emulator
3. On a Physical Device

Basic Widgets :, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File, Event Handling, Displaying Messages Through Toast, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons

Task 3: Create an application using Text Edit control

Task4: Create an application by choosing Options with Checkbox

Task5: Create an application by choosing Mutually Exclusive Items Using Radio Buttons

Layouts: Introduction to Layouts, Linear Layout, Relative Layout, Using Image View, Frame Layout, Table Layout

Task 6: Design an application using Relative Layout

Task 7: Design an application using Frame Layout

Selection widgets: Using List View, Using the Spinner control

Task 8: Create an application by choosing Options with List View

Task 9: Create an application by choosing Options with Spinner

Utilizing Media: Switching States with Toggle Buttons, Creating an Images Switcher Application, Playing Audio, Playing Video

Task 10: Create an application to play an Audio clip

Task 11: Create an application to play the Video clip

Building Menus : Creating Interface Menus, Types of menus, Creating Menus Through XML

Task 12: Create an application to display a Menu

Text Books:

1. Android Programming by B.M Harwani, Pearson Education, 2013.

Reference Books:

1. Professional Android 4 applications development, Reto Meier, Wiley India, 2012.
2. Beginning Android 4 applications development, Wei- Meng Lee, Wiley India,2013

Web References:

https://archive.nptel.ac.in/courses/106/106/106106156/

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COURSES OFFERED FOR HONOURS DEGREE IN CSE(Data Science)

Note: 1. Honors degree subjects are having a total of 20 additional Credits
2. Students should acquire 4 credits through MOOCs compulsory to award the Honors Degree

	Course Code	Course Title	Hours per week			Credits
						C
1	22A05H01	Secure Software Engineering			0	4
2	22A05H02	Agile Software Development Approaches	3	1	0	4
3	22A05H03	Introduction to IOT	3	1	0	4
4	22A05H04	Computer Vision	3	1	0	4
5	22A05H05	Visual Programming	3	1	0	4
6	22A05H06	Network Management Systems	3	1	0	4
7	22A05H07	Artificial Neural Networks	3	1	0	4
8	22A05H08	Distributed Systems	3	1	0	4

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SECURE SOFTWARE ENGINEERING
(Common to CSE, AIML, CS, DS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H01a	3:1:0:0	4	CIE: 30 SEE:70	3 Hours	Honours

Course Objectives:

This course will enable students to:

- Design and implementation of secure software.
- Demonstrate about the characteristics and best security programming practices.
- Specify Desired Security Properties for web and mobile applications.

Course Outcomes (CO):

On completion of this course, student will be able to

- Explain the Properties of Secure Software and Specify Desired Security Properties.
- Incorporate requirements into secured software development process
- Apply secure design principles for developing attack resistant software
- Analyze the Security and complexity of system drivers.
- Examine features of Governance and Security and Maturity of Practice

Syllabus		Total Hours:48
Module-I	**Security a software Issue**	**10 Hrs**

Introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security What Makes Software Secure: Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties.

Module-II	**Requirements Engineering for secure software**	**10 Hrs**

Introduction, the SQUARE process Model, Requirements elicitation and prioritization.

Module-III	**Secure Software Architecture and Design**	**10 Hrs**

Introduction, software security practices for architecture and design: architectural risk analysis, software security knowledge for architecture and design: security principles, security guidelines and attack patterns Secure coding and Testing: Code analysis, Software Security testing, Security testing considerations throughput the SDLC.

Module-IV	**Security and Complexity**	**9 Hrs**

System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security.

Module-V	**Governance and Managing for More Secure Software**	**9 Hrs**

Governance and security, adopting an enterprise software security framework, How much security is enough, Security and project management, Maturity of Practice.

Text Books:

1. Software Security Engineering: A Guide for Project Managers, Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Addison- Wesley Professional

Reference Books:

1. Howard , M and Lipner,S : The Security Development Lifecycle , Microsoft Press, 2006
2. Swiderski, F and Snyder W. :, Threat Modeling, Microsoft Press, 2004.
3. Viega, J and MCGraw G., : Building Secure Software: How to avoid Security Problems in the Right Way, Addison-Wesley,2001

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AGILE SOFTWARE DEVELOPMENT APROACHES
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H01b	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honours

Course Objectives:

- Organize Agile Software Development, Extreme Programming and Software Development Rhythms.
- Describe their unique features relative to traditional software practices.
- Examine their applications in the real world and addresses their impacts on developing software.
- An awareness of current research in software development, the analytical skills and research techniques for their critical and independent evaluation and their application to new problems.

Course Outcomes (CO):

On completion of this course, student will be able to:

- Summarize the agile methodologies: extreme programming, scrum, and feature driven programming.
- Apply The Twelve XP Practices and Illustrate pair programming and its characteristics.
- Apply XP to a small project.
- Examine Feature-Driven Development and Regaining Control
- Outline Agile Modeling and RUP.
- Apply the various tools available to Agile Development to facilitate the project.

Syllabus		Total Hours:48
Module-I	**Introduction**	**10 Hrs**
Introduction: Agile Methods, Agile Manifesto, and Agile Modeling Introduction, What Is Agile, The Agile Manifesto, Agile Methods, XP: Extreme Programming, DSDM, SCRUM, Feature-Driven Development, Modeling Misconceptions, Agile Modeling, Tools of Misconceptions, Updating Agile Models		
Module-II	**Extreme Programming**	**9 Hrs**
Extreme Programming: Introduction, Core XP Values, The Twelve XP Practices, About Extreme Programming, Planning XP Projects, Test First Coding, Making Pair Programming Work.		
Module-III	**Agile Modeling and XP**	**9Hrs**
Agile Modeling and XP: Introduction, The Fit, Common Practices, Modeling Specific Practices, XP Objections to Agile Modeling, Agile Modeling and Planning XP Projects, XP Implementation Phase.		
Module-IV	**Feature-Driven Development**	**9 Hrs**
Feature-Driven Development: Introduction, Incremental Software Development, Regaining Control: The Motivation behind FDD, Planning Iterative Project, Architecture Centric, FDD and XP.		
Module-V	**Agile Methods with RUP and PRINCE2 and Tools and Obstacles**	**10Hrs**

Agile Methods with RUP and PRINCE2 and Tools and Obstacles: Agile Modeling and RUP, FDD and RUP, Agile Methods and Prince2, Tools to Help with Agile Development, Eclipse: An Agile IDE, Obstacles to Agile Software Development, Management Intransigence, The Failed Project Syndrome, Contractual Difficulties, Familiarity with Agility.

Text Books:

1. Agile software construction,1/e,John hunt, springer, 2005
2. Agile and Iterative Development: a manager's guide, Addison-Wesley Craig Larman, [Pearson Education] - 2004.

Reference Books:

1. The Art of Agile Development, Pearson, Robert C. Martin, Juli, James Shore, Chromatic, 2013, O'Reilly Media.
2. Agile Testing, Elisabeth Hendrickson, Quality Tree Software Inc 2008.

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Introduction to IOT
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H02a	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honours

Course Objectives:

Introduce the fundamental concepts of IoT and physical computing, Expose the student to a variety of embedded boards and IoT Platform, Create a basic understanding of the communication protocols in IoT communications. Familiarize the student with application program interfaces for IoT and Enable students to create simple IoT applications.

Course Outcomes (COS):

After completion of the course, students will be able to:

- Understand the Basic sensors and actuators for an IoT application.
- Select protocols for a specific IoT application.
- Utilize the cloud platform and APIs for IoT applications.
- Experiment with embedded boards for creating IoT prototypes.
- Design a solution for a given IoT application.
- Able to understand the application areas of IOT.

Syllabus		Total Hours:48
Module- I	**Overview of IoT**	**12 Hrs**

The Internet of Things: An Overview, The Flavor of the Internet of Things, the "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, who is Making the Internet of Things?

Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.

Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open-source Vs Close source, Tapping into the community

Module-II	Embedded Devices	9 Hrs

Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things

Module-III	Communication in the IoT	9 Hrs

Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols

Prototyping Online Components:
Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol

Module-IV	Business Models	9 Hrs

Business Models: A short history of business models, the business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups.

Manufacturing: What are you producing, designing kits, Designing printed circuit boards**.**

Module-V	**Manufacturing Process**	**9 Hrs**

Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software.

Ethics: Characterizing the Internet of Things, Privacy, Control, Environment, Solutions

Textbooks:

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012

Reference Books:

1. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
2. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

Online Learning Resources:

1. https://www.arduino.cc/
2. https://www.raspberrypi.org/

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COMPUTER VISION
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H02b	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honors

Course Objectives:

- To understand the Fundamental Concepts of vision
- To understand the filtering and image filtering operations
- To understand basic principles of Thresholding.
- To teach the importance of edge detection in computer vision
- To understand the broad concepts of texture

Course Outcomes (COS):

After completion of the course, students will be able to:

- Understand vision and its concepts(L1)
- Understand the concepts of image filtering (L2).
- Use the Thresholding techniques in image conversion (L3)
- Use image edge detection for smoothing (L2)
- Understand the use of texture in image processing (L2).

Syllabus	Total Hours:48

Module-I	Vision, the Challenge	9Hrs

Vision, the Challenge: Introduction, The Nature of Vision- The Process of Recognition, Tackling the Recognition Problem, Object Location, Scene Analysis, Vision as Inverse Graphics

Module-II	Imaging and Image Filtering Operations	10 Hrs

Images and Imaging Operations: Introduction, Image Processing Operations, Convolutions and Point Spread Functions. Sequential Versus Parallel Operations.

Basic Image Filtering Operations: Introduction, Noise Suppression by Gaussian Smoothing, Median Filters, Mode Filters, Rank Order Filters, Shifts Introduced by Median Filters, Discrete Model of Median Shifts

Module-III	Thresholding Techniques	9Hrs

Thresholding Techniques: Introduction, Region-Growing Methods, Thresholding, Adaptive Thresholding, More Thoroughgoing Approaches to Threshold Selection, The Global Valley Approach to Thresholding, Practical Results Obtained Using the Global Valley Method.

Module-IV	Edge Detection	10 Hrs

Edge detection: Introduction, Basic Theory of Edge Detection, The Template Matching Approach, Theory of 3 3 3 Template Operators, The Design of Differential Gradient Operators, The Concept of a Circular Operator, Detailed Implementation of Circular Operators, 0 Hysteresis

Thresholding, The Canny Operator, The Laplacian Operator, Practical Results Obtained Using Active Contour

Module-V	Texture and Binary Shape Analysis	10 Hrs

Texture: Some Basic Approaches to Texture Analysis, Gray level Co-occurrence Matrices, Laws' Texture Energy Approach, Ade's Eigen filter Approach, Appraisal of the Laws and Ade Approaches

Binary Shape Analysis: Connectedness in Binary Images, Size Filtering, Distance Functions and Their Uses.

Text Books:

1. E. R. DAVIES, Machine Vision: Theory, Algorithms, Practicalities Fourth Edition

Reference Books:

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.
2. R. C. Gonzalez and R. E. Woods "Digital Image Processing" Addison Wesley 2008.
3. Richard Szeliski "Computer Vision: Algorithms and Applications" Springer-Verlag London Limited 2011.

E-resources:

1. https://onlinecourses.nptel.ac.in/noc19_cs58/preview

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VISUAL BASIC PROGRAMMING
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H03a	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honors

Course Objectives:

- To introduce the fundamental concepts of object-oriented programming to design & implement object-oriented programming concepts in Visual Programming.
- To learn Graphical User Interface Language.
- To develop an application using GUI Language.
- Implement VB programs to solve simple problems.
- Learn the usage of Control structures, Creating Menus and MDI Forms in Visual programming.

Course Outcomes (COS):

After completion of the course, students will be able to:

- Understand the basic concepts of OOP
- Compare & Contrast basic constructs of OOP & POP
- Design & Develop a Forms in Visual programming
- Apply Control statements to solve real time problems
- Analyze the concepts of forms and its controls, Properties of Tool Box
- Implementing Menus & MDI Forms in Visual programming

Syllabus		Total Hours:48
Module-I	**Fundamentals of Visual Programming**	**9Hrs**

Object Oriented Programming: Introduction to OOPS – Basic Concepts – Objects and Classes – Concepts of Inheritance, Encapsulation and Polymorphism.

Fundamentals Of Visual Programming: **Introduction to Visual programming– Examples of Visual Programming - Applications of Visual Programming language- Advantages of visual programming language- Disadvantages of visual programming language**

Module-II	Fundamentals of Visual Basic	10 Hrs

Fundamentals Of Visual Basic: Features of VB – VB Editions – Controls – Properties – Events – Methods.

Application Window: The Project Explorer window – the Properties Window -Tool Box: Text box control- Command Button – Check Box-Menu Bar -Tool Bars – Tool Box – Project Explorer Window – Properties Window – Object Browser – Form Designer – Code Editor Window – Form Layout Window

Module-III	Forms and Controls	9Hrs

Forms and Controls:
Setting Form Properties – Working with Properties Window – Name – Caption – Picture – The Control Box – Min Button and Max Button – Movable – Border Style - Font Properties

Form Methods – Move, Graphic Methods – Show Method

Form Events – Working with a Control – Opening the Code Window

Module-IV	Variables in VB, Arrays	10 Hrs

Variables In Vb: Declaring Variables – Data Types – Constants – Conversion – Operators

Arrays: Definition, One Dimensional & Two-Dimensional Arrays, Declaring Array, Storing Values in An Array, Control Arrays.

Writing Code in VB: The Code Window – Subroutine – control structures in VB – Performing Loops in VB.

Module-V	Menus, Multi Document Interface	10 Hrs

Menus: Menu Conventions – Creating Menus in VB. Menu Editor

Multiple Document Interface: Features of MDI form–Property– Creating MDI Forms.

Text Books:

1. Programming with Visual Basic Mohammed Azam-Vikas publishing house Pvt.Ltd.New Delhi. Mastering Visual Basic 6 by Evangelos Perroutosos (BPB Publications)
2. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill

E-resources:

1. https://www.tutlane.com/tutorial/visual-basic
2. https://www.vbtutor.net/lesson1.html
3. https://www.geeksforgeeks.org/introduction-to-visual-programming-language/

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NETWORK MANAGEMENT SYSTEMS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H03b	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honors

Course Objectives:

- Describe the introduction concepts of Network Management System platform, Current Status and Future of Network Management.
- Implement network management standards to manage practical networks
- Identify different approaches for managing OSI network model.
- Illustrate SNMP and RMON for monitoring the behavior of the network
- Describe different types of Broad band access networks
- Identify Network Management Applications

Course Outcomes (COS):

After completion of the course, students will be able to:

- Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
- Apply network management standards to manage practical networks
- Formulate possible approaches for managing OSI network model.
- Infer SNMP for managing the network
- Infer RMON for monitoring the behavior of the network
- Identify the various components of network and formulate the scheme for the managing them.

Syllabus		Total Hours:48
Module-I	**Introduction**	**9 Hrs**

Introduction: Analogy of Telephone Network Management, Data and Telecommunication Network Distributed computing Environments, TCP/IP Based Networks: The Internet and Intranets, Communications Protocols and Standards- Communication Architectures, Protocol Layers and Services; The Importance of topology , Filtering Does Not Reduce Load on Node, Some Common Network Problems; Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions- Goal of Network Management, Network Provisioning, Network Operations and the NOC, Network Installation and Maintenance; Network and System Management, Network Management System platform, Current Status and Future of Network Management.

Module-II	Basic Foundations	9 Hrs

Basic Foundations: Standards, Models, and Language: Network Management Standards, Network Management Model, Organization Model, Information Model – Management Information Trees, Communication Model; ASN.1- Terminology, Symbols, and Conventions, Objects and Data Types, Object Names, An Example of ASN.1 from ISO 8824; Encoding

Structure; Macros, Functional Model.

Module-III	SNMPv1 Network Management	10 Hrs

SNMPv1 Network Management: Managed Network: The SNMP Model, The Organization Model, The Information Model – Introduction, The Structure of Management Information, Managed Objects, Management Information Base. The SNMP Communication Model – The SNMP Architecture, Administrative Model, SNMP Specifications, SNMP Operations, Functional Model SNMP Management – RMON: Remote Monitoring, RMON SMI and MIB, RMONI1-RMON1 Textual Conventions, RMON1 Groups and Functions, Relationship Between Control and Data Tables, RMON1 Common and Ethernet Groups, RMON Token Ring Extension Groups, RMON2 – The RMON2 Management Information Base, RMON2 Conformance Specifications.

Module-IV	Broadband Access Networks	10 Hrs

Broadband Access Networks: Broadband Access Technology; HFCT Technology: The Broadband LAN, The Cable Modem, The Cable Modem Termination System, The HFC Plant, The RF Spectrum for Cable Modem; Data Over Cable, Reference Architecture; HFC Management – Cable Modem and CMTS Management, HFC Link Management, RF Spectrum Management, DSL Technology; Asymmetric Digital Subscriber Line Technology – Role of the ADSL Access Network in an Overall Network, ADSL Architecture, ADSL Channeling Schemes, ADSL Encoding Schemes; ADSL Management – ADSL Network Management Elements, ADSL Configuration Management, ADSL Fault Management, ADSL Performance Management,.

Module-V	Network Management Applications	10Hrs

Network Management Applications: Configuration Management- Network Provisioning, Inventory Management, Network Topology, Fault Management- Fault Detection, Performance Management – Performance Metrics, Data Monitoring, Performance Statistics; Event Correlation Techniques – Rule-Based Reasoning, State Transition Graph Model, Finite State Machine Model, Security Management – Policies and Procedures, Security Breaches and the Resources Needed to Prevent Them, Firewalls, Cryptography, Authentication and Authorization, Client/Server Authentication Systems, Report Management,

Text Books:

1. Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Pearson Education Asia.
2. Satish Kumar, "Neural Networks: A classroom approach", Tata McGraw Hill, 2004.

Reference Books:

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.

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ARTIFICIAL NEURAL NETWORKS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H04a	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honors

Course Objectives:

The course introduces perceptrons, discusses its capabilities and limitations as a pattern classifier and later develops concepts of multilayer perceptrons with back propagation learning

Course Outcomes (COS):

After completion of the course, students will be able to:

- Understand the role of neural networks in engineering, artificial intelligence, and cognitive modeling.
- Analyze the Mathematical foundations &Learning Mechanisms in neural networks
- Classify single layer perceptrons by using neural networks
- Design Multi-layer feed forward networks in neural networks.
- Apply various Radial basis function networks in neural networks.
- Provide hands-on experience in selected applications

Syllabus		Total Hours:48
Module-I	**Introduction and ANN Structure**	**9 Hrs**

Introduction and ANN Structure: Biological neurons and artificial neurons. Model of an ANN. Activation functions used in ANNs. Typical classes of network architectures.

Module-II	Mathematical Foundations and Learning mechanisms	9 Hrs

Mathematical Foundations and Learning mechanisms: Re-visiting vector and matrix algebra. State-space concepts. Concepts of optimization. Error-correction learning. Memory-based learning. Hebbian learning. Competitive learning.

Module-III	Single layer perceptrons	10 Hrs

Single layer perceptrons: Structure and learning of perceptrons. Pattern classifier – introduction and Bayes' classifiers. Perceptron as a pattern classifier. Perceptron convergence. Limitations of a perceptrons.

Module-IV	Feed forward ANN	10 Hrs

Feed forward ANN: Structures of Multi-layer feed forward networks. Back propagation algorithm. Back propagation – training and convergence. Functional approximation with back propagation. Practical and design issues of back propagation learning.

Module-V	Radial Basis Function Networks:	10 Hrs

Radial Basis Function Networks: Pattern separability and interpolation. Regularization Theory. Regularization and RBF networks. RBF network design and training. Approximation properties of RBF.

Text Books:

1. E. R. DAVIES, Machine Vision: Theory, Algorithms, Practicalities Fourth Edition

Reference Books:

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.
2. R. C. Gonzalez and R. E. Woods "Digital Image Processing" Addison Wesley 2008.
3. Richard Szeliski "Computer Vision: Algorithms and Applications" Springer-Verlag London Limited 2011.

E-resources:

1. https://onlinecourses.nptel.ac.in/noc19_cs58/preview

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DISTRIBUTED SYSTEMS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05H04b	3: 1:0:0	4	CIE: 30 SEE:70	3 Hours	Honors

Course Objectives:

- To learn the principles, architectures, algorithms and programming models used in distributed systems.
- To examine state-of-the-art distributed systems, such as Google File System.
- To design and implement sample distributed systems.

Course Outcomes (COS):

After completion of the course, students will be able to:

CO1: Understand the basic concepts of Distributed Systems, Architectural and Fundamental Models.
CO2: Analyze the distributed debugging concepts and multicast communication and its related problems.
CO3: Choose proper APIs for Internet protocols and client server communication and its marshalling.
CO4: Construct the basic architecture of a distributed file system and its name services.
CO5: Analyze the transaction modes and concurrency control in distributed transactions.
CO6: Identify the common deadlocks in transaction recovery while processing.

Syllabus		Total Hours:48
Module-I	**Characterization of Distributed Systems, System Models**	**9 Hrs**

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System Models: Introduction, Architectural and Fundamental models.

Module-II	Time and Global States, Agreemen	9 Hrs

Time and Global States: Introduction, Clocks, Events and Process states, Synchronizing physical clocks, Logical time and Logical clocks, Global states, Distributed Debugging.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast Communication, Consensus and Related problems.

Module-III	Inter Process Communication, Distributed Objects and Remote Invocation	10 Hrs

Inter Process Communication: Introduction, The API for the internet protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed

Objects, Remote Procedure Call, Events and Notifications, Case study-Java RMI.

Module-IV	Distributed File Systems, Name Services, Distributed Shared Memory	10 Hrs

Distributed File Systems: Introduction, File service Architecture, Case Study1: Sun Network File System, Case Study 2: The Andrew File System.

Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case study of the Global Name Service.

Distributed Shared Memory: Introduction Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models.

Module-V	Transactions and Concurrency Control, Distributed Transactions	10Hrs

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery

Text Books:

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition,2009.

Reference Books:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor & Fransis Group, 2007.

E-resources:

1. https://nptel.ac.in/courses
2. https://freevideolectures.com/university/iitm

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COURSES OFFERED FOR MINORS DEGREE IN CSE(Data Science) to OTHER DEPARTMENTS

Note: 1. Minors degree subjects are having a total of 20 additional Credits
2. Students should acquire 4 credits through MOOCs compulsory to award the Minors Degree

	Course Code	Course Title	Hours per week			Credits
						C
1	22A05M01	Computer Organization	3	1	0	4
2	22A05M02	Operating Systems	3	1	0	4
3	22A05M03	Advanced Java Programming	3	1	0	4
4	22A05M04	Design & Analysis Of Algorithms	3	1	0	4
5	22A05M05	Computer Networks	3	1	0	4
6	22A05M06	Full Stack Web Development	3	1	0	4
7	22A05M07	Object Oriented Analysis & Design	3	1	0	4
8	22A05M08	No SQL	3	1	0	4
9	22A05M09	Software Engineering	3	1	0	4

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COMPUTER ORGANIZATION

(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M01a	3: 1:0:0	4	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students to:

- Illustrate the fundamental concepts of computer organization.
- Determine the Machine Instructions, develop programs.
- Develop Arithmetic Operations on Integers and Floating Point Numbers.
- Demonstrate types of memories, use of I/O devices.
- Illustrate concepts of Pipelining, Large Computer Systems.

Course Outcomes(CO):

On completion of this course, student will be able to

- Determine the basic concepts of Computer Organization.
- Interpret the Machine Instructions and basic Input / Output Operations.
- Demonstrate Arithmetic Operations on signed and unsigned numbers, design of Control Unit.
- Differentiate types of memories and distinguish I/O Devices.
- Illustrate the concepts of Pipelining.
- Illustrate the concepts of Large Computer Systems

Syllabus		Total Hours:48
Module-I	**Basic Structure of Computers**	**9Hrs**
Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multi computer.		
Module-II	**Machine Instructions and Programs**	**10Hrs**
Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines.		
Module-III	**Computer Arithmetic and Micro Programmed Control Unit**	**10Hrs**
Computer Arithmetic: Addition and Subtraction, Multiplication algorithms, Division algorithms, Floating point arithmetic operations. **Micro Programmed Control Unit:** Control memory, address sequencing, design of control unit.		
Module-IV	**The Memory System and Input / Output Organization**	**10Hrs**

The Memory System: RAM, ROM, Cache Memory, Virtual Memory, And Secondary Storage.
Input / Output Organization: Accessing I/O Devices, Interrupts, Direct Memory Access, Buses, Standard I/O Interfaces.

Module-V	Pipelining, Large Computer Systems	9Hrs

Pipelining: Basic Concepts, Data Hazards, and Instruction Hazards.
Large Computer Systems: Forms of Parallel Processing, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Text Books:

1. Carl Hamacher, Zvonko Vranesic, SafwatZaky, "Computer Organization", 5th Edition, McGraw Hill Education, 2013.
2. M.Morris Mano, RajibMall, "Computer System Architecture", Revised Third Edition, Pearson Education India.

Reference Books:

1. Themes and Variations, Alan Clements, "Computer Organization and Architecture", CENGAGE Learning.
2. Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw Hill Education.

Web References:

1. https://archive.nptel.ac.in/courses/106/105/106105163/

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OPERATING SYSTEMS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M01b	3: 1:0:0	4	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students to:

- Choose different Scheduling Algorithms.
- Solve Classic problems of synchronization.
- Apply various memory management techniques.
- Analyzing disk management functions and techniques.
- Implement files and directories.
- Analyze the Protection and Security mechanisms.

Course Outcomes (CO):

On completion of this course, student will be able to

- Illustrate the overall view of operating system structure. (L3)
- Analyze process scheduling algorithms and Synchronization methods. (L4)
- Solve Deadlock problems using various synchronization techniques. (L3)
- Apply memory management techniques in the design of operating systems (L3).
- Identify efficient file allocation methods for optimal disk utilization. (L3).
- Analyze Security and Protection Mechanism in Operating System (L4).

Syllabus		Total Hours:48
Module-I	**Operating Systems Overview and Structures**	**10 Hrs**

Introduction, Operating System Operations, Types of Operating Systems, functions of Operating Systems, Operating System Services, System Calls, System Programs, Operating System Structure.

Module-II	Process Management and Synchronization	10 Hrs

Process Management: Process Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Thread Models, Implementing Threads in User Space and the Kernel

Process Synchronization: Critical - Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization.

Module-III	Deadlocks and Memory Management	10 Hrs

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Deadlock Detection, Recovery from Deadlock.

Memory Management: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual Memory Management, Page-Replacement Algorithms, Thrashing, Kernel memory allocation.

Module-IV	Mass – Storage Structure and File Systems	9Hrs

Mass – Storage Structure: Disk Structure, Disk Scheduling, RAID Structure.

File Systems: Files, Directory, File System Structure, File- System Implementation, Directory Implementation.

Module-V	System Protection, System Security	9 Hrs

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.

System Security: Introduction, Program threats, System and network threats.

Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.
2. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (Topics: Distributed Systems)

Reference Books:

1. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw Hill, 2012.
3. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009.
4. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004.

Web References:

1. https://nptel.ac.in/courses/106/106/106106144/
2. http://peterindia.net/OperatingSystems.html

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ADVANCED JAVA PROGRAMMING
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M01c	3: 1:0:0	4	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students to:

- To provide knowledge on console, GUI and Web based applications.
- To understand the java technologies for multi-tier enterprise application development.
- To practice applications development on Integrated Development Environment.
- To perform operations on database using Hibernate Query lnaguage.
- To examine the working principles of real time enterprise applications.
- To develop the enterprise applications with cross platform capabilities.

Course Outcomes (CO):

On completion of this course, student will be able to

- Implement simple Web Applications and networking API.
- Develop database applications using JDBC.
- Understand the dynamic request and response model using Servlets
- Design enterprise application using Java Server Pages (JSP)
- Implement Web applications using java server faces and struts
- Develop applications using Hibernate and Spring Frameworks

Syllabus		Total Hours:48
Module-I	**Introduction to J2EE and Networking**	**10 Hrs**

Java Enterprise Edition: Java Platform, J2EE Architecture Types, Explore Java EE Containers, Types of Servers in J2EE Application, HTTP Protocols and API, Request Processing in Web Application, Web Application Structure, Web Containers and Web Architecture Models.

Java Networking: Network Basics and Socket overview, TCP/IP client sockets, URL,TCP/IP server sockets, Data grams, java.net package Socket, ServerSocket, InetAddress, URL, URL Connection

Module-II	JDBC Programming	9 Hrs

The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL Updates, Transaction Management.

Module-III	Servlet API and Overview	9 Hrs

Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor Servlet Context and Servlet Config interface, Attributes in Servelt Request Dispacher interface The Filter API: Filter, Filter Chain. Using the Generic Servlet Class

Filter Config Cookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting.

Module-IV	Java Server Pages	10 Hrs

JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment JSP Directives, JSP Action, JSP Implicit Objects JSP Form Processing, JSP Session and Cookies Handling.

JSP with DATABASES: JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing.

Module-V	Java Server Faces and struts	10 Hrs

Java Server Faces :Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Convertor Tag, JSF Validation Tag, JSF Event Handling and Database Access.

Struts Framework: Basics & Architecture – Request Handling Life Cycle - Building a simple struts– Configuration, Actions, Interceptors, Results, Struts2 Tag Libraries,Struts2 XML based Validations - Database Access

Text Books:

1. Black Book " Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008. 3. Kathy walrath
2. Complete Reference J2EE by James Keogh mcgraw publication
3. Professional Java Server Programming by SubrahmanyamAllamaraju, Cedric Buest Wiley Publication

Reference Books:

1. SCWCD, Matthew Scarpino, HanumantDeshmukh, JigneshMalavie, Manning publication
2. Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson Publication
3. Java Persistence with Hibernate by Christian Bauer, Gavin King
4. Spring in Action 3rdedition , Craig walls, Manning Publication
5. Hibernate 2nd edition, Jeff Linwood and Dave Minter, Beginning Après publication
6. Java Server Faces in Action, Kito D. Mann, Manning Publication
7. JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley.
8. Beginning JSP, JSF andTomcat, Giulio Zambon, Apress.
9. JSF2.0 CookBook, Anghel Leonard, PACKT publication

E-resources:

1. https://www.computerscienceonline.org/learn-java/
2. https://docs.oracle.com/javase/tutorial/
3. https://www.tutorialspoint.com/servlets/
4. https://www.tutorialspoint.com/hibernate/index.htm
5. https://www.geeksforgeeks.org/java/

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DESIGN AND ANALYSIS OFALGORITHMS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M02a	3: 1:0:0	4	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students :

- To demonstrate the importance of algorithms in computing.
- To explain the analysis of algorithms
- To illustrate the method of finding the complexity of algorithms
- To explain the advanced algorithm design and analysis techniques.
- To introduce special classes of algorithms NP – completeness and the classes P and NP

Course Outcomes(CO):

On completion of this course, student will be able to

- To interpret the basic concepts of algorithms, Time complexity, Space complexity, Divide and conquer method, Greedy method, dynamic programming, Back tracking, Branch and Bound, NP-Hard and NP-Complete problems (Remember/Understand)
- To apply Divide and Conquer method and Greedy Method to different problems and compute their time complexity (Apply)
- To apply Dynamic Programming method to different problems (Apply)
- To apply Backtracking method to different real-world problems (Apply)
- To apply branch and bound to different problems (Apply)
- To apply NP-hard and Np-Complete concepts for different problems (Apply)

Syllabus		Total Hours:48
Module-I	**Introduction & Asymptotic Notations**	**10Hrs**

Introduction:
What is an Algorithm? , Algorithm Specification , Performance Analysis: Space complexity, Time complexity, **Asymptotic Notations:** Big-Oh notation (O), Omega notation (Ω), Theta notation (Θ), Mathematical analysis of Non-Recursive and recursive Algorithms with Examples.

Module-II	Divide and conquer & Greedy Method	9Hrs

Divide and conquer: General method, Applications-Finding Maximum and minimum, Selection, binary search, quick sort, Strassen's matrix multiplication.

Greedy Method: General method, Applications-job sequencing with deadlines, Fractional knapsack problem, minimum cost spanning trees, Single source shortest path problem.

Module-III	Dynamic Programming	10Hrs

Dynamic Programming: General method, The Principle of Optimality, Applications- 0/1 knapsack problem, All pairs shortest path problem, Travelling salesperson problem, Optimal Binary Search Tree, Reliability design, Matrix chain multiplication.

Module-IV	Backtracking	9Hrs

Backtracking: General method, N-Queens problem, Sum of subsets problem , Graph coloring , Hamiltonian cycles.

Branch and Bound: General method, applications - travelling sales person problem, 0/1 knapsack problem- LC branch and bound solution, FIFO branch and bound solution.

Module-V	NP-Complete and NP-Hard problems	10Hrs

NP-Complete and NP-Hard problems:
Basic concepts: deterministic and non deterministic algorithms, Tractable and Intractable Problems , Complexity Classes: P, NP, NP-Hard and NP-Complete

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni and Rajasekharam, Galgotia publications Pvt. Ltd.

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.
2. Design and Analysis of Algorithms , S. Sridhar, Oxford (Higher Education).
3. Introduction to the Design and Analysis of Algorithms, Anany Levitin:, 2rd Edition, 2009. Pearson.
4. Design and Analysis of Computer Algorithms by Aho, Hopcraft, Ullman 1998, PEA.
5. Introduction to the Design and Analysis of Algorithms by Goodman, Hedetniemi, TMG.

Web References:

1. https://onlinecourses.nptel.ac.in/noc19_cs47/preview
2. https://nptel.ac.in/courses/106106131

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COMPUTER NETWORKS
(Common **to CSE, AI&ML, CS, DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M02b	3: 1:0:0	4	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students :

- Determine the basic concepts of Computer Networks.
- Determine the layered approach for design of computer networks
- Distinguish OSI and TCP/IP reference models
- Predict the network path used in Internet environment
- Use the format of headers of IP, TCP and UDP
- Illustrate the concepts of application layer, network security fundamentals.

Course Outcomes(CO):

On completion of this course, student will be able to:

- Use the software and hardware components of a computer network (L3)
- Apply the reference model of a computer network(L3)
- Solve the error correction and detection in existing protocols(L3)
- Predict path for routing, and congestion control algorithms(L3)
- Determine the functionality of TCP and UDP(L3)
- Use the appropriate application layer applications(L3)

Syllabus		Total Hours:48
Module-I	**The Internet and the Reference Models**	**10Hrs**

Introduction: Computer Network, Network Topologies, types of networks, Reference models- The OSI Reference Model the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models.

Physical Layer –Introduction to physical layer, Guided Media- Twisted-pair cable, Coaxial cable, Fiber optic cable, Unguided media: Wireless-Radio waves, microwaves, infrared..

Module-II	The Data Link Layer	9Hrs

The Data Link Layer :Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

Module-III	The Network Layer	10Hrs

The Network Layer: Network Layer design issues, Routing algorithms, Congestion control and Internetworking, Network layer in internet.

Module-IV	Transport Layer	9Hrs

Transport Layer: Transport layer services, service primitives, Elements of transport protocols**,** The Internet Transport Protocols: TCP/IP, UDP.

Module-V	The Application Layer and Network security	10Hrs

The Application Layer : DNS, SMTP, FTP, Email and security, network security.

Text Books:

1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
1. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

Reference Books:

1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016.

Web Resources:

- https://nptel.ac.in/courses/106105183/25
- http://www.nptelvideos.in/2012/11/computer-networks.html
- https://nptel.ac.in/courses/106105183/3

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FULL STACK WEB DEVELOPMENT

(Common **to CSE, AI&ML, CS, DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0536c	3:1:0:0	3	CIE: 30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- To become knowledgeable about the most recent web development technologies.
- Idea for creating two tier and three tier architectural web applications.
- Design and analyze real time web applications.
- Constructing suitable client and server-side applications.
- To learn core concept of both front end and back end programming.

Course Outcomes(CO):

On completion of this course, student will be able to

- Summarize the knowledge on front end and back-end Tools
- Develop a fully functioning website on a web server.
- Use code packages based on their documentation to produce working results in a project.
- Construct web pages functioning from external data.
- Implement web application that employing efficient database access.

Syllabus		Total Hours:48
Module-I	**Web Development Basics**	**10Hrs**
Web Development Basics: Web development Basics - HTML & Web servers Shell - UNIX CLI Version control - Git &GitHub HTML, CSS		
Module-II	**Frontend Development**	**9Hrs**
Frontend Development: JavaScript basics OOPS Aspects of JavaScript Memory usage and Functions in JS AJAX for data exchange with server jQuery Framework jQuery events, UI components etc. JSON data format.		
Module-III	**REACT JS**	**10Hrs**
REACT JS: Introduction to React, React Router and Single Page Applications React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication.		
Module-IV	**Architecture Requirements and Designing**	**9Hrs**

Java Web Development: JAVA PROGRAMMING BASICS, Model View Controller (MVC) Pattern, MVC Architecture using Spring RESTful API using Spring Framework, Building an application using Maven

Module-V	Databases & Deployment	10Hrs

Databases & Deployment: Relational schemas and normalization Structured Query Language (SQL) Data persistence using Spring JDBC Agile development principles.

Text Books:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-byStep Guide to Creating Dynamic Websites by Robin Nixon

Reference Books:

1. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 BYAZAT MARDAN
2. Full-Stack JavaScript Development by Eric Bush.
3. Mastering Full Stack React Web Development Paperback – April 28, 2017 by TomaszDyl , Kamil Przeorski , Maciej Czarnecki

Web References:

1. https://www.udemy.com/course/the-complete-web-development-2020

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OBJECT ORIENTED ANALYSIS AND DESIGN
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M03a	3:1:0:0	4	CIE: 30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students to:

- Understand the concepts of object oriented system
- Unified approach,& Understand object oriented system development methodologies. & Demonstrate UML diagrams
- Model user interface and map object oriented system to relational system

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the concepts of object model.
- Identify the classes and vocabulary of the problem domain.
- Illustrate the importance of modeling and software development life cycle.
- Draw the class and object diagrams for various applications.
- Apply the basics of behavioral modeling to behavioral diagrams.
- Model the various components and deployment diagram for the applications.

Syllabus		Total Hours:48
Module-I	**Introduction & Asymptotic Notations**	**9Hrs**

Introduction to Object Model: Introduction to object oriented analysis and Design, Iterative development and the Unified Process (UP), UP phases: Inception, Elaboration, Construction and Transition, Object-oriented metrics, the Evaluation of Object Model, Foundation of Object Model, Elements of object Model, Applying object Model.

Module-II	Classes and Objects	10Hrs

Classes and Objects: The Nature of an Object, Relationships among Objects, The Nature of a Class, Relationships among Classes, The Interplay of Classes and Objects, The Importance of Proper Classification, Identifying Classes and Objects, Key Abstractions and Mechanisms.

Module-III	Introduction to UML	9Hrs

Introduction to UML: The importance of modeling, Principles of modeling, Object oriented modeling, why model, Conceptual model of UML, Architecture, Software Development Life Cycle.

Module-IV	Structural Modeling	10Hrs

Basic Structural Modelling: Classes, Relationships, Common Mechanisms, and diagrams, class diagrams.

Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

Module-V	Behavioral Modeling	10Hrs

Basic Behavioral Modeling: Interactions, Interaction diagrams, use cases, Use case diagrams, Activity Diagrams, Sequence Diagrams, Collaboration and Deployment diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, time and space, state chart diagrams

Text Books:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, PEARSON, 3rd edition, 2013.
2. **The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, PEARSON 12th Impression, 2012**

Reference Books:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning

Web Resources:

1. https://www.youtube.com/watch?v=VnVHgj6OPrQ&list=PLAXUYU7PbJhhH0iWvtyD_J2L8mv15pchq

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No SQL
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A05M03b	3:1:0:0	4	CIE: 30 SEE:70	3 Hours	Minors

Course Objectives:

- Discuss the history unstructured data
- To know non-relational databases and their importance in Data science.
- Understand the differences between Relational and No SQL databases
- To explore the several types of No SQL databases and understand the role in Big Data

Course Outcomes(CO):

On completion of this course, student will be able to

- Explain and compare different types of No SQL Databases
- Compare and contrast RDBMS with different No SQL databases.
- Demonstrate the detailed architecture and performance tune of Document-oriented No SQL databases.
- Explain performance tune of Key-Value Pair No SQL databases.
- Explain performance tune of Column-oriented and Graph No SQL databases
- Apply No sql development tools on different types of No SQL Databases.

Syllabus		Total Hours:48
Module-I	**Overview and history of No SQL Databases**	**8Hrs**

Definition of the four types of No SQL databases. The value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The emergence of No SQL, Key Points.

Module-II	**RDBMS Vs No SQL**	**8Hrs**

Comparison of relational databases to new No SQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges No SQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregated-Oriented Databases, Replication and Sharding, MapReduce on databases, Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication

Module-III	**Document Databases**	**8Hrs**

No-SQL Key-Value Databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analysis or Real Time Analytics.

Module-IV	**Column Oriented Databases**	**12Hrs**

Column-oriented No SQL databases using Apache HBASE, Column-oriented No SQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.

Module-V	**Key Value Databases**	**12Hrs**

No SQL Key-Value databases using Riak, Key-Value Databases, Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets, Firebase- Cloud hosted No SQL Database, Graph No SQL databases using Neo4j, No SQL database development tools and programming languages, Graph Databases features, consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases.

Text Books:

1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications, 1st Edition 2019.

Reference Books:

1. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence Paperback – Illustrated, 8 August 2012 by Martin Fowler (Author), Pramod Sadalage (Author)

Web References:

1. https://www.ibm.com/cloud/learn/nosql-databases
2. https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp
3. https://www.geeksforgeeks.org/introduction-to-nosql/
4. https://www.javatpoint.com/nosql-databa

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SOFTWARE ENGINEERING
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0508T	3:1:0:0	3	CIE:30 SEE:70	3 Hours	Minors

Course Objectives:

This course will enable students to:

- To learn the basic concepts of software engineering and life cycle models.
- To understand the requirements engineering and agile models.
- To interpret the basic concepts of software design
- To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
- To understand the basic concepts in risk management and reengineering.

Course Outcomes (CO):

On completion of this course, student will be able to

- Use software life cycle activities for process models (L3).
- Use software requirements specifications for given problems (L3).
- Apply design concepts, component Level and user interface design for a given problems(l3)
- Apply various test cases for a given problems (L3).
- Apply quality management concepts at the application level. (L3)
- Determine risk management plans and implementation(l3)

Syllabus		Total Hours:48
Module-I	**Software ,Software Engineering and Software Process**	**10 Hrs**

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, project scheduling, Organization and team structure, risk management.

Module-II	Requirements Engineering and Agile Models	9 Hrs

The Nature of software, The unique nature of web apps, The software myths

Requirements Engineering: Functional and non-functional requirements, the software requirements document, Requirements specification, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management

Agile development model: What is agility, what is an agile process, XP, Agile process models, CMMI

Module-III	Design Concepts, Component Level and User Interface Design	9 Hrs

Design Concepts: Good Software Design, Cohesion and coupling, The design Process, Design concepts, design models

Component Level Design: Introduction to components, designing class-based components

User Interface Design: Golden rules, User Interface analysis and design

Module-IV	Software Testing Strategies, Project Metrics and Quality Management	10 Hrs

Software Testing Strategies: coding standards and guidelines, code review, testing, types of testing.

Process and project metrics: software measurement, A framework for product metrics.

Quality Management: Quality, Software quality**,** metrics for software quality, software quality assurance.

Module-V	Risk Management and Reengineering	10 Hrs

Risk Management: Risk identification, Risk projection, risk refinement, RMMM

Maintenance and reengineering: Software maintenance, reengineering, reverse engineering and forward engineering

Case Study: Implementation of safe home system using software engineering principles.

Text Books:

1. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill.
2. Somerville, "Software Engineering", Pearson 2.

Reference Books:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.
2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.
3. Jalote Pankaj, "An integrated approach to Software Engineering", Narosa.

Web References:

https://nptel.ac.in/courses/106/105/106105182/
http://peterindia.net/SoftwareDevelopment.html