NARAYANA ENGINEERING COLLEGE::GUDUR
(AUTONOMOUS)

M.C.A

Course Structure& Syllabus

(2024-25 Academic Year)

(NECRM.C.A24)

(w.e.fAY:2024–25)

NARAYANA
ENGINEERING COLLEGE
(AUTONOMOUS)

NARAYANA ENGINEERING COLLEGE::GUDUR (AUTONOMOUS)

DEPARTMENTOFMCA

R24 Course Structure for MCA w.e.f AY:2024–25

SEMESTER-I

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
24MC101	PC	Mathematical Foundations of AI & ML	3	1	0	4	4	40	60	100
24MC102	PC	Computer Organization & Architecture	3	0	0	3	3	40	60	100
24MC103	PC	Database Management Systems	3	0	0	3	3	40	60	100
24MC104	PC	Data Structures	3	0	0	3	3	40	60	100
24MC105	PC	Operating Systems	3	0	0	3	3	40	60	100
24MC106	PC	Python Programming	3	0	0	3	3	40	60	100
24MC107	HS	Communication Skills Lab	0	0	3	3	1.5	40	60	100
24MC108	PC	Database Management Systems Lab	0	0	3	3	1.5	40	60	100
24MC109	PC	Data Structures Lab	0	0	3	3	1.5	40	60	100
24MC110	PC	Python Programming Lab	0	0	3	3	1.5	40	60	100
24MC113	HS	Health and wellness, Yoga and sports	0	0	2	2	1	100	-	100
		Activity Point Programme		During the Semester				20 Points		
		Total	18	1	14	34	26	500	600	1100

SEMESTER- II

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
24MC201	PC	Advanced Java Programming	3	0	0	3	3	40	60	100
24MC202	PC	Artificial Intelligence	3	1	0	3	4	40	60	100
24MC203	PC	Mobile Application Development	3	0	0	3	3	40	60	100
24MC204	PC	Software Engineering	3	0	0	3	3	40	60	100
-	PE	Professional Elective-I (MOOCS)	3	0	0	3	3	40	60	100
-	PE	Professional Elective– II	3	0	0	3	3	40	60	100
24MC205	PC	Advanced Java Programming Lab	0	0	3	3	1.5	40	60	100
24MC206	PC	Artificial Intelligence Lab	0	0	3	3	1.5	40	60	100
24MC207	PC	Mobile Application Development Lab	0	0	3	3	1.5	40	60	100
24MC208	PR	Mini Project	0	0	0	0	2	40	60	100
24MC209	HS	Audit Course -I	0	0	0	0	0	0	0	0
24MC212	HS	NSS/NCC/Scouts & Guides/Community Service	0	0	2	2	1	100	-	100
		Activity Point Programme	During the Semester					25 Points		
		Total	18	1	11	32	26.5	500	600	1100

SEMESTER- III

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
24MC301	PC	Computer Networks	3	0	0	3	**3**	**40**	**60**	**100**
24MC302	PC	Full Stack Development	3	0	0	3	**3**	**40**	**60**	**100**
24MC303	PC	Data Science	3	1	0	4	**4**	**40**	**60**	**100**
-	PE	Professional Elective–III (MOOCS)	3	0	0	3	**3**	**40**	**60**	**100**
-	PE	Professional Elective–IV (MOOCS)	3	0	0	3	**3**	**40**	**60**	**100**
-	PE	Professional Elective–V	3	0	0	3	**3**	**40**	**60**	**100**
24MC304	PC	Computer Networks Lab	0	0	3	3	**1.5**	**40**	**60**	**100**
24MC305	PC	Full Stack Development Lab	0	0	3	3	**1.5**	**40**	**60**	**100**
24MC306	PC	Data Science Lab	0	0	3	3	**1.5**	**40**	**60**	**100**
24MC309	PC	Internship-I	0	0	4	4	2	40	60	100
24MC310	HS	Audit Course -II	0	0	0	0	0	0	0	0
		Activity Point Programme		During the Semester				25Points		
		Total	**18**	**1**	**16**	**32**	**25.5**	**440**	**660**	**1100**

SEMESTER-IV

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
24MC401	PR	Project	-	-	-	-	12	80	120	200
24MC402	PR	Internship-II	-	-	-	-	2	40	60	100
		Total		0	0		14	100	200	300

HUMANITIES AND SOCIAL SCIENCES (HS)

SEMESTER	SUBJECT CODE	SUBJECT	CREDITS
I Sem	24MC107	Communication skills Lab	**1.5**
	24MC111	Health and wellness, Yoga and sports	**1**
II Sem	24MC209	Audit Course –I	**0**
	24MC210	NSS/NCC/Scouts & Guides/Community Service	**1**
III Sem	24MC308	Audit Course-II	**0**
		TOTAL	**3.5**

PROFESSIONAL CORE (PC)

SEMESTER	SUBJECT CODE	SUBJECT	CREDITS
I	24MC101	Mathematical Foundations of AI & ML	4
	24MC102	Computer Organization and Architecture	3
	24MC103	Database Management Systems	3
	24MC104	Data Structures and Algorithms	3
	24MC105	Operating Systems	3
	24MC106	Python Programming	3
	24MC108	Database Management Systems Lab	1.5
	24MC109	Data structures Lab	1.5
	24MC110	Python Programming Lab	1.5
		Total	**23.5**
II	24MC201	Advanced Java Programming	3
	24MC202	Artificial Intelligence	4
	24MC203	Mobile Application Development	3
	24MC204	Software Engineering	3
	24MC205	Advanced Java Programming Lab	1.5
	24MC206	Artificial Intelligence Lab	1.5
	24MC207	Mobile Application Development Lab	1.5
		Total	**17.5**
III	24MC301	Computer Networks	3
	24MC302	Full Stack Development	3
	24MC303	Data Science	4
	24MC304	Computer Networks Lab	1.5
	24MC305	Full Stack Development Lab	1.5
	24MC306	Data Science Lab	1.5
		Total	**14.5**
		TOTAL	**56.5**

Professional Core: Theory Subjects: 13 labs: 09

PROFESSIONAL ELECTIVES (PE)

SEMESTER	SUBJECT	CREDITS
II Semester	Professional Elective I	3
	Professional Elective II	3
III Semester	Professional Elective III	3
	Professional Elective IV	3
	Professional Elective V	3
	TOTAL	**15**

PROJECT(PR)

SEMESTER	SUBJECT CODE	SUBJECT	CREDITS
II Sem	24MC208	Mini Project	2
IV Sem	24MC401	Project	12
		TOTAL	**14**

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SEMESTER	SUBJECT CODE	SUBJECT	CREDITS
III Sem	24MC307	Internship-I	**2**
IV Sem	24MC402	Internship-II	**2**
		TOTAL	**04**

OVERALL CREDITS

SL NO	SUBJECT AREA	CREDITS PER SEMESTER				CREDITS
		I	II	III	IV	
1	HS	2.5	1			**3.5**
2	PC	23.5	17.5	14.5		**55.5**
3	PE		6	9		**15**
4	EEC			2	2	**04**
5	PR		2		12	**14**
TOTAL		**26**	**26.5**	**25.5**	**14**	**92**

PROFESSIONALELECTIVES

SEMESTER	COURSE CODE	SUBJECTS
Professional Elective–I		
I Year II Semester Professional Elective	24MC211	1.Linux Programming
	24MC212	2.Object Oriented Analysis and Design
	24MC213	3.Design and Analysis of Algorithms
Professional Elective–II		
I Year II Semester Professional Elective	24MC214	1.Big Data Analytics
	24MC215	2.Software Architecture
	24MC216	3.Data Warehousing and Data Mining
Professional Elective–III		
II Year I Semester Professional Elective	24MC309	1. E-Commerce
	24MC310	2.Software Project Management
	24MC311	3.Machine Learning
Professional Elective–IV		
II Year I Semester Professional Elective	24MC312	1.Cloud Computing
	24MC313	2.Software Quality Assurance
	24MC314	3.Deep Learning
Professional Elective–V		
II Year I Semester Professional Elective	24MC315	1.R-Programming
	24MC316	2.Software Testing
	24MC317	3.Cyber Security

SEMESTER - I

Subject Code	Subject Title
24MC101	Mathematical Foundations of AI & ML
24MC102	Computer Organization and Architecture
24MC103	Database Management Systems
24MC104	Data Structures
24MC105	Operating Systems
24MC106	Python Programming
24MC107	Communication Skills Lab
24MC108	Database Management Systems Lab
24MC109	Data Structures Lab
24MC110	Python Programming Lab
24MC111	Health and wellness, Yoga and sports

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC101	MATHEMATICAL FOUNDATIONS OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	1	0	48	4	40	60	100

Pre-requisite: Knowledge of Mathematics on AI & ML, problem-solving ability.

Course Objectives:

1. Understand and apply linear algebra concepts to AI and ML problems.
2. To understand learning concepts that is vital for data science.
3. To provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications
4. Utilize probability theory and statistics to analyze data and build models.
5. To understand random variable, mathematical expectation, and different types of distributions, sampling theory and estimation theory

Course Outcomes: After successful completion of the course, student will be able to:

CO 1	Describe Linear Algebra & Vector Spaces concepts.(BL-2)
CO 2	Demonstrate Analytic Geometry & Matrix Decomposition.(BL-2)
CO 3	Understand descriptive statistics (BL-2)
CO 4	Understand statistical methods and probability (BL-2)
CO 5	Illustrate Statistical and probability distributions.(BL-3)

CO-PO Mapping

CO	PO												PSO	
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1														
CO 2														
CO 3														
CO 4														
CO 5														

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Linear Algebra & Vector Spaces	10H

Linear Algebra: System of linear equations; Matrices: Matrix addition & Multiplication, Identity, Inverse, Transpose-Matrices, Matrix representation of Linear equations; Solving Systems of linear equations: Row echelon form CREF), Reduced REF, Gauss Elimination method, Gauss Jordan Method, Gauss - Jacobi method.

Vector Spaces: Group, Abelian group, Vectors, operations on vectors, Vector spaces & Vector Subspaces, Linear combinations, linear independence & Liner dependent vectors; Basis & Rank.

MODULE -2	Analytic Geometry & Matrix Decomposition	10H

Analytic Geometry: Norms - Types of norms-Manhattan Norms, Euclidean Norm, Vector Norms, Matrix Norms **Inner products:** Dot product; Symmetric, Positive Definite-Matrices; Lengths & distances.

Matrix Decomposition: Determinant & trace, Testing Matrix invariability, Laplace Expansion; Eigen Values Eigen Vectors, Choleskey Decomposition, Eigen decomposition, Single value Decomposition (SVD)

MODULE-3	Descriptive Statistics	10H

Introduction to Statistics: Definitions of Statistics; Importance & Scope of Statistics; limitations of statistics; classification of data, Qualitative & Quantitative data, discrete frequency, Distributive continue frequency.

Descriptive Statistics: Measures of Central Tendency: Mean, Median, Mode, Harmonic mean, Geometric mean - definitions, problems, Merits & demerits.

Measures of Dispersion: Range, Mean deviation from Mean, Standard Deviation, Variance Problems (No derivations)..

MODULE-4	Statistical Methods & Probability	9H

Statistical Methods: correlation - Karl Pearson coefficient of correlation; Rank correlation; Regression- regression Analysis & lines of regression; Regression coefficients

Probability: Introduction, Sample Space, events; Addition & Multiplication Theorems (no proofs & Derivations) - problems, Conditional probability; Baye's Probability (No proofs & derivation) problems.

MODULE-5	Probability & Sampling Distributions	9H

Probability distributions: Random Variables: Discrete & continuous; probability mass function, probability Density function, Discrete Distributions: Bernoulli, Binomial, Poission (No proofs & Derivations), Continuous Distributions: Normal, exponential (No proofs & Derivations)

Sampling Distribution: Introduction of Sampling, Types of Sampling, Sampling distribution, population, Sample parameter & Statistic, Standard error, Hypothesis, Types of hypothesis (Null &Alternative);Testing of hypothesis, Type-I & Type-II errors, Chi-Square distribution: Chi-Square test, Degrees of freedom, Chi-Square test for goodness of fit; Chi- Square test of independence

Total hours:	**48 hours**

Self-Study:

Contents to promote self-Learning:

Text Book(s):

1. MATHEMATICS FOR MACHINE LEARNING, Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong
2. FUNDAMENTALS OF MATHEMATICAL STATISTICS, S.C. GUPTA, V.K. KAPOOR

Reference Book(s):

1. "Mathematics for Machine Learning" by Marc Peter Deisenroth, A. Aldo Faisal, and Cheng Soon Ong
2. "Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy
3. "Elements of Statistical Learning" by Trevor Hastie, Robert Tibshirani, and Jerome Friedman

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC102	COMPUTER ORGANIZATION AND ARCHITECTURE							R 24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Nil

Course Objectives:

1. To understand basic components of system.
2. To understand number representation.
3. To understand the concepts of computer architecture.
4. To understand the concepts of memory organization.
5. To understand the system interconnection and the different I/O techniques.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Analyze how the functional units of a computer operate, interact, and communicate.**(BL-4)**
CO 2	Identify the representation of numbers and perform arithmetic operations.**(BL-3)**
CO 3	Interpret the functional architecture of computing system.**(BL-2)**
CO 4	Define a logic for assembly language programming.**(BL-1)**
CO 5	Analyze the memory organization of computer system.**(BL-4)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	1										1	1
CO2	1	3	2										1	2
CO3	3	1	2		1								2	1
CO4	2	3	1	2									1	2
CO5	2	3	1										2	1

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction of computer architecture	10 H

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Performance, Multiprocessors and Multicomputer, Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines.

At the end of the Module 1, students will be able to:

1. **Understand** the basic functional units and the ways they are interconnected to form a computer system. .**(BL - 2)**
2. **Illustrate** various addressing modes for accessing register and memory operands. .**(BL - 2)**
3. **Describe** the instruction sequencing and various types of instructions.**(BL - 2)**

MODULE -2	Data representation and computer Arithmetic	9 H

Fixed point representation of numbers: Algorithms for arithmetic operations, multiplication: Booths, Modified Booths, division: restoring and non-restoring. **Floating point representation:** IEEE standards and algorithms for common arithmetic operations, Representation of character codes.

At the end of the Module 2, students will be able to:

1. **Identify** Various Number systems. .**(BL - 3)**
2. **Analyze** the arithmetic operation**. (BL-4)**
3. **Conversion** of Binary codes. **(BL-4)**

MODULE-3	Concepts of Computer Architecture	9 H

Introduction to ISA (Instruction Set Architecture): Machine Instruction Characteristics, Types of operands, Instruction formats, Instruction types. **Basic Processing Unit:** Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization.

At the end of the Module 3, students will be able to:

1. **illustrate** various instruction formats. **(BL-2)**
2. **Demonstrate** execution of complete instruction. **(BL-2)**
3. **Apply** basic binary math operations and micro programmed control in computers.**(BL-3)**

MODULE-4	Memory Organization	10 H

Basic concepts, Semiconductor RAM memories, Read only memories, speed, size and cost, Cache memories, performance considerations, Virtual memory, Memory management requirements, Secondary storage. Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks, Data & Instruction Hazards

At the end of the Module 4, students will be able to:

1. **Analyze** the organization of various parts of a system memory hierarchy. **(BL-4)**
2. **Analyze** the structure of general-Purpose multiprocessors. **(BL-4)**
3. **Identify** various Instruction Hazards. **(BL-3)**

MODULE-5	Input/output Organization	10 H

I/O Basics: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access (DMA).**Buses:** Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface, Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB).

At the end of the Module 5, students will be able to:

1. **Describe** IO interface. **(BL-42)**
2. **Distinguish** between Synchronous &Asynchronous Bus. **(BL-4)**
3. **Analyze** the DMA transfer. **(BL-4)**

Total hours:	**48 hours**

Self-Study:

Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	**Introduction of computer architecture**	CO1	https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
2	**Data representation and computer Arithmetic**	CO2	https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/ https://www3.ntu.edu.sg/home/ehchua/programming/java/datarepresentation.html
3	**Concepts of Computer Architecture**	CO3	https://www.geeksforgeeks.org/microarchitecture-and-instruction-set-architecture/https://www.studytonight.com/computer-architecture/memory-organization
4	**Memory Organization**	CO4	https://www.studytonight.com/computer-architecture/memory-organization

5	**Input/Output Organization**	CO5	https://www.geeksforgeeks.org/io-interface-interrupt-dma-mode/ https://www.studytonight.com/computer-architecture/input-output-organisation

Text Book(s):

1. "Computer Organization", Carl Hamacher, ZvonkoVranesic, SafwatZaky, 5th Edition, McGraw Hill Education, 2013.
2. Computer Organization and Design-The Hardware/Software Interface ,David A. Patterson and John L. Hennessy 5th edition, Morgan Kaufmann, 2013.

Reference Book(s):

1. Mano M. M., Digital Logic & Computer Design, 4/e, Pearson Education, 2013.
2. W. Stallings, Computer organization and architecture, 8th edition, Prentice-Hall, 2013.
3. Patterson D.A. and J. L. Hennessey, Computer Organization and Design, 5/e, Morgan Kauffmann Publishers, 2013.
4. William Stallings, Computer Organization and Architecture: Designing for Performance, 9/e, Pearson, 2013.
5. Chaudhuri P., Computer Organization and Design, 2/e, Prentice Hall, 2008.

Online resources/Web References:

1. www.frortechbooks.com/computer-organization-and-architecturef56.com
2. https://www.pdfdrive.com/computer-organization-books.html
3. https://www.tutorialspoint.com/computer_organization/index.asp
4. https://www.geeksforgeeks.org/computer-organization-and-architecturetutorials
5. https://nptel.ac.in/courses/106/105/106105163/
6. https://www.javatpoint.com/computer-organization-and-architecture-tutorial

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC103	DATABASE MANGEMENT SYSTEMS							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Knowledge of File Structures, Data Structures

Course Objectives:

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

Course Outcomes: On successful completion of the course, the student will be able to:

CO 1	Describe database technologies and database design.**(BL-2)**
CO 2	Demonstrate Relational Database Management Systems.**(BL-2)**
CO 3	Construct queries, procedures for database creation in RDBMS.**(BL-3)**
CO 4	Apply normalization on database design and Demonstrate transaction management.**(BL-3)**
CO 5	Demonstrate concurrency control techniques and techniques for database recovery and indexing.**(BL-2)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	3	1									2	1
CO2	3	3											1	
CO3	2	3	3	3									3	1
CO4	2	3	3	3									3	1
CO5	2	3		1									1	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction to Database concepts and Modeling	9H

Introduction to Data bases, Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Database Systems architecture.Overview of Database Design, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Conceptual Design with the ER Model.

At the end of the Module 1, students will be able to:

1. Understand the Purpose of Database Systems, Data Models, and View of Data.**(BL-2)**
2. Summarize the concept of Database Languages, Users and Architecture. **(BL-2)**
3. Design ER diagrams for given database. **(BL-2)**
4. Explain conceptual design for enterprise systems **(BL-2)**

MODULE – 2	Relational Model, Relational Algebra	9H

Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, querying relational data, Logical data base Design, Views. Introduction to Relational algebra, selection and projection, set operations, renaming, joins, division.		
At the end of the Module 2, students will be able to: 1. Understand Basics of Relational Model. **(BL-2)** 2. Describe phases of Logical Database Design**. (BL-2)** 3. Explain the relational algebra operations on relations**. (BL-2)**		
MODULE – 3	**SQL**	**8H**
SQL: Basic form of SQL Query, DDL, DML, Views in SQL, Joins, Nested & Correlated queries, Operators, Aggregate Functions, integrity and security, Functions & Procedures, Packages, Triggers, Cursors, PL/SQL principles and examples.		
At the end of the Module 3, students will be able to: 1. Construct SQL queries in RDBMS. **(BL-3)** 2. Understand integrity and security Constraints in SQL **(BL-2)** 3. Construct PL/SQL programs in RDBMS. **(BL-3)**		
MODULE – 4	**Normalization&Transaction Management**	**11H**
Introduction, Functional Dependencies (FDs), Normalization for relational databases: 1NF, 2NF,3NF and BCNF, Basic definitions of Multi Valued Dependencies, 4NF and 5NF.Transaction processing, Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions.		
At the end of the Module 4, students will be able to: 1. Analyze functional dependencies. **(BL-3)** 2. Apply normal forms on functional dependencies. **(BL-3)** 3. Understand Atomicity and Durability, Concurrent Executions**. (BL-2)**		
MODULE – 5	**Concurrency Control&Recovery and Indexing**	**11H**
Lock-Based Protocols, Timestamp- Based Protocols, Validation-Based Protocols, Multiple Granularity.Failure Classification, Recovery and Atomicity, Log-Based Recovery.Introduction to Index data structures, Hash-Based, Tree Based Indexing.		
At the end of the Module 5, students will be able to: 1. Discuss the Concurrency Control and various Protocols**. (BL-2)** 2. Understand reasons for system failures. **(BL-2)** 3. Understand Ordered Indices, B+ Tree Index Files. **(BL-2)**		
	Total hours:	**48 Hours**
Content beyond syllabus: 1. Embedded SQL 2. Client/Server Database environment 3. Web Database environment		
Self-Study: Contents to promote self-Learning:		

S.No	Module	Reference
1	Introduction to Database concepts and Modelling	https://nptel.ac.in/courses/106/105/106105175/ Week 1 – Lecture 1,2 https://nptel.ac.in/courses/106/105/106105175/ Week 1 – Lecture 3,4

2	Relational Model, Relational Algebra	https://nptel.ac.in/courses/106/106/106106220/ Week-3
3	SQL	https://nptel.ac.in/courses/106/105/106105175/ Week 3 – Lecture 6,7,8,9,10
4	Normalization&Transaction Management	https://nptel.ac.in/courses/106/105/106105175/ Week 4 – Lecture 31,32,33,34,35
5	Concurrency Control, Recovery, Indexing	https://nptel.ac.in/courses/106/105/106105175/ Week 6 – Lecture 6,7,8,9,10 https://nptel.ac.in/courses/106/105/106105175/ Week 7 – Lecture 26,27,28,29,30

Text Book(s):

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

Reference Book(s):

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.

Web Resources:

1. http://www.w3schools.in/dbms/
2. https://www.geeksforgeeks.org/dbms/
3. https://www.javatpoint.com/dbms-tutorial

Online compilers:

1. https://www.tutorialspoint.com/execute_sql_online.php
2. https://sqliteonline.com/

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC104	DATA STRUCTURES							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Knowledge of Mathematics, Computer Programming, Analytical & Logical Skills

Course Objectives:

6. To explain efficient storage mechanisms of data for an easy access.
7. To design and implementation of various basic and advanced data structures.
8. To introduce various techniques for representation of the data in the real world.
9. To develop applications using data structures.
10. To pertain knowledge on improving the efficiency of algorithm by using suitable data structure.

Course Outcomes: After successfulcompletion of the course, student will be ableto:

CO 1	Understand basic concepts of data structures and algorithm analysis. **(BL - 2)**
CO 2	Develop the applications using stacks and queues. **(BL - 3)**
CO 3	Demonstrate use of different types of linked lists. **(BL - 2)**
CO 4	Apply the tree data structures for various applications. **(BL - 3)**
CO 5	Apply the graph data structures for various applications. **(BL - 3)**

CO-PO Mapping

CO	PO												PSO	
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO 1	1	1	2										1	
CO 2	2	3	2	2									2	1
CO 3	2	2	3	2	2								3	2
CO 4	2	2	2	1	1							2	3	2
CO 5	2	2	3	1								1	3	1

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction to Data Structures	9H

Introduction: Overview of Data Structures, Implementation of Data Structures, Algorithm Specifications, Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off, Arrays.

Searching: Introduction, Basic Terminology, Linear Search and Binary Search Techniques and their complexities.

At the end of the Module 1, students will be able to:

1. Understand the linear and non-linear data structures. (BL - 2)
2. Understand the time and space complexities of an algorithm. (BL - 2)

<table>
<tr><td colspan="3">3. Illustrate representation of data using Arrays. (BL - 2)
4. Explain searching techniques. (BL - 2)</td></tr>
<tr><td>MODULE -2</td><td>Stacks and Queues</td><td>9H</td></tr>
<tr><td colspan="3">Stacks: Introduction, Representation of a Stack, Stack Operations, Applications of Stacks.
Queues: Introduction, Representation of a Queue, Queue Operations, Various Queue Structures: Circular Queue, Double Ended Queue, Priority Queue, Applications of Queues.</td></tr>
<tr><td colspan="3">At the end of the Module 2, students will be able to:
4. Explain stack ADT and its operations. (BL - 2)
5. Understand the expression evaluation using stacks. (BL - 2)
6. Implement various queue structures. (BL - 3)</td></tr>
<tr><td>MODULE-3</td><td>Linked Lists and Sorting</td><td>10H</td></tr>
<tr><td colspan="3">Introduction, Singly linked lists, Doubly Linked Lists, Circular Linked Lists, Linked Stacks and Queues, Applications of Linked Lists.
Sorting: Introduction, Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort</td></tr>
<tr><td colspan="3">At the end of the Module 3, students will be able to:
1. Understand basics concepts of linked lists. (BL - 2)
2. Illustrate various structures of linked lists. (BL - 2)
3. Understand the concept of sorting. (BL - 2)</td></tr>
<tr><td>MODULE-4</td><td>Trees</td><td>10H</td></tr>
<tr><td colspan="3">Introduction, Basic Terminologies, Definition and concepts, Representation of Binary Tree, operations on a BinaryTree, Binary SearchTree, Height balancedBinaryTree, B Trees.</td></tr>
<tr><td colspan="3">At the end of the Module 4, students will be able to:
1. Understand the concept of trees. (BL - 2)
2. Compare different tree structures. (BL - 2)
3. Apply trees for indexing. (BL - 3)</td></tr>
<tr><td>MODULE-5</td><td>Graphs& Hashing</td><td>10H</td></tr>
<tr><td colspan="3">Graphs:Introduction, Graph Terminologies, Representation of Graphs, Graph Operations, Shortest Paths, Topological Sorting, Minimum Spanning Trees – Kruskal’s and Prim’s algorithms.
Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.</td></tr>
<tr><td colspan="3">At the end of the Module 5, students will be able to:
1. Explain the importance of Graphs for solving problems. (BL - 2)
2. Understand graph traversal methods. (BL - 2)
3. Implement algorithms to identify shortest path. (BL - 3)</td></tr>
<tr><td colspan="2">Total hours:</td><td>48 hours</td></tr>
<tr><td colspan="3">Content beyond syllabus:
• Activation Record Management
• Optimum Sorting Algorithms</td></tr>
<tr><td colspan="3">Self-Study:
Contents to promote self-Learning:</td></tr>
<tr><td>SNO</td><td>Module</td><td>Reference</td></tr>
</table>

1	**Introduction to Data Structures**	https://www.youtube.com/watch?v=coxWfcz_sIk&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=1 https://www.youtube.com/watch?v=qt6gnsxevZ0&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=5 https://www.youtube.com/watch?v=NlWEdScxU9k&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=7
2	**Stacks and Queues**	https://www.youtube.com/watch?v=o-B4qNnwujY&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=10 https://www.youtube.com/watch?v=UK8WaQYdcMo&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=12
3	**Linked List and Sorting**	https://www.youtube.com/watch?v=hGxtTPPpqQs&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=22 https://www.youtube.com/watch?v=TnU8COKcZs&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=52
4	**Trees**	https://www.youtube.com/watch?v=e14hpagIr3U&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=26
5	**Graphs**	https://www.youtube.com/watch?v=ZAU5IlCQBls&list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR&index=46

Text Book(s):

3. D. Samanta, **Classic Data Structures**, 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
4. Ellis Horowitz and SartajSahni, **Fundamentals of Data Structures in C**, 2nd Edition, Universities Press, 2008.

Reference Book(s):

4. Data Structures A Pseudo code Approach with C, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.
5. Data Structures and Algorithms Using C++ by AnandaRaoAkepogu, RadhikaRajuPalagiri, Pearson, 2010.
6. Data Structures and Algorithms Made Easy by NarasimhaKarumanchi, Careermonk Publications, 2016
7. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2014
8. Data Structures, RS Salaria, Khanna Publishing House, 3rd Edition, 2017
9. Data Structures through C, YashwantKanetkar, BPB Publications, 3rd Edition, 2019
10. Expert Data Structures with C, RB Patel, Khanna Publications, 2019

Online Resources / Web Resources:

1. https://nptel.ac.in/courses/106/102/106102064/
2. https://swayam.gov.in/nd2_cec19_cs04/preview
3. https://www.youtube.com/watch?v=0IAPZzGSbME&list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O
4. https://www.youtube.com/playlist?list=PLrqxgoIHbaCQPHa2LnGX0f-dCIH2MWlFS

5. https://www.youtube.com/playlist?list=PLrjkTql3jnm8ikiQIeIHrMYCaBfkBkfYR
6. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics.htm
7. https://www.hackerrank.com/domains/data-structures
8. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
9. https://discuss.codechef.com/t/data-structures-and-algorithms/6599
10. https://books.goalkicker.com/AlgorithmsBook/

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC105	OPERATING SYSTEMS							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Fundamentals of computers

Course Objectives:

1. To understand the fundamental principles of the operating system, its services and Functionalities.
2. To illustrate the concepts of inter-process communication, synchronization and scheduling.
3. To understand different types of memory management viz. virtual memory, paging and segmentation.
4. To identify the reasons for deadlock and understand the techniques for deadlock detection, prevention and recovery.
5. To understand the need of Mass storage and protection mechanisms in computer systems.

Course Outcomes: After successful completion of the course, Student will be ableto:

CO 1	Describe the concept operating system and operating system design. (BL-2)
CO 2	Analyze Process and CPU Scheduling, Process Coordination with concurrencies. (BL-3)
CO 3	Identify and evaluate Memory Management and Virtual Memory. (BL-3)
CO 4	Organize File System Interface. (BL-3)
CO 5	Understand Mass Storage Structure and Protection Mechanism. (BL-2)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	2	2									2	
CO2		2	2	1										
CO3	3	1	2	1	1								1	
CO4	1	2	1		1									
CO5	3	2	1		2								2	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction	9H

Operating systems objectives and functions: Computer system architecture, operating systems structure, operating systems operations; Evolution of operating systems: Simple Batch, multi programmed, time shared, parallel distributed systems, real time systems,

special purpose systems, operating system services, user operating systems interface. **Systems calls:** Types of systems calls, system programs, protection and security, operating system design and implementation, operating systems structure**.**		
At the end of the Module 1, students will be able to: 1. Illustrate the structure of operating system and basic architectural components involved in operating system design. (BL-2) 2. Demonstrate how the computing resources are managed by the operating system. (BL-2) 3. Explain the objectives and functions of operating systems. (BL-2)		
MODULE -2	**Process and CPU scheduling, process coordination**	**10H**
Process concepts: The process, process state, process control block, threads; Process scheduling: Scheduling queues, context switch, preemptive scheduling, dispatcher, scheduling criteria, scheduling algorithms. **Thread scheduling**: Process synchronization, the critical section problem, synchronization hardware, semaphores and classic problems of synchronization, monitor. **System model**: Deadlock characterization, methods of handling deadlocks, deadlock prevention, dead lock avoidance, dead lock detection and recovery from deadlock**.**		
At the end of the Module 2, students will be able to: 1. Contrast the process and a thread. (BL-2) 2. Develop applications to run in parallel either using process or thread models of different operating system. (BL-3) 3. Illustrate the various resource management techniques for timesharing and distributed systems. (BL-2) 4. Describe deadlock and deadlock mechanisms.(BL-2)		
MODULE-3	**Memory management and virtual memory**	**10H**
Logical and physical address space: Swapping, contiguous memory allocation, paging, structure of page table. **Segmentation:** Segmentation with paging, virtual memory, demand paging; Performance of demand paging: Page replacement, page replacement algorithms, allocation of frames, thrashing**.**		
At the end of the Module 3, students will be able to: 1. Demonstrate the virtual memory, entities and attributes. (BL-3) 2. Illustrate the mapping from virtual memory address to physical address and vice-versa. (BL-3) 3. Identify how a shared memory area can be implemented using virtual memory addresses in different processes. (BL-3) 4. Contrast between Paging and Segmentation. (BL-2)		
MODULE-4	**File system interface**	**9H**
File system: The concept of a file, access methods, directory structure, file system mounting, file sharing, protection, file system structure. **File system implementation:** File system structure, File system implementation, directory implementation, allocation methods, free space management**.**		
At the end of the Module 4, students will be able to:		

4. List the mechanisms adopted for file distribution in applications. (BL-1)
5. Explain the need of memory management in operating systems and understand the limits of fixed memory allocation schemes. (BL-2)
6. Organize file management when designing or developing a new operating system. (BL-3)

MODULE-5	Mass-storage structure	10H

Mass Storage Structure: Overview of mass storage structure,
Disk structure, Disk attachment, Disk scheduling, Disk management, Swap space management, RAID structure, Stable storage implementation**.**
Protection: goals of protection, principles of protection, domain of protection, access matrix, implementation of access matrix

At the end of the Module 5, students will be able to:

1. Illustrate the fragmentation in dynamic memory allocation, and identify dynamic allocation approaches.(BL-2)
2. Illustrate how program memory addresses relate to physical memory addresses, memory management in base-limit machines, and swapping.(BL-2)
3. Compare RAID levels of memory.(BL-2)
4. Illustrate various disk scheduling algorithms.(BL-2)
5. Understand the access control and protection mechanisms. (BL-2)

Total hours:	48 hours

Content beyond syllabus:
Linux operating systems, Multiprocessor management systems, Unix features, real time operating systems, modern operating systems.

Self-Study:
Contents to promote self-Learning:

SNo	Module	Reference
1	Introduction	https://nptel.ac.in/courses/106/105/106105214/ (week 1- lecture 1-5) https://www.udemy.com/course/operating-system-introduction/
2	Process and CPU scheduling, process coordination & Deadlocks	https://nptel.ac.in/courses/106/105/106105214/ (week 6- lecture 26-28) https://www.digimat.in/cgi-bin/search.cgi (lecture 18- lecture 23) https://nptel.ac.in/courses/106/105/106105214/ (week 8- lecture 36-4
3	Memory management and virtual memory	https://nptel.ac.in/courses/106/105/106105214/ (week 9- lecture 41-45) https://www.digimat.in/nptel/courses/video/106106144/L10.html https://www.udemy.com/tutorial/operatingsystems/how-cpu-executes-a-process-in-contiguous-allocation/
4	File system interface	https://nptel.ac.in/courses/106/105/106105214/ (week 12- lecture 57-60) https://www.udemy.com/course/operating-systems-

		computer-science-course/
5	Mass-storage structure and protection	https://nptel.ac.in/courses/106/105/106105214/ (week 12- lecture 57-60) https://www.digimat.in/nptel/courses/video/106102132/L31.html https://www.digimat.in/nptel/courses/video/106102132/L36.html https://www.udemy.com/course/operating-systems-online-course/

Text Book(s):

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Principles",10th Edition, Wiley Student Edition, 2018.
2. William Stallings, "Operating System- Internals and Design Principles", 6th Edition, Pearson Education, 2002.

Reference Book(s):

1. D. M. Dhamdhere, "Operating Systems a Concept based Approach", 2nd Edition, Tata McGraw-Hill, 2006.
2. P.C.P. Bhatt, "An Introduction to Operating Systems", PHI Publishers.
3. G. Nutt, N. Chaki and S. Neogy, "Operating Systems", Third Edition, Pearson Education.
4. Andrew S Tanenbaum, "Modern Operating Systems", 3rd Edition, PHI, 2007.

Online Resources/ Web References:

1. https://nptel.ac.in/courses/106/106/106106144/
2. https://www.udacity.com/course/introduction-to-operating-systems--ud923
3. https://www.javatpoint.com/os-tutorial
4. https://www.tutorialspoint.com/operating_system/index.htm
5. https://learn.saylor.org/course/view.php?id=94
6. https://swayam.gov.in/nd1_noc20_cs75/preview

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC106	PYTHON PROGRAMMING							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: **K**nowledge of Mathematics and Basic Programming Language

Course Objectives:

1. To learn the fundamentals of python.
2. To implement python programs for conditional loops and functions.
3. To handle the compound data using python lists, tuples, sets, dictionaries.
4. To learn the files, modules, packages concepts.
5. To introduce the concepts of class and exception handling using python.

Course Outcomes: After successful completion of the course, Student will be able to:

CO 1	mmarize the fundamental concepts of python programming. (BL - 2)
CO 2	pply the basic elements and constructs the python to solve logical problems.(BL-3)
CO 3	ganize data using different data structures of python. (BL - 3)
CO 4	plement the files modules and packages in programming. (BL - 3)
CO 5	ply object-oriented concepts to build simple applications. (BL - 3)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	3	2	1	1										1
CO2	3	3	2	2	1	2							1	1
CO3	1	1	3	2	2								1	
CO4	3	3	2	2										
CO5	1	3	2	2									1	1

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction to Python	9 H

Introduction: History of Python, Features of Python Programming, Applications of Python Programming, Running Python Scripts, Comments, Typed Language, Identifiers, Variables, Keywords, Input/output, Indentation, Data types, Type Checking, range( ), format( ), Math module.

At the end of the Module 1, students will be able to:

1. Learn the basics of python. (BL - 1)
2. Write the python programs. (BL - 1)
3. Understand concept of type checking. (BL - 2)

MODULE -2	Operators Expressions and Functions	10 H

Operators Expressions: Arithmetic, Assignment, Relational, Logical, Boolean, Bitwise,

Membership, Identity, Expressions and Order of Evaluations, Control Statements. **Functions**: Introduction, Defining Functions, Calling Functions, Anonymous Function, Fruitful Functions and Void Functions, Parameters and Arguments, Passing Arguments, Types of Arguments, Scope of variables, Recursive Functions.		
At the end of the Module 2, students will be able to: 1. Solve the problems using operators, conditional and looping. (BL - 3) 2. Solve the problems using the functions. (BL -3) 3. Apply the principle of recursion to solve the problems. (BL-3)		
MODULE-3	**Strings, Lists,Tuples, and Dictionaries**	**10 H**
Strings, Lists,Tuples, and Dictionaries: Strings- Operations, Slicing, Methods, List- Operations, slicing, Methods, Tuple- Operations, Methods, Dictionaries- Operations, Methods, Mutable Vs Immutable, Arrays Vs Lists, Map, Reduce, Filter, Comprehensions.		
At the end of the Module 3, students will be able to: 1. Write programs for manipulating the strings. (BL - 1) 2. Understand the knowledge of data structures like Tuples, Lists, and Dictionaries.(BL - 2) 3. Select appropriate data structure of Python for solving a problem.(BL -3)		
MODULE-4	**Files, Modules and Packages**	**10 H**
Files, Modules and Packages: Files- Persistent, Text Files, Reading and Writing Files, Format Operator, Filename and Paths, Command Line Arguments, File methods, Modules- Creating Modules, Import Statement, Form.Import Statement, name spacing, Packages- Introduction to PIP, Installing Packages via PIP(Numpy).		
At the end of the Module 4, students will be able to: 1. Understand the concepts of files. (BL - 2) 2. Implement the modules and packages. (BL - 3) **3.** Organize data in the form of files. (BL - 3)		
MODULE-5	**Object Oriented Programming, Errors and Exceptions**	**9 H**
OOP in Python: Object Oriented Features, Classes, self variable, Methods, Constructors, Destructors, Inheritance, Overriding Methods, Data hiding, Polymorphism. **Error and Exceptions:**Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions.		
At the end of the Module 5, students will be able to: 1. Apply object orientation concepts.(BL -3) 2. Apply the exception handling concepts. (BL -3) 3. Implement OOPs using Python for solving real-world problems. (BL -3)		
	Total hours:	**48 Hours**

Content Beyond Syllabus: Turtle Module, GUI Programming, Matplotlib, Databases.

Self-Study:
Contents to promote self-Learning:

SNo	Module	Reference
1	Introduction to Python	https://www.youtube.com/watch?v=WvhQhj4n6b8

		https://www.youtube.com/results?search_query=History+of+Python%2C+Features+of+Python+Programming%2C+Applications+of+Python+Programming%2C+Running+Python+Scripts%2C+Comments+in+edureka
		https://www.youtube.com/watch?v=9F6zAuYtuFw
		https://www.youtube.com/watch?v=yHFcNNh-SsA
		https://www.youtube.com/watch?v=FuPHs7GLxq8
		https://www.youtube.com/watch?v=6yrsX752CWk
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 27 & 30]
		https://www.youtube.com/watch?v=0Hp7AThTZhQ
		https://www.youtube.com/watch?v=fy10ci10R_g
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 11]
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 5]
2	Operators, Expressions and Functions	https://www.youtube.com/watch?v=Pm9FOpOwhlA&t=143s
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 9]
		https://www.youtube.com/watch?v=oSPMmeaiQ68&t=51s
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 24]
3	Strings, Lists,Tuples, and Dictionaries	https://nptel.ac.in/courses/106/106/106106145/ [Lec - 6]
		https://nptel.ac.in/courses/106/106/106106145/ [Lec - 7, 12 & 23]
		https://www.youtube.com/watch?v=MEPlLAjPvXY
4	Files, Modules and Packages	https://nptel.ac.in/courses/106/106/106106145/ [Lec - 28]
5	Object Oriented Programming, Errors and Exceptions	https://nptel.ac.in/courses/106/106/106106145/ [Lec - 26, 37 & 38]

Text Book(s):

1. Python Programming: A Modern Approach,VamsiKurama, Pearson, 2017.
2. Think Python,Allen Downey, 2ndEdition,Green Tea Press

Reference Books :

1. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019.
2. Allen B. Downey, “Think Python”, 2ndEdition, SPD/O’Reilly, 2016.
3. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
4. Mark Lutz, Learning Python, 5th Edition, Orielly, 2013.

5. Wesley J Chun, Core Python Programming, 2nd Edition, Pearson, 2007
6. Kenneth A. Lambert, Fundamentals of Python, 1st Edition, Cengage Learning, 2015

Online Resources / Web Resources:

1. https://www.datacamp.com/learn-python-with-anaconda/
2. https://www.codecademy.com/learn/paths/data-science?
3. https://www.coursera.org/courses?query=python
4. https://www.edx.org/learn/python
5. https://www.w3schools.com/python/
6. https://www.javatpoint.com/python-tutorial
7. https://www.geeksforgeeks.org/python-programming-language/
8. https://www.learnpython.org/
9. https://docs.python.org/3/
10. Python - Simplilearn: https://www.youtube.com/playlist?list=PLEiEAq2VkUUKoW1o-A-VEmkoGKSC26i_I
11. Python - edureka: https://www.youtube.com/playlist?list=PL9ooVrP1hQOHY-BeYrKHDrHKphsJOyRyu
12. Python Notes for Professionals book : https://books.goalkicker.com/PythonBook/

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC107	COMMUNICATION SKILL LAB							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	0	3	48	1.5	40	60	100

Course Outcomes: After successful completion of the course, Student will be able to:

CO 1	To understand the communication concepts and to develop the students' competence in communication at an advanced level
CO 2	To participate in Team activities that leads to the development of collaborative work skills
CO 3	To develop strategies appropriately to improve Listening skills and Spoken Skills
CO 4	To provide the knowledge on Presentation Skills, Group Discussion, Interview Skills and Resume Writing
CO 5	To improve skills to write resume, cover letter and Technical report

TASK – 1

Class Room: Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication.

Practice-1: Ice - Breaking Activity, Introducing Oneself and Others – Greetings – Taking Leave

TASK – 2

Class Room: Verbal& Non Verbal Communication - Interpersonal Communication in/with Groups – Barriers to effective Communication – Public Speaking Skills - Poster Presentation

Practice-2: Role Plays – Just a Minute (JAM) – Conversation Practice

Practice-3: Oral Description of Pictures, Photographs, Products, and Process – Poster Presentation

TASK – 3

Class Room: Listening Skills - Types of Listening Skills- Active listening and anticipating the speaker

Practice-4: Listening for Specific & General Details- Listening Comprehension

TASK – 4

Class Room: Reading Skills: Skimming, Scanning, Intensive & Extensive reading **–** Debate :How to Debate, Tips for Debate, Debate Practice, Explanation of Debate Techniques, Debate Videos Presentation

Practice-5: Debate (Planned & Extempore)

Practice-6: Reading comprehension- Skimming, Scanning, Intensive & Extensive reading

TASK – 5

Class Room: Scientific and Technical writing; Formal and Informal writing – Abstract Writing – Technical Report Writing– Resume Writing: Cover Letter, Resume Preparation

Practice-7: Technical Report Writing

Practice-8: Resume Writing

TASK – 6

Class Room: Presentation Skills Presentation techniques-tips of how to be an effective Presenter-Preparation — how to deal with fear and anxiety - Voice, pace and gesture — how to speak, stand and move. Getting live feedback — how to interact with the audience

Practice-9: Technical Report Writing
Practice-10: Resume Writing

TASK – 7

Class Room: Group Discussion: What is Group Discussion, Types of Group Discussion, Tips and Techniques for Effective Group Discussion, Group Discussion Videos Presentation – Interview Skills :Interview strategies, Interview questions, Successful Interview presentations
Practice-11: Group Discussion (Planning & Extempore)
Practice-12: Mock Interviews

Text Book(s):

1. Technical Communication: Principles and Practice by Meenakshi Raman&Sangeeta Sharma, OxfordUniversityPress.

Reference Books:

1. Effective Technical Communication by M. Ashraf Rizvi, Tata McGraw-Hill Publishing Company Ltd. 2005.
2. English Language Communication: A Reader cum Lab Manual byAnuradha Publications, Chennai, 2006. 4. Dr. ShaliniVerma, "Body Language- Your Success Mantra", S. Chand, 2006.
3. Business Communication today by Bovee, Till and Schatzman, Pearson

Software :

1. Walden ELCS&AECS Lab
2. English In Mind (EIM) all level by Cambridge University
3. Cambridge Pronunciation Dictionary by Cambridge University
4. Oxford Advanced Learners Dictionary, Oxford University

WebResources:

- *Grammar/Listening/Writing1-language.com*
- *http://www.5minuteenglish.com/*
- *https://www.englishpractice.com/Grammar/Vocabulary*
- *EnglishLanguageLearning Online*
- *http://www.bbc.co.uk/learningenglish/*
- *http://www.better-english.com/*
- *http://www.nonstopenglish.com/*
- *https://www.vocabulary.com/*
- *BBCVocabularyGames*
- *FreeRiceVocabulary GameReading*
- *https://www.usingenglish.com/comprehension/*
- *https://www.englishclub.com/reading/short-stories.htm*
- *https://www.english-online.at/Listening*
- *https://learningenglish.voanews.com/z/3613*
- *http://www.englishmedialab.com/listening .htmlSpeaking*
- *https://www.talkenglish.com/*
- *https://www.englishclub.com/*
- *http://www.world-english.org/*
- *http://learnenglish.britishcouncil.org/*

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC108	DATABASE MANAGEMENT SYSTEMS LAB							R24
Semester	Hours/Week			Total hrs	Credits	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	0	3	48	1.5	40	60	100

Course Objectives: This Course will enable students to

- Populate and query a database using SQL DDL/DML Commands
- Declare and enforce integrity constraints on a database
- Writing Queries using advanced concepts of SQL
- Programming PL/SQL including procedures, functions, cursors and triggers.

CourseOutcomes:After successful completion of this course, the students should be able to:

CO 1	Utilizing Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL) commands effectively within a database environment **(BL3)**
CO 2	Constructing and execute queries to manipulate and retrieve data from databases **(BL3)**
CO 3	Develop application programs using PL/SQL **(BL3)**
CO 4	Analyze requirements and design custom Procedures, Functions, Cursors, and Triggers, leveraging their capabilities to automate tasks and optimize database functionality **(BL4)**
CO 5	Establish database connectivity through JDBC(Java Database Connectivity) **(BL3)**

Experiments covering the topics:

- DDL, DML, DCL commands
- Queries, nested queries, built-in functions,
- PL/SQL programming-control structures
- Procedures, Functions, Cursors, Triggers,
- Database connectivity-ODBC/JDBC

COURSE CONTENT	CO
List of Experiments	
TASK–1	**CO1**
1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.	
TASK–2	**CO1**
2. Queries (along with subQueries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.	
TASK–3	**CO1**

3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.	
TASK–4	**CO1**
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substrandinstr),datefunctions(Sysdate,next_day,add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)	
TASK–5	**CO2**
i. Create a simple PL/SQL program which includes declaration section, executable section and exception–Handling section(Ex. Student mark scan be selected from the table and printed for those who secured first class and an exception can be raised if no records were found) ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.	
TASK–6	**CO2**
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.	
TASK–7	**CO2**
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.	
TASK–8	**CO3**
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.	
TASK–9	**CO4**
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.	
TASK–10	**CO4**
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.	
TASK–11	**CO4**
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers	
TASK–12 STUDENT PROGRESS MONITORING SYSTEM	**CO4**
A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) M.Sc., etc)within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programs have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses,	

degrees they read for, and their past performance i.e. modules taken and examination results.

For the above case study, do the following:
1. Analyze the data required.
2. Normalize the attributes.
3. Create the logical data model i.e., ER diagrams.
4. Comprehend the data given in the case study by creating respective tableswithprimary keys and foreign keys where ever required.
5. Insert values into the tables created (Be vigilant about Master- Slavetables).
6. Display the Students who have taken M.Sc course
7. Display the Module code and Number of Modules taught by each Lecturer.
8. Retrieve the Lecturer names who are not Module Leaders.
9. Display the Department name which offers 'English' module.
10. Retrieve the Prerequisite Courses offered by every Department (with Department names).
11. Present the Lecturer ID and Name who teaches 'Mathematics'.
12. Discover the number of years a Module is taught.
13. List out all the Faculties who work for 'Statistics' Department.
14. List out the number of Modules taught by each Module Leader.
15. List out the number of Modules taught by a particular Lecturer.
16. Create a view which contains the fields of both Department and Module tables.
(Hint- The fields like Module code, title, credit, Department code and its name).
12. 17. Update the credits of all the prerequisite courses to 5. Delete the Module 'History' from theModule table.

Text Books / Suggested Reading:

1. Oracle: The Complete Reference by Oracle Press
2. NileshShah, "DatabaseSystemsUsingOracle",PHI,2007
3. RickFVanderLans,"IntroductiontoSQL",FourthEdition,PearsonEducation,2007

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC109	Data Structures Lab							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	0	3	48	1.5	40	60	100

Pre-requisite: Knowledge of Mathematics, Computer Programming, Analytical & Logical Skills

Course Objectives:

1. To introduce various data structures.
2. To elucidate how the data structure selection influences the algorithm complexity.
3. To explain the different operations that can be performed on data structures.
4. To introduce to the search and sorting algorithms.

Course Outcomes: After successful completion of the course, Student will be able to:

CO 1	Apply the Arrays for solving the problems. (BL -3)
CO 2	Implementsearching and sorting algorithmsfor given applications. (BL -3)
CO 3	Apply the stacks and queues and linked lists for solving the given applications. (BL -3)
CO 4	Implement operations on trees and graphs for given applications. (BL -3)

CO-PO Mapping

	PO												PSO	
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	2									1	1	1
CO2	3	2	2									1	2	1
CO3	2	2	3	1								1	2	1
CO4	2	2	3	1								1	2	1

1: Low, 2-Medium, 3- High

COURSE CONTENT	CO
TASK-1	**(3H)**
1 a) Write a c language program to display largest and smallest values in an array b) Write a c language program to find matrix multiplication using functions c) Write a c language program to check the given string is palindrome or not using pointers.	CO1
TASK-2	**(6H)**
1. Write a Program to Implement the following Searching Algorithms: a)Linear Search b) Binary Search 2.Write a Program to Sort the set of elements: a)Bubble sort b) Insertion Sort	CO2
TASK-3	**(3H)**
1. Write a Program to Sort the set of elements: Merge Sort b) Quick Sort	CO2
TASK-4	**(6H)**
1. Implement the following using arrays: a) Write a Program to Implement Stack Operations b) Write a Program to convert a given infix expression into its Postfix using stack. Write a Program to evaluate the Postfix Expression using stack	CO3

TASK-5	(6H)
1. Write a Program to Implement Queue Operations using Arrays 2. Write a Program to Implement Circular Queue Operations using Arrays	CO3
TASK-6	**(3H)**
1. Write a Program to implement the operations of Singly Linked List 2. Write a Program to implement the operations of Doubly Linked List	C03
TASK-7	**(3H)**
1. Write a Program to implement stack operations using linked list 2. Write a Program to implement the operations of Circular Singly Linked List	C03
TASK-8	**(6H)**
1. Write a Program to implement the following on trees a) Insertion and deletion operations b) Traversals 2. Write a Program to implement Binary Search Tree Operations.	CO4
TASK-9	**(6H)**
1. Write a Program to implement the following Graph Traversal Algorithms: a) Depth first traversal b) Breadth first traversal	CO4
TASK-10	**(6H)**
1. Write a Program to implement the following Minimum Spanning Tree Algorithms: a) Kruskal's Algorithm b) Prim's Algorithm	CO4

Additional Experiments:	
TASK-1	
1. Write Program to Implement Fibonacci Search 2. Write a Program to Implement Double Ended Queue Operations by using Array	CO4
TASK-2	
1. Write a Program to Implement Tree traversal Techniques 2. Write a Program to Implement Radix Sort	CO4

Text Book(s):

1. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Horowitz Sahni and Anderson-Freed —Fundamentals of Data Structures in C. 2nd Edition,
Universities Press, 2008.

Reference Book(s):

1. Richard F. Gilberg& B. A. Forouzan —Data Structures A Pseudocode Approcah with C, Second Edition, CENGAGE Learning.
2. Ananda Rao,Data Structures and Algorithms Using C++,Akepogu, Radhika Raju Palagiri, Pearson, 2010.
3. Mark Allen Weiss, Data structure and Algorithm Analysis in C. Addison Wesley Publication. 2006.
4. Jean Paul Trembley and Paul G. Sorenson, An Introduction to Data Structures with Applications, 2ndEdition, McGraw Hill Education, 2017
5. Thomas Cormen, C. Leiserson, R. L. Rivest and C. Stein, —Introduction to Algorithms,

2nd Edition, PHI, 2010
6. Narasimha Karumanchi, Data Structures and Algorithms Made Easy, Careermonk Publications, 2016
7. Peter Bras, Advanced Data Structures, Cambridge University Press, 2014
8. Data Structures, RS Salaria, Khanna Publishing House, 3rd Edition, 2017
9. Data Structures through C, Yashwant Kanetkar, BPB Publications, 3rd Edition, 2019
10. Expert Data Structures with C, RB Patel, Khanna Publications, 2019

Web Resources:

1. http://cse01-iiith.vlabs.ac.in/
2. https://www.javatpoint.com/data-structure-tutorial
3. https://www.faceprep.in/data-structures/data-structures-programs/
4. https://www.edureka.co/blog/c-data-structures/

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC110	PYTHON PROGRAMMING LAB							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	0	3	48	1.5	40	60	100

Pre-requisite: Programming Knowledge

Course Objectives:

1. To gain knowledge on python programs basics
2. To prepare students for solving the programs on functions, data structures, Files
3. To prepare students for solving the programs on Classes, Exception Handiling, Regular Expressions and Multi threading

Course Outcomes: After successful completion of the course, the student will be able to:

CO1	Understanding and use of python- Basic Concepts**(BL -2)**
CO2	Solve the concepts of python functions and data structures**(BL -3)**
CO3	Understand the concepts of files, modules, multithreading and regular expressions **(BL -2)**
CO4	Solve the concepts of class and exception handling **(BL -3)**

CO-PO Mapping

CO	PO												PSO	
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	1	1	2										1	
CO2	2	3	2	2									2	1
CO3	2	2	3	2	2								3	2
CO4	2	2	2	1	1								3	2

1-Low, 2-Medium, 3- High

COURSE CONTENT	CO
Task-1 - Python Basics (4 H)	
1. Running instructions in Interactive interpreter and a Python Script 2. Write a program to purposefully raise Indentation Error and Correct it 3. Write a program to compute distance between two points taking input from the user (Pythagorean Theorem) 4. Write a program to convert a Binary number to Decimal number and verify if it is a Perfect number.	CO 1
Task-2 - Conditional Statements (2 H)	
1. Write a program to determine if a given string is a Palindrome or not 2. Write a program for Fibonacci sequence is generated by adding the previous two terms by starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...	CO 1
Task-3 - Functions (2 H)	
1. Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding. Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)	CO 2
TASK-4 - Functions Continued (2 H)	

1. Write a function that draws a Pyramid with # symbols  2. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.	CO 2
TASK-5 - Strings(4 H)	
1. Write a program to use split and join methods in the string and trace a birthday with Dictionary data structure. 2. Write a program using map, filter and reduce functions	CO 2
TASK-6 - Lists (4 H)	
1. Write program which performs the following operations on list's. Don't use built-in functions a) Updating elements of a list b) Concatenation of list's c) Check for member in the list d) Insert into the list e) Sum the elements of the list f) Push and pop element of list g) Sorting of list h) Finding biggest and smallest elements in the list i) Finding common elements in the list	CO 2
TASK-7 - Files (4 H)	
1. Write a program to print each line of a file and count the number of characters, words and lines in a file. 2. Write a program that allows you to replace words, insert words and delete words from the file.	CO 3
TASK-8 - Modules and Packages (2 H)	
1. Write a program for creating a module and import a module 2. Write a program to perform any two operations using Numpy	CO 3
TASK-9-Class and Objects (4 H)	
1. Write a Python class to find validity of a string of parentheses, '(', ')', '{', '}', '[' and ']. These brackets must be close in the correct order, for example "()" and "()[]{}" are valid but "[)", "({[)]" and "{{{" are invalid 2. Write a Python class to get all possible unique subsets from a set of distinct integers. Input : [4, 5, 6] Output : [[], [6], [5], [5, 6], [4], [4, 6], [4, 5], [4, 5, 6]]	CO 4
TASK-10 - Exception Handiling (4 H)	
1. Write a program of exception handling to open a file while do not have write permissions 2. Write a Programto handle multiple errors with one except statement.	CO 4

Additional Experiments:	
TASK-1	
1. Write a python programs on lists 2. Write a python program on strings 3. Write a python program on tuples	

Virtual Labs:	
Python Lab (IIT Bombay) : http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/experimentlist.html	
List of Experiments	
1. Arithmetic Operations 2. Built-in Functions 3. Loops 4. Data Types 5. Strings	6. Classes and Objects 7. Built-in Modules 8. Constructors and Inheritance 9. File Operators

Text Book(s):

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson, 2017
2. Learning Python, Mark Lutz, Orielly, 5th Edition, 2013

Reference Book(s):

1. Think Python, Allen Downey, Green Tea Press, 2nd Edition
2. Core Python Programming, W.Chun, Pearson, 2nd Edition, 2007
3. Fundamentals of Python, Kenneth A. Lambert, Cengage Learning, 1st Edition, 2015
4. R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019
5. Allen B. Downey, "Think Python", 2ndEdition, SPD/O'Reilly, 2016
6. Martin C.Brown, "The Complete Reference: Python", McGraw-Hill, 2018.
7. Michael Dawson, —Python Programming for absolute beginners, 3rd Edition, CENGAGE Learning Publications, 2018.
8. Taming Python by Programming, Jeeva Jose,Khanna Publishing House, 1st Edition, 2018
9. Introduction to Computing and Problem Solving with Python, J. Jose, Khanna Publications, 1st Edition, 2019.
10. Guido Van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Web References:

1. https://www.tutorialspoint.com/python/index.htm
2. https://www.w3schools.com/python/
3. https://www.javatpoint.com/python-tutorial
4. https://www.geeksforgeeks.org/python-programming-language/

SEMESTER- II

Subject Code	Subject Title		
24MC201	Advanced Java Programming		
24MC202	Artificial Intelligence		
24MC203	Mobile Application Development		
24MC204	Software Engineering		
-	Professional Elective-I (MOOCS)	24MC211	1.Linux Programming
		24MC212	2.Object Oriented Analysis and Design
		24MC213	3.Design and Analysis of Algorithms
-	Professional Elective– II	24MC214	1.Big Data Analytics
		24MC215	2.Software Architecture
		24MC216	3.Data Warehousing and Data Mining
24MC205	Advanced Java Programming Lab		
24MC206	Artificial Intelligence Lab		
24MC207	Mobile Application Development Lab		
24MC208	Mini Project		
24MC209	Audit Course -I		
24MC210	NSS/NCC/Scouts & Guides/Community Service		

NARAYANAENGINEERINGCOLLEGE:: GUDUR								
24MC201	ADVANCED JAVA PROGRAMMING							R24
Semester	Hours/Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite: Basic knowledge of programming.

Course Objectives:

1. To provide sufficient knowledge on developing real world problems.
2. To demonstrate the principles of packages, inheritance and interfaces.
3. To understand exception handling and Multi-threading.
4. To perform operations on database using java database connectivity.
5. To examine the working principles of real time enterprise applications.

CourseOutcomes: After successful completion of the course, Student will be able to:

CO1	Constructprogramsonclasses,inheritance,polymorphismandinterfaces.(BL-3)
CO2	Develop packages, handling of Exceptions.(BL-3)
CO3	Construct programs using multi-threading and Applets.(BL-3)
CO4	Develop database applications using JDBC and Servlets.(BL 3)
CO5	Design enterprise application using Java Server Pages(JSP).(BL 3)

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	2	2	1				1			2	1	2
CO2	2	2	2	1								3	1	1
CO3	2	2		2					1			3	2	1
CO4	2	2	2	1	2								2	1
CO5	2	2	1	2	2							2	2	2

1:Low,2-Medium,3- High

COURSECONTENT

MODULE –1	OOPs Concepts	10H

Basic Characteristics of OOP, Class fundamentals. Declaration objects, Introducing Methods, Constructors, this keyword. Inheritance, Types of inheritance, Member access rules, Abstract Classes, Super and final keywords**.** Method overloading and overriding. Defining an interface, Implementing interface, Accessing interface properties.

AttheendoftheModule1,students will be able to:

1. Understandthebasicsyntaxforclass fundamentals. (BL-2)
2. ExplainAccessmodifiersinInheritance. (BL-2)
3. CompareandContrastMethodoverloadingandMethodoverriding. (BL-3)
4. Explaininterfaceanditsimplementation. (BL-2)

MODULE-2	Packages, Exception Handling	9H

Packages: Defining Package, Built in packages, accessing Packages, Creating packages, accessing Protection.

Exception Handling: Exception handling Fundamentals, exception types, Built-inExceptions,Usingtry-catch-finallythrow-throwskeywords,creatingyourownExceptions.

AttheendoftheModule2,students will be able to:

1. Develop user defined packages. (BL-3)
2. Implement Exception Handling. (BL-3)
3. Writeourown Exceptions (BL-1)
4. Implement Applet Life Cycle Methods.(BL-3)

MODULE-3	Multi-Threaded Programming, AWT & Swings	10H

Multi-Threaded Programming: The java thread model, Thread Life Cycle, The main()thread, creating a Thread, Creating Multiple Threads, Using isalive() and join(), Thread Priorities, Synchronization.

Basics of AWT and Swing : Layout Managers, Event Handling, Panels, Classes for various controls, such as labels, choice, list, Checkbox, etc., The Action Listener interface, Using menus, Using the adapter classes

Graphics, Dialogs and frame.

AttheendoftheModule3,students willbeableto:

1. Explaintheconceptofmulti-threadedconcept. (BL-2)
2. Discussthreadstatesanditspriorities. (BL-3)
3. UnderstandtheconceptofSynchronization. (BL-2)

Demonstrateinput/outputFiles. (BL-3)

MODULE-4	JDBC and Servlets	9H

The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, The Statement Interface, Prepared Statement, Callable Statement The Result Set Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries.

Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor Servlet Context and Servlet Config interface, Attributes in Servlet Request Dispatcher interface,

At the end of the Module 4, students will be able to:

1.Understand Servlet Life Cycle. (BL 2)
2. Differentiate ServletContext and ServletConfig interface. (BL 2)
3. Prepare The JDBC Connectivity Model. (BL 3)
4. Practice on PreparedStatement, CallableStatementand ResultSet Interface. (BL 3)
5. Explain JDBC Types. (BL 2)

Implement SQL Queries &Transaction Management. (BL 2)

MODULE-5	JSP	10H

Using the GenericServlet Class, Understanding Session Timeout and Session Tracking, URL Rewriting., 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 Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag.

At the end of the Module 5, students will be able to:

4. Explain struts frame work. (BL 2)
5. Implement the Struts Framework. (BL 3)
6. Understand Spring Architecture(BL-2)

Implementation of spring to build web applications(BL-3).

Totalhours:	**48Hours**

Contentbeyondsyllabus:

1. EventHandlingMechanism
2. Java mobile application development.

Self-Study: Contentstopromoteself-Learning:

Sno	Module	CO	Reference
1	OPsConcepts	CO1	https://nptel.ac.in/courses/106/105/106105191/ https://youtu.be/2duE6dWb6dY
2	Packages,ExceptionHandlingandApplets	CO2	https://nptel.ac.in/courses/106/105/106105191/(lecture 20,21,22,23)https://youtu.be/0pzR2FGTEhk
3	Multi-ThreadedProgrammingandFiles	CO3	.https://www.youtube.com/watch?v=TCd8QIS-2KI https://www.edureka.co/advanced-java-sp?qId=856296e26b4a2a954919bfb8fb145248&index_name=prod_search_results_courses&objId=193&objPos=1 https://youtu.be/fnFQWtZZE-4
4	JDBC and Servlets	CO4	
5	JSP	CO5	

TextBook(s):

1. "JavaThecompletereference",HerbertScheldt,9th edition,McGrawHillEducation(India)Pvt.Ltd.
2. BeginningJava2,IvorHorton,JDK5thEdition,WileyDreamtech.

ReferenceBook(s):

1. RA. Johson-Thomson,Anintroductionto javaprogrammingandobject orientedapplicationdevelopment,
2. YDanielliang,Introductiontojavaprogramming6thEdition, PearsonEducation.
3. C.Xavier,Javaprogramming:Apracticalapproach,Firstedition,TMH,2011.
4. BruceEckel, ThinkinginJava,2ndEdition,PearsonEducation
5. H.MDietelandP.JDietel,JavaHowtoProgram,6th Edition,PearsonEd.
6. Y. Daniel Liang,Introduction to Java programming-comprehensive,10E, Pearson ltd2015.
7. EBalagurusamy, Programming WithJava:APrimer 5thEditionTataMcGrawHill.

OnlineResources/WebReferences:

1. https://www.edx.org/professional-certificate/uc3mx-introduction-java-programming
2. https://www.coursera.org/specializations/java-programming
3. https://www.classcentral.com/course/java-programming-4305
4. https://www.edx.org/course/learn-to-program-in-java-2
5. https://nptel.ac.in/courses
6. https://freevideolectures.com/university/iitm
7. https://www.javatpoint.com/java-tutorial
8. https://www.w3resource.com/java-exercises/
9. https://www.geeksforgeeks.org/java/

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC202	ARTIFICIALINTELLIGENCE							R24
Semester	Hours/Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	1	0	48	4	40	60	100

Pre-requisite: OOP Languages like java and python

Course Objectives:

1. To Learn about basic AI fundamentals and AI problems.
2. To understanding about searching.
3. To implement AI game playing concepts.
4. To Understand about AI knowledge
5. To describe AI order logic

Course Outcomes: After successful completion of the course, the student will be able to:

CO1	Describe applications of Artificial Intelligence.(BL-2)
CO2	Evaluate problem solving strategies in AI.(BL-3)
CO3	Illustrate problem reduction techniques.(BL-2)
CO4	List the logic concepts.(BL-2)
CO5	Analyze the current knowledge representation techniques in AI.(BL-3)

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	2	1	3										3	
CO2	3	1	2										2	1
CO3	2	2	3	1									2	2
CO4	1	2		3	2								1	
CO5	1	1	2											2

1:Low,2-Medium,3-High

COURSECONTENT

MODULE – 1	Introduction to Artificial Intelligence	10H

Introduction to Artificial Intelligence: Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of AI languages, current trends in AI.

Problem Solving: State-Space Search And Control Strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative- deepening a*, constraint satisfaction.

At the end of the Module 1, students will be able to:

1. Analyze the components of State applications of Artificial Intelligence
2. Understand the use various Problem solving.
3. Understanding about searching.

MODULE -2	Problem Reduction and Logic Concepts	10H

Problem Reduction and Game Playing: Introduction, problem reduction, game playing, alpha- beta pruning, two-player perfect information games. **Logic Concepts:** Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic.		
At the end oftheModule2, students will be able to: 1. understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs. 2. Identify the use of Logic concepts.		
MODULE – 3	**Knowledge Representation and Techniques**	**9H**
Knowledge Representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames. **Advanced Knowledge Representation Techniques:** Introduction, conceptual dependency theory, script structure, CYC theory, case grammars, semantic web.		
AttheendoftheModule3, students will be ableto: 1. Analyzethe AI knowledge 2. Understandtheuse ofAdvancedknowledgerepresentationtechniques.		
MODULE – 4	**Artificial neural networks**	**10H**
Artificial neural networks: Introduction, artificial networks, single layer feed forward networks, multi layered forward networks, design issues of artificial neuralnetworks. **Uncertainty measure: probability theory:** Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory.		
AttheendoftheModule4, studentswillbeableto: 1. UnderstandthevariousInvestigatevariousexpertsystems 2. IdentifytheuseExpertsystemapplications.		
MODULE – 5	**Fuzzy Logic and ML paradigms**	**9H**
Fuzzy sets and fuzzy logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzysystems **Machine learning paradigms**: Introduction, machine learning systems, supervised and unsupervised learning's, inductive learning, deductive learning, clustering, support vector machines, case based reasoning and learning.		
AttheendoftheModule5, studentswillbeableto: 1. Analyzethedifferentprobabilitytheory. 2. IdentifytheFuzzysetsandfuzzylogic		
	Totalhours:	**48hours**
Term work: proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language		

Contentbeyondsyllabus: 1. CloudDatasecurityusingcryptographictechniques.			
Self-Study: Contentstopromoteself-Learning:			
SN	**Topic**	**CO**	**Reference**

O			
1	State applications ofArtificialIntelligence	CO 1	https://www.youtube.com/watch?v=VNRmsACNSaY
2	Enumerateproblemsolvingstrategiesi nAI	CO 2	https://www.youtube.com/watch?v=1CsC5aa0Zek
3	Illustrateproblemreductiontechniques	CO 3	https://www.youtube.com/watch?v=d7EI8B7jTrI
4	Listthelogicconcepts	CO 4	https://www.youtube.com/watch?v=KWxTx7JlWLo
5	Analyzethecurrentknowledgerepresentation TechniquesinAI	CO 5	https://www.youtube.com/watch?v=WEqY5kRk-g0

TextBook(s):

1. Artificial Intelligence- SarojKaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA

ReferenceBook(s):

1. Artificial Intelligence- Rich, Kevin Knight,Shiv Shankar B Nair, 3rd ed, TMH
2. IntroductiontoArtificialIntelligence,Patterson,PHI
3. Artificialintelligence,structuresandStrategiesforComplexproblemsolving,-GeorgeFLugar,5th ed, PEA
4. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
5. ArtificialIntelligence,AnewSynthesis,NilsJNilsson,Elsevier

OnlineResources:

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

Web Resources:

1. https://www.youtube.com/watch?v=VNRmsACNSaY
2. https://www.youtube.com/watch?v=1CsC5aa0Zek
3. https://www.youtube.com/watch?v=d7EI8B7jTrI
4. https://www.youtube.com/watch?v=KWxTx7JlWLo
5. https://www.youtube.com/watch?v=WEqY5kRk-g0
6. https://www.youtube.com/watch?v=NLeWaH6O-TE

NARAYANAENGINEERINGCOLLEGE::GUDUR								
24MC203	MOBILEAPPLICATIONDEVELOPMENT							R24
Semester	Hours/Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

COURSECONTENT		
MODULE–1	**Introduction to Android**	**12H**
TheAndroid4.1jellyBeanSDK, Understanding the Android Software Stack, installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Textview Control, Using the Android Emulator, Launching Android Applications on a Handset.		
MODULE-2	**Basic Widgets**	**10H**
The Role of Android Application Components, Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File, CreatingtheUserInterface,CommonlyUsedLayoutsandControls,EventHandling,DisplayingMessages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons.		
MODULE-3	**Building Blocks for Android Application Design**	**9H**
Introduction to Layouts, Linear Layout, Relative Layout, Absolute Layout, Using Image View, Frame Layout, Table Layout, Grid Layout, Adapting to Screen orientation. Utilizing Resources and Media Resources, Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Creating an Images Switcher Application, Scrolling Through Scroll View, playing Audio, Playing Video		
MODULE-4	**Selection widgets And Fetching Information Using Dialogs and Fragments**	**9H**
Using List View, Using the Spinner control, Using the Grid View Control, Dialogs, and Selecting the Date and Time in One Application, Fragments, Creating Special Fragments**.**		
MODULE-5	**Building Menus**	**8H**
Creating Interface Menus and Action Bars, Menus and Their Types, Creating Menus Through XML, Applying a Context Menu to a List View, Using the Action Bar, SqLite, Database Applications.		
	Total hours:	**48hours**

TEXTBOOK(S):

1. B.M Harwani, Android Programming, Pearson Education.
2. Lauren Darcey and Shane Conder, "Android Wireless Application Development", 2nd edition, Pearson Education.

REFERENCES:

ProfessionalAndroidApplicationDevelopment,WileyIndiaPrivateLimited.

1. Dawn Griffiths, David Griffiths, “Head First Android Development: A Brain-FriendlyGuide”,SecondEdition,O'ReillyMedia,2017.
2. James CSheusi, Android application Development for Java Programmers, Cengage Learning
3. RetoMeier,ProfessionalAndroid 4applicationsdevelopment, WileyIndia.
4. Wei-MengLee,BeginningAndroid4applicationsdevelopment, WileyIndia.

NARAYANA ENGINEERING COLLEGE:NELLORE							
24MC204	SOFTWARE ENGINEERING						R24
Semester	Hours / Week			Total hrs	Credit	Max Marks	
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite: Programming Skills

Course Objectives:

1. To understand the software life cycle models.
2. To understand the software requirements and SRS document.
3. To understand the important of modeling and modeling languages
4. To design and develop correct and robust software products
5. To understand the maintenance of the software.

Course Outcomes: After successful completion of the course, Student will be able to:

CO 1	Identify the best suitable Process Methodology for developing a quality-oriented software solution **(BL-3)**
CO 2	Sketch the requirements analysis model for a project work by using various modelling diagrams. **(BL-3)**
CO 3	Apply the standard design principles based on the suitable architectural styles for given specifications. **(BL-3)**
CO 4	Describe the standard Golden rules for developing the user interface. **(BL-2)**
CO 5	Apply testing principles on software project and identify various software metrics **(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	3	3										1	1
CO2	2		2										1	2
CO3		3	2										2	1
CO4	2		2										1	2
CO5	1	2	2										1	2

COURSE CONTENT		
MODULE – 1	**The Software Process**	**10H**

The Nature of Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths**.** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process. Agility and the Cost of Change, Agile Process, Extreme Programming.

At the end of the Module 1, students will be able to:

1.Demonstrate the different phases involved in the software development. (BL-3)

2.Classify the various process models. (BL-2)

3. Identify suitable lifecycle model to be used. (BL-3) 4. Identify the need of agility and examine Agile process models (BL-3)		
MODULE -2	**Modeling Concepts**	**10H**
Requirements Engineering, Eliciting Requirements, Developing Use Cases, and Building the requirements model, Negotiating Requirements, Validating Requirements. Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling**.**		
At the end of the Module 2, students will be able to: 4. Understand the requirements. (BL-2) 5. Solve the problem by defining the computing requirements of the problem. (BL-3) 6. Organize the scenario-based modeling and class based modeling in the design phase (BL-3) 7. Construct SRS for Problems. (BL-3)		
MODULE-3	**Design concepts**	**10H**
Design with Context of Software Engineering, The Design Process, Design Concepts, The Design Model. Software Architecture, Architecture Genres, Architecture Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow. Component, Designing Class-Based Components, Conducting Component-level Design, Designing Traditional Components, Component-Based Development**.**		
At the end of the Module 3, students will be able to: 1. Identify the basic issues in software design. (BL-3) 2. Illustrate the importance of software architecture. (BL-2) 3. Apply the standard design principles based on suitable Architecture. (BL-3)		
MODULE-4	**User Interface Design, Coding and Testing**	**9H**
Characteristics of a Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology. Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-box Testing, White-Box Testing		
At the end of the Module 4, students will be able to: 1. Analyze the architecture styles and build the system from the components. (BL-3) 2. Describe the golden rules in designing and analyzing UI. (BL-2) 3. Explain the user interface design process. (BL-2) 4. Explain the MVC (model-view-controller) design pattern and its importance to sound user interface software design and implementation. (BL-2)		
MODULE-5	**Software Quality & Product Metrics**	**9H**
Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity **Model Product metrics:** Metrics for Requirements Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.		
At the end of the Module 5, students will be able to: 1. Illustrate the strategic approach to software testing (BL-2) 2. Describe the art of debugging (BL-2) 3. Explain the various testing strategies (BL-2) 4. Describe the Product metrics in Software Quality(BL-2)		
	Total hours:	**48 hours**

Content beyond syllabus:
Open source software Testing Automation Tools

Self-Study:
Contents to promote self-Learning:

SNO	MODULE	CO	Reference
1	Software engineering Basics	**CO1**	https://nptel.ac.in/courses/106/105/106105182/ (Module 1 – Lecture 1-5) http://digimat.in/nptel/courses/video/106105182/L01.html (lecture 1 to 5)
2	Requirements Engineering	**CO2**	https://nptel.ac.in/courses/106/105/106105182/ (Module 4– Lecture 16 & 17) http://digimat.in/nptel/courses/video/106105182/L16.html (lecture 16)
3	Software design Basics Architectural Design	**CO3**	https://nptel.ac.in/courses/106/105/106105182/ (Module 4– Lecture 19 & 20) https://www.youtube.com/watch?v=IPlP2R7l-Nc
4	User Interface	**CO4**	https://nptel.ac.in/courses/106/105/106105087/
5	Software Testing & Product metrics	**CO5**	https://nptel.ac.in/courses/106/105/106105182/ (Module 9 to 12– Lecture 43 & 60) http://digimat.in/nptel/courses/video/106105182/L16.html (lecture 21)

Text Book(s):

1. Software engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition, McGraw Hill International Education, 2016.
2. Fundamentals of Software Engineering, Rajib Mall, , Third Edition, PHI.

Reference Book(s):

1. Ian Somerville, Software Engineering, 9th Edition Pearson Education Asia,2011.
2. Pankaj Jalote, A concise introduction to software Engineering, Springer
3. PankajJalote, Software Engineering, A Precise Approach, Wiley India,2010
4. Jim Arlow, Ila Neustadt, UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2nd Edition, Pearson, (2005).
5. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Publishers, 2007

Online references/ Web references:

1. https://nptel.ac.in/courses/106/105/106105182/
2. http://digimat.in/nptel/courses/video/106105182/L01.html (lecture 1-39)

3.https://www.tutorialspoint.com/software_engineering/software_engineering_overview.htm
4.http://www.tutorialspoint.com/software_engineering
5.https://www.w3schools.in/sdlc-tutorial/software-development-life-cycle-sdlc/
6.https://www.tutorialspoint.com/software_engineering/index.htm
7.https://www.tutorialspoint.com/software_quality_management/software_quality_measurement_metrics.htm

NARAYANA ENGINEERING COLLEGE:NELLORE							
24MC211	LINUX PROGRAMMING						R24
Semester	Hours / Week			Total hrs	Credit	Max Marks	
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite: "Operating Systems"

Course Objectives:

1. To Explore Unix Operating system & Explore commands to work with files and directories
2. To know about basic Shell scripting & Solve Advanced C and Shell Script Programming problems in Linux Environment.
3. Memory to develop inters Process communication in Linux.
4. Understand of Golden rules in developing user interface
5. Understand of Testing Principles in Software environment

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Identify** the best suitable **Process Methodology** for developing a quality oriented software solution**.(BL-2)**
CO 2	**Sketch** the **requirements analysis model** for a project work by using various modelling diagrams**.(BL-3)**
CO 3	**Applythe standard design principles** and select the suitable architectural styles for given specifications**.(BL-3)**
CO 4	**Demonstrate standard Golden rules** for developing the user interface**.(BL-2)**
CO 5	**Applying** of **Testing principles** on software project**.(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	3	3										2	
CO2	2		2							2				
CO3		3		2									2	
CO4	2			2	1							1		
CO5			3											2

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Linux Utilities	10 H

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities. Sed-Scripts, Operation, Addresses, Commands, Applications, awk- Execution, Fields and Records, Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, System commands in awk, Applications.

At the end of the Module 1, students will be able to:

8. Learn Linux operating system basics. **(BL-2)**
9. Gain the knowledge on security and utilites. **(BL-2)**
10. Learn awk, sed commands usage in Linuxprogramming.**(BL-2)**

MODULE -2	Shell programming	10 H

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts. Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

At the end of the Module 2, students will be able to:

1. Explore java inheritance. **(BL-2)**
2. Understand the concepts of interfaces and abstract classes. **(BL-2)**
3. Creating and accessing a package. **(BL-2)**

MODULE-3	Process concepts & Signals	10 H

Process – Process concept, Layout of a C program image in main memory, Process environment, environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process hierarchy, process states, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, system, I/O redirection, Process Groups, Sessions and Controlling Terminal, Differences between threads and processes.
Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

At the end of the Module 3, students will be able to:

7. Write the programs for file management using I/O streams. **(BL-2)**
8. Illustrate the importance of networking in java. **(BL-3)**
9. Write the programs on networking. **(BL-3)**

MODULE-4	Files and Directories	9 H

Files and Directories- File Concept, File types, File System Structure, file metadata-Inodes, kernel support for files, system calls for file I/O operations- open, create, read, write, close, lseek, dup2,file status information-stat family, file and record locking-lockf and fcntl functions, file permissions - chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links – symlink, link, unlink.
Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir, seekdir, telldir functions.

At the end of the Module 4, students will be able to:

7. Handle the predefined exceptions. **(BL-2)**
8. How to create and handle the user defined exceptions. **(BL-2)**
9. Learn the concept of multithreading.**(BL-1)**

MODULE-5	Inter-process Communication& Semaphores	9 H

Inter-process Communication : Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs (Named pipes), differences between unnamed and named pipes, popen and pclose library functions.
Message Queues- Kernel support for messages, Linux APIs for messages, client/server example.
Semaphores-Kernel support for semaphores, Linux APIs for semaphores, file locking with semaphores.

At the end of the Module 5, students will be able to:

1. What is the usage of IPC. **(BL-2)**
2. Explain the various inter process communication. **(BL-3)**
3. Learn about linux APIs for Message Queues, Semaphores. **(BL-2)**

Total hours:	**48 hours**

Content beyond syllabus:

1.Open source software Test Automation Tools

Self-Study: Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	**Linux Utilities**	CO1	https://infotricks1on1.blogspot.com/p/blog-page_3.html
2	**Shell programming with Bourne again shell**	CO2	https://www.tutorialspoint.com/unix/unix-using-variables.htm
3	**Process**	CO3	https://www.tutorialspoint.com/unix/unix-processes.htm
4	**Files and Directories**	CO4	https://www.geeksforgeeks.org/unix-file-system/
5	**Inter-process Communication**	CO5	https://www.geeksforgeeks.org/inter-process-communication-ipc/

Text Book(s):.

1. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.
2. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition,rp-2008.
3. Unix Network Programming, W.R.Stevens, PHI.
4. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.

Reference Book(s):

1. Linux System Programming, Robert Love, O"Reilly, SPD, rp-2007.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education, 2003
3. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.

Online Resources:

1. http://www.acadmix.com/eBooks_Download
2. http://www.freetechbook.com/software-engineering-f15.html

Web Resources:

1. http://www.nptel.iitm.ac.in/courses/Webcourse-contens/IITKharagpur/SoftEngg/
2. http://www.Computer.org/portal/wen/swebok
3. http://www.softwareengineerinsider.com/articles/what-is-software -engineering.html
4. http://www.tutorialspoint.com/software_engineering

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC212	OBJECT ORIENTED ANALYSIS AND DESIGN							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite: Object oriented programming concepts.

Course Objectives:

1. To understand the concepts of object oriented system, unified approach.
2. To understand object oriented system development, methodologies.
3. To demonstrate UML diagrams.
4. To model user interface and map object oriented system to relational system.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Define the concepts of object model.**(BTL-2)**
CO 2	Identify the classes and vocabulary of the problem domain. **(BTL-2)**
CO 3	Sketch the class and object diagrams for various applications. **(BTL-3)**
CO 4	Apply the basics of behavioural modelling to behavioural diagrams. **(BTL-3)**
CO 5	Sketch the model various components and deployment diagram for the applications**.(BTL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2			1								2	3	
CO2	2			1								2	3	2
CO3	2	2	3	2	2							2	3	2
CO4	2		3		2							2	3	2
CO5	2		3		2							2	3	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction	7 H

Introduction: The structure of complex systems, the inherent complexity of software, attributes of complex system, organized and disorganized complexity, bringing order to chaos, designing complex systems, evolution of object model, foundation of object model, elements of object model, applying the object model.

At the end of the Module 1, students will be able to:

1. Understand the Generations of Programming Languages.**(BTL-2)**
2. Describe the Unified process phases. **(BTL-2)**
3. Compare the object oriented programming, Design and analysis. **(BTL-2)**
4. Summarize the elements of object Model. **(BTL-2)**

MODULE -2	Classes and Objects	7 H

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.

At the end of the Module 2, students will be able to:

1. Identify the Nature of an Object, relationships among objects and classes. (**BTL-2)**
2. Identify the classes and objects to state model. (**BTL-2)**
3. Classify the general approaches to design of complex system. (**BTL-2)**

MODULE-3	Introduction to UML	6H

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams

At the end of the Module 3, students will be able to:

1. the unified modeling language for writing software blueprint. (**BTL-2)**
2. Achieve the aims of Model to specify the structure and behavior of system. (**BTL-2)**
3. Illustrate the various artifact to modeling the different views of system architecture.(**BTL-2)**

MODULE-4	Structural Modeling	6H

Structural Modeling: Package Diagram, Composite structure Diagram, Component diagrams, Deployment diagrams, Profile Diagram.

At the end of the Module 4, students will be able to:

1. Classify the structural Modeling components. (**BTL-2)**
2. Compare the Basic structural and advanced structural Modelling. (**BTL-2)**
3. Draw the Interaction and activity diagram for various applications. (**BTL-3)**

MODULE-5	Behavioural Modeling	6H

Basic Behavioral Modeling: Use case diagrams, Activity Diagrams, state machines, sequence diagram, Communication diagram, Timing diagram, interaction overview diagram, Events and signals, processes and Threads.

At the end of the Module 5, students will be able to:

1. Classify the Behavioral Modeling components.(**BTL-2)**
2. Identify the mechanisms and frameworks that shape the architecture of yoursystem.**(BTL-3)**
3. Draw the interaction diagram for various applications. (**BTL-3)**

Total hours:32 Hours

Term work:

1. Develop the modelling of System Architecture: Satellite-Based Navigation.
2. Develop the modelling of Artificial Intelligence: Cryptanalysis.
3. Develop the modelling of Control System: Traffic Management.
4. Compare the static view , Design view, activity view and use case view.
5. Demonstrate the semantic responsibities and Notation responsibities.

Content beyond syllabus:

1. Forward & Reverse Engineering of all UML diagrams.

Self-Study:

Contents to promote self-Learning:

SNO	Topic	Reference

1	Elements of the Object Model	http://www.digimat.in/nptel/courses/video/106105153/L16.html
2	Classes and objects	https://www.youtube.com/watch?v=tWIe9E4SWQo
3	Class diagram	https://www.youtube.com/watch?v=UI6lqHOVHic
4	Use case diagram	https://www.lucidchart.com/blog/types-of-UML-diagrams
5	Uml sequence diagram	https://www.lucidchart.com/pages/how-to-draw-a-sequence-diagram-in-UML
6	Activity diagram	https://www.smartdraw.com/activity-diagram/

Text Book(s):

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 Book(s):

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
4. "The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

Online Resources:

1. https://nptel.ac.in/courses/106/105/106105153/
2. http://www.digimat.in/nptel/courses/video/106105153/L51.html

Web References:

1. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_tutorial.pdf
2. https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/
3. https://www.smartdraw.com/uml-diagram/

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC213	DESIGN & ANALYSIS OF ALGORITHMS							R24
Semester	Hours/ Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite:CProgramming&Data structures

CourseObjectives:

- Toknowtheimportanceofthespaceandtimecomplexityofagivenalgorithm.
- Tostudyvariousalgorithmdesigntechniquesandimplementation.
- Toutilizedatastructuresand/oralgorithmicdesigntechniquesinsolvingnewproblems.
- UnderstandofLowerBound theoryand implementationtechniquesof it
- Toknow and derstandbasiccomputabilityconcepts andthecomplexityclassesP,NP,andNP-Complete.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	Analyzethecomplexities ofalgorithmsanddesignofalgorithms and Divide and conquer strategy**(BL-4)**
CO 2	Use techniques Greedy, Dynamic Programming, Backtracking,BranchandBoundtosolvetheproblems.**(BL-3)**
CO 3	Analyzecriteriaandspecificationstonewproblems,andchoosetheappropriatealgorithmicdesigntechniquetosolvethesolution. **(BL-4)**
CO 4	Illustrate the worst-case time complexity of an algorithm is defined, howasymptoticnotationisusedtoprovidea roughclassificationofalgorithms.**(BL-2)**
CO 5	AbletoidentifythatacertainproblemisNP-CompleteorNPHard**(BL-3)**

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1		3											
CO2	2	1	2											2
CO3	1	3	1	1										
CO4	3	3	2		1									
CO5	1		2		1									

1:Low, 2-Medium,3-High

COURSECONTENT		
MODULE – 1	**Introduction & Divide and Conquer**	**10 H**

Introduction:WhatisanAlgorithm,Algorithmsspecification,Performanceanalysis,Typesofalgorithmstrategies,AsymptoticNotations,PerformanceMeasurement,PerformanceAnalysis,AmortizedAnalysis

DivideandConquer: DivideandconquerBasicMethodStrategy,BinarySearch,Findingthemaximum and minimum, Merge sort, Quick Sort, Selection sort, Strassen's matrix multiplication

AttheendoftheModule1,studentswill beableto:

1. Learn about different types of algorithms for problems**(BL-2)**
2. AbletoidentifythePerformanceanalysisofanalgorithm**(BL-2)**
3. ImplementationofDivideandConquerStrategy**(BL-3)**

MODULE -2	**Greedy Method and Dynamic Programming**	**10 H**

GreedyMethod:Generalmethod,Knapsackproblem,JobSchedulingwithDeadlines,MinimumcostSpanningTrees,Optimalstorage ontapes,Single-source shortestpaths. **Dynamicprogramming:**GeneralMethod,Multistagegraphs,All-pairsshortestpaths,Optimalbinary searchtrees, 0/1Knapsack, The travellingsalespersonproblem		
AttheendoftheModule2,studentswill beableto: 1. Importance of greedy algorithm where it is implemented **(BL-2)** 2. Dynamic programming role in algorithms evolution**(BL-3)** 3. Different problems on Greedy approach and Dynamic Programming**(BL-2)**		
MODULE-3	**Basic Traversal & Search Techniques, Back Tracking**	**9 H**
BasicTraversalandSearchTechniques:Techniquesforbinarytrees,TechniquesforGraphs,Connectedcomponents andSpanningtrees,Bi-connectedcomponents andDFS **Backtracking:**GeneralMethod,8–queensproblem,Sumofsubsetsproblem,Graphcoloringand Hamiltoniancycles,KnapsackProblem		
AttheendoftheModule3,studentswill beableto: 1. AnalysisofGraphsandimplementation ofgraphs**(BL-4)** 2. ImplementationofBackTrackingApproach**(BL-3)** 3. AnalyzingofcomplexAlgorithms**(BL-4)**		
MODULE-4	**Branch and Bound & Lower Bound Theory**	**9 H**
BranchandBound: Themethod,Travellingsalesperson,0/1Knapsackproblem,EfficiencyConsiderations,LIFOBranchandBoundSolution,FIFOBranchandBoundSolution,LCSearchBranchandBound Solution.		
AttheendoftheModule4,studentswill beableto: 1. ImplementationofBranchandBoundStrategyonProblems**(BL-3)** 2. DifferenttypesofBranchandBoundApproach**(BL-2)** 3. Solve problems by using BranchandBoundApproach**(BL-3)**		
MODULE-5	**Lower Bound Theory & P,NP,NP Hard & NP Complete**	**10 H**
NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being inP,Cook‘sTheorem,ConvexHullAlgorithm,CliqueDecisionProblem,VertexCoverProblem ,ReductionSourceProblems,Reductions:Reductionsforsomeknownproblems		
AttheendoftheModule5,studentswill beableto: 1. DifferencebetweenP,NP,NP-Hard,NP-Complete**(BL-2)** 2. Reductionanditsimportanceinsolvingproblems**(BL-2)** 3. Understand about Deterministic and Non Deterministic Problems **(Bl-2)**		
	Totalhours:	**48hours**

Contentbeyondsyllabus:		
1.ApproximationandDifferenttypesofApproximation2.Satisfiability 3.ConjunctiveNormalForm		
Self-Study: Contentstopromoteself-Learning:		
SNO	**Topic**	**Reference**

1	**Divideand Conquer**	https://www.tutorialspoint.com/data_structures_algorithms/divide_and_conquer.htm
2	**Greedy algorithms**	https://www.tutorialspoint.com/data_structures_algorithms/divide_and_conquer.htm
3	**0/1knapsack Problem**	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_01_knapsack.htm
4	**Travelling Salesman problem**	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_travelling_salesman_problem.htm
5	**NPHardandNPComplete**	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_np_hard_complete_classes.htm

TextBook(s):

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014,
2. "Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.

ReferenceBook(s):

1. Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. "Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. "Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4. "Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5. "Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

Online/WebResources:

1. https://www.pdfdrive.com/horowitz-and-sahani-fundamentals-of-computer-algorithms-2nd-edition-d18723362.html
2. https://www.worldcat.org/title/design-and-analysis-of-algorithms/oclc/754014154/https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://www.javatpoint.com/daa-tutorial
4. https://www.vidyarthiplus.com/vp/Thread-CS6402-Design-and-Analysis-of-Algorithms--38558

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC214	BIG DATA ANALYTICS							R24
Semester	Hours /Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Pre-requisite: BasicconceptofBigData

CourseObjectives:

- IntroductiontoBigData&BigDataChallenges.
- Limitations&SolutionsofBigData Architecture.
- Hadoop&itsFeatures.
- HadoopStorage:HDFS(HadoopDistributedFileSystem)
- HadoopProcessing:MapReduceFramework.
- DifferentHadoopDistributions.

CourseOutcomes:Aftersuccessful completionofthecourse,thestudentwillbeableto:

CO1	To explorethefundamentalconceptsofBig Data**.(BL-2)**
CO2	ToLearnBasic concepts ofHadoop. **(BL-2)**
CO3	ToWriteHadoopMapReducePrograms for analyzingBigdata. **(BL-2)**
CO4	ToExploreHadoopEnvironment. **(BL-2)**
CO5	ToLearn fundamentals of HBase and Zookeeper. **(BL-2)**

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3		3										2	2
CO2	2	2	3										1	1
CO3	2	1	2	2	2								2	1
CO4	2	2	2	2	1								2	1
CO5	2	2	1	2	2								1	1

1:Low,2-Medium,3-High

COURSECONTENT

MODULE–1	UnderstandingBig Data	10 Hours

Introduction to Big Data Platform – Challenges of Conventional System , features, Datasets,DataAnalysis,DataAnalytics-DescriptiveAnalysis, DiagnosticsAnalytics,Predictive Analytics,PrescriptiveAnalytics,BigDataCharacteristics – volume,velocity,variety,veracity,value,DifferentTypesofData– StructuredData,UnstructuredData,SemiStructured Data.

At the endofthe Module 1,studentswillbe able to:

1. **illustrate**DataAnalytics. **(BL-2)**
2. **Learn**toDiagnosticsAnalyticsandAnalytics. **(BL-2)**
3. **Identify**basicsandBigDataCharacteristics.**(BL-3)**

MODULE-2	HadoopBasics	10 Hours

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop – Analyzing the Data with Hadoop – Scaling Out – Hadoop Streaming – Design of HDFS- Java interfaces to HDFS Basics-Developing a Map Reduce Application – How Map Reduce Works – Anatomy of a Map Reduce Job run – Failures – Job Scheduling – Shuffle and Sort – Task Execution – Map Reduce Types and Formats – Map Reduce Features.

At theendofthe Module2,studentswillbeableto:

1. **Learn**thehistoryofhadoop. **(BL-2)**
2. **Developing**theanalyzing thedatawithunixtools.**(BL-3)**
3. **Describe**HDFSand MapreduceArchitecture. **(BL-2)**

MODULE-3	**WritingHadoopMapReducePrograms**	**10 Hours**

Understanding the basics of MapReduce, Introducing Hadoop Map Reduce-Listing Hadoop mapReduceentities, Understanding theHadoop MapReducescenario, Understanding the limitationsofMapReduce,WritingaHadoopMapReduceexample-Understanding thestepstorunaMapReducejob.

At theendofthe Module3,studentswillbeableto:

1. **Demonstate** thebasicsofMapReduce. **(BL-2)**
2. **Apply**BasicoperationsonHadoopMapReduce.**(BL-3)**
3. **Describe**thestepstorunaMapReducejob. **(BL-2)**

MODULE-4	**Hadoop Environment**	**9 Hours**

Setting up a Hadoop Cluster – Cluster specification – Cluster Setup and Installation –Hadoop Configuration – Security in Hadoop – Administering Hadoop – HDFS – Monitoring – Maintence – Hadoop Benchmarks – Hadoop in the Cloud.

At theendofthe Module4,studentswillbeableto:

1. **Descrbe**Cluster Setup and Installation. **(BL-2)**
2. **Demonstrate**Security in Hadoop. **(BL-2)**
3. **Describe**Hadoop Benchmarks. . **(BL-2)**

MODULE-5	**Frame works**	**9 Hours**

Applications on Big Data Using Pig and Hive – Data Processing operators in Pig – Hive Services – HiveQL – Querying Data in Hive – fundamentals of HBase and Zookeeper – IBM Info Sphere Big Insights and Streams. Visualization - Visual data analysis techniques, interaction techniques; Systems and applications.

At theendofthe Module5,studentswillbeableto:

1. **Describe**theApplicationsonBigDataUsingPigandHive. . **(BL-2)**
2. **Demonstrate**DataProcessingoperatorsinPig. . **(BL-2)**
3. **Learn**theVisualdataanalysistechniques,interactiontechniques. . **(BL-2)**

Totalhours:	**48hours**

Contentbeyondsyllabus:

1. AdvancedtopicsrelatedissuesinBigDataAnalytics.
2. LearningexperiencemeldstheknowledgeofDataAnalytics withhands-ondemosandprojects.

Self-Study:

Contents topromoteself-Learning:

SNO	Topic	CO	Reference
1	UnderstandingBig DataRequirements	CO1	**https://www.redhat.com/en/topics/big-data**
2	HadoopBasics	CO2	**https://www.tutorialspoint.com/hadoop/index.htm**
3	WritingHadoop MapReducePrograms	CO3	**https://hadoop.apache.org/docs/current/hadoop-mapreduce**
4	Hadoop Environment	CO4	**https://www.tutorialspoint.com/hadoop/hadoop_enviornment_setup.htm**
5	Frame works	CO5	**https://www.tutorialspoint.com/hive/index.htm**

TextBook(s):

1. "BigDataFundamentals:Concepts,Drivers&Techniques",1/e,2016,ThomasErl,WajidKhattak,Paul Buhler,PrenticeHall.
2. "BigDataAnalyticswithRandHadoop",1e,2013,VigneshPrajapati,PacktPublishingLtd,UK.

ReferenceBook(s):

1. MichaelBerthold,DavidJ.Hand,"IntelligentDataAnalysis",Springer,2007.
2. JayLiebowitz,"BigDataandBusinessAnalytics" AuerbachPublications,CRCpress(2013).
3. TomPlunkett, MarkHornick, "UsingRtoUnlocktheValueofBigData:BigData
4. Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media(2013),Oraclepress.

OnlineResources:

1. https://www.analyticsvidhya.com/resources-big-data/

WebReferences:

1. www.jigsawacademy.com
2. www.allindiaexams.in
3. www.upgrad.com
4. www.datamation.com

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC215	SOFTWARE ARCHITECTURE							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Course Objectives:

- Understand software architectural requirements.
- To analyze the architecture styles.
- Be exposed to various quality attributes.
- To analyze the achieving architecture goals
- To analyze the architecture of cloud environment.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Discuss the importance and role of software architecture in large-scale software systems**.(BL-2)**
CO 2	Analyze the architecture styles**(BL-3)**
CO 3	Illustrate the quality attributes of a system at the architectural level**.(BL-2)**
CO 4	Implement the major software architecturee models**.(BL-3)**
CO 5	Analyze the software architecture qualities, attributes and solutions**.(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	1										2
CO2	3	2	2	1									1	2
CO3		2	1		1								1	1
CO4	3	2	2	2									2	1
CO5	3	2	1	1									1	2

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	ENVISIONING ARCHITECTURE	10 H

Introduction – What is software Architecture-What is Software Architecture, Other Points of View, Architectural Patterns, Reference Models, and Reference Architectures, Importance of Software Architecture, Architectural Structures and views. Architecture Business Cycle- Architectures influences, Software Processes and the Architecture, Business Cycle, Making of "Good" Architecture.

At the end of the Module 1, students will be able to:

5. Understand the software architectural requirements**.(BL-1)**
6. Describe influence of software architecture on business. **.(BL-2)**

MODULE -2	DESIGNING THE ARCHITECTURE WITH STYLES	9 H

Designing the Architecture: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a Skeletal System.

Architecture Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-OrientedOrganization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.

At the end of the Module 2, students will be able to:

1. Ability to understand the architecture life cycle**.(BL-2)**
2. Describe the use of architecture styles **.(BL-2)**

MODULE-3	CREATING AN ARCHITECTURE-1	10 H

Creating Architecture: Understanding Quality Attributes – Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute. Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities. Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance, Tactics, Security Tactics, Testability Tactics, Usability Tactics.

At the end of the Module 3, students will be able to:

1. Ability to understand, to use the quality attributes **.(BL-2)**
2. Explain the tactics of software architecture**.(BL-3)**

MODULE-4	CREATING AN ARCHITECTURE-II	9 H

Documenting Software Architectures: Use of Architectural Documentation, Views, Choosing the Relevant Views, Documenting a view, Documentation across Views. Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

At the end of the Module 4, students will be able to:

10. Ability to use architecture documentation**..(BL-2)**
11. Specify the relevant views in software architecture**.(BL-2)**

MODULE-5	ANALYZING ARCHITECTURES	10 H

The ATAM: Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, The Basis for the CBAM, Implementing the CBAM. The World Wide Web: A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

At the end of the Module 5, students will be able to:

10. Ability to analyze the architecture qualities, attributes and solutions**..(BL-3)**
11. Ability to select the best architecture**.(BL-3)**

TOTAL HOURS:	48 H

Content beyond syllabus:

Object Oriented Frameworks, Software Product Line Architecture

Self-Study:

Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	Software Architecture	CO1	https://www.geeksforgeeks.org/fundamentals-of-software-architecture/
2	Architecture Styles	CO2	https://www.geeksforgeeks.org/software-engineerir architectural-design/
3	System Quality Attributes	CO3	https://www.softwaretestingmaterial.com/quality-attributes-in-software-architecture/
4	Database Construction	CO4	https://www.geeksforgeeks.org/data-architecture-design-and-data-management/
5	ATAM	CO5	https://www.geeksforgeeks.org/architecture-tradeoff-analysis-method-atam/

Text Book(s):

1. Software Architectures in Practice, Len Bass, Paul Clements, Rick Kazman, 2nd Edition, Pearson Publication.
2. Software Architecture , Mary Shaw and David Garlan, First Edition, PHI Publication, 1996

Reference Book(s):

1. Software Design: From Programming to Architecture, Eric Braude, Wiley, 2004.
2. N. Domains of Concern in Software Architectures and Architecture Description Languages. Medvidovic and D. S. Rosenblum. USENIX.

Online Resources:

1. https://cosmolearning.org/courses/software-architecture-design/video-lectures/

Web Resources:

1. https://www.tutorialspoint.com/software_architecture_design/index.htm
2. https://index-of.es/Varios2/Software%20Architecture%20and%20Design%20Tutorial.pdf

NARAYANA ENGINEERING COLLEGE: NELLORE								
24MC216	DATAWAREHOUSE & DATAMINING							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	2	0	2	48	3	40	60	100

Pre-requisite: Data Base Management Systems

Course Objectives:

- To facilitate with the concept of Data warehouse and Data mining
- To introduce the concept of Datawarehousing with special emphasis on design
- To understand the concepts of Association and Correlation
- To understand the concept of Classification
- To understand the concept of Clustering

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Remember** the basics of **Datawarehouse and Data mining**(BL-1)
CO 2	**ApplyData Pre-processing techniques** in detail(BL-3)
CO 3	**Illustrate** the concepts of **Association and Correlation techniques**(BL-2)
CO 4	**Demonstrate** the concepts of **Classification Methods**(BL-2)
CO 5	**Demonstrate** the concepts of **Clustering Methods**(BL-2)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	1										1	
CO2	2	1	2	1	2								2	2
CO3	1		1											1
CO4	2	1			1	1							2	
CO5	1	2	2										1	2

COURSE CONTENT

MODULE – 1	Introduction to Data Mining	7H

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining

At the end of the Module 1, students will be able to:

1. Discuss about Datamining.(BL-2)
2. Demonstrate about the Datawarehouse Basics.(BL-2)
3. Student able to learn about the need of data mining and Datawarehouse.(BL-1)

MODULE -2	Data Preprocessing & OLAP Technology	7 H

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture.

At the end of the Module 1, students will be able to:

1. Demonstrate about the Data Pre-processing(BL-2)
2. Illustrate about the stages of Data Pre-processing.(BL-2)

3. Analyze the stages and OLAP Technology in Data mining & Datawarehouse(BL-3)

MODULE-3	Mining Frequent Patterns, Associations and Correlations	6H

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

At the end of the Module 1, students will be able to:

1. Illustrate about the Mining Frequent Patterns.(BL-2)
2. Demonstrate about the Association rules in Data mining (BL-2)
3. Importance of association in Datamining.(BL-2)

MODULE-4	Classification Analysis	6H

Classification and Prediction Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Prediction

At the end of the Module 1, students will be able to:

1. Demonstrate of Classification analysis in Data Mining(BL-2)
2. Illustrate of different Classification Algorithms in Datamining(BL-2)
3. Student able to analyze the classification methods in Datamining.(BL-3)

MODULE-5	Cluster Analysis	6H

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods., Density-Based Methods, Outlier Analysis

At the end of the Module 1, students will be able to:

1. Demonstrate of Cluster Analysis in Data mining(BL-2)
2. Analyze of various clustering algorithms used in Data mining(BL-2)
3. Implementation of Clustering algorithms in Data mining Problems(BL-2)

Total Hours:	**32Hours**

Content beyond syllabus: Quality Assurance , Selenium Testing Tool ,Bugzilla Testing Tool

Self-Study: Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	KDD Process	CO1	https://www.geeksforgeeks.org/kdd-process-in-data-mining/
2	Data ware House Architecture	CO2	https://www.javatpoint.com/data-warehouse-architecture
3	Apriori Algorithm	CO3	https://www.geeksforgeeks.org/apriori-algorithm/
4	Naïve Bayesian Method	CO4	https://www.geeksforgeeks.org/naive-bayes-classifiers/
5	Outlier Analysis	CO5	https://www.geeksforgeeks.org/types-of-outliers-in-data-mining/

Text Book(s):

1. Data Mining – Concepts and Techniques - Jiawei Han &MichelineKamber, Morgan Kaufmann Publishers, Elsevier,2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

Reference Book(s):

1. Data Mining Techniques – Arun K Pujari, 2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory& Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
4. Data Warehousing Fundamentals – PaulrajPonnaiah Wiley student Edition

Online Resources:

1. https://www.geeksforgeeks.org/data-warehousing/
2. https://www.tutorialspoint.com/dwh/index.htm
3. https://www.javatpoint.com/data-warehouse
4. https://www.guru99.com/data-mining-tutorial.html

NARAYANAENGINEERINGCOLLEGE: GUDUR								
24MC205	ADVANCED JAVA PROGRAMMING LAB							R24
Semester	Hours/Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
II	0	0	3	48	1.5	40	60	100

Pre-requisite: Basic concepts of JAVA

CourseObjectives:

1. Understandfundamentalsofobject-orientedprogramminginJava,includingdefiningclasses,invokingmethods,usingclasslibraries,etc.
2. Havetheabilitytowriteacomputerprogramtosolvespecifiedproblems.
3. Able to develop server side programming
4. Able to develop the dynamic web pages using JSP.
5. Student can able to Designing of window based applications.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	Constructprograms usingClass,objectandConstructor relationshipinObjectOrientedProgramming.
CO2	Implementbasicknowledgeof Operations,Expressions,Control-flow,Stringswiththe helpofJavainObjectOrientedProgramming.
CO3	Analyzethesignificanceofvariouskeywordsandimplementreusability ofcode,Encapsulationandpolymorphismtechniquein OOPs.
CO4	ImplementsInterface,exceptionhandlinginJava
CO5	ImplementMultithreading,packagesandApplet(Webprograminjava) programmingconceptinJava.

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2
CO1		3	3										1	3
CO2		3	2		2								3	2
CO3		3	2		3							2	2	2
CO4		3	2						2	2	2	3	2	2
CO5		3	3	2	3				2	2	2	3	3	3

1:Low,2-Medium, 3-High

COURSECONTENT	CO
Task1-Class,Objects	
a).WriteaJAVAprogramtoimplementclass mechanism.–Createaclass, methodsandinvoketheminsidemainmethod? b). WriteaJAVAprogramtoimplementconstructor?	CO1
Task2 - Methods	

a). WriteaJAVAprogramto implementconstructoroverloading? b). WriteaJAVAprogramimplementmethodoverloading.?	CO1
Task-3Inheritance	
a). WriteaJAVAprogramto implementSingleInheritance? b). WriteaJAVAprogramtoimplementmulti-levelInheritance? c). Writeajavaprogramfor abstractclasstofindareasofdifferentshapes?	CO2
TASK-4Interfaces	
a). WriteaJAVAprogramgiveexamplefor "super"keyword.? b). WriteaJAVAprogramtoimplementInterface. WhatkindofInheritancecanbeachieved? WriteaJAVAprogramtoimplementmultipleinheritanceaccessinjava?	CO2
TASK-5Exceptions	
a). WriteaJAVAprogramthatdescribesexceptionhandling mechanism.? b).WriteaJAVAprogramIllustratingMultiplecatchclauses? c).Write aJAVAprogramforcreationofUserDefined Exception?	CO3
TASK-6Threads	
a). Createtwothreadssuchthatone ofthethreadprintevenno's andanotherprintsoddno'suptoagivenrange? b). Writeaprogram to implement thread synchronization?	CO4
TASK-7Packages	
a). WriteaJavaProgramtoCreateapackagecalled"Arithmetic"thatcontainsmethodstodealwithall arithmeticoperations.Also,writeaprogramtousethe package.?	CO4
TASK - 8 JDBC	
a). Write a program to establish successful connection to database? b). Write a program to send data to Table (for ex. "Student" table) in database using prepared statement and retrieve data from same Table "Student" and display on screen.	CO4
TASK-9 Servlet	
a). write a servlet to display the user name and password accepted from the client. b). write a Servlet for demonstrating the concept of Session and Cookies.	CO4
TASK -10 J S P	
a). Write a java Program to create a JSP page to display a simple message along with current Date? b). Write a java Program to create a User request page in JSP?	CO5
TotalHours:	**48H**

VirtualLabs:

1. https://cse11-iiith.vlabs.ac.in/MIPS1/Procedure.html?domain=Computer%20Science&lab=CSO%20Lab
2. https://www.researchgate.net/publication/225171615_Virtual_Programming_Lab_for_Online_Distance_Learning

Self-Study:

Contentstopromoteself-Learning:

SNO	Topic	Reference
1	Class-objectConstructorrelationshipinObject OrientedProgramming.	https://nptel.ac.in/courses/106/105/106105191/Lecture(1,2,3)
2	Operations,Expressions,Control-flow,Stringswiththehelpof Java	https://nptel.ac.in/courses/106/105/106105191/Lecture(4,6)
3	Implement reusabilityofcode,Encapsulationandpolymorphism techniqueinOOPs	https://nptel.ac.in/courses/106/105/106105191/Lecture(7,13)
4	Implements Interface,exceptionhandlinginJava	https://nptel.ac.in/courses/106/105/106105191/Lecture(20,21,22)
5	Multithreading, packagesandApplet	https://nptel.ac.in/courses/106/105/106105191/Lecture(17,18,19)

TextBook(s):

1. Java:HerbertSchildt"JavaThecompletereference",9thedition,McGrawHillEducation(India)Pvt. Ltd.
2. BeginningJava2, JDK5Edition,Ivor Horton,Wileydreamtech.

3.Y.DanielLiang,IntroductiontoJavaprogramming-comprehensiveversion-TenthEdition, Pearsonltd 2015.

ReferenceBook(s):

1. Anintroductiontojavaprogrammingandobjectorientedapplicationdevelopment,RAJohson-Thomson.
2. Introductiontojavaprogramming6thEdition,YDanielliang, PearsonEducation.
3. Javaprogramming:Apracticalapproach,C.Xavier,TMH, Firstedition,2011.
4. BruceEckel[2008],[2ndEdition],ThinkinginJava, PearsonEducation.
5. H.MDieteland P.JDietel[2008], [6thEdition], JavaHowto Program,PearsonEd.

WebResources:

1. https://nptel.ac.in/courses
2. https://freevideolectures.com/university/iitm
3. www.javatpoint.com
4. https://www.tutorialspoint.com/jaindex.htm
5. https://docs.oracle.com/javase/tutorial/

6.https://nptel.ac.in/courses/106/105/106105191/

7.https://www.edx.org/professional-certificate/uc3mx-introduction-java-programming

NARAYANAENGINEERINGCOLLEGE: NELLORE								
24MC206	ARTIFICIALINTELLIGENCELAB							R24
Semester	Hours/ Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	0	0	3	48	1.5	40	60	100
Pre-requisite: Any OOP Programming Language								

CourseObjectives:

1. LearnaboutbasicAI fundamentalsandAI problems.
2. Studentswillgain an understandingaboutsearching.
3. UnderstandaboutAIknowledge
4. Examinethefundamentalsandterminologiesofexpertsystem.
5. IdentifyandDevelopsimpleapplicationsmakinguseofExpertSystemTools.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	StateapplicationsofArtificialIntelligence
CO2	EnumerateproblemsolvingstrategiesinAI
CO3	Illustrateproblemreductiontechniques
CO4	Applyknowledgerepresentationtechniques tosolverealworldproblems
CO5	ApplyComputationalIntelligencetechniquestosolvereal-worldproblems

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2		1											2
CO2	2	2	2										2	3
CO3	3	3	3	2									3	3
CO4	3	2	3	3	2								3	2
CO5	3	2	3	2	2								2	

1:Low, 2-Medium,3-High

COURSECONTENT	CO
Task -1	
Install the python software/Anaconda- python and install useful package and install NLTK software.	CO1
Task-2	
a. Write a python program to print the multiplication table for the given number? b. Write a python program to check whether the given number is prime or not? c. Write a python program to find factorial of the given number?	CO2
Task-3	
Write a python program to implement simple Chatbot?	CO2
TASK-4	
a. Write a python program to implement List operations (Nested List, Length, Concatenation, Membership, Iteration, Indexing and Slicing)? b. Write a python program to implement List methods (Add, Append, Extend& Delete).	CO3
TASK-5	

a. Write a python program to Illustrate Different Set Operations? b. Write a python program to generate Calendar for the given month and year?	CO2
TASK-6	
Write a python program to implement Simple Calculator program?	CO2
TASK-7	
a. Write a python program to Add Two Matrices. b. Write a python program to transpose a Matrix.	CO3
TASK-8	
Write a python program to implement Breadth First Search Traversal	CO4
TASK-9	
Write a python program to implement Water Jug Problem	CO4
TASK-10	
a. Write a python program to remove punctuations from the given string? b. Write a python program to sort the sentence in alphabetical order?	CO4 CO5
TASK-11	
Write a program to implement Hangman game using python.	CO5
TASK-12	
Write a program to implement Tic-Tac-Toe game using python.	CO5
Totalhours:	**48hours**

AdditionalExperiments:	
TASK-13	
a. Write a python program to remove stop words for a given passage from a text file Using NLTK? b. Write a python program to implement stemming for a given sentence using NLTK? c. Write a python program to POS (Parts of Speech) tagging for the give sentence using NLTK	CO5
TASK-14	
a. Write a python program to implement Lemmatization using NLTK? b. Write a python program to for Text Classification for the give sentence using NLTK?	CO5

Self-Study:

Contentstopromoteself-Learning:

SNO	Topic	CO	Reference
1	Prolog	CO1	https://www.youtube.com/watch?v=hBz3DgXlg0Q

2	ArtificialIntelligence	CO1	**https://www.youtube.com/watch?v=JMUxmLyrhSk&=527s**
3	ExpertSystems	CO2	**https://www.youtube.com/watch?v=l0CRFuA0m_8&=37s**

TextBook(s):

1. Think Python, How to Think Like a Computer Scientist, Version 2.0.17, Allen Downey, Green Tea Press.
2. Artificial Intelligence a Modern Approach, Stuart Russell, Peter Norvig (Person Education), 2nd edition.

3.Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000

ReferenceBook(s):

1. Python Essential Reference, David M. Beazley, Pearson Education, Inc.
2. Fluent Python, Luciano Ramalho by O'Reilly Media
3. Python Cookbook, David Beazley and Brian K. Jones, O'Reilly Atlas.3e
4. Artificial Intelligence- Rich E & Knight K (TMH), 4th edition.
5. Artificial Intelligence Structures and Strategies complex problem Solving – George F. Lugar Pearson Education.

Web References:

https://www.youtube.com/watch?v=l0CRFuA0m_8&t=121shttps://www.youtube.com/watch?v=OVZUKXxMzSEhttps://www.youtube.com/watch?v=Hor5r8bz8SA

NARAYANAENGINEERINGCOLLEGE::GUDUR								
24MC207	MOBILE APPLICATION DEVELOPMENT LABORATORY							R24
Semester	Hours/Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	0	0	2	38	1	40	60	100

ListofExperiments		
TASK–1	**Android installations**	**3H**
Setup the Development environment to develop Android Applications		
TASK–2	**Hello World Application.**	**3H**
Create "Hello World" Application.		
TASK–3	**Using the Activity class**	**1H**
Create an application using the Activity class.		
TASK–4	**Edit Text control.**	**3H**
Create an application using Edit Text control.		
TASK–5	**Check Box control.**	**3H**
CreatinganapplicationthatallowschoosingoptionsusingCheckBoxcontrol.		
TASK–6	**Radio Button control**	**3H**
CreatinganapplicationthatallowschoosingoptionsusingRadioButtoncontrol		
TASK–7	**Linear Layout**	**3H**
Create an application using Linear Layout		
TASK–8	**Relative Layout**	**3H**
Create an application using Relative Layout		
TASK–8	**Relative Layout**	**3H**
Create an application using Relative Layout		
TASK–9	**Absolute Layout**	**3H**
Create an application using Absolute Layout		
TASK–10	**Play Audio and Video clips**	**3H**
Create an application to play Audio and Video clips		
TASK–11	**Using Spinner.**	**3H**
Create an application that allows choosing options using Spinner.		
TASK–12	**Menus**	**3H**
Create an application using Menus.		
Additional Experiments: 3H		
TASK-13	**Radio Button control**	**1H**
Creatinganapplicationthatallowschoosingoptionsusingtwosetsof RadioButtoncontrols.		
TASK-14	**ActionBar**	**1H**

1. CreateanapplicationusingActionBar. 2. CreateanapplicationtodisplayaDrop-DownListActionBar.	
Totalhours:	**38hours**

SEMESTER- III

Subject Code	Course Title		
24MC301	Computer Networks		
24MC302	Full Stack Development		
24MC303	Data Science		
-	Professional Elective–III (MOOCS)	24MC309	1. E-Commerce
		24MC310	2.Software Project Management
		24MC311	3.Machine Learning
-	Professional Elective–IV (MOOCS)	24MC312	1.Cloud Computing
		24MC313	2.Software Quality Assurance
		24MC314	3.Deep Learning
-	Professional Elective–V	24MC315	1.R-Programming
		24MC316	2.SoftwareTesting
		24MC317	3.Cyber Security
24MC304	Computer Networks Lab		
24MC305	Full Stack Development Lab		
24MC306	Data Science Lab		
24MC307	Internship-I		
24MC308	Audit Course –II		

NARAYANA ENGINEERING COLLEGE::NELLORE							
24MC301	COMPUTER NETWORKS						R24
Semester	Hours / Week			Total hrs	Credit	Max Marks	
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: Knowledge of Information Technology, Computer Organization & Architecture

Course Objectives:

1. To impart the core principles of Information Communication Technology.
2. To deliver background information on the key transmission technologies used in computer networks.
3. To convey dimensions of Network layer through Internet Protocol.
4. To provide an insight into the most widely used Transport Layer protocols
5. To teach the principles of Application Layer and its protocols.

Course Outcomes: On successful completion of the course,student will be able to:

CO 1	Choose suitable transmission media depending on the requirements.(BL-2)
CO 2	termine the errors in data transfer between source and destination. (BL-3)
CO 3	Obtain the skills of subnetting and routing mechanisms. (BL-2)
CO 4	Illustrate reliable, unreliable communication on public networks. (BL-3)
CO 5	Demonstrate the elements of socket programming, principles of protocols. (BL-3)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2											1	
CO2	2	2	3	3									3	3
CO3	2	3	2										1	2
CO4	2	1											1	
CO5	2	1	1										1	1

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE - 1	Physical Layer	(10H)

Data Communications, Networks, Network Types, Internet History, Standards and Administration, Protocol Layering, TCP/IP Protocol Suite, The OSI Model.Data and Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance.TransmissionMedia:Introduction, Guided Media, Unguided Media

At the end of the Module 1, students will be able to:

1. Understand the basics of computer networks. (BL-2)
2. Describe the picture of data communication with layered architecture. (BL-2)
3. Describe performance issues in data transmission. (BL-2)
4. Classify the elements of physical media used for data transmission. (BL-2)

MODULE –2	Data-Link Layer & MAC	(9H)

Introduction, Link-Layer Addressing, Error Detection and Correction: Cyclic Codes,Checksum, Forward Error Correction, Data Link Control (DLC):DLC Services, Data-Link Layer Protocols, Sliding Window Protocols, HDLC, PPP.MAC: Random Access.		
At the end of the Module 2, students will be able to: 1. Explain link layer services. (BL-2) 2. Discuss Error Detection and Correction mechanisms. (BL-2) 3. Describe Data Link Control services and protocols. (BL-2) 4. Illustrate Media Access Control Protocols. (BL-3)		
MODULE –3	**Network Layer**	**(10H)**
Network Layer:Network Layer Design Issues, Routing Algorithms: The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector, Link State, Hierarchical, Broadcast, Multicast, Anycast,Congestion Control Algorithms, Quality of Service. Internetworking, IPV4 Addresses, IPV6, OSPF, BGP, IP.		
At the end of the Module 3, students will be able to: 12. Understand design issues of network layer. (BL-2) 13. Explain efficient routing protocols in computer networks. (BL-2) 14. Discuss the concept of internetworking and its implementation issues. (BL-2) 15. Describe the elements of network layer required for data transfer over Internet. (BL-2)		
MODULE –4	**Transport Layer**	**(9H)**
The Transport layer services, Elements of Transport Protocols, Congestion Control in Transport Layer. UDP, TCP,Performance problems in computer networks, Network performance measurement, Real-time interactive protocols.		
At the end of the Module 4, students will be able to: 1. Understand the services provided by transport layer. (BL-2) 2. Describe elements of transport layer required for data transfer over Internet. (BL-2) 3. Demonstrate end to end communication. (BL-3) 4. Discuss performance issues in transport layer. (BL-2)		
MODULE –5	**Application Layer**	**(10H)**
Introduction, Client Server Programming-Iterative communication using UDP, Iterative communication using TCP.Standard Client Server Protocols:WWW, HTTP, Domain Name System, FTP, e-mail, TELNET, Secure Shell.		
At the end of the Module 5, students will be able to: 1. Implement client server communication. (BL-3) 2. Explain the working of world wide web with HTTP, DNS. (BL-2) 3. Describe the protocols for mail, remote system login. (BL-2) 4. Discuss file transfer, network management protocols. (BL-2)		
	Total hours:	**48 hours**

Content beyond syllabus:

1. Wired LANs (Ethernet Family), Wireless LANs (802.11 Family)
2. Connecting Devices and VPN
3. Peer-to-Peer paradigm

Self-Study:

Contents to promote self-Learning:

S.No.	Module	Reference

1.	Physical Layer	https://nptel.ac.in/courses/106/105/106105183/ Lecture - 3
2.	Data link layer	https://nptel.ac.in/courses/106/105/106105183/ Lecture – 46,47,48,49,50
3.	Network Layer	https://nptel.ac.in/courses/106/105/106105183/ Lecture – 26, 27, 28, 29, 30
4.	Transport Layer	https://nptel.ac.in/courses/106/105/106105183/ Lecture – 11,12,13,14,15
5.	Application Layer	https://nptel.ac.in/courses/106/105/106105183/ Lecture – 5, 6, 7, 8, 9, 10

Text Book(s):

1. Data communications and networking, Behrouz A. Forouzan, 5th edition, McGraw Hill Education, 2012.
2. Computer Networks, Andrew S. Tanenbaum, Wetherall, 5th edition, Pearson, 2013.

Reference Book(s):

1. Douglas E. Comer, Internetworking with TCP/IP – Principles, protocolsand architecture-Volume 15th edition, PHI.
2. Kurose James, Ross Keith, Computer Networking: A Top-Down Approach, 6th Edition, Pearson Education
3. Fall, Richard, TCP/IP Illustrated: The Protocols, 2ND edition, Pearson Education
4. Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th edition, Tata McGraw Hill
5. BhushanTrivedi, Data Communication and Networks, Oxford,2016.
6. Davie, Elsevier,Computer Networks, 5th Edition, Peterson.
7. M. Dave, Computer Networks, Cengage Learning,2012.

Online Resources/ Web References:

1. https://www.coursera.org/learn/tcpip
2. https://www.youtube.com/watch?v=aHJElrgj6UA&list=PLBbU9-SUUCwVmwRswAHdqoJw-D2WeD9CN
3. https://www.youtube.com/watch?v=vrh0epPAC5w&list=PL1kr2FHR_uFHQk2hy2g8lr7ouBhSJFEk_
4. https://www.youtube.com/watch?v=flDzURAm8wQ&list=PL6gx4Cwl9DGBI2ZFuyZOl5Q7sptR7PwYN
5. https://www.geeksforgeeks.org/computer-network-tutorials/

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC302	FULL STACK DEVELOPMENT							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: A Course on "Web technologies".

Course Objectives:

1. Understand the process to develop dynamic web pages using HTML, CSS
2. Understand Client-side scripting with JavaScript
3. Understand PHP language for server-side scripting.
4. Understand server-side scripting with PHP language
5. Understand what is XML and how to parse and use XML Data with Java

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	gain knowledge to develop dynamic web pages using HTML, CSS**(BL-2)**
CO 2	Learn the basics of Java Script**(BL-2)**
CO 3	Demonstrate server-side scripting with PHP language**(BL-2)**
CO 4	gain knowledge of server-side scripting, validation of forms**(BL-2)**
CO 5	Working with XML and processing of XML Data .**(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	1												2
CO2	2	2	1										1	1
CO3	3	1	2	2	1								2	
CO4	2	2	2	1									2	1
CO5	1	2	2										1	2

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	HTML & CSS	10 H

HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Markup, HTML styles, Elements, Attributes, Heading, Layouts, HTML media, Iframes Images, Hypertext Links, Lists, Tables, Forms, GET and POST method, HTML 5, Dynamic HTML.

CSS: Cascading style sheets, Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution, CSS3, Web Servers- Apache, IIS, Bundle Servers.

At the end of the Module 1, students will be able to:

11. **Learn** basic HTML tags. **(BL-2)**
12. **Gain** the knowledge on HTML styles**. (BL-2)**
13. **Describe** Levels of Style Sheets. **(BL-2)**

MODULE -2	Java Script	10 H

Java script: Introduction to Java script, Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, Exception Handling, Validation, Built-in objects, Event Handling, DHTML with JavaScript., DOM Model

Angular Java Script: Introduction to Angular JS Expressions: ARRAY, Objects, Strings, Angular JS Form Validation & Form Submission.

At the end of the Module 2, students will be able to:

1. **Learn** the basic concepts of java script**(BL-2)**
2. **Demonstrate** the concepts of Angular Java Script**. (BL-2)**
3. **Handling** Form Validation & Form Submission**. (BL-3)**

MODULE-3	PHP	10 H

Introduction to PHP: The problem with other Technologies (Servelets and JSP), Downloading, installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page.
Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

At the end of the Module 3, students will be able to:

12. **Learning** the concepts of PHP . **(BL-2)**
13. **Illustrate** the importance of Programming in a Web environment. **(BL-2)**
14. **Demonstrate** PHP Data type. **(BL-2)**

MODULE-4	PHP Advanced Concepts	9 H

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, authenticating users, Using Environment and Configuration variables, Working with Date and Time.
Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, validating form input, working with multiple forms, and Preventing Multiple Submissions of a form.

At the end of the Module 4, students will be able to:

16. **Handling** Cookies. **(BL-3)**
17. **Create** and handle Forms. **(BL-3)**
18. **Preventing** multiple submissions of a form. **(BL-3)**

MODULE-5	XML & Node.js	9 H

Working with XML: Document type Definition (DTD), XML schemas, XSLT, Document object model, Parsers - DOM and SAX. News Feed (RSS and ATOM).
Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules, Node JS File system, Node JS URL module, Node JS Events.

Total hours:	**48 hours**

Self-Study:
Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	HTML & CSS	CO1	https://www.w3schools.com/html/html_css.asp
2	Java Script	CO2	https://www.w3schools.com/js/js_intro.asp
3	PHP	CO3	https://www.tutorialspoint.com/php/index.htm
4	PHP Advanced Concepts	CO4	https://www.phptpoint.com/advanced-php-tutorial/
5	XML & Node.js	CO5	https://www.javatpoint.com/what-is-xml

Text Book(s):

1. Programming the World Wide Web, Robet W Sebesta, 7th Edition, Pearson, 2013
2. Web Technologies, Uttam K Roy, 1stEdition ,7th impression, Oxford, 2012

Reference Book(s):

1. Deitel and Deitel and Nieto, Internet and World Wide Web - How to Program, , 5th Edition, Prentice Hall, 2011.
2. ELad Elrom, Pro Mean Stack Development, 1st Edition, Apress O'Reilly, 2016
3. David sawyer mcfarland, Java Script & jQuery the missing manual, 2nd Edition, O'Reilly, 2011
4. Peter Pollock, Web Hosting for Dummies, 1st Edition, John Wiley & Sons, 2013
5. Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens, PHP 5 Recipes A problem Solution Approach.
6. Tom Christiansen, Jonathan Orwant, Programming Perl, 4th Edition, O'Reilly, 2012
7. Kogent L S, Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech, 2009
8. Paul S Wang, Sanda S Katila, An Introduction to Web Design, Programming, 1st Edition, Cengage Learning, 2003

Online Resources:

1. https://www.geeksforgeeks.org/web-technology/

Web Resources:

1. https://www.w3schools.com/html/
2. https://www.w3schools.com/html/html_iframe.asp
3. https://www.w3schools.com/nodejs/

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC303	DATA SCIENCE							R 24
Semester	Hours/ Week			Total Hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	1	0	48	4	40	60	100

Pre-requisite: Python programming, Data Mining, ML Algorithms, Probability and Statistics Concepts

CourseObjectives:

1. To introduce the field of data science, the nature and structure of data.
2. To emphasize the importance and application of statistics in analyzing the data.
3. To develop the skills in using data science techniques for solving data intensive problems.
4. To understand learning concepts that is vital for data science.
5. To explain the concepts of supervised and unsupervised learning.
6. To evaluate data visualizations based on python programming.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	Memorize the statistics concepts applicable to data science **(BL-1)**
CO2	Demonstrate data analysis, manipulation and visualization of data using Python libraries such as Pandas, Matplotlib and Plotly etc. **(BL-2)**
CO3	Enumerate machine learning algorithms. **(BL-1)**
CO4	Analyze the various applications of data science**. (BL-4)**
CO5	To demonstratetheclustering algorithms .**(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	1	3	3										1	1
CO2	2		2										1	2
CO3		3	2										2	1
CO4	2		2										1	2
CO5	1	2	2										1	2

COURSECONTENT

MODULE – 1	Introduction of Data Science and Big Data	9H

Introduction: Introduction to Data Science, Examples, Data Sources, Challenges, Applications, Comparative Study of data science with databases, facets of data, big data ecosystem and data science.

Learning Outcomes:
Attheendof theModule1, studentswillbeableto:

1. Describe the data scienceaffectsvariousfields. **(BL-1)**
2. Memorize the statistics concepts applicable to data science.**(BL-1)**
3. Solve the measures of dispersion. **(BL-3)**

MODULE - 2	Python for Data Science	12H

Python for Data Analysis: Introduction to Numpy, Numpy Arrays and indexing, Introduction to pandas, Series, Dataframes, Missing data, Groupby, Merging Joining and Concatenating, read csv and json, Cleaning Data.
Python for Data Visualization: Matplotlib library**,** Seaborn Distribution, Matrix and Regression Plots, Introduction to SKlearn and Plotly.

Learning outcomes:

Attheend of the Module 2, studentswillbeableto:

1. Execute programs using python libraries such as Numpy, Pandas**. (BL-3)**
2. Execute and solve data visualization problems with python libraries like matplotlib, Seaborn and Plotly**. (BL-3)**

MODULE-3	Supervised Learning - Regression	9H

What Is data science, How does data science relatetootherfields. Data Preprocessing in Python
Introduction to Supervised Learning: Introduction to Machine Learning, Types of ML Algorithms
Regression: Regression, Simple Linear regression, Multiple Linear Regression, Polynomial regression, Support Vector Regression (SVR), Decision Tree Regression.

Attheend of the Module 3, studentswillbeableto:

1. Apply data preprocessing steps using python. **(BL-3)**
2. Describe the regression techniques and implements the models. **(BL-3)**

MODULE-4	Supervised Learning -Classification	9 H

Classification:Logistic Regression, K-Nearest Neighbors (KNN), Support vector Machine (SVM), NaïveBayes, Decision Tree Classification, and Random Forest Classification.

Attheendof theModule 4, studentswillbeableto:

1. Understandtheclassificationoflearningstrategies. **(BL-3)**
2. Evaluatevariousclassificationtechniques. **(BL-3)**

MODULE-5	Unsupervised Learning -Clustering	9H

Introduction to Unsupervised Learning:K-Means Clustering, Hierarchical Clustering, Introduction to Reinforcement Learning, Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA).

Attheendof theModule 5, studentswillbeableto:

1. Understandthedifferentiationbetweenclassificationandclustering. **(BL-2)**
2. Compareandcontrastvariousclusteringtechniques.**(BL-2)**
3. Understandnewlearningstrategyusedinrealtimescenario.**(BL-2)**

TotalHours:	48Hours

Self-Study:

Contentstopromoteself-Learning:

SNo	Module	CO	Reference
1	Introduction to Probability and Statistics	CO1	https://www.dataquest.io/blog/best-free-tools-data-science/
2	Python for Data Science	CO2	https://nptel.ac.in/courses/106/106/106106179/(Week-2Lec:12To18)
3	Regression	CO3	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi
4	Supervised Learning - Classification	CO4	https://www.youtube.com/watch?v=fn1rKKNLuzk&list=PL15FRvx6P0OWTlNBS_93NHG2hIn9cynVT https://www.youtube.com/watch?v=2pWv7GOvuf0&list=PLqYmG7hTraZDM-OYHWgPebj2MfCFzFObQ

5	Unsupervised Learning - Clustering	CO5	https://www.youtube.com/watch?v=NOIfMY0KajE https://youtu.be/GGL6U0k8WYA

TextBook(s):

1. A Hands onIntroductiontoData Science,CambridgeUniversityPress,ISBN10:1108472443,2020.
2. PrinciplesofData Science-Learnthetechniquesandmathyouneedtostartmakingsenseofyourdataby SinanOzdemir,

ReferenceBook(s):

1. JoelGrus,DataSciencefromScratch,Oreillymedia,2015.
2. Gareth James Daniela Witten Trevor Hastie, Robert Tibshirani, an Introduction to Statistical Learning with Applications in R, February11, 2013.
3. MarkGardener,BeginningRThe statisticalProgrammingLanguage, Wiley,2015.
4. Han, Kamber, and J Pei, Data Mining Concepts and Techniques, 3rd edition, Morgan Kaufman, 2012.
5. LinearAlgebraandItsApplications, 4thEdition,GilbertStrang
6. 4.Python Data Science Handbook by Jake VanderPlasReleased November 2016 Publisher(s): O'ReillyMedia, Inc.ISBN: 9781491912058

OnlineResources/WebReferences:

1. https://intellipaat.com/blog/tutorial/data-science-tutorial/
2. https://www.guru99.com/data-science-tutorial.html
3. https://www.edureka.co/blog/data-science-tutorial/
4. https://www.programmer-books.com/introducing-data-science-pdf/
5. https://onlinelibrary.wiley.com/doi/book/10.1002/9781119092919
6. https://www.digiteum.com/data-visualization-techniques-tools
7. https://towardsdatascience.com/applications-of-reinforcement-learning-in-real-world-1a94955bcd12
8. https://scikit-learn.org/stable/modules/tree.html
9. https://www.academia.edu/8135057/Methods_of_Data_Analysis

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC304	COMPUTER NETWORKS LAB							R24
Semester	Hours/ Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100

Pre-requisite:Nil

CourseObjectives:

1. To Understand the functionalities of various layers of OSI model
2. To expose networking concepts using simple programs
3. To emulate client server architecture using different protocols
4. To illustrate different routing protocols and algorithms for reliable data transfer.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	Define basic concepts of networking **(BL-3)**
CO2	Apply error detection control techniques**(BL-3)**
CO3	Apply packet routing techniques **(BL-3)**
CO 4	Develop Client Server programming **(BL-3)**

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	3	3											
CO2	2		2							2				
CO3		3		2										
CO4	1	1			1								1	

1:Low, 2-Medium,3-High

COURSE CONTENT

TASK–1 **CO1**

1. To identify various devices available in campus.
2. To know the internet facility available in college

TASK-2 **CO2**

1. Write a C program to implement the algorithm for parity method for error control.
2. Write a C program to implement the algorithm on hamming method for error correction (both single and block errors).
3. Write a C program to implement the algorithm for check sum computation

TASK-3 **CO3**

1. Write a C program to implement the data link layer framing methods such as bit stuffing.
2. Write a C program to implement the data link layer framing method such as character stuffing.
3. Write a C program to implement data link layer framing method character count.

TASK-4 CO4

1. Write a C program to implement on a data set characters the three CRC polynomials – CRC 12, CRC 16, and CRC CCIP.

TASK-5 **CO3**

1. Write a C program to Implement Dijkstra's Algorithm to compute the shortest path through a given path

TASK-6 CO4	
1. Write a C program to take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.	
TASK – 7 CO3	
1. Write a C program to implement the link state routing algorithm	
TASK – 8	**CO4**
1. Write a C program Implement Broadcast Tree for a given subnet hosts	
TASK – 9 CO3	
1. Write a program for File Transfer in client-server architecture using TCP/IP	
TASK – 10 CO3	
1. A Client Server application for chat.	
Totalhours:	**48hours**

TextBook(s):

1. "Data communications and networking", Behrouz A. Forouzan, Mc Graw Hill Education, 5th edition, 2012.
2. "Computer Networks", Andrew S. Tanenbaum, Wetherall, Pearson, 5th edition, 2010.

ReferenceBook(s):

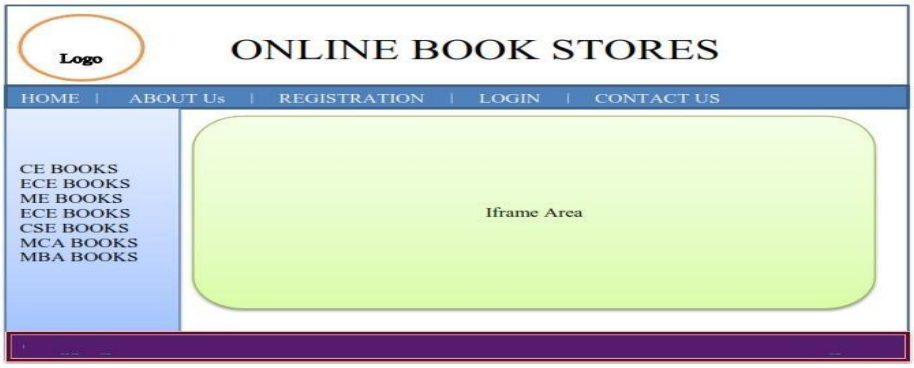
1. Data Communication and Networks, Bhushan Trivedi, Oxford
2. "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
3. "Computer Networks", 5E, Peterson, Davie, Elsevier.
4. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRC Publications.

Online/WebResources:

1. https://www.tutorialspoint.com/data_communication_computer_network/index.htm2.
2. https://www.geeksforgeeks.org/computer-network-tutorials/

NARAYANA ENGINEERING COLLEGE:NELLORE								
24MC305	FULL STACK DEVELOPMENT LAB							R24
Semester	Hours /Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100
Pre-requisite: JavaProgrammingLanguage								
CourseObjectives: 1. Togainknowledgeoncreatingthestaticweb pages 2. Topreparestudentsforcreatingthedynamicandresponsiveweb pages 3. Topreparestudentsforcreatingtheserver sideweb pagesusingdatabase								
CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:								
CO1	Buildawebpageontheir ownand usingvalidations							
CO2	ApplybasicresponsiveprogramsusingAngularJs							
CO3	Applytheconceptsfor writingtheprogramsusingXML							
CO4	Buildtheserver sideapplicationswithdatabaseconnectivityusingforms							

CO-POMapping													
CO	**PO**											**PSO**	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	1	2									1	2	2
CO2	1	1	1									2	1	1
CO3	1	1	1									1	2	2
CO4	2	2	2									2	2	2
1-Low, 2-Medium, 3-High														

COURSECONTENT	**CO**
Task1-HTMLandCSS	
 Createthefollowingweb 1. Welcome.html Itexplainaboutwebsite (Hint:Headingthewebsite(PreferableH1,Describewebsite)it includesminimumtwoparagraphs)	CO1

<table>
<tr><td>2. Aboutus.html
(Hint:Aboutowner ofwebsite)
3. Contactus.html
(Hint:Incontactus.htmlweb-pageaddGooglemaps)
4. List.html
(Hint:MentionListofcourses)</td><td></td></tr>
<tr><td>Task-2-HTMLandCSSextension</td><td></td></tr>
<tr><td>2.a.Createwebpagesforeachcourse.Examplecse.html(Hint:ItcontainsHeadingandListofsubjectsintabularform)
Example
<table><tr><th>SNo</th><th>Title Book</th><th>Author</th><th>Publisher</th><th>Price</th><th>Image</th></tr><tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr></table>
b. CreateRegistrationandLoginforms
RegistrationForm:ItcontainsStudentName,RollNumber,Password,
Gender,EmailID,Phone Number,optedcourse andlanguages known.
LoginForm:Itcontainsrollnumber, name, userid, password, submitbuttonand
cancelbutton</td><td>CO1</td></tr>
<tr><td>Task-3-CSS3</td><td></td></tr>
<tr><td>3.a.ApplyCSS 3 onweb-pagescreatedon1and2 experiments.
b. Makeuseoftheselectorslikeclass,id, htmlelements, pseudoclassesandelements</td><td>CO1</td></tr>
<tr><td>TASK-4–HTML5andCSS3</td><td></td></tr>
<tr><td>4. DesignHTML5webpagebyembeddingAudio, Videoelements.
5. WriteHTML5andCSS3codetodrawArc,Circle,RectangleandTriangleusingCanvas.</td><td>CO1</td></tr>
<tr><td>TASK-5-Javascript</td><td></td></tr>
<tr><td>6. Writeajavascriptprogramtocreatecalculator
7. WriteaJavaScriptprogramtofind theareaofatrianglewherelengthsofthethreeofitssides anddisplaytheoutputs inpopupwindows</td><td>CO1</td></tr>
<tr><td>TASK-6-JavascriptandXML</td><td></td></tr>
<tr><td>8. ApplyvalidationandpatternmatchingonRegistrationandLoginformson2(b)experiment
9. WriteanXMLfilewhichwilldisplaytheBookinformationwhich includesthefollowing:
1) Title ofthe book
2) AuthorName
3) ISBNnumber
4) Publishername
5) Edition
6) Price
WriteaDocumentTypeDefinition(DTD)tovalidatetheaboveXML file.</td><td>CO3</td></tr>
<tr><td>TASK-7-XMLExtension</td><td></td></tr>
</table>

10. CreateaXMLschematodescribeabankthathasoneormorecustomers,accountsoremploye e 1. Eachcustomerhasacustomerid,nameandaddress 2. Eachaccounthasanaccountid,branchid,customerid,accounttype,balance	CO3
3.Eachemployeehasaempid, name,designation, doj,salaryandaddress 11.CreatetheXML filethatcontainstheinformationaboutfivestudentsanddisplayingthe XMLfileusingXSLT.	
TASK-8-PHP	
12. WritePHP programoncontactuspage 13. Assumefourusersuser1,user2,user3anduser4havingthepasswords pwd1,pwd2,pwd3andpwd4respectively.WriteaPHPfor doingthefollowing 1. CreateaCookieandaddthesefour userid'sandpasswordstothisCookie. 2. Readtheuser id and passwordsenteredintheLoginformandauthenticatewiththevalues(useridandpassw ords)availableinthe cookies. If he is a valid user(i.e., user-name and password match) you should welcome himbyname(user-name)elseyoushoulddisplay"Youarenotanauthenticateduser''.	CO4
TASK-9-PHPExtension	
14. CreateadatabaseandwriteaPHPprogramfor registeringusersofawebsiteandlogin 15. Createatablewhichshouldcontainatleastthefollowingfields:name,password,email-id, phonenumber(theseshouldholdthedatafromtheregistrationform). Write a PHP programto connect to that database and extract data from the tables anddisplaythem. ExperimentwithvariousSQLqueries. Insertthedetailsoftheuserswhoregister withthewebsite,wheneveranewuserclicksthesubmitbuttoninthe registrationpage	CO4
TASK-10PHP	
16.Insertthe detailsofthe 3or4userswhoregisterwiththe websitebyusing registrationform.Authenticatetheuserwhenhesubmitstheloginformusingtheusername andpassword)fromthedatabase	CO4
Totalhours:	**48hours**

AdditionalExperiments:	
TASK-14	
23. Writeastructs2programtocreatesamplechatapplication 24. Writeaphpprogramtocreatesampleonlinequizapplication	CO4

TEXTBOOKS:

1. KogentLearningsolutionsInc.,"HTML 5Blackbook",Dreamtech,2011,
2. UttamKRoy,"Web Technologies",Oxford,2010
3. ShyamSeshadri&BradGreen,AngularJS:UPandRunning,publishedbyO'ReillyMedia,Inc.,2015

REFERENCEBOOKS:

1. RobertWSebesta,"ProgrammingtheWorldWideWeb",7ed,Pearson,2012
2. PaulSWang,SandaSKatila,"AnIntroductiontoWebDesign,Programming",Cengage,2003.

OnlineResources:

1. https://www.udemy.com/topic/angularjs/
2. https://www.coursera.org/courses?query=angularjs
3. https://www.coursera.org/learn/web-applications-php?
4. https://www.udemy.com/topic/php/

WebReferences:

1. https://www.w3schools.com/
2. https://www.tutorialspoint.com/html/index.htm
3. https://www.javatpoint.com/html-tutorial

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC306	DATA SCIENCE LAB							R24
Semester	Hours/ Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100
Pre-requisite:Nil								
CourseObjectives: 1. To learn andwritepythonprograms for Numpy and Pandas. 2. To understandtheconcepts of data visualization. 3. Apply regression models on different datasets. 4. Able to work with classification and clustering algorithms.								
CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:								
CO1	Create python programs on Numpy, pandas, MatplotLib and Plotly.							
CO2	Writepythonbasicprograms usingregression.							
CO3	Applypython control structures for classification techniques.							
CO 4	Implement programsonclustering techniques using python.							

CO-POMapping														
CO	**PO**												**PSO**	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	3	2										3	3
CO2	2	1	3										1	1
CO3	1	1	1	2									1	1
CO4	2	3	3		1								3	3

COURSECONTENT
TASK–1
1. (a)PythoninstallationforWINDOWS (b)Installation of Jupyter Notebook 2. Practising Numpy (a) Write a Numpy program to add a border filled with 0's around the existing array. (b) Write a Numpy program to get the unique elements of an array. (c) Write a Numpy program to get the values and indices of the elements that are bigger than10 in a given array.
TASK-2
3. Pandas (a) Write a pandas program to create and display a dataFrame from a specified dictionary data which has the index labels. (b) Write a pandas program to select the rows where the score is missing, i.e. is NaN.
TASK- 3
4. MatplotLib a) Write a Python program to draw a scatter plot with empty circles taking a random distribution in X and Y and plotted against each other. **b)** Write a Python program to create a pie chart with a title of the popularity of programming languages.
TASK– 4

5. (a) Install Plotly (b) Create Line Chart, Bar Chart, Pie Charts using Plotly. (c) Create Box Plots, Violin Plots, Heatmaps using Plotly.
TASK- 5
6. (a) Develop the model Simple Linear regression with Python. (b) Develop the model Multiple Linear regression with Python.
TASK- 6
7.Write a program to implement Logistic Regression. 8.Write a program to implement the Decision Tree Regression model.
TASK- 7
9.Write a program to implement the Random Forest Classification model.
TASK – 8
10.Write a program to implement the K-Nearest Neighbor algorithm to classify the given dataset.
TASK – 9
11.Write a program to implement the Naïve Bayesian classifier for a simple training data set stored as a .CSV file.
TASK– 10
12.Write a program to implement the k-Means clustering algorithm to cluster the set of data stored in .CSV file.

Total Hours:	**48Hours**

Self-Study:

Contentstopromoteself-Learning:

SNO	Topic	CO	Reference
1	Pythoninstallation	CO1	https://www.javatpoint.com/how-to-install-python
2	Data analysis with python	CO2	https://youtu.be/r-uOLxNrNk8
3	Data Science NPTEL	CO3	https://youtu.be/fn1rKKNLuzk
4	Classification	CO4	https://youtu.be/vz_xuxYS2PM https://youtu.be/6kZ-OPLNcgE
5	Clustering	CO5	https://youtu.be/1XqG0kaJVHY

TextBook(s):

1. Python Programming – An Introduction to computer science, John Zelle,JimLeisy
2. Programming and Problem Solving with Python by Ashok NamdevKamthane and Amit Ashok Kamthane, McGraw Hill Education; First edition (1 November 2017)

ReferenceBook(s):

1. Programming Python, Mark Lutz, O'Reilly, 3rd Edition, 2006
2. Core Python Programming, Wesley J Chun, PH, 2nd Edition
3. Python Programming: A Compatible Guide for Beginners to Master and Become an Expert in

python programming Language, Brain Draper, CreateSpace Independent Publishing Platform, 2016

Online/WebResources:

1. http://www.freebookcentre.net/Language/Free-Python-Books-Download.html
2. https://www.pdfdrive.com/python-programming-books.html
3. https://nptel.ac.in/courses/106/106/106106182/
4. https://www.javatpoint.com/python-tutorial
5. https://www.python.org/about/gettingstarted/
6. https://www.tutorialspoint.com/python/index.htm

NARAYANA ENGINEERING COLLEGE: NELLORE								
24MC309	E-COMMERCE							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: NIL

Course Objectives:

- To understand about the need of e-commerce in digital environment
- To learn about the various prospects of broad band communications in networks
- To know about the Need of firewalls in e-commerce for a secured environment
- Importance of encryption and different methods of encryption in networks
- To understand about the e-payments using credit and debit cards

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Memorize** about the **E-commerce** and need of E-commerce**(BL-1)**
CO 2	**Demonstrate** about the different **broad band telecommunications in Internet(BL-2)**
CO 3	**Analyze** about the **Firewalls** and its importance in security environment**(BL-3)**
CO 4	**Illustrate** about the encryption and **different types of encryption** in networks**(BL-2)**
CO 5	**Summarize** about the electronic payments and **protection in e-payments(BL-2)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2											2	1
CO2	2	2	2										1	1
CO3	2	1	2										1	1
CO4	2	2											2	
CO5	2	1	2										2	

COURSE CONTENT

MODULE – 1	INTRODUCTION	10H

Definition of Electronic Commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of E-Commerce, advantages and disadvantages, framework, Impact of E-commerce on business, E-Commerce Models.

At the end of the Module 1, students will be able to:

1. To understand about the E-commerce in digital environment.**(BL-2)**
2. To Learn about the basics of E-commerce.**(BL-2)**
3. Able to learn about the different prospects of e-commerce.**(BL-2)**

MODULE -2	NETWORK INFRASTRUCTURE FOR E- COMMERCE	10H

Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN,

FRAME RELAY). Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device.		
At the end of the Module 2, students will be able to: **1.** To learn about the basics of internet and Intranet services**(BL-2)** **2.** To understand about the different Broad band Communications**(BL-2)** **3.** To understand about the different wireless protocols**(BL-2)**		
MODULE-3	**WEB SECURITY**	**9H**
Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design Limitation of Firewalls.		
At the end of the Module 3, students will be able to: **1.** To analyze about the need of firewalls in Networks**(BL-3)** **2.** To know about the different security threats in Networks**(BL-2)** **3.** To understand about the advantages and disadvantages of Firewalls**(BL-2)**		
MODULE-4	**ENCRYPTION**	**10H**
Encryption techniques, Symmetric Encryption: Keys and data encryption standard, Triple encryption, Secret key encryption; Asymmetric encryption: public and private pair key encryption, Digital Signatures, Virtual Private Network.		
At the end of the Module 4, students will be able to: **1.** To understand about the Encryption Techniques**(BL-2)** **2.** To know about the different Security keys used in Encryption**(BL-2)** **3.** To implement public keys and privates keys in digital signatures**(BL-3)**		
MODULE-5	**ELECTRONIC PAYMENTS**	**9H**
Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card-based EPS, online Banking.EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.		
At the end of the Module 5, students will be able to: **1.** Describe the importance of SET protocol**(BL-2)** **2.** Understand about the E-Payments in E-Commerce**(BL-1)** **3.** Able to analyze about the credit and debit transactions based on EPS**(BL-3)**		
Total Hours:		**48HOURS**

Content beyond syllabus:Digital Economy, E-Banking System, EFT-Electronic Funds Transfer
Self-Study:

Contents to promote self-Learning:			
SNO	**Topic**	**CO**	**Reference**
1	E-Commerce Technology	CO1	https://www.geeksforgeeks.org/e-commerce/
2	Broad Band Tele communications	CO2	https://www.geeksforgeeks.org/difference-between-broadband-and-dsl/
3	Transaction Security	CO3	https://www.javatpoint.com/security-threat-to-e-commerce
4	Encryption Techniques	CO4	https://www.javatpoint.com/what-is-encryption
5	SET Protocol	CO5	https://www.geeksforgeeks.org/secure-electronic-transaction-set-protocol/

Text Book(s):

5. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.
6. Pete Lohsin , John Vacca "Electronic Commerce", New Age International.

Reference Book(s):

1. Goel, Ritendra "E-commerce", New Age International
2. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education
3. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
4. Turban, "Electronic Commerce 2004: A Managerial Perspective", Pearson Education

Online /Web Resources:

1. https://www.geeksforgeeks.org/e-commerce/
2. https://www.javatpoint.com/
3. https://www.tutorialspoint.com/e_commerce/index.htm
4. https://www.freebookcentre.net/business-books-download/E-Commerce-Notes.html
5. http://ebooks.lpude.in/computer_application/bca/term_6/DCAP306_DCAP511_E-COMMERCE_AND_E-BUSINESS.pdf

NARAYANA ENGINEERING COLLEGE:NELLORE							
24MC310	SOFTWARE PROJECT MANAGEMENT						R24
Semester	Hours / Week			Total hrs	Credit	Max Marks	
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: Nil

Course Objectives:

1. To understand the software management and software economics.
2. To understand how to improve the software economics and its principles.
3. To understand the life cycle phases of project development and its artefacts.
4. To understand the process work flow , checkpoints and project organization responsibilities.
5. To understand the process metrics and process instrumentation.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Analyze the concept of software management economics.(BL-4)
CO 2	Determine how to improve software economics.(BL-3)
CO 3	Analyze life cycle phases in project development and artifact sets.(BL-4)
CO 4	Define the workflow of the process and project organization responsibilities.(BL-1)
CO 5	Illustrate the project metrics and process instrumentation. (BL-1)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1					2					2	1
CO2	2	3	1		1							1	1	2
CO3	3	2	1										1	2
CO4	3	1	2		1				2				2	1
CO5	1	3	2										1	2

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	CONVENTIONAL SOFTWARE MANAGEMENT AND SOFTWARE ECONOMICS	10 H

Conventional software management: The Waterfall Model, Conventional software Management Performance.

Evolution of Software Economics: Software Economics, Pragmatic Software Cost Estimation**.**

At the end of the Module 1, students will be able to:

1. Describe the steps in Water fall Model. (BL-1)
2. Understand the conventional principles in software management performance and software metrics. (BL-2)
3. Determine the software economics and cost estimation. (BL-1)

MODULE -2	IMPROVING SOFTWARE ECONOMICS	10H

Improving Software Economics: Reducing Software Product Size, Improving software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

The Old way and the NEW way: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process.

At the end of the Module 2, students will be able to:

1. Explain the steps included in improving software economics. (BL-2)
2. Define the concept of achieving required quality for successful project . (BL-1)

3. Distinguish between the principles of conventional and modern software management(BL-2)

MODULE-3	LIFE CYCLE PHASES AND ARTIFACTS	10 H

Life Cycle Phases: Engineering and Production Stages, Inception. Elaboration, Construction, Transition Phases.

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

At the end of the Module 3, students will be able to:

1. Explain the classification of Lifecycle phases.(BL-2)
2. Identify the different Artifact sets in lifecycle phases. (BL-2)
3. Analyze the model based software architectures.(BL-2)

MODULE-4	WORKFLOWS OF THE PROCESS AND ORGANIZATION RESPONSIBILITIES	9 H

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation: Automation Building Blocks, the Project Environment.

At the end of the Module 4, students will be able to:

1. Determine the process workflow in project development and planning guidelines. (BL-3)
2. Explain Project Organization Responsibilities and Activities. . (BL-2)
3. Identify the Building blocks in process Automation. . (BL-2)

MODULE-5	PROJECT CONTROL AND PROCESS INSTRUMENTATION	9 H

Project Control and Process Instrumention: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics, Metrics Automation.

TAILORING THE PROCESS: Process discriminates, Future Software Management: Modern Project Profiles Next generation software economics, modern process transitions.

At the end of the Module 5, students will be able to:

1. Distinguish between Mangement Indicators and Quality Indicators. . (BL-2)
2. Analyze the Pragmatic Software Metrics and process discrimination. . (BL-3)
3. Describe Modern project profiles and software economics next generations. . (BL-2)

Total hours:	48 hours

Self-Study:

Contents to promote self-Learning:

S NO	Topic	CO	Reference
1	Waterfall Model	CO1	https://www.google.com/search?q=waterfall+model+in+spm&rlz=1C1CHBD_enIN855IN855&oq=waterfall+model+in+spm&aqs=chrome..69i57j0l2.13538j0j15&sourceid=chrome&ie=UTF-8
2	Improving Software Economics	CO2	https://www.slideshare.net/deepkumar814/improving-software-economics
3	Life Cycle Phases	CO3	https://www.geeksforgeeks.org/life-cycle-phases-of-project-management/

4	Workflows of the Process and Project Organization Responsibilities	CO4	https://www.geeksforgeeks.org/process-workflows-in-software-project-management/ https://www.geeksforgeeks.org/project-organizations-and-their-responsibilities/	
5	Process Control and Instrumentation And Tailoring the process and Future Software project Management	CO5	http://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/SPM/unit5.pdf http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.203.4476&rep=rep1&type=pdf https://project-management-software.financesonline.com/future-project-management/	

Text Book(s):

1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Software Project Management, Joel Henry, Pearson Education.

Reference Book(s):

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGrawHill Edition.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

Online Resources:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.html
2. https://www.slideshare.net/sheetal_singh/software-project-management-by-walker-royce

Web References:

1. https://docs.google.com/presentation/d/1hYtTO5nJ1yTlOXPWPZTTGtCbYqPEM-bB5GVnxYjuoe0/htmlpresent
2. https://www.slideshare.net/sheetal_singh/software-project-management-by-walker-royce
3. http://archive.mu.ac.in/myweb_test/MCA%20study%20material/M.C.A%20(Sem%20-%20IV)%20Paper%20-%20Software%20Project%20Management.pdf
4. https://london.ac.uk/sites/default/files/study-guides/software-engineering-project-management.pdf

NARAYANAENGINEERINGCOLLEGE::NELLORE								
24MC311	MACHINE LEARNING							R24
Semester	Hours /Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite:Basicsofalgorithmdesign, ProbabilityandStatistics

CourseObjectives:

1. Tounderstandthebasicprinciplesof machinelearning.
2. Tounderstandvariousclassification methods.
3. Tounderstandtheconceptsofdimensionalityreductionandclustering.
4. Tounderstandthefundamentalsofartificialneuralnetworks.
5. TounderstanddifferentkernelfunctionsandReinforcementlearning.

CourseOutcomes:Aftersuccessfulcompletionofthecourse,thestudentwillbeableto:

CO1	Understandthetypes ofmachinelearningand itsapplications.**(BL-2)**
CO2	Analyzevariousclassificationmethodstoclassifythetraineddata.**(BL–4)**
CO3	Applyprinciplesof clusteringtoclassifyuntrained data.**(BL-3)**
CO4	Understand therole ofneuralnetworksinclassificationofdata.**(BL-2)**
CO 5	Identifytheusageofkernelfunctionsandvariouslearningtechniques.**(BL-1)**

CO-POMapping

CO	PO												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO1	PSO2
CO1	2	2											2	2
CO2	1	2	2	1									1	
CO3	3	1	1	2									1	2
CO4	2	2	2	1	1								2	
CO5	3	2	1										1	

1:Low, 2-Medium,3-High

COURSECONTENT

MODULE – 1	INTRODUCTION	10 HOURS

Introduction: MachineLearning,TypesofMachineLearning,Examples.
SupervisedLearning: Learningclassfromexamples,VCDimension,PACLearning,Noise,LearningMultiple Classes, regression, Model Selection and generalization, dimensions of a supervised learningalgorithm.

AttheendoftheModule1,studentswill beableto:

1. Typesofmachinelearning.**(BL - 2)**
2. Examplesofmachinelearninginrealtime.**(BL - 2)**
3. Fundamentalsofclassification.**(BL - 4)**

MODULE -2	CLASSIFICATION	10 HOURS

ParametricMethods: Introduction,MaximumLikelihoodEstimation,EvaluatingEstimator,Bayes'Estimator,ParametricClassification.
MultivariateMethods: MultivariateData,ParameterEstimation,EstimationofMissingValues,MultivariateClassification,MultivariateRegression.

AttheendoftheModule2,studentswillbeableto:

1. Variousparametricmethodsforclassification. .**(BL - 4)**
2. Estimatorsforevaluation.**(BL - 5)**
3. Multivariateclassification.**(BL - 4)**

MODULE-3	Clustering	10 HOURS

Introduction: Subset Selection,PrincipalComponent Analysis,FactorAnalysis,LinearDiscriminantAnalysis.
Clustering: Introduction,K-meansclustering,HierarchicalClustering,Choosingthenumberofclusters.
Non-parametricMethods:Introduction,non-parametricdensityestimation,non-parametricclassification.

AttheendoftheModule3,studentswillbeableto:
1. Principlesofdimensionalityreductioninnormalizingthedatasize. .**(BL - 2)**
2. Variousclusteringapproachesforgroupinguntraineddata.**(BL - 4)**
3. various non-parametricmethodsusedinclusteringofdata. .**(BL - 4)**

MODULE-4	Decision Trees & ANN	9 HOURS

Decision Tree: Introduction,UnivariateTrees,Pruning,RuleExtractionfromTrees,LearningRulesfromData
MultilayerPerceptron: Introduction,trainingaperceptron,LearningBooleanFunctions,MultilayerPerceptron,BackpropogationAlgorithm.

At theendofthe Module4,studentswillbe ableto:
1. knowingtheprinciplesofhowtoidentifyclasslabels.**(BL - 2)**
2. fundamentalsofartificialneuralnetworks.**(BL - 4)**
3. Understand the Back propagation procedues.**(BL - 4)**

MODULE-5	KERNEL MACHINES &REINFORCEMENT LEARNING	9 HOURS

Kernel Machines: Introduction,SVM, Kerneltricks,verticalkernel,definingkernel,multiclasskernel machines,one-classkernel machines.
ReinforcementLearning: Introduction,singlestate cases,elements of reinforcementlearning,temporaldifferencelearning,generalization,partiallyobservedstate.

AttheendoftheModule5,studentswillbeableto:
1. varioustypesofkernelfunctionsandtheir role.**(BL - 4)**
2. Theroleofreinforcementlearningintrainingthedata.**(BL - 2)**
3. Differentiatebetweenlearningstrategies.**(BL - 4)**

Totalhours:	**48hours**

Self-Study:
Contents to promote self-Learning:

SNO	Topic	Reference
1	Introduction toMachineLearning	https://www.edureka.co/blog/introduction-to-machine-learning/, https://www.geeksforgeeks.org/ml-types-learning-supervised-learning/
2	Methods forclassification	https://medium.com/@jorgesleonel/classification-methods-in-machine-learning-58ce63173db8, https://machinelearningmastery.com/types-of-classification-in-machine-learning/
3	ClusteringTechniques	https://www.geeksforgeeks.org/clustering-in-machine-learning/ https://www.analyticsvidhya.com/blog/2016/11/an-introduction-to-clustering-and-different-methods-of-clustering/
4	Artificial NeuralNetworks	https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_neural_networks.htm https://www.geeksforgeeks.org/introduction-artificial-neural-network-set-2/
5	ReinforcementLearning	https://www.geeksforgeeks.org/what-is-reinforcement-learning/ https://medium.com/@violante.andre/simple-reinforcement-learning-temporal-difference-learning-e883ea0d65b0

TextBook(s):

1. A Concise Introduction to Machine Learning, Anitha C. Faul, CRC Press, 2020
2. An Introduction to Machine Learning Springer International Publishing Gopinath Rebala, Ajay Ravi, Sanjay Churiwala, 2019.
3. A Brief Introduction to Machine Learning for Engineers Now Publishers Osvaldo Simeone,2018
4. E. Alpaydin "Introduction to Machine Learning", third Edition, MIT Press, 2014

ReferenceBook(s):

1. AnIntroductiontoMachineLearning SpringerInternationalPublishing MiroslavKubat(auth.),2017
2. AnintroductiontomachinelearningInterpretability,O'Reilly,PatrickHallandNavadeepGill,2018
3. Abriefintroductiontomachinelearningforengineers,kingscollegeLondon,OsvaldoSimeone,2018
2. Anintroductiontomachinelearning,Springer,Kubat,Miroslav,2015

OnlineResources:

1. http://web4.cs.ucl.ac.uk/staff/D.Barber/textbook/091117.pdf
2. https://www.cs.huji.ac.il/~shais/UnderstandingMachineLearning/index.html
3. https://alex.smola.org/drafts/thebook.pdf
4. https://seat.massey.ac.nz/personal/s.r.marsland/MLBook.html

WebReferences:

1. https://www.guru99.com/machine-learning-tutorial.html
2. https://www.toptal.com/machine-learning/machine-learning-theory-an-introductory-primer
3. https://nptel.ac.in/courses/106/106/106106198/
4. https://www.youtube.com/watch?v=T3PsRW6wZSY

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC312	CLOUD COMPUTING							R24
Semester	Hours/Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite:Nil

CourseObjectives:

- Thestudentwill learnabout thecloudenvironment.
- Applies thevarious cloud service models including Iaas, Paas, Saas,
- To understand the techniques of Cloud Programming and Software Environments.
- Tostudytheconcepts of CloudResourceManagementandScheduling.
- Tounderstandthe basicconceptsofStorageSystems.

CourseOutcomes:Aftersuccessfulcompletionofthe course,thestudentwillbeableto:

CO1	**Remember**the**keydimensions**ofthechallengeofCloudComputing**(BL-2)**
CO2	**Apply**oftheeconomics,financial,andtechnologicalimplicationsfor**selectingcloudcomputingfo rownorganization(BL-2)**
CO3	**Illustrate**thefinancial,technological,andorganizational capacityofemployer's foractively**initiatingandinstallingcloud-basedapplications.(BL-2)**
CO4	**Demonstrate**ofownorganizations'needsforcapacity**buildingandtraininginCloudcomputing-relatedAreas(BL-3)**
CO5	**Assessment**ofCloud resourcesmanagementandschedulingofthecloudresources and **Storage systems in Cloud(BL-2)**

CO-POMapping

CO	PO												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2										1	
CO2	1	2	1											1
CO3	1		2	1										2
CO4	1	2		3									1	
CO5		1	2											2

1:Low,2-Medium,3-High

COURSECONTENT

MODULE– 1	Fundamental Cloud Computing	9 H

Fundamental Cloud Computing-Understanding Cloud Computing, Origins influences, Basic Concepts and Terminology,
Goals,Benefits,risks,Challenges,Rollsandboundaries,Cloudcharacteristics,CloudDeliverymodels,Clouddeployment models.

Attheend oftheModule1,studentswillbeableto:

1. Analyze the components of cloud computing and its business perspective**.(BL-2)**
2. Evaluate the various cloud development tools**..(BL-2)**
3. Utilizetheresourcemanagementinthecloud**..(BL-2)**

MODULE-2	Systemsmodeling,Clustering andvirtualization:	10H

Systemsmodeling,Clustering andvirtualization: ScalableComputingovertheInternet,TechnologiesforNetworkbasedsystems,SystemmodelsforDistributedandCloudComputing,SoftwareenvironmentsfordistributedsystemsandClouds, Performance, Security And Energy Efficiency.

AttheendoftheModule2,studentswillbeableto:

1. Discuss the use of Internet and Network systems..**(BL-2)**
2. Identify the use of System models for Distributed and Cloud Computing..**(BL-1)**
3. UnderstandtheuseofClouddatainreal-timeworld..**(BL-2)**

MODULE-3	Virtual Machines and Virtualization	9H

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, VirtualizationStructures/Toolsandmechanisms,VirtualizationofCPU,MemoryandI/ODevices,VirtualClustersandResourceManagement,VirtualizationforDataCenterAutomation.**(10Hrs)**

AttheendoftheModule3,studentswillbeableto:

1. Implement the Levels of Virtualization in cloud..**(BL-3)**
2. Understand the use of Virtualization Structures/ Tools and mechanisms.**(BL-3)**
3. Virtualize the CPU, Memory and I/O Deviceusingdatacentres. .**(BL-2)**

MODULE-4	Cloud Platform Architecture	10 H

Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds,Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service OrientedArchitecture,MessageOrientedMiddleware.

AttheendoftheModule4,studentswillbeableto:

1. Understand the Cloud service models..**(BL-2)**
2. Analyze the Cloud Resource, Cloud Security and Trust Management..**(BL-3)**
3. UnderstandtheuseofServiceOriented ArchitectureinCloud..**(BL-2)**

MODULE-5	CloudProgrammingandSoftwareEnvironments	10H

CloudProgrammingandSoftwareEnvironments: Features ofCloudandGrid Platforms,Programming SupportofGoogleAppEngine,AmazonAWSandMicrosoftAzure.
StorageSystems: Evolutionofstoragetechnology,storagemodels,filesystemsanddatabase,distributedfilesystems,general parallelfilesystems.Googlefilesystem

AttheendoftheModule5,studentswillbeableto:

1. Understand the cloud programming and software environment..**(BL-2)**
2. Analyze the different cloud platforms used for data storage..**(BL-3)**
3. Identify the EmergingCloudSoftwareEnvironments..**(BL-1)**

TotalHours:	**48H**

Contentbeyondsyllabus:

1. CloudDatasecurityusingcryptographictechniques.

Self-Study: Contentstopromoteself-Learning:

SNO	Topic	CO	Reference
1.	Systemmodelsfor Distributed and CloudComputing	CO1	https://www.youtube.com/watch?v=VNRmsACNSaY
2.	Virtualization of CPU,Memoryand I/ODevices	CO2	https://www.youtube.com/watch?v=1CsC5aa0Zek
3.	Cloud Computing andserviceModels	CO3	https://www.youtube.com/watch?v=d7EI8B7jTrI
4.	Programming onAmazon AWS andMicrosoft Azure	CO4	https://www.youtube.com/watch?v=KWxTx7JlWLo

5.	Scheduling AlgorithmsforComputingClouds	CO5	https://www.youtube.com/watch?v=WEqY5kRk-g0

TextBook(s):

1. Distributedand CloudComputing,KaiHwang,GeoffryC.Fox,JackJ.DongarraMKElsevier.
2. CloudComputing,TheoryandPractice, DanCMarinescu, MKElsevier.

ReferenceBook(s):

1. CloudComputing,APracticalApproach,AnthonyTVelte,TobyJVelte,RobertElsenpeter,TMH.
2. MasteringCloudComputing,FoundationsandApplicationProgramming,RajKumarBuyya,Christenvecctiola,STammaraiselvi,TMH.
3. CLOUDCOMPUTINGPrinciplesandParadigms,RajkumarBuyya,JamesBroberg,AndrzejGoscinski

Online/Web Resources:

1. https://www.tutorialspoint.com/cloud_computing/index.htm
2. https://www.tutorialspoint.com/cloud_computing/index.htm
3. https://www.tutorialspoint.com/cloud_computing/index.htm
4. https://www.tutorialspoint.com/cloud_computing/index.htm
5. https://www.tutorialspoint.com/cloud_computing/index.htm
6. https://www.tutorialspoint.com/cloud_computing/index.htm
7. https://www.tutorialspoint.com/cloud_computing/index.htm

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC313	SOFTWARE QUALITY ASSURANCE							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: A Course on "Software Engineering".

Course Objectives:

- To understand the basic principles of software quality and quality factors.
- To be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- To understand how the SQA components can be integrated into the project life cycle.
- To be familiar with the software quality infrastructure.
- To be exposed to the management components of software quality.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Demonstrate knowledge on quality, architecture, metrics of software development**.[BL:2]**
CO 2	Demonstrate software quality plan for a software project to include sections on change management, configuration management, defect elimination, validation and verification and measurement. **[BL:2]**
CO 3	Design software quality plans for a software project and asses their capability to adopt quality standards. **[BL:3]**
CO 4	Summarize the quality of software product using software quality metrics. And adapt procedures and work instructions, Templates, checklists development for Software quality infrastructure**[BL:2]**
CO 5	Commit to ethics to apply ISO and IEEE standards in preparing the quality plan and documents. **[BL:2]**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1		3	2	3								2	
CO2	2	2	3	2	3								1	
CO3	2	1	2	2	2								2	2
CO4	2	2	2	2	1								2	
CO5	2	2	2	1	1			3					1	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Introduction to Quality	10 HOURS

Historical Perspective of Quality, What is Quality? Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools.

At the end of the Module 1, students will be able to:

1. Define Quality. [BL:1]
2. Extend core components of quality. [BL:2]
3. Discuss problem solving software tools. [BL:2]

MODULE -2	Introduction to Software Quality & Architecture	10 HOURS

Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall‟s quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.

At the end of the Module 2, students will be able to:

1. Classify need for software quality. [BL:2]
2. Extend McCall‟s quality model. [BL:2]
3. Interpret Software Project life cycle Components. [BL:2]

MODULE-3	SQA Components and Project Life Cycle	10 HOURS

Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.

At the end of the Module 3, students will be able to:

15. Define verification and validation. [BL:1]
16. Illustrate quality assurance tools. [BL:2]

MODULE-4	Software Quality Infrastructure	9 HOURS

Procedures and work instructions – Templates – Checklists – 3S developmenting – Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

Software Quality Management & Metrics

Project process control - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

At the end of the Module 4, students will be able to:

19. Classify procedures and work instructions. [BL:2]
20. Extend configuration management audit. [BL:2]
21. Illustrate software quality metrics. [BL:2]

MODULE-5	Standards, Certifications & Assessments	9 HOURS

Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities

At the end of the Module 6, students will be able to:

5. Demonstrate quality management standards. [BL:2]
6. Explain project management responsibilities. [BL:2]

Total hours:	48 HOURS

Content beyond syllabus:

1. Application Life-Cycle Management - Secure Application Development.

Self-Study:

Contents to promote self-Learning:

SNO	Topic	CO	Reference
1	SQA Components	CO1	https://www.tutorialspoint.com/software_quality_mana ent/software_quality_management_sqa_components.htr ~:text=Advertisements,defined%20or%20standardized% quality%20specifications.
2	Software quality challenges	CO2	https://www.slideshare.net/HelmySatria/lecture-1-31203638
3	Software development methodologies	CO3	https://youtu.be/aX4_s5_Hroc
4	Storage and retrieval and Management aspects of Quality	CO4	https://www.researchgate.net/publication/3837365_Stor _and_retrieval_of_software_components_using_aspects https://nptel.ac.in/courses/110/104/110104080/
5	Quality management standards	CO5	https://www.tutorialspoint.com/software_testing_dictionar uality_management.htm

Text Book(s):

1. "Software Quality Assurance",Daniel Galin, Pearson Publication, 2009.

Reference Book(s):

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.
3. Software Quality Assurance – Principles & Practices, 2016, Nina S & Godbole, Alpha Science International Ltd.

Online Resources:

1. www.inf.ed.ac.uk/teaching/.../notes/LectureNote20_SoftwareQuality.pdf
2. www.cs.toronto.edu/~yijun/csc408h/handouts/lecture5.pdf
3. web.uettaxila.edu.pk/CMS/SP2012/.../notes%5CSQA%20Lec_2.pdf
4. www.facweb.iitkgp.ernet.in/~spp/lect14.ppt
5. www.etsmtl.ca/Professeurs/.../Teaching-Software-Quality-Assurance.pdf

NARAYANA ENGINEERING COLLEGE::NELLORE								
24MC314	DEEP LEARNING							R21
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	50	3	40	60	100

COURSE CONTENT		
MODULE – 1		**10H**
Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis. Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.		
MODULE – 2		**10H**
Machine Learning: Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feed forward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms		
MODULE – 3		**10H**
Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms		
MODULE – 4		**10H**
Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks		
MODULE – 5		**10H**
Sequence Modelling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models		
	Total hours:	**50 hours**

TEXTBOOK:

. Ian Goodfellow, YoshuaBengio, Aaron Courville, “Deep Learning”, MIT Press,2016.
. Josh Patterson and Adam Gibson, “Deep learning: A practitioner's approach”, O'Reilly Media, First Edition,2017

REFERENCES:

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, O’Reilly, 2019

NARAYANA ENGINEERING COLLEGE:NELLORE							
24MC315	R PROGRAMMING						R24
Semester	Hours / Week			Total hrs	Credit	Max Marks	
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: Basic knowledge of programming.

Course Objectives:

1. Understand the fundamentals of 'R' programming.
2. Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression.
3. Explore data-sets to create testable hypotheses and identify appropriate statistical tests.
4. Learn different Packages in R
5. Produce data visualizations with the ggplot package.

Course Outcomes: After successful completion of the course, the student will be able to:

CO1	Be able to use and program in the programming language R.(BL-3)
CO2	Be able to use R to solve statistical problems. (BL-2)
CO3	Be able to implement and describe Monte Carlo the technology. (BL-3)
CO4	Develop and use different packages.(BL-3)
CO5	Be able to minimize and maximize functions using R. (BL-3)

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	1		1									1	
CO2	2	2	3		2								1	1
CO3	3	1	2	2	1								3	1
CO4	1	1	2	1									2	3
CO5	3	1												2

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	INTRODUCTION TO R	10H

Getting the Hand of R, Running the R Program, Finding Your Way with R, Command Packages. BECOMING FAMILIAR WITH R: Reading and Getting Data into R, Viewing Named Objects, Types of Data Items, The Structure of Data Items, Examining Data Structure Working with History Commands, Saving your Work in R. WORKING WITH OBJECTS: Manipulating, Viewing, Constructing Data Objects, Forms of Data Objects: Testing and onverting.

At the end of the Module 1, students will be able to:

1. Describe the Purpose of R Programming.(BL-2)
2. Explain the importance of R Packages. (BL-2)
3. Identify various Objects and packages of R. (BL-2)

MODULE -2	DATA DISTRIBUTION	9H

Data: Descriptive statistics and tabulation. DISTRIBUTION: Looking at the Distribution of Data SIMPLE HYPOTHESIS TESTING: Using the Student's t-test, The Wilcoxon U-Test (Mann-Whitney), Paired t- and U-Tests, Correlation and Covariance, Tests for Association.

At the end of the Module 2, students will be able to:

1. Understand Hypothesis Testing.**(BL-2)**
2. DemonstrateDistributions.**(BL-2)**

3. Explain the Correlation and Covariance.**(BL-2)**		
MODULE-3	**INTRODUCTION TO GRAPHICAL ANALYSIS**	**10H**
Box-whisker Plots, Scatter Plots, Pairs Plots(Multiple Correlation Plots) Line Charts, Pie Charts, Cleveland Dot Charts, Bar Charts, Copy Graphics to Other Applications. FORMULA NOTATION AND COMPLEX STATISTICS: Examples of Using Formula Syntax for Basic tests, Formula Notation in Graphics, Analysis of Variance (ANOVA).		
At the end of the Module 3, students will be able to: 1. Understand the different Plots.**(BL-2)** 2. Discuss the Complex Statistics.**(BL-2)** 3. Describe Anova concepts. **(BL-3)**		
MODULE-4	**MANIPULATING DATA AND EXTRACTING COMPONENTS**	**9H**
ating Data for Complex Analysis, Summarizing Data. REGRESSION (LINEAR MODELING): Simple Linear Regression, Multiple Regression, Curvilinear Regression, Plotting Linear Models and Curve Fitting, Summarizing Regression Models.		
At the end of the Module 4, students will be able to: 22. Explain the concept ofRegression.**(BL-2)** 23. Discuss Linear models.**(BL-3)** 24. Understand the concept of Curve fitting.**(BL-2)**		
MODULE-5	**PLOTS**	**10H**
Adding elements to existing plots, Matrix plots, multiple plots in one window, exporting graphs WRITING YOUR OWN SCRIPTS: BEGINNING TO PROGRAM: Copy and Paste Scripts, Creating Simple Functions, Making Source Code.		
At the end of the Module 5, students will be able to: 1. Understand Plots.**(BL-3)** 2. Understand the concept of Scripts.**(BL-2)**		
	Total hours:	**48 hours**

Term work:

1. Mini Project on Library Management.
2. Write a case study on RStudio Integrated Development Environment (IDE)
3. Write a case study on R Studio.
4. Write a case study on R-Packages.
5. Write a case study on Data Visualization Techniques.
6. Write a case study on R Data Structures.
7. Write case study Data importation methods.
8. Write a Case study on Basic R Data Types.

Content beyond syllabus:

1. Machine Learning Algorithms SVM and XGB explanation.
2. Data Preprocessing Using R.

Text Book(s):

1. R Programming for Data Science by Roger D. Peng.
2. The Art of R Programming by Prashanth singh, Vivek Mourya, Cengage Learning India.

Reference Book(s):

1. Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD,2014.
2. The R Book, Michael J. Crawley, WILEY, 2012.

Online Resources:

1. https://www.youtube.com/watch?v=7076ZuAwUn8&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=1
2. https://www.youtube.com/watch?v=rGfuLF0QJ2M&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=2
3. https://www.youtube.com/watch?v=Al-pTT-YMEA&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=3
4. https://www.youtube.com/watch?v=Njw0FHe0jow&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=4.

Web References:

1. https://www.youtube.com/watch?v=i8naytvS5G8&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=5
2. https://www.youtube.com/watch?v=gKWIM5MN6Go&list=PLWPirh4EWFpEvN4ktS8LE0cvLCSfhD55t&index=6

NARAYANA ENGINEERING COLLEGE: NELLORE								
24MC316	SOFTWARE TESTING							R24
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite: Software Engineering

Course Objectives:

- Fundamentals for various testing methodologies.
- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.
- Understand of Logic Design

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Demonstrate**the **basic testing procedures. (BL-2)**
CO 2	Student able to **write** and generate**test cases and test suites**. **(BL-2)**
CO 3	**Illustrate** the applications manually by applying different **testing methods and automation tools.(BL-2)**
CO 4	**Apply** tools to resolve the **problems in Real time environment.(BL-3)**
CO 5	**Demonstrate** the basic **testing State graphs and Charts**. **(BL-2)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	1										1	
CO2	2	1	2	1	2								2	2
CO3	1		1											1
CO4	2	1			1								2	
CO5	1	2	2										1	2

COURSE CONTENT

MODULE – 1	Flow graphs and Path testing	10H

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs.Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

At the end of the Module 1, students will be able to:

4. Discuss model for testing.(BL-2)
5. Explain the different types of bugs.(BL-2)
6. Discuss about path predicates &path sensitizes methods.(BL-2)

MODULE -2	Transaction Flow Testing & Dataflow Testing	10H

Transaction Flow Testing: Transaction Flow Testing Introduction,Transaction Flows, Transaction Flow Testing Techniques.

Dataflow Testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.

At the end of the Module 1, students will be able to:

4. Understand transaction flow testing(BL-2)
5. Explain different testing techniques.(BL-2)
6. Define data flow testing strategies.(BL-2)

MODULE-3	Domain Testing	9H

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains andInterfaces Testing, Domain and Interface Testing, Domains and Testability.

At the end of the Module 1, students will be able to:

4. Explain domain testing.(BL-2)
5. Understand domain and interface testing (BL-2)
6. Identify bugs are nice/ugly domain bugs.(BL-2)

MODULE-4	Paths, Path products and Regular expressions	10H

Paths, Path products and Regular expressions: Path Products & Path Expression, ReductionProcedure, Applications, Regular Expressions & Flow Anomaly Detection.
Logic Based Testing: Overview of logic based testing, Decision Tables, Path Expressions, KV Charts, Specifications.

At the end of the Module 1, students will be able to:

4. Understand about path, path expressions(BL-2)
5. Explain about reduction procedure.(BL-2)
6. Explain different types of applications in reduction procedure.(BL-2)

MODULE-5	State Graphs and Transition Testing	9H

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, StateTesting, Testability Tips. Motivational Overview, Matrix of Graph, Relations, Power of aMatrix, Node Reduction Algorithm, Building Tools.

At the end of the Module 1, students will be able to:

4. Explain KV Charts.(BL-2)
5. Explain state graphs.(BL-2)
6. Discuss about decision tables.(BL-2)

Total Hours:	48Hours

Content beyond syllabus: Quality Assurance , Selenium Testing Tool ,Bugzilla Testing Tool

Self-Study: Contents to promote self-Learning:

S. NO	Topic	CO	Reference
1	**Flow graphs and Path testing**	CO1	https://www.youtube.com/watch?v=t-C3Bt7f1M8
2	**Transaction Flow Testing & Dataflow Testing**	CO2	https://www.youtube.com/watch?v=581VLmAb3GE
3	**Domain Testing**	CO3	https://www.youtube.com/watch?v=TEzF7pk0rIY
4	**Paths, Path products and Regular expressions**	CO4	https://www.youtube.com/watch?v=H_zkA0korRA
5	**Logic Based Testing**	CO5	https://www.youtube.com/watch?v=hWbwpTNyftk

Text Book(s):

1. Software testing techniques – Boris Beizer, Dreamtech, second edition
2. Software Testing- Yogesh Singh, Camebridge

Reference Book(s):

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ. Press.

Online Resources:

5. http://www.softwaretestinghelp.com/practical-software-testing-new-free-ebook-download/
6. http://www.guru99.com/software-testing.html
7. http://www.fromdev.com/2012/04/8-best-software-testing-books-every-qa.html
8. https://onlinecourses.nptel.ac.in/noc16_cs16/preview

Web Resources:

1. http://www.qatutorial.com/?q=Software_Test_Metrics
2. http://softwaretestingfundamentals.com/MODULE-testing/
3. http://qainsights.com/challenges-in-test-automation/
4. http://www.softwaretestinghelp.com/manual-and-automation-testing-challenges/

NARAYANAENGINEERINGCOLLEGE:NELLORE								
24MC317	CYBER SECURITY							R24
Semester	Hours/Week			Total hrs	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

Pre-requisite:ComputerNetworks

CourseObjectives:

- Appraisethecurrentstructure ofcybersecurityrolesacrosstheDoD(Department ofDefense) enterprise, including the roles and responsibilities of the relevantorganizations.
- Evaluatethetrendsandpatternsthatwilldeterminethefuturestateofcybersecurity.
- Tocreateanassuranceframeworkfordesignofsecuritypolicies.
- Tostrengthentheregulatoryframeworkforensuringasecurecyberspaceecosystem
- UnderstandofCyberLawsandhowtoimplementinthebusinessrequirements

CourseOutcomes:Aftersuccessfulcompletionofthecourse,the studentwillbeableto:

CO1	**Illustrate**theCybersecurityand**troubleshootingofCyberSecurity(BL-4)**
CO2	**Design**ofnewsecurityapproachesand**SecurityToolsinCyberCrimes(BL-6)**
CO3	**ApplyingComputerForensics** andpracticestotheenvironment**(BL-4)**
CO4	Abilityto**implementComputer forensicstoprotectDevicesfromattacks(BL-3)**
CO 5	Abilityhowto **implementProtectthenetworkfrombothinternalandexternalattacks(BL-1)**

CO-POMapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	1												1	
CO2	2	2	2										2	
CO3	2	3											1	
CO4	2	2	2	3									2	2
CO5	1	1	3											2

1:Low,2-Medium,3-High

COURSECONTENT

MODULE – 1	Cyber Crime	9 H

Cybercrime:Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations, Organizational measurement for Handling mobile-Security policies and measures in mobile computing era. Cases.

AttheendoftheModule1,studentswillbeableto:

1. Importanceand Need of security**(BL - 2)**
2. Organizational security importance**(BL - 2)**
3. Security for Hand-Held devices at the time of access internet**(BL - 2)**

MODULE -2	Tools and Methods – Cyber Crime	9 H

Tools and methods - Cyber Crime-Proxy servers and Anonymizers- Phishing Password cracking-Keyloggers and Spy wares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQLInjection-Buffer overflow-Attacks onwireless network. Cases.

AttheendoftheModule2,studentswillbeableto: 1. DifferentmethodsofcrackingData**(BL - 4)** 2. Awarenessofdifferenttypesofattacks**(BL - 4)** 3. Methodstohandledifferentattacks**(BL - 2)**		
MODULE-3	**Computer Forensics**	**10 H**
Understanding ComputerForensics-Historical background of cyber forensic, Forensic analysisof e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-RelevanceoftheOSI7LayermodeltocomputerForensicfromcompliance perspectives.Cases**.**		
AttheendoftheModule3,studentswillbeableto: 1. Forensicinnovationtoprotectdata**(BL - 4)** 2. Highendofcomputerforensicfor securecommunication**(BL - 2)** 3. Networkinterpretationforsecuredprocessinginnetworks**(BL - 4)**		
MODULE-4	**Forensics on Hand Held Devices**	**10 H**
Forensic of Hand –Held Devices-Understanding cell phone working characteristics Hand-Helddevices and digital forensic- Toolkits for Hand-Held device-Forensic of i-pod and digital musicdevices-Techno legalChallengeswithevidencefromhand-heldDevices.		
AttheendoftheModule4,studentswillbeableto: 1. ImplementationofForensiconhandhelddevices**(BL - 3)** 2. Differentdevicesusingforensics**(BL - 4)** 3. Legalchallengestoovercomeformattacksusingforensics**(BL - 4)**		
MODULE-5	**Cyber Security-Applications**	**10 H**
CyberSecurity–Applications-Organizationalimplications-costofcybercrimesandIPRissues Webthreatsfororganizations:theevilsandPerils-SocialmediamarketingSecurityandprivacyImplications-Protecting peopleprivacyinthe organizationsForensicbestpracticesfor organizations Cases		
AttheendoftheModule5,studentswillbeableto: 1. Socialmedia impact onorganizations(BL - 3) 2. Protectingthemselvesformsocialmedia(BL - 4) 3. Different Application where cyber security requirement is needed(BL - 4)		
	Totalhours:	**48H**

Contentbeyondsyllabus:

1.Digital Signature

2.Kerberos

3.Digitalcertificates

Self-Study:

Contentstopromoteself-Learning:

S. NO	Topic	CO	Reference
1	Cybersecurity&cybercrime	CO1	https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm

2	Computer Forensics	CO2	https://www.geeksforgeeks.org/information-security-and-computer-forensics/
3	Cybersecurity Strategies	CO3	https://www.tutorialspoint.com/information_security_cyber_law/cyber_security_strategies.htm
4	DigitalSignatures	CO4	https://www.tutorialspoint.com/information_security_cyber_law/digital_and_electronic_signatures.htm
5	CyberSecurity Polices	CO6	https://www.tutorialspoint.com/information_security_cyber_law/policies_to_mitigate_cyber_risk.htm

TextBook(s):

1. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
2. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA

ReferenceBook(s):

1. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.DavidIrwin.CRC Press T&F Group
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Information Systems Security,Godbole,Wiley Student Edition.
4. Cryptography and Network Security by William Stallings, Fourth Edition,Pearson Education 2007.
5. Fundamentals of Computer Security , Springer.
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Computer Security Basics by Rick Lehtinen, Deborah Russell &G.T.Gangemi Sr., SPD O'REILLY 2006.
8. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

Online/WebResources:

1. http://index-of.es/Hack/Network%20Security%20Essentials%204th%20Edition.pdf
2. https://www.academia.edu/31141817/Introduction_to_Computer_Networks_and_Cybersecurity
3. www.tutorialpoint.com 4.www.geeksforgeeks.com

Audit Courses : – 30 Marks
Universal Human Values
Environmental Sciences
Constitution of India
Life Skills
Gender Equality
Research Methodology
Publication Ethics
Indian Knowledge system

Audit Courses

1. Universal Human Values

UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; Personality Traits- Self Excellence, „Natural Acceptance‟ and Experiential Validation- as the process for self-exploration, Adaptability, Belief and Understanding- Self discipline
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony atvarious levels.
7. Myers-Briggs Type Indicator (MBTI) Personality test

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient „I‟ and the material „Body‟
2. Understanding the needs of Self („I‟) and „Body‟ - happiness and physical facility
3. Understanding the Body as an instrument of „I‟ (I being the doer, seer and enjoyer)- Habits and Hobbies, SWOT Analysis (Activity)
4. Understanding the characteristics and activities of „I‟ and harmony in „I‟ – Dalai Lamas‟ Tibetan Personality Test – Dr. Menninger‟s Psychometric Test.
5. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure Sanyam and Health.
7. Epidemiology- Definition of health, Social and Preventive Medicine, Personal hygiene and handling stress, WHO Guidelines

Include practice sessions to discuss the role others have played in making material goodsavailable to me. Identifying from one‟s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
2. Understanding the meaning of Trust; Difference between intention and competence
3. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige.
4. Concept of an Ideal family- Marriage as an Institution
5. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
6. Visualizing a universal harmonious order in society- Undivided Society, Universal Human Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a

universal value in relationships. Discuss with scenarios. Elicit examples from students‟ lives

UNIT 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

1. Understanding the harmony in the Nature and its Equanimity, Respect for all, Nature as Teacher
2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclabilityand self-regulation in nature
3. Understanding Existence as Co-existence of mutually interacting units in all- pervasive space
4. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film “Home” can be used), pollution, depletion of resources and role of technology etc.

UNIT 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values
2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
5. Case studies of typical holistic technologies, management models and production systems
6. Vision for the Holistic alternatives, UHVs for entrepreneurship
7. Strategy for transition from the present state to Universal Human Order: (a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers (b) At the level of society: as mutually enriching institutions and organizations – Right understanding and dilemmas of professional ethics in today‟s world.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad

12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)
14. Life Skills by KVSG Murali Krishna

2. Environmental Sciences

Unit-I: Fundamentals of Environmental Sciences

Definition, Principles and Scope of Environmental Science.

Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere.
Laws of thermodynamics, heat transfer processes, mass and energy transfer across various interfaces, material balance.
Interaction between Earth, Man and Environment. Biogeographic provinces of the world and agro-climatic zones of India. Concept of sustainable development.
Environmental education and awareness. Environmental ethics.

Unit-II : Energy and Environment

Sun as source of energy; solar radiation and its spectral characteristics.Fossil fuels: classification, composition, physico-chemical characteristics and energy content of coal, petroleum and natural gas. Shale oil, Coal bed Methane, Gas hydrates. Gross-calorific value and net-calorific value.

Principles of generation of hydro-power, tidal energy, ocean thermal energy conversion, wind power, geothermal energy, solar energy (solar collectors, photo-voltaic modules, solar ponds).

Unit-III: Environmental Pollution and Control

Air Pollution: Sources and types of Pollutants - Natural and anthropogenic sources, primary and secondary pollutants. Criteria air pollutants. Sampling and monitoring of air pollutants (gaseous and particulates); period, frequency and duration of sampling. Principles and instruments for measurements of (i) ambient air pollutants concentration and (ii) stack emissions. Indian National Ambient Air Quality Standards. Impact of air pollutants on human health, plants and materials. Acid rain. Dispersion of air pollutants.

Water Pollution: Types and sources of water pollution. Impact on humans, plants and animals. Measurement of water quality parameters: sampling and analysis for pH, EC, turbidity, TDS, hardness, chlorides, salinity, DO, BOD, COD, nitrates, phosphates, sulphates, heavy metals and organic contaminants. Microbiological analysis – MPN. Indian standards for drinking water (IS:10500, 2012).

Soil Pollution: Physico-chemical and biological properties of soil (texture, structure, inorganic and organic components). Analysis of soil quality. Soil Pollution control. Industrial effluents and their interactions with soil components. Soil micro-organisms and their functions - degradation of pesticides and synthetic fertilizers.

Unit-IV: Solid and Hazardous Waste Management

Solid Waste - types and sources. Solid waste characteristics, generation rates, solid waste components, proximate and ultimate analyses of solid wastes.

Hazardous waste – Types, characteristics and health impacts. Hazardous waste management: Treatment Methods – neutralization, oxidation reduction, precipitation, solidification, stabilization, incineration and final disposal.
e-waste: classification, methods of handling and disposal. Fly ash: sources, composition and utilisation.
Plastic waste: sources, consequences and management.

Unit-VIII: Environmental Assessment, Management and Legislation

Aims and objectives of Environmental Impact Assessment (EIA). Environmental Impact Statement (EIS) and Environmental Management Plan (EMP).
Risk Assessment - Hazard identification, Hazard accounting, Scenarios of exposure, Risk characterization and Risk management.
Overview of Environmental Laws in India

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3. Constitution of Indian

Chapter – 1 Making of Indian Constitution : Constituent Assembly – Composition, Objectives, Preamble and Salient features of the Indian Constitution.

Chapter-2 Fundamental Rights, Fundamental Duties, Directive Principles.

Chapter-3 Union Government – President, Prime Minister and Council of Ministers

Chapter-4 State Government – Governor, Chief Minister and Council of Ministers

Chapter – 5 Judiciary – Supreme Court and High Court: composition, Powers and Functions and Judicial Review.

Chapter Electoral Process : Election Commission – Composition, Powers and Functions, Electoral Reforms.

Suggested Readings :

1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon: Lesis Nexis, (23rd edn.)2018.
2. M.V. Pylee, Inda's Constitution, New Delhi : S.Chand Pub.,(16th edn.) 2017.
3. J.N.Pandey, The Constitutional Law of India, Allahabad : Central Law Agency, (55th edn.) 2018
4. Constitution of Indai (Full Test), India.gov.in., National Portal of India, https:/www.india.gov.in/sites/uploas_files/npi/files/coi_part_full.pdf
5. KB Merunandan, Bharatada Samvidhana Ondu Parichaya, Bangalore, Meragu Publications, 2015.

4. Life –Skills

Module 1

Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: Self- awareness, Empathy, Critical thinking, Creative thinking, Decision making, problem solving, Effective communication, interpersonal relationship, coping with stress,coping with emotion.

Life skills for professionals: positive thinking, right attitude, attention to detail, having the big picture, learning skills, research skills, perseverance, setting goals and achieving them, helping others, leadership, motivation, self-motivation, and motivating others, personality development, IQ, EQ, and SQ

Module 2

Self-awareness: definition, need for self-awareness; Coping With Stress and Emotions, Human Values, tools and techniques of SA: questionnaires, journaling, reflective questions, meditation, mindfulness, psychometric tests, feedback.

Stress Management: Stress, reasons and effects, identifying stress, stress diaries, the four A's of stress management, techniques, Approaches: action-oriented, emotion- oriented, acceptance-oriented, resilience, Gratitude Training,

Coping with emotions: Identifying and managing emotions, harmful ways of dealing with emotions, PATH method and relaxation techniques.

Morals, Values and Ethics: Integrity, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, Time management, Co- operation, Commitment, Empathy, Self-Confidence, Character, Spirituality, Avoiding Procrastination, Sense of Engineering Ethics.

Module 3

21st century skills: Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.

Steps in problem solving: Problem Solving Techniques, Six Thinking Hats, MindMapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking

Module 4

Group and Team Dynamics: Introduction to Groups: Composition, formation, Cycle, thinking, Clarifying expectations, Problem Solving, Consensus, Dynamics techniques,Group vs Team, Team Dynamics, Virtual Teams. Managing team performance and managing conflicts, Intrapreneurship.

Module 5

Leadership: Leadership framework, entrepreneurial and moral leadership, vision, cultural dimensions. Growing as a leader, turnaround leadership, managing diverse stakeholders, crisis management. Types of Leadership, Traits, Styles, VUCA Leadership, Levels of Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders.

Reference Books

1. Shiv Khera, “You Can Win” , Macmillan Books, New York, 2003.
2. Barun K. Mitra, “Personality Development & Soft Skills”, Oxford Publishers, Third impression,2017.
3. ICT Academy of Kerala, "Life Skills for Engineers", McGraw Hill Education (India) Private Ltd.,2016.
4. Caruso, D. R. and Salovey P, “The Emotionally Intelligent Manager: How to Develop and Use the Four Key Emotional Skills of Leadership”, John Wiley &Sons, 2004.
5. Kalyana, “Soft Skill for Managers”; First Edition; Wiley Publishing Ltd, 2015.
6. Larry James, “The First Book of Life Skills”; First Edition, Embassy Books, 2016.

5. Gender Equality

MODULE1

ConceptualizingGender: SexandGender,TypesofGender.ConceptsinrelationwithGender-Genderneeds, Gender Roles, Gender Stereotyping, Gender Discrimination, Gender Identity.

MODULE2

GenderinIndia: GenderStatusand genderdisparityinEducation,Labourforceparticipationandeconomy, Political participation, Health. Gender and Media- Role of Media in constructing ideologies, Gender sensitivity, Gender equality, Gender and development

MODULE3

GenderIssuesandGenderbasedViolence: HumanRightsviolations,Majorgender-basedviolence:Sexual abuse, Domestic Violence, Female infanticide, dowry death, workplace harassment.

MODULE4

InternationalandNationalresponsetogenderdiscrimination: InternationalConventiononElimination of all forms of Discrimination against Women (CEDAW), National Human Rights Commission, National and
StateWomen's Commission

MODULE5

State Initiatives to promote Gender Equality. Law Enforcing Agencies: All Women's Police Stations, VigilanceCell,LegalAid−Cells,Women'scell,FamilyCourts,Childline,JagrataSamithi, Equalopportunity cell, Service Providers and Helplines for Women and Children.

REFERENCES

- Mukherjee,Mukul(1992),*HumanRightsandgenderissues*,NewDelhi:InstituteofSocialSciences
- BhasinKamala(2000):Understandinggender,kaliforwomen,N.Delhi.
- GuptaKR(2009),*Gender:Problemsandpolicies*,NewDelhi:AtlanticPublishers
- Manoranjanpal(2009),*GenderandDiscrimination:Health,Nutritionalstatusandroleofwomenin India*,London : Oxford University Press

6. Research Methodology

1. FoundationsofResearch:Meaning,Objectives,Motivation,Utility.Conceptof theory,empiricism,deductive andinductivetheory.Characteristicsofscientific method- Understanding the language of Research-Concept, Construct, Definition,Variable.ResearchProcess.

2. Problem Identification&Formulation-Research Question-Investigation Question-MeasurementIssues-Hypothesis -Qualities of a goodHypothesis- Null Hypothesis& Alternative Hypothesis. Hypothesis Testing-Logic&Importance.

3. Research Design: Concept and Importance in Research-Features of a good research design-Exploratory Research Design-concept, types and uses, DescriptiveResearchDesigns-concept,typesanduses.ExperimentalDesign: ConceptofIndependent&Dependentvariables.

4. Qualitative and Quantitative Research: Qualitative research-Quantitative research-Concept of measurement, causality, generalization, replication. Merging thetwoapproaches.

5. Measurement: Concept of measurement- what is measured? Problems in measurementin research- Validity and Reliability. Levels of measurement-Nominal,Ordinal, Interval,Ratio.

RecommendedBooks:

1. BusinessResearchMethods-DonaldCooper&PamelaSchindler,TMGH,9theditions.
2. BusinessResearchMethods-AlanBryman&EmmaBell,OxfordUniversityPress.
3. ResearchMethodology-C.R.Kothari
4. Selectreferencesfromthe Internet

7. Publication Ethics

Unit I: PHILOSOPHY AND ETHICS (3 Hrs.)

Introduction to philosophy: definition, nature and scope, concept, branches - Ethics: definition, moral philosophy, nature of moral judgements and reactions.

Unit II: SCIENTIFIC CONDUCT (5 Hrs.)

Ethics with respect to science and research - Intellectual honesty and research integrity - Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP) - Redundant Publications: duplicate and overlapping publications, salami slicing - Selective reporting and misrepresentation of data.

Unit III: PUBLICATION ETHICS (7 hrs)

Publication ethics: definition, introduction and importance - Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. - Conflicts of interest - Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals - Predatory publisher and journals.

Unit IV: OPEN ACCESS PUBLISHING (4 Hrs.)

Open access publications and initiatives - SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies - Software tool to identify predatory publications developed by SPPU - Journal finger / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer, Journal Suggester, etc.

Unit V: PUBLICATION MISCONDUCT (4Hrs.)

Group Discussion (2 Hrs.) : a) Subject specific ethical issues, FFP, authorship b) Conflicts of interest c) Complaints and appeals: examples and fraud from India and abroad

Software tools (2 Hrs.) : Use of plagiarism software like Turnitin, Urkund and other open source software tools.

Unit VI: DATABASES AND RESEARCH METRICS (7Hrs.)

Databases (4 Hrs): Indexing databases, Citation databases: Web of Science, Scopus, etc.

Research Metrics (3 Hrs.): Impact Factor of journal as per Journal Citations Report, SNIP, SJR, IPP, Cite Score - Metrics: h-index, g index, i10 Index, altmetrics.

References

1. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity. 2007. Available at: https://ori.hhs.gov/sites/default/files/rcrintro.pdf
2. The Student's Guide to Research Ethics By Paul Oliver Open University Press, 2003
3. Responsible Conduct of Research By Adil E. Shamoo; David B. Resnik Oxford

University Press, 2003

4. Ethics in Science Education, Research and Governance Edited by Kambadur Muralidhar, Amit Ghosh Ashok Kumar Singhvi. Indian National Science Academy, 2019. ISBN : 978-81-939482-1-7.
5. Anderson B.H., Dursaton, and Poole M.: Thesis and assignment writing, Wiley Eastern 1997.
6. Bijorn Gustavii: How to write and illustrate scientific papers? Cambridge University Press.
7. Bordens K.S. and Abbott, B.b.: Research Design and Methods, Mc Graw Hill, 2008.
8. Graziano, A., M., and Raulin, M.,L.: Research Methods – A Process of Inquiry, Sixth Edition, Pearson, 2007.

8. Indian Knowledge system

UNIT -I: Bhāratīya Civilization and Development of Knowledge System (4hours)
Genesisoftheland,Antiquityofcivilization,OntheTrailoftheLostRiver,DiscoveryoftheSaraswatī River, the Saraswatī-Sindhu Civilization, Traditional Knowledge System, The Vedas, Main Schools of Philosophy(6+3), Ancient Education System, the Takṣaśilā University, the Nālandā University, Alumni, Knowledge Export from Bhārata.

UNIT-II: Arts, Literature, and Scholars (4 hours)

Art, Music, and Dance, Naṭarāja–A Masterpiece of Bhāratīya Art,Literature,Lifeandworksof Agastya, Lopāmudrā, Ghoṣā, Vālmīki, Patañjali, Vedavyāsa, Yājñavalkya Gārgī, Maitreyī, Bodhāyana, Caraka,Suśruta, Jīvaka,Nāgārjuna, Kaṇāda,Patañjali, Kauṭīlya,Pāṇini, Thiruvalluvar, Āryabhaṭa, Varāhamihira, Ādi Śaṅkarācārya, Bhāskarācārya, Mādhavācārya.

UNIT-III: Science, Astronomy, and Mathematics (4 hours)
ConceptofMatter,LifeandUniverse,Gravity,SageAgastya'sModelofBattery,Velocity ofLight, Vimāna: Aeronautics, Vedic Cosmology and Modern Concepts, Bhāratīya Kāla-gaṇanā, Kerala School for Mathematics and Astronomy, History and Culture of Astronomy, Sun, Earth, Moon, and Eclipses, Earth is Spherical and Rotation of Earth, Archaeostronomy; Concepts of Zero and Pi, Number System, Pythagoras Theorem, and Vedic Mathematics.

UNIT-IV:Engineering, Technology,andArchitecture (4hours)
Pre-Harappan and Sindhu Valley Civilization, Laboratory and Apparatus, Juices, Dyes, Paints and Cements, Glass and Pottery, Metallurgy, Engineering Science and Technology in the Vedic Age and Post-Vedic Records, Iron Pillar of Delhi, Rakhigarhi, Mehrgarh, Sindhu Valley Civilization, Marine Technology, and Bet–Dwārkā.

UNIT-V: Life, Environment, and Health (4 hours) Ethnic Studies, Life Science in Plants, Anatomy, Physiology, Agriculture, Ecology and Environment, Āyurveda, Integrated Approach to Healthcare,Medicine, Microbiology, Medicine, Surgery, and Yoga, etc.

Text books:

1. TextbookonTheKnowledgeSystem ofBhāratabyBhagChand Chauhan,
2. Histrory of Science in India Volume-1, Part-I, Part-II, Volume VIII, by Sibaji Raha, et al. National AcademyofSciences, Indiaand TheRamkrishanMission InstituteofCulture, Kolkata (2014).

ReferenceBooks:

1. PrideofIndia-AGlimpseofIndia'sScientificHeritageeditedbyPradeepKohleetal. Samskrit Bharati (2006).
2. VedicPhysicsbyKeshav DevVerma,MotilalBanarsidassPublishers(2012).

3. India'sGloriousScientificTraditionbySureshSoni,Ocean BooksPvt. Ltd.(2010).

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HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to All branches of Engineering)

Course Objectives:

The main objective of introducing this course is to make the students maintain their mental andphysical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components. **CO3:** Compare and contrast various activities that help enhance their health.**CO4:** Assess current personal fitness levels.
CO5: Develop Positive Personality

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.
   Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

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NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

(Common to All branches of Engineering)

Course Objectives:

The objective of introducing this course is to impart discipline, character, fraternity, teamwork,social consciousness among the students and engaging them in selfless service.

Course Outcomes: After completion of the course the students will be able to

CO1: Understand the importance of discipline, character and service motto.
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems.
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.

UNIT I Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT II Nature & CareActivities:

i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III Community ServiceActivities:

i) Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities-experts-etc.

ii) Conducting awareness programs on Health-related issues such as General Health,Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and PopulationEducation.
v) Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme* Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, DirectorateGeneral of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering",McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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