NRI INSTITUTE OF TECHNOLOGY

An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
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POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

DEPARTMENT OF COMUTER SCIENCE AND ENGINEERING

STRUCTURE FOR SECOND YEAR B.TECH CSE (DS) PROGRAMME

II YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	20A2100201	Vector calculus, Transform Techniques and Partial Differential Equations	3	0	0	3	30	70	100	3
2	20A2105401	Python Programming	3	0	0	3	30	70	100	3
3	20A2105402	Data Base Management Systems	3	0	0	3	30	70	100	3
4	20A2105403	Computer Organization and Architecture	3	0	0	3	30	70	100	3
5	20A2144401	Introduction to Data Science	3	0	0	3	30	70	100	3
6	20A2105491	Python programming Lab	0	0	3	3	15	35	50	1.5
7	20A2105492	Data Base Management System Lab	0	0	3	3	15	35	50	1.5
8	20A2144491	Data Science Lab	0	0	3	3	15	35	50	1.5
9	SOC	Mobile Application Development	0	0	4	4	15	35	50	2
10	20A2105901	Aptitude and Reasoning	0	2	0	2	15	35	50*	0
Total			**15**	**2**	**13**	**30**	**225**	**525**	**750**	**21.5**

II YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	20A2200201	Probability and Statistics	3	0	0	3	30	70	100	3
2	20A2205401	Web Technologies	3	0	0	3	30	70	100	3
3	20A2205402	Software Engineering	3	0	0	3	30	70	100	3
4	20A2242401	Introduction to Machine Learning	3	0	0	3	30	70	100	3
5		Formal Languages and Automata Theory	3	0	0	3	30	70	100	3
6	20A2205491	Web Technologies Lab	0	0	3	3	15	35	50	1.5
7	20A2205492	Software Engineering Lab	0	0	3	3	15	35	50	1.5
8	20A2242491	Machine Learning Lab	0	0	3	3	15	35	50	1.5
9	SOC	Mango DB	0	0	4	4	15	35	50	2
10	20A2200802	Professional ethics and Human Values	0	2	0	2	30	70*	100	0

Total	**15**	**2**	**13**	**30**	**240**	**560**	**800**	**21.5**

*** Internal Evaluation**

L - LECTURE T – TUTORIAL P - PRACTICAL
CIA – Continuous Internal Assessment SEA – Semester End Assessment

Internship2Months(Mandatory)during summer vacation				
Honors/Minorcourses (The hours distribution can be3-0-2or3-1-0also)	**4**	0	**0**	**4**

20A2100201: Vector Calculus, Transform Techniques and Partial Differential Equations

Lecture **Tutorial**	3 0	**Internal Marks:**	30
Credits	3	**External Marks:**	70

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world application

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Interpret the physical meaning of different operators such as gradient, cur land divergence (L5)
CO2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
CO3	Apply the Laplace transform for solving differential equations (L3)
CO4	Find or compute the Fourier series of periodic signals (L3)
CO5	Knowandbe able to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3)
CO6	Identify solution methods for partial differential equations that model physical processes (L3)

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	3	3	2	2	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO6	3	3	2	2	-	-	-	-	-	-	-	-

UNIT I

Unit–I: Vector calculus:
Vector Differentiation: Gradient –Directional derivative–Divergence–Curl–Scalar Potential. Vector Integration: Line integral–Work done–Area–Surface and volume integrals.
Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof)

UNIT II

Unit–II: Laplace Transforms:
Laplace transforms of standard functions – Shifting theorems – Transforms of derivatives and integrals – Inverse Laplace transforms– Convolution theorem (without proof).

Applications:
Solving ordinary differential equations (initial value problems) using Laplace transforms

UNIT III

Unit–III: Fourier series and Fourier Transforms:

Fourier Series:

Introduction – Periodic functions – Fourier series of periodic function –Dirichlet's conditions – Even and odd functions – Change of interval – Half-range sine and cosine series.

Fourier Transforms:

Fourier integral theorem (without proof) –Fourier sine and cosine integrals –Sine and cosine transforms – inverse trans forms –Finite Fourier transforms

UNIT IV

Unit–IV: PDE of first order:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

UNIT: V

UNIT-V:Second order PDE:

Second order PDE: Solutions of linearpartial differential equations with constant coefficient – term of the typee^{ax+by}, $sin(ax + by)$, $cos(ax + by)$, $xmyn$.

Method of separation of variables – introduction.

TEXT BOOKS:

1B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.

2. B.V.Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc.Graw Hill Education

REFERENCE BOOKS:

1. ErwinKreyszig, Advanced Engineering Mathematics, 10thEdition, Wiley-India.

2. Dean. G. Duffy, Advanced Engineering Mathematics with MATLAB, 3rdEdition, CRC Press.

3. Peter O'Neil, Advanced Engineering Mathematics, Cengage.

4. Srimantha Pal, SCBhunia, Engineering Mathematics, Oxford University Press

E-RESOURCES:

1. **www.nptel**videos.com/mathematics/ (Math Lectures from MIT, Stanford,IIT'S)
2. nptel.ac.in/courses/122104017
3. nptel.ac.in/courses/111105035

20A2105401-Python Programming

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks:**	
Credits:	3				**External Marks:**	

Prerequisites:

Adequate exposure to Programming

A basic understanding on various computer concepts , C programming basic syntax

Course Objectives:

To learn the fundamentals of python programming

To get a solid understanding of python functions and data structures

To demonstrate the use of python lists and dictionaries.

To implement methods and functions to improve readability of programs.

Students able to describe and apply object-oriented programming methodology.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO 1	Experience with an interpreted Language and to build software for real needs
CO 2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
CO 3	Describe and use of Python lists, dictionaries, tuples and sets.
CO 4	Implement methods and functions to improve readability of programs
CO 5	Describe and apply object-oriented programming methodology, top-down concepts in algorithm design.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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**	**PSO2**	**PSO3**
CO 1	3	--	--	--	3	--	--	--	3	--	3	--	3	3	--
CO 2	--	3	2	--	--	--	--	--	--	--	--	--	2	3	2
CO 3	--	--	--	2	3	--	--	--	3	--	--	--	3	3	--

CO 4	--	--	--	3	3	--	--	--	3	--	--	--	2	3	--
CO 5	--	--	--	3	--	--	--	--	--	--	3	--	3	3	3

UNIT I : DATA, EXPRESSIONS, STATEMENTS

Python Interpreter and Interactive mode; Values and Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple assignment, Precedence of operators, Comments; Modules and Functions, Function Definition and use, Flow of Execution, Parameters and Arguments; Illustrative programs: Exchange the values of two variables, Distance between two points.

UNIT II: *CONTROL FLOW, FUNCTIONS.*

Conditionals: Boolean values and operators, Conditional (if), Alternative (if-else), Chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, sum an array of numbers, Linear search, Binary search

UNIT III: *LISTS, TUPLES, DICTIONARIES*

Lists: List operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning lists, List parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension; Illustrative programs: selection sort, insertion sort, mergesort.

UNIT IV: *FILES, MODULES, PACKAGES AND EXCEPTION HANDLING*

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

UNIT V:CLASSES AND OBJECTS

Implementation of classes and objects in Python: Classes and Objects, Methods and Self Argument, The __init__Method, Class Variables and Object Variables, The __del__Method, Public and Private Data Members, Private Methods,Built-in Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection (Destroying Objects)

TEXT BOOKS:

1.Python Programming: A Modern Approach , Vamsi Kurama,Pearson

2. Learning Python , Mark Lutz ,Orielly

REFERENCE BOOKS:

Think Python , Allen Downey , Green Tea Press

E-RESOURCES:

https://www.tutorialspoint.com/python/index.htm

https://www.programiz.com/python-programming

https://www.w3schools.com/python/

https://www.javatpoint.com/python-tutorial

20A2105402-DATA BASE MANAGEMENT SYSTEMS

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks:**	30
Credits:	3				**External Marks:**	70

Prerequisites:

Basic Database,Data Structures, Mathematics

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- Learn and practice data modelling using the entity-relationship and developing database designs
- To master the basics of SQL and construct queries using SQL.
- Apply normalization techniques to normalize the database
- Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access
- Learn the concepts of transaction management and how they provide security and consistency
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Ability to define, understand the database management system structure
CO2	Ability to apply as relational algebra to find solutions to a broad range of queries.
CO3	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies
CO4	Will be able to explain the principle of transaction management design.
CO5	Understands and applies indexing mechanisms in databases

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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 3**
CO1	2	2	2	--	2	--	--	--	--	--	--	2	2	2
CO2	3	3	3	--	--	--	--	--	--	--	2	2	2	2
CO3	3	3	--	--	3	2	--	--	--	--	2	2	3	2
CO4	2	2	3	--	2	2	--	--	--	--	2	3	2	2
CO5	3	3	3	--	2	3	--	--	--	--	2	2	2	2

UNIT I :

DATABASE SYSTEM APPLICATIONS:

Database System Applications, Purpose of Database Systems, File Systems versus a DBMS**,** View of Data – Data Abstraction, Instances and Schemas, Data Models, Data Independence, Database Users and Administrators, Structure of a DBMS.

INTRODUCTION TO DATABASE DESIGN:

Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT II:

INTRODUCTION TO THE RELATIONAL MODEL:

Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, Destroying/altering tables and views.

RELATIONAL ALGEBRA AND CALCULUS:

Relational Algebra – Selection and Projection, Set operations,Renaming, Joins,Division,Examples of Algebra Queries, Relational calculus – Tuple relationalCalculus – Domain relational calculus.

UNIT III:

SQL: QUERIES, CONSTRAINTS, TRIGGERS:

Form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, Triggers and active data bases.

SCHEMA REFINEMENT:

Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal Form.

UNIT IV:

OVERVIEW OF TRANSACTION MANAGEMENT:

The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks –Performance of Locking – Transaction Support in SQL.

CONCURRENCY CONTROL:

Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

CRASH RECOVERY:

Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.

UNIT V:

OVERVIEW OF STORAGE AND INDEXING:

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and

Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition,2003.

2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan,McGraw hill, VI edition,2006.

3. Fundamentals of Database Systems 5th edition., Ramez Elmasri, Shamkant .Navathe,Pearson Education,2008.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*

3. Introduction to Database Systems, C. J. Date, *Pearson Education*

4. Oracle for Professionals, The X Team, S.Shah and V. Shah, *SPD*.

5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah, *PHI*.

6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Student* Edition.

E-RESOURCES:

1.https://www.javatpoint.com/dbms-tutorial

2.https://www.tutorialspoint.com/dbms/index.htm

3.https://www.geeksforgeeks.org/dbms/

20A2105403- Computer Organization and Architecture

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks:**	30
Credits:	3				**External Marks:**	70

Prerequisites:

NIL

Course Objectives:

- To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, binary codes and error detecting and correcting binarycode.
- To study the combinational logic design of various logic and switching devices and theirrealization
- Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
- The memory organization of the computer and input output organization understanding

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand the numeric information in different forms and interpret different logic gates.
CO2	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO3	Able to understand the basic components and the design of CPU, ALU and Control unit
CO4	Students can calculate the effective address of an operand by addressing modes
CO5	Ability to understand memory hierarchy and its impact on computer cost/performance..
CO6	Ability to understand the advantage of instruction level parallelism.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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**	**PSO2**	**PSO3**
CO1	2	-	2	2	--	--	--	--	--	--	--	--	2	--	2
CO2	3	--	3	--	3	--	--	--	--	--	--	--	--	3	--
CO3	--	--	2	2	2	--	--	--	--	--	--	--	--	--	3
CO4	--	--	2	3	3	--	--	--	--	--	--	--	--	2	--
CO5	--	--	3	2	--	--	--	--	--	--	--	2	2	3	--
CO6	--	--	--	2	2	--	--	--	--	--	--	--	3	2	--

UNIT I :

NUMBER SYSTEMS & BOOLEAN FUNCTIONS: Representation of numbers in different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed numbers,Boolean theorems, principle of complementation & duality, De-Morgans theorems, Basic logic gates and Universal gates, NAND-NAND and NOR-NOR realizations, Standard SOP and POS.

UNIT II:

Design of Half adder, full adder half subtractor, full subtractor, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, 4 bit parallel adder, Carry look-a- head adder circuit. Decoders, Encoders, priority encoder, Multiplexer, Demultiplexer. Basic Structure Of Computers : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Software, Performance.

UNIT III:

Register Transfer and Micro-Operations: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Microoperations, Shift Micro-operations, Arithmetic Logic Shift Unit. Basic Computer Organization and Design: Instruction codes, Computer Registers,Computer Instructions, Timing and Control, Instruction cycle, Memory ReferenceInstructions, Input-Output and Interrupts

UNIT IV:

Central Processing Unit: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).Computer Arithmetic : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations.

UNIT V:

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.Input Output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)

TEXT BOOKS:

1 Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013

2 Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill,
Third edition, 1998.

E-RESOURCES:

https://www.tutorialspoint.com/computer_organization/index.asp

https://www.geeksforgeeks.org/computer-organization-basic-computer-instructions/

20A2144401- Introduction to Data Science

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks**
Credits:	3				**External Mark :**

Prerequisites:

Course Objectives:

- Building the fundamentals of data science.
- Imparting design thinking capability to build big-data
- Developing design skills of models for big data problems
- Gaining practical experience in programming tools for data sciences
- Empowering students with tools and techniques used in data science

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Apply data visualisation in big-data analytics
CO2	Utilise EDA, inference and regression techniques
CO3	Utilize Matrix decomposition techniques to perform data analysis
CO4	Apply data pre-processing techniques
CO5	Apply Basic Machine Learning Algorithms

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	PS O	PS O2
CO1	3	--	--	2	--	2	--	--	--	--	--	--	3	3
CO2	3	--	--	2	3	--	--	3	--	--	--	--	-	2
CO3	--	3	--	--	--	--	--	3	--	--	--	--	2	--
CO4	--	--	--	--	3	--	--	--	3	--	--	--	3	2
CO5	3	--	3	--	--	--	--	3	--	--	--	--	2	3

UNIT I : Introduction to Data Science

Big Data and Data Science - Big Data Analytics, Business intelligence vs Big data, big data frameworks, Current landscape of analytics, data visualisation techniques, visualisation software, Exploratory Data Analysis (EDA), statistical measures, Basic tools (plots, graphs and summary statistics) of EDA, Data Analytics Lifecycle, Discovery

UNIT II: Basic Statistical Inference and Regression models

Developing Initial Hypotheses, Identifying Potential Data Sources, EDA case study, testing hypotheses on means, proportions and variances, Regression models: Simple linear regression, least-squares principle, MLR, logistic regression, Multiple correlation, Partial correlation

UNIT III: Linear Algebra Basics

Matrices to represent relations between data, Linear algebraic operations on matrices – Matrix decomposition: Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNIT IV: Data Pre-processing and Feature Selection

Data cleaning - Data integration - Data Reduction - Data Transformation and Data Discretization, Feature Generation and Feature Selection, Feature Selection algorithms: Filters- Wrappers - Decision Trees - Random Forests

UNIT V: Basic Machine Learning Algorithms

Classifiers - Decision tree - Naive Bayes - k-Nearest Neighbors (k-NN), k-means – SVM Association Rule mining – Ensemble methods

TEXT BOOKS:

1. Mining of Massive Datasets. v2.1, Jure Leskovek, Anand Rajaraman and Jefrey Ullman., Cambridge University Press. (2019). (free online)
2. Big Data Analytics, paperback 2nd ed., Seema Acharya, Subhasini Chellappan, Wiley (2019).

REFERENCE BOOKS:

1. Jacob T. VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly Publications, 2016.

2. Jojo Moolayil, "Smarter Decisions : The Intersection of IoT and Data Science", PACKT, 2016.

3. Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.

4. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013

5. Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

6 . Doing Data Science, Straight Talk From The Frontline, Cathy O'Neil and Rachel Schutt, O'Reilly (2014).

7. Data Mining: Concepts and Techniques", Third Edition, 2 Jiawei Han, Micheline• Kamber and Jian Pei, ISBN 0123814790,(2011).

8. Big Data and Business Analytics, Jay Liebowitz, CRC press (2013)

9. Data mining methods,2 4 nd edition, C. Rajan, Narosa (2016)

E-RESOURCES:

www.NPTEL.com

20A2105491-Python Programming Lab

Lecture – Tutorial-Practical::	0-0-3				**Internal Marks**
Credits:	1.5				**External Mark :**

Prerequisites:

Adequate exposure to Programming

A basic understanding on various computer concepts , C programming basic syntax

Course Objectives:

To learn the fundamentals of python programming

To get a solid understanding of python functions and data structures

To demonstrate the use of python lists and dictionaries

To implement methods and functions to improve readability of programs.

Students able to describe and apply object-oriented programming methodology.

Students able to build software for real needs and prior introduction to testing software

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Experience with an interpreted Language and to build software for real needs
CO2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
CO3	Describe and use of Python lists, dictionaries, tuples and sets.
CO4	Implement methods and functions to improve readability of programs
CO5	Describe and apply object-oriented programming methodology, top-down concepts in algorithm design.
CO6	Design, code ,test and debug python language programs

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	PS O	PS O2
CO1	3	--	--	--	3	--	--	--	3	--	3	--	3	3

CO2	--	3	2	--	--	--	--	--	--	--	--	--	2	3
CO3	--	--	--	2	3	--	--	--	3	--	--	--	3	3
CO4	--	--	--	3	3	--	--	--	3	--	--	--	2	3
CO5	--	--	--	3	--	--	--	--	--	--	3	--	3	3
CO6	--	--	--	--	2	--	--	--	3	--	3	--	2	3

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user

(Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10

c) Write a program using a for loop that loops over a sequence.

d) Write a program using a while loop that asks the user for a number, and prints a countdownfrom that number to zero

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million

b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. Bystarting with 1 and 2,

the first 10 terms will be:1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

c) By considering the terms in the Fibonacci sequence whose values do not exceed four million,find the sum of the

even-valued terms

Exercise - 5 - DS

a) Write a program combine_lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character

frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) 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)

b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions- Continued

a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to find all the unique elements of a list.

Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative_product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 11 - Multi-D Lists

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

Exercise - 12 - Modules

a)Write a program that defines a module "person" and import it

b)write a program that renames a module

Exercise - 13 OOP

a) Class variables and instance variable and illustration of the self variable

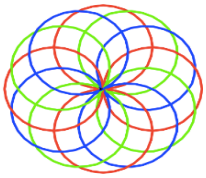
i) Robot

ii) ATM Machine

Exercise - 14 GUI, Graphics

1. Write a GUI for an Expression Calculator using tk

2. Write a program to implement the following figures using turtle:



Exercise - 15 - Testing

a) Write a test-case to check the function even_numbers which return True on passing a list of all

even numbers

b) Write a test-case to check the function reverse_string which returns the reversed string

Exercise - 16 - Advanced

Build any one classical data structure

TEXT BOOKS:

1.Python Programming: A Modern Approach , Vamsi Kurama,Pearson

2. Learning Python , Mark Lutz ,Orielly

REFERENCE BOOKS:

Think Python , Allen Downey , Green Tea Press

E-RESOURCES:

https://www.tutorialspoint.com/python/
https://docs.python.org/3/tutorial/
https://www.w3schools.com/python/
https://www.javatpoint.com/python-tutorial

20A2105492-DATABASEMANAGEMENTSYSTEMS LAB

Lecture – Tutorial-Practical::	0-0-3				**Internal Marks**
Credits:	1.5				**External Mark :**

Prerequisites:

C Programming, Mathematics

Course Objectives:

- Design and implement a database schema for a given problem-domain
- Populate and query a database using SQLDML/DDL commands.
- Declare and enforce integrity constraints on a database
- ProgrammingPL/SQLincludingstoredprocedures,stored functions,cursors,packages.
- Understand realtime database design models and cancodethemodel
- understandandretrieveinformationfromcomplexdesigneddatabasesusingcorrelatednestedqueries

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
CO2	Queries to Retrieve and Change Data:Select, Insert,Delete,andUpdate
CO3	QueriesusingBuilt-InFunctions:StringFunctions,NumericFunctions,DateFunctionsandConversion Functions.
CO4	Queries using GroupBy,OrderBy,andHavingClauses
CO5	Queries on Joins and CorrelatedSub-Queries
CO6	Queries on Controlling Data:Commit,Rollback,andSavepoint

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O**	**PS O2**
CO1	3	2	--	--	--	--	--	--	--	--	--	--	2	--
CO2	2	3	3	--	2	--	--	--	--	--	--	--	-	2
CO3	2	2	2	--	2	--	--	--	--	--	--	--	2	--

CO4	2	2	3	--	3	--	--	--	--	--	--	2	2
CO5	2	2	2	--	2	--	--	--	--	--	--	--	2
CO6	2	2	3	--	2	--	--	--	--	--	--	--	2

ListofExperiments :

SQL

1. QueriesforCreating,Dropping,andAlteringTables,Views,andConstraints
2. QueriestoRetrieveandChangeData:Select,Insert,Delete,andUpdate
3. QueriesusingoperatorsinSQL
4. QueriesusingBuilt-InFunctions:StringFunctions,NumericFunctions,DateFunctionsandConversion Functions
5. QueriesusingGroupBy,OrderBy,andHavingClauses
6. Queries on Controlling Data: Commit, Rollback, and Save point
7. Queries on Joins and Correlated Sub-Queries
8. Queries on Working with Index, Sequence, Synonym

PL/SQL

1. WriteaPL/SQLCodeusingBasicVariable,AnchoredDeclarations,andUsageofAssignmentOperation
2. WriteaPL/SQLCodeBindandSubstitutionVariables.PrintinginPL/SQL
3. WriteaPL/SQLblockusingSQLandControlStructuresinPL/SQL
4. WriteaPL/SQLCodeusingCursors,ExceptionsandCompositeDataTypes
5. WriteaPL/SQLCodeusingProcedures,Functions,TriggersandPackage

TEXT BOOKS:

FundamentalsofDatabaseSystems,ElmasriNavrate,6thedition, PearsonEducation

REFERENCE BOOKS:

1. ”DatabaseSystemConcepts”,.Korth,Slberchatz,Sudarshan,6thEdition,McGraw–Hill
2. PeterRobandCarlosCoronel,“DatabaseSystemsDesign,ImplementationandManagement”,Thomson Learning,5thEdition.
3. IntroductiontoDatabaseSystems,CJDate,Pearson

DatabaseManagementSystems,RaghuramaKrishnan,JohannesGehrke,TATAMcGrawHill3rdEdition

20A2144491- Data Science Lab

Lecture – Tutorial-Practical::	0-0-3				**Internal Marks**
Credits:	1.5				**External Mark :**

Prerequisites:

Course Objectives:

This course will give an introduction to the basic data science techniques including programming in R, SQL/SPARQL and Map-Reduce for small and big data manipulation and analytics.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand and master the fundamentals of Data Science
CO2	Understand the basics of Numpy for computations
CO3	Make use of pandas for various data manipulations
CO4	Experiment visualizations with Matplotlib Library
CO5	Apply the machine Learning Algorithms to various datasets

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	PS O	PS O2
CO1	3	--	3	--	2	--	--	--	--	--	--	2	2	2
CO2	--	--	--	--	--	--	--	--	--	--	--	--		2
CO3	--	2	3	--	3	--	--	--	--	--	--	2	3	
CO4	--	2	--	--	2	--	--	--	--	--	--	2	2	
CO5	2	--	3	2	--	--	--	--	--	--	--		3	2

Modules-I: Numpy

Pandas

Matplotlib

Scikit

Module-II : Data Collection

Categorical Data

Data Cleaning : Missing Values

Normalization of Data Set

Module-III: Mean (mean, fmean, geometric, mean), Median,Mode

Variance Standard deviation

Quantiles

Distributions

Exceptions

Module- IV DATA VISUALIZATION :

Box plots

Histograms

Pie charts

Bar charts

X-Y Plots

Heat maps

Module-V WITH SUPERVISED LEARNING :

Linear Regression

K nearest Neighbors

Logistic Regression

Decision Trees

TEXT BOOKS:

1. Mining of Massive Datasets. v2.1, Jure Leskovek, Anand Rajaraman and Jefrey Ullman., Cambridge University Press. (2019). (free online)
2. Big Data Analytics, paperback 2nd ed., Seema Acharya, Subhasini Chellappan, Wiley (2019).

REFERENCE BOOKS:

1. Jacob T. VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly Publications, 2016.

2. Jojo Moolayil, "Smarter Decisions : The Intersection of IoT and Data Science", PACKT, 2016.

3. Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.

4. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013

5. Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

6 . Doing Data Science, Straight Talk From The Frontline, Cathy O'Neil and Rachel Schutt, O'Reilly (2014).

7. Data Mining: Concepts and Techniques", Third Edition, 2 Jiawei Han, Micheline• Kamber and Jian Pei, ISBN

0123814790,(2011).

8. Big Data and Business Analytics, Jay Liebowitz, CRC press (2013)

9. Data mining methods,2 4 nd edition, C. Rajan, Narosa (2016)

E-RESOURCES:

www.NPTEL.com

Course Code- Mobile Application Development

Lecture – Tutorial-Practical::	0-0-4				**Internal Marks**
Credits:	2				**External Mark :**

Prerequisites:

Course Objectives:

- To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms

CO2	Critique mobile applications on their design pros and cons
CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
CO4	Program mobile applications for the Android operating system that use basic and advanced phone features
CO5	Deploy applications to the Android marketplace for distribution.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O**	**PS O2**
CO1	3	2	--	--	--	--	--	--	--	--	--	--	2	--
CO2	2	3	3	--	2	--	--	--	--	--	--	--	-	2
CO3	2	2	2	--	2	--	--	--	--	--	--	--	2	--
CO4	2	2	3	--	3	--	--	--	--	--	--	2	2	2
CO5	2	2	2	--	2	--	--	--	--	--	--	--	2	--

List of Experiments :

1. Introduction to mobile technologies and devices , Android platform and applications overview
2. Setting Android development environments
3. Writing Android applications, Understanding anatomy of an Android application
4. Develop an application that uses GUI components, Font and Colours
5. Develop an application that uses Layout Managers and event listeners.
6. Write an application that draws basic graphical primitives on the screen.
7. Develop an application that makes use of databases.
8. Develop an application that makes use of Notification Manager
9. Implement an application that uses Multi-threading
10. Develop a native application that uses GPS location information
11. Implement an application that writes data to the SD card.
12. Implement an application that creates an alert upon receiving a message
13. Write a mobile application that makes use of RSS feed
14. Develop a mobile application to send an email.
15. Develop a Mobile application for simple needs (Mini Project)

REFERENCE BOOKS:

1. Android Programming unleashed , B.M. Harwani, Pearson, 2013.
2. Android Programming (Big Nerd Ranch Guide), by Bill Phillips, Chris Stewart, Brian Hardy, Kristin Marsicano, Pearson, 2016
3. Android Programming – Pushing the limits by Hellman by Erik Hellman, WILEY, 2013

20A2105901: APTITUDE AND REASONING

COURSE DESCRIPTION AND OBJECTIVE:

1. Students will be introduced to various Arithmetic and Reasoning Problems.
2. The students will have acquaintance with various topics like Time, Speed and Distance, Percentages, Data Interpretation etc…
3. Aptitude is designed to assess the logical thinking and how well they are able to think out of the box. These ability tests (All the companies do prefer this test) are strictly timed to assess the speed and accuracy of the students in solving the problems.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

1. Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible.
2. Exhibits good analytical skills and aptitude skills.
3. Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING etc…
4. Clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc…

UNIT – I

1. PERCENTAGES
2. SIMPLE INTEREST & COMPOUND INTEREST

UNIT – II

1. TIME AND WORK
2. PIPES AND CISTERN

UNIT- III

1. DIVISION OF WAGES
2. MAN DAYS & CHAIN RULE

UNIT- IV

1. CODING AND DECODING
2. ALPHABET & NUMBER SERIES

UNIT – V

1. ANALOGY
2. ODD ONE OUT

TEXT BOOKS:

1) **APTIPEDIA, WILEY**
2) **Quantative Aptitude, RS AGARWAL, S.Chand Publishers**

REFERENCE BOOKS:

1). HOW TO PREPARE FOR Quantative Aptitude, ARUN SHARMA, Mc GRAW HILL

20A2200201-PROBABILITY AND STATISTICS

Lecture – Tutorial:	3-0-0	**Internal Marks:**	30
Credits:	3	**External Marks:**	70

Prerequisites:--- NIL

Course Objectives:

- To familiarize the students with the foundations of probability and statistical methods
- To impart probability concepts and statistical methods in various applications Engineering

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Classify the concepts of data science and its importance
CO2	Interpret the association of characteristics and through the correlation and Regression tools
CO3	Make us of the concepts of probability and their applications
CO4	Apply discrete and Continuous probability distributions

CO5	Design the components of a classical hypothesis test
CO6	Infer the statistical inferential methods based on small and large sampling tests

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	--	--	--	--	--	--	--	--
CO2	3	3	2	2	--	--	--	--	--	--	--	--
CO3	3	3	2	2	--	--	--	--	--	--	--	--
CO4	3	3	2	2	--	--	--	--	--	--	-	--
CO5	3	3	2	2	--	--	--	--	--	--	-	--
CO6	3	3	2	2	--	--	--	--	--	--	--	--

UNIT I

Descriptive Statistics and Methods for Data Science : Data Science- Introduction to Statistics- Population Vs sample – Collection of Data – Primary and Secondary Data - Types of Varibales : Dependent and Independent , Catagorical and Continuous Variables – Data Visualization - Measures of Central Tendency - Measures of Variability (spread and variance) – Skewness and Kurtosis

UNIT II

Correlation and Curve Fitting : Correlation –Correlation Coefficient – Rank Correlation – Regression Coefficients and properties – Regression lines – Method of Least Squares – Straight line – parabola – Exponential –power curves

UNIT III

Probability and distributions: Probability and conditional probability-Baye's theorem-Random variables- Discrete and continuous Random variables –Distribution Function- Mathematical Expectation and Variance – Binomial ,Poisson and Uniform and Normal Distributions

UNIT IV

Introduction – Population and Samples – Sampling distribution of Means and Variance (definition only) – Central limit theorem (without proof) – Representation of the normal theory distributions — Point and Interval estimations – Maximum error of estimate. Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors – Level of significance

UNIT V

One tail and two-tail tests-Tests Concerning One Mean and Two Means (Large Samples) – Tests on Proportions. Introduction to t, χ^2 and F – Tests.

TEXT BOOKS:

1) Miller and Freund's, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2) S. C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

REFERENCE BOOKS:

1) Shron L. Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
2) Jay l. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage.
3) Sheldon M. Ross, Introduction to probability and statistics Engineers and the Scientists, 4th Edition, Academic Foundation, 2011.
4) Johannes Ledolter and Robert V. Hogg, Applied statistics for Engineers and Physical Scientists, 3rd Edition, Pearson, 2010.

E-RESOURCES:

1.nptel

20A2205401- Web Technologies

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks:**	30
Credits:	3				**External Marks:**	70

Prerequisites:

1. **Java Programming**

2.**DataBaseManagementSystems**

Course Objectives:

To understand the concepts of Hyper Text Markup Language and Cascading Style Sheets

To learn JavaScript for creating dynamic websites

To learn the operations perform on data among web applications usingXML

To learn Server-SideProgramming using Servlets and JavaServerPages.

To learn the creationof pure DynamicWebApplication using JDBC

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Student able to Implement and design webbased applications using features of HTML
CO2	Implement webbased applications using features of XML
CO3	Student will Apply the concepts of server side technologies for dynamic web applications
CO4	Ability to design the webbased applications using effective database access with rich client interaction
CO5	Abilityto Develop reusable component for Graphical User Interface applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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	S 2	P S C 3
CO 1	-	-	3	-	-	-	-	-	-	-	-	2	3	3	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	2	3	3	-
CO 3	3	-	2	-	-	-	-	-	-	-	-	2	3	3	-
CO 4	-	3	3	2	-	-	-	-	-	-	-	2	3	3	-
CO 5	-	3	-	3	2	-	-	-	-	-	-	3	3	3	-

UNIT I :

Introduction to Javascript, objects in JavaScript, Dynamic HTML with JavaScript

UNIT II:

Working with XML: Document Type Definition, XMLschemas, Documentobjectmodel, XSLT,DOM and SAX.

UNIT III:

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues

UNIT IV:

Database Access: Database Programming using JDBC, studying javax.sql.*package, accessing a database from a JSP page, Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSPProcessing.JSP application design with MVC.

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing–Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests.

UNIT V:

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. **Working with variables and constants:** Using variables, Using constants, Data types,Operators.**Controlling program flow:** Conditional statements,Controlstatements,Arrays,functions.Working with forms and Databases such as MySQL.

TEXT BOOKS:

- TheComplete Reference,Java2, 3ed, PatrikNaughton, HerbertSchildt, TMH
- ProgrammingtheWorldWideWeb,RobetWSebesta,7ed,Pearson.
- WebTechnologies,UttamKRoy,OxfordJavaServerPages,HansBergstan,Oreilly

REFERENCE BOOKS:

- Web Technologies, HTML<JavaScript,PHP,Java,JSP,XMLandAJAX,Blackbook,DreamTech.
- An Introduction to Web Design, Programming, PaulSWang, SandaSKatila,Cengage
- An introduction toWeb Design and Programming,WangThomson
- Web application technologies concepts,Knuckles,JohnWiley.
- Programming worldwideweb,Sebesta,Pearson
- BeginningWebProgramming,JonDuckett,Wrox,WileyJavaserverpages,Pekowsky,Pearson

E-RESOURCES:

1. https://www.w3schools.com/
2. https://www.tutorialspoint.com/perl/
3. https://www.railstutorial.org/book
4. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

20A2205402- SOFTWARE ENGINEEEING

Lecture – Tutorial-Practical::	3	**0**	**0**	**Internal Marks:**	30
Credits:	3			**External Marks:**	70

Prerequisites:

Programming and problem solving, General Aptitude

Course Objectives:

1. To study pioneer of Software Development Life Cycle, Development models and Agile Software development.
2. To study the concepts related to analysis, design concepts of software development
3. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
4. To discuss various software testing strategies viz., unit test; integration, regression, and system testing and validation testing
5. To learn the process of improve the quality of software work products.
6. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand the basic concepts of Software engineering and applications
CO2	Compare different software engineering process models
CO3	Analyze the principles of requirement Engineering
CO4	Create design models for software Engineering projects
CO5	Apply different testing techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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	PSO2	PSO3
CO1	2	--	--	--	--	--	--	--	--	--	--	--	2	--	--
CO2	--	--	2	--	--	--	--	--	3	--	2	--	--	3	--
CO3	--	2	3	--	--	--	--	2	--	3	2	--	--	--	--
CO4	--	2	--	--	--	--	--	--	--	3	--	--	2	--	3
CO5	--	--	2	--	--	--	--	--	--	2	--	--	--	3	--

UNIT I :

Software and Software Engineering: The Nature of Software, Defining Software, Software Application Domains, Legacy Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practice, The Essence of Practice, General Principles, Software Myths.
The Software Process: Software Engineering, Software Process, Generic process model, Prescriptive process model, specialized, unified process, Agile development, Agile Process, Extreme Programming, Other agile Process models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

UNIT II:

Agile Development: Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP) Other Agile Process Models, A Tool Set for the Agile Process.
Principles that guide practice, Software Engineering Knowledge, Principles That Guide Process, Principles That Guide Practice, Principles That Guide Each Framework Activity, Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

UNIT III:

Requirements Modeling: Scenarios, Information and Analysis classes: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.
Requirements Modeling: Flow, Behavior, Patterns, And Web apps: Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirement modeling for WebApps.

UNIT IV:

Design Concepts: Design within the Context of Software Engineering, the Design Process, Design Concepts, the Design Model.
Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Assessing Alternative Architectural Designs.
Modeling Component-Level Design: What Is a Component? Designing Class-Based Components, Conducting Component Level Design, and Component level design for Web Apps.
Performing User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps.

UNIT V:

Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation testing, System testing, the art of debugging.
Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Model-Based Testing, Testing for Specialized Environments, Architectures, and Applications, Patterns for Software Testing.

TEXT BOOKS:

1. Roger S, "Software Engineering – A Practitioner's Approach", seventh edition, Pressman, 2010.

2. Ian Somerville, "Software Engineering". 9th ed, Pearson Education. 2011.

REFERENCE BOOKS:

1. Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, "Fundamentals of Software Engineering".2 ed, PHI. 2009
2. RajibMall, Fundamentals of Software Engineering. 3 ed, PHI. 2009.
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Hans Van Vliet, "Software Engineering: Principles and Practices"–, 2008.

E-RESOURCES:

1. http://www.dcnicn.com/BusinessNews/WVU-MIS13Apr00/Software-Engineering.pdf
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE7/Presentations/PDF/ch1.pdf
3. http://sites.computer.org/ccse/SE2004Volume.pdf
4. http://homepages.cs.ncl.ac.uk/brian.randell/NATO/nato1968.PDF
5. http://www.dau.mil/pubs/pdf/SEFGuide 01-01.pdf
6. https://nptel.ac.in/courses/106101061/2
7. https://nptel.ac.in/courses/106101061/5

20A2242401- Introduction to Machine Learning

Lecture – Tutorial-Practical::	3-0-0				**Internal Marks:**	3 0
Credits:	3				**External Marks:**	1 0

Prerequisites: Differentiation, Calculus, Descriptive Statistics.

Course Objectives: To learn the fundamentals of Machine Learning with R, Basics of Convex and Non-Convex functions and Optimization methods, Understanding the use and evaluation of Machine Learning Models.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Able to learn fundamentals of Machine Learning.

CO2	Understanding R Data Structures and Exploring Data.
CO3	Learn the use of Convex and Non-Convex functions.
CO4	Analyze various Optimization methods.
CO5	Use of Machine Learning Models.
CO6	Evaluation of Machine Learning Models.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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	PSO2	PSO3
CO1	3	-	2	2	2	2	-	-	-	-	2	-	2	2	3
CO2	2	2	3	2	2	-	-	-	-	-	2	-	2	2	2
CO3	-	-	3	2	2	-	-	-	-	-	2	-	3	3	2
CO4	3	3	2	3	3	3	-	-	-	-	2	-	2	3	2
CO5	3	3	2	3	3	3	-	-	-	-	2	-	2	3	2
CO6	-	2	2	3	3	3	-	-	-	-	2	-	2	3	3

UNIT I: Introducing to Machine Learning

Introduction to Machine Learning- Origins, Uses, and abuses, How do machines learn, Steps to apply machine learning to your data, Choosing a machine learning algorithm, Using R for machine learning.

UNIT II: Managing and Understanding Data

R data structures, Vectors, Lists, Dataframes, Matrices and arrays, Managing data with R,
Exploring and understanding data- Exploring the structure data, Exploring numeric variables, Exploring Categorical variables, Exploring the relationship between variables, Understanding Imbalanced Data Sets, Outliers, Noisy Data.

UNIT III: Convex and Non-Convex functions

Convex functions-Examples, Finding maximum and minimum- Differentiation, Gradient descent

Non-Convex functions-Examples, Difference between the minimum and global minimum

UNIT IV: Optimization Methods

Applications of Operations Research,

Linear Programming- Formulation-Graphical Method, Simplex Method, Artificial Technique-Two phase method-Big-M method, Duality principle.

UNIT V: MACHINE LEARNING MODELS

Machine Learning Models-Types, Calculating accuracy of Regression and Classification Models, Traning Validation and Testing Data, Overfitting and Underfitting, Regularization, Hyperparameter.

Supervised Models: Linear, KNN, Naïve-Bayes.

TEXTBOOKS:

1. Machine Learning with R, Learn how to use R to apply powerful machine learning methods and gain an insight into real-world applications, Brett Lantz, PACKET PUBLISHING.
2. Operations Research, S. D. Sharma –Kedarnath Ramnath & Co 2002.

REFERENCE BOOKS

1. Introduction to Machine Learning Alex Smola and S.V.N. Vishwanathan, CAMBRIDGE UNIVERSITY PRESS.

E-RESOURCES:

1. https://onlinecourses.swayam2.ac.in/aic20_sp35/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs29/preview
3. https://www.coursera.org/learn/r-programming.
4. https://www.coursera.org/browse/data-science/machine-learning

Formal Languages and Automata Theory

Lecture – Tutorial-Practical::	3-0-0	**Internal Marks:**	30
Credits:	3	**External Marks:**	70

Prerequisites:

Course Objectives:-

1. To give an overview of the theoretical foundations of computer science from the perspective of formal languages
2. To illustrate finite state machines to solve problems in computing
3. To explain the hierarchy of problems arising in the computer sciences.
4. To familiarize Regular grammars, context frees grammar.

CourseOutcomes:

Upon successful completion of the course, the student will be able to:

CO1	Able to use basic concepts of formal languages of finite automata techniques
CO2	Student able to design Finite Automata's for different Regular Expressions and Languages
CO3	Construct context free grammar for various languages
CO4	Solve various problems of applying normal form techniques, push down automata and Turing Machines
CO5	Participate in GATE, PGECET and other competitive examinations

ContributionofCourseOutcomestowardsachievementofProgramOutcomes(1–Low,2-Medium,3 – High)

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

UNIT I : FINITE AUTOMATA (FA)

Introduction to Finite Automata, Central Concepts of Automata Theory, Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Equivalence of NFA and DFA. Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion. Text search using automata.

UNIT II: REGULAR EXPRESSIONS (RE) & REGULAR GRAMMARS

Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions.
Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, Closure properties of regular languages. Applications of RE – RE in Unix

UNIT III: CONTEXTS FREE GRAMMER (CFG) & Push Down Automata(PDA)

Context Free Grammars: Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL. Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

UNIT IV: Turing Machines(TM)

Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). , linear bounded automata and context sensitive language.

UNIT V: Computability Theory:

Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

TEXTBOOKS:

1."Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.

2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

REFERENCEBOOKS:

- Introduction to Formal Languages , Automata Theory and Computation – Kamala Krithivasan, Rama R
- Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
- Theory of Computation : A Problem – Solving Approach- Kavi Mahesh, Wiley India Pvt. Ltd.
- "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
- Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.
- Introduction to languages and the Theory of Computation, John C Martin, TMH..

E-RESOURCES:

1. Foundations of Computation-CAROL CRITCHLOW, DAVID ECK
2. Introduction to Theory of Computation- Anil Maheshwari,Michielsmid-carleton University-2012

20A2205491- WEB TECHNOLOGIES LAB

Lecture – Tutorial-Practical::	0-0-3				**Internal Marks**
Credits:	1.5				**External Mark :**

Prerequisites:

1. **JavaProgramming**

2.**DataBaseManagementSystems**

Course Objectives:

1	HyperTextMarkupLanguage(HTML)andCascadingStyleSheets(CSS)forlayingout(formatting)pages that contain text, images andgraphics
2	ExtensibleMarkupLanguages(XMLisusedtostoreandtransportdataamongwebpages),amechanismfordefining newtagsets and interchangingdataamongwebapplications

3	Client-sideProgrammingusingJavaScriptforvalidatingthe data
4	Server-SideProgrammingusingservletsaretogeneratestaticcontentandJavaServerPagesareusedtogenerate dynamiccontent
5	CreatingapureDynamicWebApplicationwhichretrievesthedatafromDatabaseaccordingtotheclient request usingJDBC
6	CreatingapureDynamicWebApplicationwhichretrievesthedatafromDatabaseaccordingtotheclient request usingPHP

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Createawebsitestaticallyordynamically
CO2	Getknowledgeon displayingand decoratingthecontentsin awebpage.
CO3	Learntheconceptsofstoreandtransportthedataamongwebpages
CO4	Createobjectswithwhichtheclientcancommunicatewithserver.
CO5	Generatestaticordynamiccontentaccordingtotheclient'srequest
CO6	ProvideUser Authentication byusingcookiesand back end operations usingJDBC and PHP

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	PS O	PS O2
CO1	-	-	3	-	-	-	-	-	-	-	-	2	3	3
CO2	-	-	3	-	-	-	-	-	-	-	-	2	3	3
CO3	3	-	2	-	-	-	-	-	-	-	-	2	3	3
CO4	-	3	3	2	-	-	-	-	-	-	-	2	3	3
CO5	-	3	-	3	2	-	-	-	-	-	-	3	3	3
Total	3	6	11	5	2	-	-	-	-	-	-	11	3	3

Week-1:
Designthefollowingstaticweb pagesrequired foranonlinebook storeweb site.

Week-1:
Designthefollowingstaticweb pagesrequired foranonlinebook storeweb site.
1)**HOMEPAGE:**
Thestatichomepagemust containthree**frames**.

Topframe: Logoandthecollegenameandlinkstohomepage,Loginpage,Registrationpage, Catalogue pageandCartpage (thedescriptionof these pageswillbegivenbelow).

Leftframe: Atleastfourlinksfornavigation,whichwilldisplaythecatalogueofrespectivelinks. Fore.g.:Whenyouclickthelink**"CSE"**thecatalogueforCSEBooksshould be displayedintheRightframe.

Rightframe: The*pagestothelinksintheleftframemustbeloadedhere*.Initiallythispagecontains descriptionofthewebsite.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

2) LOGINPAGE:

Thispagelooks likebelow:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : Password: Submit Reset			

3) CATOLOGUEPAGE:

Thecataloguepageshouldcontain thedetails ofall thebooksavailable inthe websiteina table.Thedetails should contain the following:

1. SnapshotofCoverPage.
2. AuthorName.
3. Publisher.
4. Price.
5. Addto cartbutton.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	   	Book : XML Bible Author : Winston Publication : Wiely Book : AI Author : S.Russel Publication : Princeton hall Book : Java 2 Author : Watson Publication : BPB publications Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 40.5 $ 63 $ 35.5 $ 50	Add to cart Add to cart Add to cart Add to cart

Note:Week2 containstheremainingpages andtheir description.

Week-2:

4) CARTPAGE: Thecart pagecontainsthedetailsabout thebookswhich areaddedto thecart.Thecartpageshould look likethis:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	**Book name** Java 2 XML bible	**Price** $35.5 $40.5	**Quantity** 2 1 **Total amount -**	**Amount** $70 $40.5 $130.5

5) REGISTRATIONPAGE:

Createa"*registrationform* "withthefollowingfields

1) Name(Textfield)
2) Password(passwordfield)
3) E-mailid (textfield)
4) Phonenumber(text field)
5) Sex (radiobutton)
6) Dateofbirth(3selectboxes)
7) Languagesknown(checkboxes –English,Telugu,Hindi,Tamil)
8) Address(textarea)

WEEK3:

VALIDATION:

Write*JavaScript* to validatethe followingfields oftheaboveregistrationpage.

1. Name(Name shouldcontains alphabetsand thelength shouldnot belessthan 6characters).
2. Password(Passwordshouldnot belessthan6 characterslength).
3. E-mail id (should not contain any invalid and must follow the standard patternname@domain.com)
4. Phone number (Phone number should contain 10 digits only).Note:Youcan alsovalidatetheloginpagewiththeseparameters.UsePHPto connectwiththedatabaseto storetheabovedetails.

Week-4:

Designawebpageusing **CSS (C**ascading**S**tyle**S**heets**)**whichincludesthe following:

1) Usedifferent font, styles:
Inthestyledefinitionyoudefinehow eachselectorshouldwork(font,coloretc.).Then,inthebodyofyour pages,yourefertotheseselectorstoactivatethe styles.
Forexample:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-decoration:underline}
</style>

</HEAD>
```

```
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```

2) Setabackgroundimage forboththepageandsingleelementson thepage.Youcan definethe background imageforthepagelikethis:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.Asbackground-repeat: repeat
Tilesthe imageuntil theentirepageisfilled, justlikeanordinarybackground imageinplainHTML.

4) Define styles for links
asA:link
A:visitedA
:activeA:h
over
Example:
<styletype="text/css">
A:link {text-decoration:
none}A:visited {text-decoration:
none}A:active{text-decoration:none}
A:hover{text-decoration:underline;color:red;}
</style>

5) Workwithlayers:
Forexample:
LAYER1ONTOP:
<divstyle="position:relative;font-size:50px;z-index:2;">LAYER1
LAYER2
LAYER2ONTOP:
<divstyle="position:relative;font-size:50px;z-index:3;">LAYER1
LAYER2

6) Add a customized
cursor:Selector{cursor:va
lue}
Forexample:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

WriteanXMLfile which willdisplaytheBookinformation whichincludesthefollowing:

1) Title ofthebook
2) AuthorName
3) ISBNnumber
4) Publishername
5) Edition
6) Price

WriteaDocumentTypeDefinition(DTD)tovalidate theaboveXMLfile.DisplaytheXMLfileasfollows. Thecontentsshouldbedisplayedinatable.Theheaderofthetableshouldbeincolor GREY.And the Authornamescolumnshouldbedisplayedinonecolorandshouldbecapitalizedandinbold.Useyour own colors forremaining columns.
UseXMLschemas XSLand CSS forthe abovepurpose.
Note:Giveatleastfor4 books. Itshouldbevalidsyntactically.Hint:You can usesome xml editors like XML-spy

Week-6:

1) InstallTOMCATwebserverandAPACHE.
WhileinstallationassignportnumberA040toTOMCATand8080toAPACHE.Makesurethattheseports areavailablei.e., no other process is usingthis port.

2) Accesstheabovedevelopedstaticwebpagesforbookswebsite,usingtheseserversbyputtingthe web pages developed in week-1 andweek-2 in thedocument root.
Access the pages by using the urls :http://localhost:4040/rama/books.html (for tomcat)http://localhost:8080/books.html (forApache)

Week-7:

UserAuthentication:

Assumefourusersuser1,user2,user3anduser4havingthepasswordspwd1,pwd2,pwd3andpwd4respectively.
Writeaservelet fordoingthefollowing.

1. CreateaCookieandadd thesefouruser id'sand passwordsto this Cookie.
2. Readtheuseridandpasswordsenteredintheloginform(week1)andauthenticatewiththevalues(useridand passwords) available in thecookies.

If heisavaliduser(i.e.,user-name andpassword match)youshould welcomehimbyname(user-name)elseyou shoulddisplay"Youarenot anauthenticated user".
Useinit-parameterstodothis.Storetheuser-namesandpasswordsinthewebinf.xmlandaccessthemin theservlet byusingthegetInitParameters() method.

Week-8:

Installadatabase(Mysql orOracle).
Createatablewhichshouldcontainatleastthefollowingfields:name,password,email-id,phonenumber(theseshould hold the data from theregistration form).
Practice'JDBC'connectivity.
Writeajavaprogram/servlet/JSP/PHPtoconnecttothatdatabaseandextractdatafromthetablesanddisplaythe m. Experiment with various SQLqueries.
Insertthedetailsoftheuserswhoregisterwiththewebsite,wheneveranewuserclicksthesubmitbutton inthe

registration page(week2).

Week-9:

WriteaJSP whichdoes the followingjob:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registrationform. Authenticate the user when he submits the login form using the user name and passwordfromthedatabase(similar to week8 instead of cookies).

Week-10:

Create tables in the database which contain the details of items (books in our case like Bookname , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in sucha way that you should connect to the database and extract data from the tables and display theminthecataloguepageusingJDBC.

TEXT BOOKS:

- TheComplete Reference,Java2, 3ed, PatrikNaughton, HerbertSchildt, TMH
- ProgrammingtheWorldWideWeb,RobetWSebesta,7ed,Pearson.
- WebTechnologies,UttamKRoy,OxfordJavaServerPages,HansBergstan,Oreilly

REFERENCE BOOKS:

- WebTechnologies,HTML<JavaScript,PHP,Java,JSP,XMLandAJAX,Blackboo k,DreamTech.
- AnIntroductiontoWebDesign,Programming,PaulSWang,SandaSKatila,Cengage
- AnintroductiontoWebDesignandProgramming,WangThomson
- Webapplicationtechnologiesconcepts,Knuckles,JohnWiley.
- Programmingworldwideweb,Sebesta,Pearson
- BeginningWebProgramming,JonDuckett,Wrox,WileyJavaserverpages,Pekowsk y,Pearson

E-RESOURCES:

1. https://www.w3schools.com/
2. https://www.tutorialspoint.com/perl/
3. https://www.railstutorial.org/book
4. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

20A2205492- SOFTWARE ENGINEEEING LAB

Lecture – Tutorial-Practical::	0-0-3			**Internal Marks:**	15
Credits:	1.5			**External Marks:**	35

Prerequisites:

Programming and problem solving, General Aptitude

Course Objectives:

- To understand the software engineering methodologies involved in the phases forproject development.
- To gain knowledge about open source tools used for implementing softwareengineering methods.
- To exercise developing product-startups implementing software engineering methods.
- To use Open source Tools, viz., StarUML / UMLGraph / Topcased

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Ability to translate end-user requirements into system and software requirements
CO2	Analyze the principles of requirement Engineering
CO3	Ability to generate a high-level design of the system from the software requirements
CO4	Create design models for software Engineering projects
CO5	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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**	**PSO 3**
CO1	2	--	--	--	--	--	--	--	--	--	--	--	2	--	--
CO2	--	--	2	--	--	--	--	--	3	--	2	--	--	3	--
CO3	--	2	3	--	--	--	--	2	--	3	2	--	--	--	--
CO4	--	2	--	--	--	--	--	--	--	3	--	--	3	--	3
CO5	--	--	3	--	--	--	--	--	--	2	--	--	--	3	--

List of Experiments

(For at least 4 problems)

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

1. Problem Analysis and Project Planning -Thorough study of the problem – IdentifyProject scope, Objectives and Infrastructure.
2. Software Requirement Analysis – Describe the individual Phases/modules of theproject and Identify deliverables. Identify functional and non-functional requirements.
3. Data Modeling – Use work products – data dictionary.
4. Software Designing - Develop use case diagrams and activity diagrams, build and testclass diagrams, sequence diagrams and add interface to class diagrams.
5. Prototype model – Develop the prototype of the product.

Sample Projects:

1. Course management system (CMS)

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A grade book where faculty can record grades and each student can view his or hergrades
- An integrated email tool allowing participants to send announcement email messagesto the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants
- A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

2. Easy Leave

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the from and to dates, reason for taking leave, address for

communication while on leave and his/her superior's email id

- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
- Cancel his/her leave (which has been already approved). This will need to beapproved by his/her Superior
- get help about the leave system on how to use the different features of the system
- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

3. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent- the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span ofa few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system
To generate the quick reports
To make accuracy and efficient calculations
To provide proper information briefly
To provide data security
To provide huge maintenance of records Flexibility of
transactions can be completed in time

4. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws

- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automatethe entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking theURL.
- There is no risk of data mismanagement at any level while the project development isunder process.
- It provides high level of security with different level of authentication

Other Sample Projects :

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Roger S, "Software Engineering – A Practitioner's Approach", seventh edition, Pressman, 2010.

2. Ian Somerville, "Software Engineering". 9th ed, Pearson Education. 2011.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education

REFERENCE BOOKS:

1. Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, "Fundamentals of Software Engineering".2 ed, PHI. 2009
2. RajibMall, Fundamentals of Software Engineering. 3 ed, PHI. 2009.
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Hans Van Vliet, "Software Engineering: Principles and Practices"–, 2008.

E-RESOURCES:

1. http://www.dcnicn.com/BusinessNews/WVU-MIS13Apr00/Software-Engineering.pdf
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE7/Presentations/PDF/ch1.pdf
3. http://sites.computer.org/ccse/SE2004Volume.pdf
4. http://homepages.cs.ncl.ac.uk/brian.randell/NATO/nato1968.PDF
5. http://www.dau.mil/pubs/pdf/SEFGuide 01-01.pdf
6. https://nptel.ac.in/courses/106101061/2
7. https://nptel.ac.in/courses/106101061/5

20A2242491- Machine Learning Lab

Lecture – Tutorial-Practical::	0-0-3				**Internal Marks:**
Credits:	1.5				**External Marks:**

Prerequisites: Differenciation, Calculus, 'R'

Course Objectives: Understanding the implementation of various 'R' Data Structures, Graphs, and Machine Learning Models of Classification and Regression.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Able to Implement Lists and Data Frames and Matrices.
CO2	Able to Know the Data Cleaning and Pre-Processing Methods.
CO3	Able to build Various Graphics Applications.
CO4	Able to categorize the predictions against the actual values.
CO5	Able to build multiple Linear regression models across the range of predictor values.
CO6	Able to use K.N.N., Naive Bayes in Machine Learning Models.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	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**	**PSO 2**
CO1	3	-	2	2	2	2	-	-	-	-	2	-	2	2
CO2	2	2	3	2	2	-	-	-	-	-	2	-	2	2
CO3	-	-	3	2	2	-	-	-	-	-	2	-	3	3
CO4	3	3	2	3	3	3	-	-	-	-	2	-	2	3
CO5	3	3	2	3	3	3	-	-	-	-	2	-	2	3
CO6	-	2	2	3	3	3	-	-	-	-	2	-	2	3

List of Experiments

- Implement List
- Implement DataFrames.
- Implement Matrices.
- Implement Data Cleaning Techniques.
- Implement Data Pre-Processing Techniques.
- Implement Bar Charts(Side by Side, Stacked).
- Implement Line Charts.
- Implement ScatterPlot**,** Histogram.
- Implement Confusion Matrix.

- Implement Linear Regression Model.
- Implement K.N.N. Regression and Classification Model.
- Implement Naïve Bayes Classification Model.

TEXTBOOKS:

Machine Learning with R, Learn how to use R to apply powerful machine learning methods and gain an insight into real-world applications, Brett Lantz, PACKET PUBLISHING.

REFERENCE BOOKS

1. Introduction to Machine Learning Alex Smola and S.V.N. Vishwanathan, CAMBRIDGE UNIVERSITY PRESS.

E-RESOURCES

1. www. onlinecourses.nptel.ac.in/noc20_mg24/preview.
2. www.coursera.org/learn/predictive-modeling-analytics.
3. https://onlinecourses.swayam2.ac.in/imb21_mg20/preview.

Course Code- MONGO DB

Lecture – Tutorial-Practical::	0-0-4				**Internal Marks**
Credits:	2				**External Mark :**

Prerequisites:

Course Objectives:

The main objective of the course is Understand the various concepts of Mongo DB

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Installing and configuring mongoDB in windows
CO2	Perform all database operations using mongoDB
CO3	Develop applications by integrating mongoDBwith java/PHP.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O**	**PS O2**
CO1	3	2	--	--	--	--	--	--	--	--	--	--	2	--

CO2	2	3	3	--	2	--	--	--	--	--	--	--	2
CO3	2	2	2	--	2	--	--	--	--	--	--	--	--

List of Experiments :

1. MongoDB installation and configuration in windows.
2. Demonstrate how to create and drop a database in MongoDB.
3. Creating the Collection in MongoDB on the fly
4. Creating collection with options before inserting the documents and drop the collection created.
5. MongoDB insert document a. Insert single document b. Insert multiple documents in collection
6. Querying all the documents in json format and Querying based on the criteria.
7. MongoDB update document a. Using update() method. b. Using save() method.
8. MongoDB delete document from a collection. a. Using remove() method. b. Remove only one document matching your criteria c. Remove all documents
9. MongoDB Projection
10. limit() ,skip(), sort() methods in MongoDB
11. MongoDB indexing a. Create index in MongoDB b. Finding the indexes in a collection c. Drop indexes in a collection d. Drop all the indexes
12. 12. MongoDB with java and PHP a. Create a simple application that uses MongoDB with Java b. Create a simple application that uses MongoDB with PHP

WEB REFERENCES

1. http://begineersbook.com/2017/09/mongodb-tutorial

20A2200802: Professional Ethics & Human Values

Lecture – Tutorial- Practical:	0-2-0	**Internal Marks:**	30
Credits:	0	**External Marks:**	70*

Prerequisites:

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of others
- To create awareness on assessment of safety and risk

Course Outcomes

Students will be able to:
Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
Identify the multiple ethical interests at stake in a real-world situation or practice
Articulate what makes a particular course of action ethically defensible
Assess their own ethical values and the social context of problems
Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Unit I- Human Values:

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others –Living Peacefully –Caring –Sharing –Honesty -Courage-Cooperation– Commitment – Empathy –Self Confidence Character –Spirituality.

Learning outcomes:

1. Learn about morals, values & work ethics.
2. Learn to respect others and develop civic virtue.
3. Develop commitment
4. Learn how to live peacefully

Unit II – Engineering Ethics:

Senses of 'Engineering Ethics-Variety of moral issued –Types of inquiry –Moral dilemmas – Moral autonomy –Kohlberg's theory-Gilligan's Theory-Consensus and controversy –Models of professional roles-Theories about right action-Self-interest -Customs and religion –Uses of Ethical theories –Valuing time –Cooperation –Commitment.

Learning outcomes:

1. Learn about the ethical responsibilities of the engineers.
2. Create awareness about the customs and religions.
3. Learn time management
4. Learn about the different professional roles.

Unit III Engineering as Social Experimentation:

Engineering As Social Experimentation –Framing the problem –Determining the facts – Codes of Ethics –Clarifying Concepts –Application issues –Common Ground -General Principles –Utilitarian thinking respect for persons. Learning outcomes:

1. Demonstrate knowledge to become a social experimenter.
2. Provide depth knowledge on framing of the problem and determining the facts.
3. Provide depth knowledge on codes of ethics.
4. Develop utilitarian thinking

Unit IV

Engineers Responsibility for Safety and Risk: Safety and risk –Assessment of safety and risk –Risk benefit analysis and reducing riskSafety and the Engineer-Designing for the safety-Intellectual Property rights (IPR). Learning outcomes:

1. Create awareness about safety, risk & risk benefit analysis.
2. Engineer's design practices for providing safety.
3. Provide knowledge on intellectual property rights.

Unit IV

Global Issues: Globalization –Cross-culture issues-Environmental Ethics –Computer Ethics –Computers as the instrument of Unethical behavior –Computers as the object of Unethical acts – Autonomous Computers-Computer codes of Ethics –Weapons Development -Ethics and Research –Analyzing Ethical Problems in research. Learning outcomes:

1. Develop knowledge about global issues.
2. Create awareness on computer and environmental ethics
3. Analyze ethical problems in research.
4. Give a picture on weapons development.

TEXT BOOKS:

1."Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and, V.S.Senthil Kumar-PHI Learning Pvt. Ltd-2009

2) "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.

3) "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger –Tata McGrawHill–2003.

4) "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.

5) "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M. Jayakumaran, Laxmi Publications.

6) "Professional Ethics and Human Values" by Prof.D.R.Kiran-"Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication