



Three-Year Undergraduate Programme

Diploma Engineering

Computer Engineering

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

Faculty of Engineering & Technology
Diploma Engineering in Computer Engineering

1. Vision of the Department

The Computer Engineering Department envisions diploma students as future tech leaders, equipped with practical skills and theoretical knowledge. Our vision includes offering hands-on experiences and industry-aligned projects to cultivate innovation and problem-solving abilities. We aim to empower students to seamlessly transition into the workforce or pursue further education, contributing effectively to the digital economy. By instilling a strong foundation in computer engineering principles and fostering a passion for lifelong learning, we aim to nurture skilled professionals who drive technological advancements and make meaningful societal impacts.

2. Mission of the Department

M1 Fostering a culture of academic excellence by providing a comprehensive and up-to-date curriculum in computer engineering that equips students with the necessary theoretical knowledge and practical skills.

M2 Offering hands-on training and practical experience through laboratory work, projects, and internships to ensure that students can apply theoretical concepts to real-world scenarios.

M3 Continuously evaluating and updating the curriculum to incorporate the latest technological advancements and industry best practices, ensuring that graduates are well-prepared for the ever-changing demands of the field.

M4 Encouraging research activities and fostering an environment conducive to innovation, to ensure students contribute to the advancement of the field of computer engineering.

3. Program Educational Objectives

The statements below indicate the career and professional achievements of the Diploma. Computer engineering curriculum enables graduates to attain.

PEO 1	Preparation	To prepare students to succeed in employment/profession and/or to pursue under graduate educations in civil Engineering discipline in particular and allied Engineering discipline in general.
PEO 2	Core Competence	To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to formulate, analyse and solve engineering problems requiring knowledge of civil Engineering.
PEO 3	Breadth	To prepare students with engineering breadth to innovate, design, and develop products and to contribute in providing solutions related to multidisciplinary real life problems.

PEO 4	Professionalism	To inculcate in students professional and ethical attitude, effective communication skills and team work to become a successful professional.
PEO 5	Learning Environment	To provide students with an academic environment that makes them aware of excellence and lifelong learning in emerging technologies.

4. Program Learning Outcomes

Program Learning outcomes are statements conveying the intent of a program of study.

PO 1	Basic and Discipline specific knowledge	Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
PO 2	Problem analysis	Identify and analyse well-defined engineering problems using codified standard methods.
PO 3	Design/development of solutions	Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
PO 4	Engineering Tools, Experimentation and Testing	Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
PO 5	Engineering practices for society, sustainability and environment:	Apply appropriate technology in context of society, sustainability, environment and ethical practices.
PO 6	Project Management	Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
PO 7	Life-long learning	Ability to analyse individual needs and engage in updating in the context of technological changes.

5. Credit Framework

Semester wise Credit distribution of the programme	
Semester-1	16
Semester-2	20
Semester-3	24
Semester-4	22
Semester-5	24
Semester-6	21
Total Credits:	127

Category wise Credit distribution of the programme	
Category	Credit
Major Core	83
Minor Stream	30
Multidisciplinary	16
Ability Enhancement Course	8
Skill Enhancement Courses	7
Value added Courses	4
Summer Internship	4
Research Project/Dissertation	14
Total Credits:	127

6. Program Curriculum

Semester 1						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03605101	Environmental Science	0	2	-	-
2	03606107	Programming in C - I	3	3	-	-
3	03606108	Programming in C Lab - I	2	-	4	-
4	03606109	Basics of Web Development	1	1	-	-
5	03606110	Basics of Web Development - Lab	2	-	4	-
6	03607151	Fundamentals of Electrical and Electronics Engineering	3	2	-	1
7	03607152	Fundamentals of Electrical and Electronics Engineering Lab	1	-	2	-
8	03691101	Mathematics - I	3	2	-	1

9	03693103	Communication Skills - I	1	1	-	-
Total			16	11	10	2
Semester 2						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
8	03606155	Programming in C - II	3	3	-	-
9	03606156	Programing in C Lab - II	2	-	4	-
10	03606157	Python Programming	3	3	-	-
11	03606158	Python Programming Lab	2	-	4	-
12	03606160	Computer Workshop Lab	1	-	2	-
13	03691151	Mathematics-II	4	3	-	1
14	03692154	Basic Physics Lab	1	-	2	-
15	03692155	Basic Physics	3	3	-	-
16	03693153	Communication Skills - II	1	1	-	-
Total			20	13	12	1
Semester 3						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
17	03600201	Entrepreneurship and Start-ups	1	1	-	-
18	03606201	Data Structures	3	3	-	-
19	03606202	Data Structures Lab	1	-	2	-
20	03606205	Operating Systems	3	3	-	-
21	03606206	Operating Systems Lab	1	-	2	-
22	03606207	Introduction to DBMS	3	3	-	-
23	03606208	Introduction to DBMS Lab	2	-	4	-
24	03606213	Object Oriented Programming with C++	3	3	-	-
25	03606214	Object Oriented Programming with C++ Lab	2	-	4	-
26	03606215	Computer Organization & Architecture	4	3	-	1
27	03693203	Professional Communication and Critical Thinking	1	1	-	-
Total			24	17	12	1
Semester 4						

Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
28	03600251	Essence of Indian Knowledge and Tradition	0	2	-	-
29	03606251	Computer Networks	2	2	-	-
30	03606252	Computer Networks Lab	1	-	2	-
31	03606253	Software Engineering	3	3	-	-
32	03606255	Java Programming	3	3	-	-
33	03606256	Java Programming Lab	2	-	4	-
34	03606257	Algorithms	4	3	-	1
35	03606264	Minor Project	1	-	2	-
36	03606265	Web Development Using PHP	3	3	-	-
37	03606266	Web Development Using PHP - Lab	2	-	4	-
38	03693251	Employability Skills	1	1	-	-
Total			22	17	12	1
Semester 5						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
39	03606305	Information Security	3	3	-	-
40	03606306	Information Security Lab	1	-	2	-
41	03606308	Summer Internship	2	-	2	-
42	03606314	Major Project - I	6	-	12	-
43	03606303	Advanced Java Programming	3	3	-	-
44	03606304	Advanced Java Programming Lab	2	-	4	-
45	03606301	Internet of Things (IoT)	2	2	-	-
46	03606302	Internet of Things (IoT) Lab	1	-	2	-
47		Program Elective - I (Compulsory Subjects :1)	3	3	-	-
48		Program Elective Lab- I (Compulsory Subjects :1)	1	-	2	-
Total			24	12	24	
PE 01						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606331	Data Mining	3	3	-	-
2	03606333	Cloud Computing	3	3	-	-
PE 01-LAB						

Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606332	Data Mining Lab	1	-	2	-
2	03606334	Cloud Computing Lab	1	-	2	-

Semester 6						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03600351	Indian Constitution	0	2	0	0
2	03606351	Android Programming	3	3	0	0
3	03606352	Android Programming Lab	1	0	2	0
4	03606353	.Net Programming with C#	2	2	0	0
5	03606354	.Net Programming with C# Lab	1	0	2	0
6	03606364	Major Project - II	6	0	12	0
7		Program Elective - II (Compulsory Subjects :1)	3	3	0	0
8		Program Elective - III (Compulsory Subjects :1)	3	3	0	0
9		Program Elective Lab- II (Compulsory Subjects :1)	1	0	2	0
10		Program Elective Lab- III (Compulsory Subjects :1)	1	0	2	0
Total			21	13	20	0

Program Elective - II						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606381	Advanced Database Management System	3	3	0	0
2	03606383	Advanced Computer Network	3	3	0	0
Program Elective - III						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606385	Multimedia Technologies	3	3	0	0
2	03606387	Artificial Intelligence and Machine Learning	3	3	0	0

Program Elective Lab- II						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606382	Advanced Database Management System Lab	1	0	2	0
2	03606384	Advanced Computer Network Lab	1	0	2	0
Program Elective Lab- III						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	03606386	Multimedia Technologies Lab	1	0	2	0
2	03606388	Artificial Intelligence and Machine Learning Lab	1	0	2	0

Semester 1

(1)

- a. **Course Name:** Environmental Science
- b. **Course Code:** 03605101
- c. **Prerequisite:** Zeal to learn the subject
- d. **Rationale:** The course is designed to give developers a general awareness of these and related issues so that every student will start acting as a responsible citizen to make the country and the world a better place to live in.
- e. **Course Learning Objective:**

CLOBJ 1	Understanding Ecosystem Structure and Describe the components of an ecosystem, including both biotic and abiotic factors and understand the significance of these cycles in maintaining ecosystem balance.
CLOBJ 2	Evaluate air and noise pollution sources, effects, and control measures, considering both natural and anthropogenic factors. Studying Air and Noise Pollution and Identify common air pollutants and their sources. Evaluate noise pollution sources, measurement techniques, and regulatory measures
CLOBJ 3	Analyse characteristics such as turbidity, pH, BOD, and COD in water. Examine primary, secondary, and tertiary methods of wastewater treatment. Investigate causes, effects, and preventive measures of soil pollution.
CLOBJ 4	Explore the basics of solar energy and different solar technologies and Evaluate biomass as an energy source, including its thermal characteristics and biogas production. Investigate new energy sources like hydrogen, ocean energy, tidal energy, and geothermal energy.
CLOBJ 5	Understand the principles of the 3Rs (Reduce, Reuse, Recycle) in solid waste management. Evaluate methods of energy recovery and disposal, including sanitary landfill for municipal solid waste.

f. Course Learning Outcomes:

CLO 1	Understand the ecosystem and terminology and solve various engineering problems applying
CLO 2	Ecosystem knowledge to produce eco – friendly products.
CLO 3	Understand the suitable air, the extent of noise pollution, and control measures and acts.
CLO 4	Understand the water and soil pollution, and control measures and acts.
CLO 5	Understand different renewable energy resources and efficient process of harvesting.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the ecosystem and terminology and solve various engineering problems applying
CLO 2	Ecosystem knowledge to produce eco – friendly products.
CLO 3	Understand the suitable air, the extent of noise pollution, and control measures and acts.
CLO 4	Understand the water and soil pollution, and control measures and acts.
CLO 5	Understand different renewable energy resources and efficient process of harvesting.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	0	20	20	-	-	-	40

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Ecosystem: Structure of ecosystem, Biotic & Abiotic components, Food chain and food web Carbon, Nitrogen, Sulphur, Phosphorus cycle. Global warming -Causes, effects, process, Green House Effect, Ozone depletion.	15%	3
2	Air and Noise Pollution: Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.C., Boiler). Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator). Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler, Noise pollution: sources of pollution, measurement of pollution level,	22%	6

	Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000.		
3	Water and Soil Pollution: Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation. Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis), Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.	24%	8
4	Renewable Sources of energy: Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills. Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas. Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy.	24%	8
5	Solid Waste management: Solid waste generation- Sources and characteristics of: Municipal solid waste, E- waste, biomedical waste. Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries. Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste.	15%	3

j. Text Book and Reference Book:

1. "Principles of Solar Engineering" By Yogi Goswami D., Frank Kreith, Jan F. Kreider | Taylor & Francis, 2003 | Second.
2. "Environmental Studies" By M.P. Poonia, S.C. Sharma | Khanna Publishing House, New Delhi | 2017.
3. "Renewable Energy Sources" By Twidell J.W. and Weir. A | EFN Spon Ltd "Linear Systems and Signals" by B.P. Lathi.
4. "Environmental Sciences", By Daniel B Botkin & Edward A Keller, | John Wiley & Sons
5. "Air Pollution", By M. N. Rao and H. V. N. Rao | Tata McGraw-Hill Publishing Company

6. “Environmental Pollution Control Engineering”, By Rao C.S | 2nd edition
7. “Solid Waste Treatment and Disposal”, By G. Charangoes | McGraw Hill Pub.

(2)

- a. **Course Name:** Programming in C - I
- b. **Course Code:** 03606107
- c. **Prerequisite:** Basic knowledge of a computer
- d. **Rationale:** This course aims to teach students about knowledge of computer programming
- e. **Course Learning Objective:**

CLOBJ 1	To make the student learn a programming language.
CLOBJ 2	To teach the student to write programs in C and to solve the problems.
CLOBJ 3	To develop the ability to analyse a problem and devise an algorithm to solve it.
CLOBJ 4	To understand structured programming approach.

f. **Course Learning Outcomes:**

CLO 1	Perform various Algorithms and Flowcharts.
CLO 2	Computationally formulate basic problems and write code snippets to execute them.
CLO 3	Focus of the course as mentioned above should be on example-based learning.
CLO 4	Use an operator, loop and conditional statements.

g. **Mapping of Course Learning Outcomes and Bloom’s Taxonomy:**

Course Learning Outcomes	
CLO 1	Perform various Algorithms and Flowcharts
CLO 2	Computationally formulate basic problems and write code snippets to execute them.
CLO 3	Focus of the course as mentioned above should be on example-based learning.
CLO 4	Use an operator, loop and conditional statements.

h. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			External marks		Total
				MSE	CE	P	Theory	P	

3	0	0	3	20	20	-	60	-	100
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L- Lectures; T- Tutorial; P- Practical; C- Credit; **MSE**- Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE**- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Basics of Algorithm and Flowchart Development: Introduction of algorithm, General approaches in Algorithm Design, Advantages and Disadvantages of Algorithm, Description of Flowchart, Importance of Flowchart, Symbols of Flowchart, Structure of flowchart, Limitations of Flowchart.	12%	5
2	Fundamental of 'C': Introduction of Structured programming Language, General structure of 'C' program, Standard Directories, Benefits of C Language, Character Set ,Tokens of C language, Keywords and Constant, Identifier and Variable, Data Types used in C language, Rules for declaring variables, Declaration & Initialization, Dynamic Initialization, Type Conversions and modifiers, use of constant and volatile variable, Types of Comments in C Input & Output Statements in C language, Write & Compile C program, Execution of C program	17%	7
3	Types of Operators and Expression: Define Operator, Properties of operator, Types of Operators, Arithmetic operator, Relational operator, Logical operator, Bitwise operator, Assignment operator, Conditional operator, Misc operator: Ternary operator, Size of Operator, operator precedence.	21%	9
4	Decision making in C: Introduction of conditional and unconditional branching, Types of conditional branching, If else statement, Nested If-else statement, If- else-if Ladder statement, and Switch statements.	24%	10
5	Loop control statements in C language: Introduction of Loop, Types of Loop, For Loop, While Loop, Do While Loop, Nested for Loop, Infinite Loop, Unconditional Statements: break statement, continue statement, go to statements.	26%	11

j. Text Book and Reference Book:

1. Programming in ANSI C (Textbook) By E. Bala Guruswamy | Tata McGraw-Hill
2. Programming in 'C' By Kamthane, A.N | Pearson,2012
3. Let us 'C' By Kanetkar Yash Avant | BPB publications, Latest Edition

- a. **Course Name:** Programming in C - I Lab
- b. **Course Code:** 03606108
- c. **Prerequisite:** Basic knowledge of a computer
- d. **Rationale:** This course aims to teach students about knowledge of computer programming
- e. **Course Learning Objective:**

CLOBJ 1	To make the student learn a programming language.
CLOBJ 2	To teach the student to write programs in C and to solve the problems.
CLOBJ 3	To develop the ability to analyse a problem and devise an algorithm to solve it.
CLOBJ 4	To understand structured programming approach.

f. Course Learning Outcomes:

CLO 1	Perform various Algorithms and Flowcharts.
CLO 2	Computationally formulate basic problems and write code snippets to execute them.
CLO 3	Focus of the course as mentioned above should be on example-based learning.
CLO 4	Use an operator, loop and conditional statements.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Perform various Algorithms and Flowcharts
CLO 2	Computationally formulate basic problems and write code snippets to execute them.
CLO 3	Focus of the course as mentioned above should be on example-based learning.
CLO 4	Use an operator, loop and conditional statements.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			External marks		Total
				MSE	CE	P	Theory	P	
0	0	4	2	0	0	100	0	0	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Text Book and Reference Book:

1. Programming in ANSI C (Textbook) By E. Bala Guruswamy | Tata McGraw-Hill
2. Programming in 'C' By Kamthane, A.N | Pearson, 2012

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	1. Draw Flow Chart and write algorithm to add two numbers. 2. Draw Flow Chart and write algorithm Convert Temperature from Fahrenheit (°F) to Celsius (°C). 3. Draw Flow Chart and write algorithm to find maximum (or minimum) out of three numbers. 4. Draw Flow Chart and write algorithm Whether a Student Passed the Exam or Not. 5. Draw Flow Chart and write algorithm Calculate the Interest of a Bank Deposit.
2	1. Make C Program to display your Full Name on the monitor. 2. Perform the basic Arithmetic operation for the any two Numbers given by the User. 3. C Program to convert temperature from degree centigrade to Fahrenheit 4. C Program to shows how to use const to declare constants of different data types. 5. Make C Program to Calculate Area and Circumference of Circle. 6. Write a C Program to Calculate Area of Scalene Triangle.
3	1. Write a C program to read two numbers and print maximum and minimum of them. 2. Write a C program to implement implicit type conversion. 3. Calendar Program in C Programming Language: Display Day of the month. 4. C Program to reverse a given number 1234. 5. C Program to Create Simple Calculator.
4	1. Enter the birth year and check whether the person is born in leap year or not. 2. C Program to generate the Fibonacci Series starting from any two numbers. 3. Write a program to input name, marks of 5 subjects of a student and display the name of the student, the total marks scored, percentage scored and the class of result 4. Write a C program which will invoke the command processor to execute a command.
5	1. Write a C program to read ages of two person and check whether they are of same age or not. 2. Write a program to check whether two numbers are equal or not. 3. Write a program to check whether a given number is greater or smaller. 4. Write a program to print smallest number from 3 numbers.
6	1. Write a program to find the list of students having pass marks in both exams. 2. Write a program to perform bitwise operation on operands. 3. Write a program to Reverse a Given Number Using While Loop. 4. Print Multiplication Table Using for Loop.
7	1. Read the percentage of a student and check in which class he belongs: (1) distinction (2) first class (3) second class (4) fail. (Using if-else ladder). 2. C Program to Calculate Gross Salary of an Employee.
8	1. Write a C program to display 1 to N, read N from key board. (in same row and different rows, using all three loops) 2. C program to add two numbers without using the addition operator.
9	1. Write a C program to add first 10 numbers and display the summation, using loops. 2. C Program to Print Day of Week Name Using Switch Case. 3. To check for equality of two numbers without using arithmetic or comparison operator.
10	1. Write programs using While Loop and Do-while loop. 2. Write a program to display terms of Fibonacci series. 3. Write a program to check whether the given number is prime or not
11	1. Write a C program to find the factorial of given number. 2. C program to read string with spaces using scanf () function.

12	1. Write a C program to make patterns using nested loops. 2. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
13	1. Write a program to check if the number is Armstrong or not.
14	1. Program in C to print the number pyramid pattern. 2. Program in C to print the Number Diamond Pattern.

4)

a. Course Name: Basic Of Web Development

b. Course Code: 03606109

c. Prerequisite: Basics of computer

d. Rationale: This subject is to introduce the students to the Internet and web. This subject covers the basics WWW, technologies like HTML, CSS. These technologies are equally used for developing web based educational and business applications.

e. Course Learning Objective:

CLOBJ 1	Understand the concepts of WWW including browser and HTTP protocol.
CLOBJ 2	Acquire the knowledge of various HTML tags and use them to develop web pages.
CLOBJ 3	Demonstrate proficiency in creating structured forms with diverse input types, implementing validation, and optimizing user interaction using HTML
CLOBJ 4	Develop web pages using CSS styles, internal and/or external style sheets.

f. Course Learning Outcomes:

CLO 1	Understand the concepts of WWW including browser and HTTP protocol.
CLO 2	Acquire the knowledge of various HTML tags and use them to develop web pages.
CLO 3	Demonstrate proficiency in creating structured forms with diverse input types, implementing validation, and optimizing user interaction using HTML
CLO 4	Develop web pages using CSS styles, internal and/or external style sheets.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts of WWW including browser and HTTP protocol.
CLO 2	Acquire the knowledge of various HTML tags and use them to develop web pages.
CLO 3	Demonstrate proficiency in creating structured forms with diverse input types, implementing validation, and optimizing user interaction using HTML
CLO 4	Develop web pages using CSS styles, internal and/or external style sheets

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			External marks		Total
				MSE	CE	P	Theory	P	
1	0	0	1	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Internet and www: Introduction to internet and its applications: E-mail, Telnet, FTP, web pages, Web server, Search Engines, World wide web and its evolution, URL, Browsers	20%	2
2	Introduction to HTML: HTML page structure, formatting tags in HTML, Basic Tags of HTML - HTML Tag - TITLE Tag, BODY Tag, Formatting of Text - Headers, PRE-Tag, FONT Tag, META Tag	25%	3
3	Advanced HTML: Links, Lists - Unordered Lists - Ordered Lists Definition Lists, Tables Tags- Col span and Row span, Frames - Frameset, FRAME Tag, Frame inside other frames, Forms - FORM and INPUT Tag, Textbox, Radio Button, Checkbox	25%	4
4	Introduction to CSS: CSS Introduction, Features, basics of Style Sheet, Working with CSS files, Syntax, Borders, Backgrounds, Fonts, Text effects. Types of Style Sheets- Inline Styles, Embedded Styles, External or Linked Styles	30%	5

j. Text Book and Reference Book:

1. HTML & CSS: The Complete Reference (Textbook) By Thomas A. Powell | McGraw Hill
2. WEB PROGRAMMING WITH HTML By Duckett, Jon | Wrox,2008

5)

- a. **Course Name:** Basic Of Web Development-Lab
- b. **Course Code:** 03606110
- c. **Prerequisite:** Basic Knowledge of HTML
- d. **Rationale:** This course aims to teach students to gain knowledge of Web Technologies and Designing.
- e. **Course Learning Objective:**

CLOBJ 1	To introduce HTML (Hyper Text Markup Language), one of the two core languages used to create web pages.
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CLOBJ 2	To learn problem solving techniques.
CLOBJ 3	To understand how use HTML tags and tag attributes to control a Web page's appearance.
CLOBJ 4	To Learn how to add absolute URLs, relative URLs, and named anchors to your Web pages.
CLOBJ 5	To help students more easily personalize and design their websites.

f. Course Learning Outcomes:

CLO 1	Understand the concepts of WWW including browser and HTTP protocol.
CLO 2	Acquire the knowledge of various HTML tags and use them to develop web pages.
CLO 3	Demonstrate proficiency in creating structured forms with diverse input types, implementing validation, and optimizing user interaction using HTML
CLO 4	Develop web pages using CSS styles, internal and/or external style sheets.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts of WWW including browser and HTTP protocol.
CLO 2	Acquire the knowledge of various HTML tags and use them to develop web pages.
CLO 3	Demonstrate proficiency in creating structured forms with diverse input types, implementing validation, and optimizing user interaction using HTML
CLO 4	Develop web pages using CSS styles, internal and/or external style sheets

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			External marks		Total
				MSE	CE	P	Theory	P	
0	0	4	2	0	0	100	0	0	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

1. HTML & CSS: The Complete Reference (Textbook) By Thomas A. Powell | McGraw Hill

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List																				
1	Write a HTML page to print Hello World.																				
2	Create HTML page contains single paragraph by using basic HTML tags																				
3	Create a Web page illustrating text formatting tags available in HTML.																				
4	Create a web page which defines all text formatting tags in HTML.																				
5	Create a web page to illustrate three types of lists in HTML.																				
6	Write the HTML code to display the following: 1. Actors 1. Bruce Willis 2. Gerard Butler 3. Vin Deisel 4. Bradd Pit 2. Actress 1. Julin Roberts 2. Angelina Jolie 3. Kate Winslet 4. Cameron Diaz																				
7	Create a HTML page which displays 3 images at LEFT, RIGHT and CENTER respectively.																				
8	Write an HTML program to create a web page with an image as background and add some text																				
9	Design a HTML page which includes two links. Also write two HTML documents for the links.																				
10	Write HTML code to create a table with 5 rows and 3 columns. Even no. of rows display in green colour and odd no. of rows display in blue colour.																				
11	Write HTML Code for the following Table. <table><tr><td colspan="2">Name</td><td colspan="2">Rahul</td></tr><tr><td colspan="2">Roll No.</td><td colspan="2">101</td></tr><tr><td>subject</td><td>Max</td><td>Min</td><td>Obtain</td></tr><tr><td>java</td><td>100</td><td>33</td><td>75</td></tr><tr><td>Multimedia</td><td>100</td><td>33</td><td>70</td></tr></table>	Name		Rahul		Roll No.		101		subject	Max	Min	Obtain	java	100	33	75	Multimedia	100	33	70
Name		Rahul																			
Roll No.		101																			
subject	Max	Min	Obtain																		
java	100	33	75																		
Multimedia	100	33	70																		
12	Create a Web page using Frame and Frameset Tags																				
13	Create the following page using frameset tags. <table><tr><td>Frame 1 Contents of Frame 1</td><td>Frame 2 Contents of Frame 2</td><td>Frame 3 Contents of Frame 3</td><td>Frame 4 Contents of Frame 4</td></tr></table>	Frame 1 Contents of Frame 1	Frame 2 Contents of Frame 2	Frame 3 Contents of Frame 3	Frame 4 Contents of Frame 4																
Frame 1 Contents of Frame 1	Frame 2 Contents of Frame 2	Frame 3 Contents of Frame 3	Frame 4 Contents of Frame 4																		
14	Create a web page which includes audio tags of HTML.																				

15	Create a web page which includes video tags of HTML.
16	Create a student registration form using Tag. The registration form must consist of following information: First Name, Middle Name, Last Name, Gender, Address, Phone No., email id, Hobbies, City, State, Country, and College Name.
17	Design sample web page using CSS 'Inline style
18	Design sample web page using CSS- Internal style
19	Design sample web page using CSS- External style
20	Develop a web page using CSS to create a time table for the class using different border style.

6)

- a. **Course Name:** Fundamentals of Electrical and Electronics Engineering
- b. **Course Code:** 03607151
- c. **Prerequisite:** Knowledge of Physics and Mathematics up to 10th Standard Level
- d. **Rationale:** Electrical and electronics engineering equipment is widely used in mechanical/ metallurgy/mining /Auto mobile / Aeronautical engineering applications and a diploma engineer from any of these disciplines have to identify the related equipment being used in the industry to their working and major faults that could occur. Electronics is an integral part of computers; hence students of computer engineering and information technology need to know the fundamental of electronics. This course has been designed to provide the needful inputs to handle simple electronic components and circuits. Students after studying this course will be able to understand the basics of analog electronics, various electronics components and develop skills to use simple electronic instruments needed for computer-based working environment.

e. Course Learning Objective:

CLOBJ 1	Develop a comprehensive understanding of signals, the fundamental components, and concepts in electronics, including Periodic and non-periodic signals, AC and DC signals, and identify and analyse different types of waveforms including sinusoidal, triangular, sawtooth, and square waves.
CLOBJ 2	Analyse the working principle of a P-N junction diode. Study and interpret the voltage-current (V-I) characteristics of a P-N junction diode. Understand the physical construction of bipolar junction transistors (BJTs).
CLOBJ 3	Understand different number systems, including binary, decimal, hexadecimal, and octal. Analyse truth tables and the behaviour of basic gates. Comprehend the concept of universal gates and their significance. Understand the operation of adders and subtractors in digital systems
CLOBJ 4	Learn to the fundamental properties and characteristics of resistors, inductors, and capacitors. Compare and contrast electric and magnetic circuits in terms of

	elements, laws, and characteristics. Use these concepts to analyse magnetic circuits. Understand Fleming's Right-Hand Rule and Fleming's Left-Hand Rule.
CLOBJ 5	Understand the basic components and construction of transformers. Derive and understand the EMF equation for transformers. Derive and understand the basic equations governing the operation of motors, including the torque equation.

f. Course Learning Outcomes:

CLO 1	Understand the basic circuit elements
CLO 2	Understand the basic concepts of Transistor, and their applications
CLO 3	Understand logic gates and use them in various electronic circuits
CLO 4	Solve basic problems related to electrical circuits and machines.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the basic circuit elements
CLO 2	Understand the basic concepts of Transistor, and their applications
CLO 3	Understand logic gates and use them in various electronic circuits.
CLO 4	Solve basic problems related to electrical circuits and machines.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	1	0	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Overview of Electronic Components & Signals: Active and passive components- Resistances, Capacitors, Inductors, Diodes, Transistors, Voltage and Current Source, Symbols of various Semiconductor components, Signals: DC/AC, periodic/nonperiodic signal, Definitions of: amplitude, Frequency, Phase, Wavelength, Types of Signals: sinusoidal, triangular and saw tooth, square wave, Energy Bands- (Valance Band, Conduction Band) Types of material-(Conductor, semiconductor, Insulator), Intrinsic and extrinsic Semiconductor material	15%	6
2	Introduction of Semiconductor Components P-N junction diode, V-I Characteristics of P-N junction Diode, Zener Diode, Classification of Transistor, Transistor construction, Types of transistors (NPN & PNP)	10%	5
3	Overview of Digital Electronics: Number systems, Base Conversion -BINARY - DECIMAL -HEX -OCTAL, Complements - 2' and 10's Complement -1's and 9's Complement, Binary addition, subtraction, multiplication and division Logic Gates -Basic Gates (AND, OR, Not), Universal Gates (NAND and NOR Gate), Complementary Gates-(EX-OR, EX-NOR), De-Morgan's Theorems, Adder and Subtractor, Multiplexer and Demultiplexer	25%	10
4	Electric Circuit Generation of electricity, Different terms related to electric circuit, Concept of AC and DC, Concept of 1-phase and 3-phase supply, Electrical circuit elements – Resistor Inductor and Capacitor, Resistor in series and parallel, Ohm's law and its limitations, Factors affecting the value of resistance	20%	8
5	Magnetic Circuit Terms Related to magnetic circuit, Terms Related to AC circuit, Faraday's Law, Fleming's law, Lenz's Law, Hysteresis loop (B/H Curve), Types of Induced EMF, Comparison between Electric and Magnetic Circuit	20%	8

6	Transformer and Machines: General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations of motors.	10%	5
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j. Text Book and Reference Book:

1. " Basic Electrical Engineering" by Ritu Sahdev; Khanna Publishing House
2. "Basic Electrical Engineering" by Mittle and Mittal; McGraw Education
3. "Fundamentals of Electrical Engineering "by Saxena, S. B. Lal; Cambridge University Press.
4. "Electrical Technology Vol-1 " by Theraja, B. L.; S. Chand, New Delhi.
5. "Principles of Electronics", by V.K. Mehta; S. Chand and Company

7)

- a. Course Name:** Fundamentals of Electrical and Electronics Engineering Lab
- b. Course Code:** 03607152
- c. Prerequisite:** Knowledge of Physics and Mathematics up to 10th Standard Level.
- d. Rationale:** Electrical and electronics engineering equipment is widely used in mechanical/ metallurgy/mining /Auto mobile / Aeronautical engineering applications and a diploma engineer from any of these disciplines have to identify the related equipment being used in the industry with respect to their working and major faults that could occur. Electronics is an integral part of computers; hence students of computer engineering and information technology need to know the fundamental of electronics. This course has been designed to provide the needful inputs to handle simple electronic components and circuits. Students after studying this course will be able to understand the basics of analog electronics, various electronics components and develop skills to use simple electronic instruments needed for computer-based working environment

e. Course Learning Objective:

CLOBJ 1	Knowledge of electrical and electronic circuits.
CLOBJ 2	Proficiency with electronic lab equipment, making electrical measurements and interpretations.
CLOBJ 3	Ability to demonstrate a basic understanding of physics of inductors, resistors and capacitors.
CLOBJ 4	Ability to analyses and design simple circuits of gates.
CLOBJ 5	Ability to recall potential and current laws in the field of electrical and electronic engineering.

f. Course Learning Outcomes:

CLO 1	Understand the basic circuit elements.
CLO 2	Understand logic gates and use them in various electronic circuits.

CLO 3	Understand the basic concepts of op-amps, and their applications.
CLO 4	Solve basic problems related to electrical circuits and machines.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the basic circuit elements.
CLO 2	Understand logic gates and use them in various electronic circuits.
CLO 3	Understand the basic concepts of op-amps, and their applications.
CLO 4	Solve basic problems related to electrical circuits and machines.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	00	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

1. Basic Electrical Engineering Ritu Sahdev; Khanna Publishing House
2. Basic Electrical Engineering Mittle and Mittal; McGraw Education
3. Fundamentals of Electrical Engineering Saxena, S. B. Lal; Cambridge University Press
4. Electrical Technology B. L. Theraja; S. Chand
5. Principles of Electronics V.K. Mehta; S. Chand and Company

j. Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Determine the permeability of magnetic material by plotting its B-H curve.
2	Measure voltage, current and power in 1-phase circuit with resistive load.
3	Measure voltage, current and power in R-L series circuit.

Exp. No.	Name of the Experiment
4	Determine the transformation ratio (K) of 1-phase transformer.
5	Connect single phase transformer and measure input and output quantities.
6	Identify various active and passive electronic components.
7	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.
8	Use multimeter to measure the value of given resistor. Determine the value of given resistor using digital multimeter to confirm with colour code.
9	Test the performance of PN-junction diode.
10	Test the half wave rectifier using CRO.
11	Test the Bridge rectifier and capacitor filter using CRO.
12	Test the performance of Zener diode.
13	Identify the pins of IC 741
14	Test the performance of CE NPN transistor.
15	Test the performance of transistor amplifier circuit.

8)

- a. **Course Name:** Mathematics I
- b. **Course Code:** 03691101
- c. **Prerequisite:** Knowledge of basic concept studied till 10th STD.
- d. **Rationale:** The study of mathematics is an important requirement for the understanding and development of any branch of engineering. The purpose of teaching mathematics to diploma engineering students is to impart them basic knowledge of mathematics which is needed for full understanding and study of Engineering subjects.

e. Course Learning Objective:

CLOBJ 1	Understand logarithm in engineering calculation
CLOBJ 2	Analyse rational fraction into sum of partial fraction in engineering problems
CLOBJ 3	Learn trigonometric functions and its graph for engineering
CLOBJ 4	Understand the concepts of complex numbers in engineering
CLOBJ 5	Understand the use of limit and functions in engineering
CLOBJ 6	Learn Differentiation of different functions in engineering

f. Course Learning Outcomes:

CLO 1	Understand the concepts logarithm with different examples
CLO 2	Understand rational fraction into sum of partial fraction in engineering
CLO 3	Understand trigonometric functions and its graph with different examples
CLO 4	Understand the concepts of complex numbers by using examples
CLO 5	Use limit to functions by using examples
CLO 6	Understand derivative to different functions with examples

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts logarithm with different examples
CLO 2	Understand rational fraction into sum of partial fraction in engineering
CLO 3	Understand trigonometric functions and its graph with different examples
CLO 4	Understand the concepts of complex numbers by using examples
CLO 5	Use limit to functions by using examples
CLO 6	Understand derivative to different functions with examples

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	1	0	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Logarithms: Definition, Logarithm as a transformation, Antilogarithm, Rules of Logarithms and examples, use logarithmic functions for simplifying arithmetic computations. Partial fractions: Definition of partial fractions. Types of partial fraction (Denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors).	17%	4
2	Trigonometry: Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Trigonometric identities, Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of all trigonometric functions	23%	7
3	Permutations and Combinations: Value of nPr and nCr with related examples, First principal of Mathematical Induction (without proof) Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for rational index (expansion without proof) first and second binomial approximation with applications to engineering problems	9%	3
4	Complex Numbers: Definition of a complex number, real and imaginary parts of a complex number, Polar and Cartesian representation of complex number, Conjugate of complex number, Geometric representation of complex numbers and their operations, Modules and Amplitude form, De Moivre's Theorem, Root of Complex Number, Use of De Moivre's Theorem to simplify mathematical expressions.	17%	4

5	Calculus: Definition of function; Concept of limits and standard forms of limits And Definition of continuous function and examples. Definition of derivative, differentiation of standard function by first principle, Rule of Differentiation, Differentiation of algebraic, trigonometric, Exponential, Logarithmic, Implicit functions and Composite functions, Higher order derivatives.	34%	10
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j. Text Book and Reference Book:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics (Diploma Stream), H.K. Dass, S. Chand Publishing
3. Mathematics for Polytechnic, S.P. Deshpande, Pune Vidyarthi Griha Prakashan.
4. Polytechnic Mathematics (Made Easy) (Applied Mathematics), Manjeet Singh

9)

- a. **Course Name:** COMMUNICATION SKILLS-I
- b. **Course Code:** 03693103
- c. **Prerequisite:** Basic Knowledge of English
- d. **Rationale:** Communication confidence laced with knowledge of English grammar is essential for all engineers
- e. **Course Learning Objective:**

CLOBJ 1	Develop basis Communication
CLOBJ 2	Learn the fundamental use of grammar
CLOBJ 3	Understand Four basic parameters of LSRW.
CLOBJ 4	Understand & learn communication skills through extempore & debates
CLOBJ 5	Comprehend & learn through the ways of stories & make it more interesting
CLOBJ 6	Learn soft skills for professional use.

f. Course Learning Outcomes:

CLO 1	Use grammar knowledge while communicating through proper formation of sentence.
CLO 2	Analyse soft skills and their usage in different areas of working.
CLO 3	Understand basic skills of writing formal letters
CLO 4	Understand various types & forms of written communication used in corporate world. Develop even soft skills.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand & learn different role play activities which improve communication
CLO 2	Analyse fundamental use of grammar
CLO 3	Learn importance fundamental of communication process
CLO 4	Understand various types of speaking & listening by the use of different activities through role play activities

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	-	1	-	-	-	100	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Ice breaker + Introducing your friend: This is one activity which will build the bond between the students in the class and work as a team in the task given to them. The students will be asked to introduce their new best friend in the class. This will ensure that the bond being created here will stay strong and also breaks the ice between them.	05%	1
2	Picture connector: In this class the students will be trained to form a logical connection between a set of pictures which will be shared with them. This geared towards building creativity and presentation skills.	05%	1
3	Crazy Scientist: The students will be taught the importance of invention and innovation using some examples that changed the world the way it worked.	05%	1
4	Shopping role play: This activity topic gears towards making students do role	05%	1

	playbased on shopping scenarios. It involves giving them a scenario and asking them to further develop the idea in a very interesting manner, then going on to enact it.		
5	Grammar Parts of speech, Active and Passive voice, Tenses	20%	10
6	Communication: Theory & Practice Basics of communication: Introduction, meaning, definition, Process of communication Types of communication: Formal, Informal, Verbal / Nonverbal and Written barriers to effective communication 7 Cs of effective communication: (considerate, concrete, concise, clear, complete, correct and courteous) Technical Communication:	12%	5
7	Soft Skills for Professional excellence Introduction: Soft skills and hard skills, Importance of Soft Skills	12%	2
8	Debate: Students are trained to let go of inhibitions and come forward and speak openly on passionate topics. The students will be divided into teams and made to share their ideas and views on the topics.	05%	1
9	Extempore: To change the average speakers in the class to some of the best Orator. This will be done by making the students give variety of impromptu speeches in front of the class.	05%	1
10	Letter Writing Types of letters-Inquiry letter, Order letter, Complaint letter, Adjustment, Request letter, Recommendation letter Format of letters	12%	2
11	Reading Comprehension: Dabbawallas, A Snake in the grass Internet – Dr. Jagdish Joshi	14%	5
	Total	100	60

j. Text Book and Reference Books:

1. Active English – Almas Juneja and Vaseem Qureshi-Macmillan Publishers India Ltd
2. English- Prof. Pradyuman Raj, Prof. Rakhi Moghe, Ms. Anisha Modi
3. Technical Communication –Principles & Practice-IIInd Edition by Meenakshi Raman & Sangeeta Sharma.
4. Effective Technical Communication by Dr. Bharti Kukreja & Dr. Anupama Jain
5. J.D. O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
6. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson & Sons, 1908.
7. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Re-vised Edition 2018)
8. Margaret M. Maisson. Examine your English. Orient Longman: New Delhi, 1964.
9. M.Ashraf Rizvi. Effective Communication. Mc-Graw Hill: Delhi, 2002.
10. A Ready Reckoner –Dineshbhai J. Shah, Dr. Janak Bhai I. Shah, Bhartiben P. Shah. Oxford Dictionary
11. Roget's Thesaurus of English Words and Phrases.

Semester 2

1)

a) **Course Name:** Programming in C - II

b) **Course Code:** 03606155

c) **Prerequisite:** Basic knowledge of computer programming

d) **Rationale:** This course aims to teach students advanced knowledge of computer programming

e) **Course Learning Objective:**

CLOBJ 1	Understand the concept of arrays in C programming. Declare, initialize, and manipulate arrays effectively. Demonstrate proficiency in accessing and modifying array elements. Implement dynamic memory allocation for arrays when necessary.
CLOBJ 2	Implement sorting algorithms such as bubble sort, selection sort, and merge sort. Implement searching algorithms like linear search and binary search to find elements in arrays. Analyse and compare the efficiency of different sorting and searching algorithms.
CLOBJ 3	Manipulate characters and strings using built-in functions in C. Process textual input and output efficiently. Implement string formatting and parsing techniques to handle textual data effectively.
CLOBJ 4	Identify and define basic computational problems. Break down problems into smaller, manageable sub-problems. Design algorithms and write code snippets to solve these problems using arrays and strings.
CLOBJ 5	Provide numerous examples illustrating the concepts covered in the course. Guide students through example problems and solutions to reinforce understanding. Encourage hands-on practice through example-based exercises and coding assignments.
CLOBJ 6	Understand the role of pointers, functions, arrays, and strings in C programming. Demonstrate proficiency in using pointers to manipulate arrays and strings. Write functions to perform operations on arrays and strings effectively.

f) **Course Learning Outcomes:**

CLO 1	Recognize arrays in c Programming.
CLO 2	Perform various tasks like sorting, searching operations.
CLO 3	To work with textual information, characters and strings.
CLO 4	Computationally formulate basic problems and write code snippets to execute them.
CLO 5	Focus of the course as mentioned above should be on example-based learning.
CLO6	Use a pointer, function, array and string.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Recognize arrays in c Programming.
CLO 2	Perform various tasks like sorting, searching operations.
CLO 3	To work with textual information, characters and strings.
CLO 4	Computationally formulate basic problems and write code snippets to execute them.
CLO 5	Focus of the course as mentioned above should be on example-based learning.
CLO6	Use a pointer, function, array and string.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	0	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i) Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Arrays and String Introduction of array, Advantages, Disadvantages, Applications Declaration and Initialization of Array in C, Types of Array, returning an array, Array Operations: Insertion, Deletion, Searching, Merging, Sorting, 2-Dimensional Array and its Operations: Matrix addition operation, 3*3 Matrix addition operation, Introduction of String, Declaration and Initialization of String, gets () & puts () functions, string functions(strlen(), strcpy(), strcmp(), strev(),strupr(), strlwr() ,strstr() ,strcat())	21%	9
2	Functions Introduction of Function: Advantages of using Functions, working of a Function, inbuilt function, Types of function, User defined Functions Function Declaration, calling a Function, call by value, Call by reference, recursive function, Difference Between Call by Value and Call by Reference, Storage class	24%	10

3	Pointers Introduction and Features of Pointers, Initialization Declaration of Pointer, Types of Pointers in C: Null Pointer, Void Pointer, Const Pointer, Pointer Arithmetic in C, Function Pointer in C, Pointer to Pointer (double pointer)	19%	8
4	Structure & Union Introduction and Features of Structures, Declaration and Initialization of Structures, Array of Structures, Structure within Structure, Define Union, Union of Structures, Difference between structure & Union	19%	8
5	File Management Introduction of File, File Operations: Opening a File, reading a File, closing a File, File Input/output in C: fprintf (), fscanf (), getc (), put (), fgetc (), fputc (), fseek (), feof ()	17%	7

j) Text Book and Reference Book:

1. Programming in C (Textbook) |By E. Balagurusamy | Tata McGraw-Hill
2. Computer Programming in 'C By Rajaraman V | Prentice Hall of India Pvt.Ltd., New Delhi

2)

- a) **Course Name:** Programing in C Lab - II
- b) **Course Code:** 03606156
- c) **Prerequisite:** Basic knowledge of computer programming
- d) **Rationale:** This course aims to teach students advanced knowledge of computer programming.
- e) **Course Learning Objective:**

CLOBJ 1	Understand the concept of arrays in C programming. Declare, initialize, and manipulate arrays effectively. Demonstrate proficiency in accessing and modifying array elements. Implement dynamic memory allocation for arrays when necessary.
CLOBJ 2	Implement sorting algorithms such as bubble sort, selection sort, and merge sort. Implement searching algorithms like linear search and binary search to find elements in arrays. Analyse and compare the efficiency of different sorting and searching algorithms.
CLOBJ 3	Manipulate characters and strings using built-in functions in C. Process textual input and output efficiently. Use string formatting and parsing techniques to handle textual data effectively.
CLOBJ 4	Identify and define basic computational problems. Break down problems into smaller, manageable sub-problems. Design algorithms and write code snippets to solve these problems using arrays and strings.
CLOBJ 5	Provide numerous examples illustrating the concepts covered in the course. Guide students through example problems and solutions to reinforce understanding. Encourage hands-on practice through example-based exercises and coding assignments.

CLOBJ6	Understand the role of pointers, functions, arrays, and strings in C programming. Demonstrate proficiency in using pointers to manipulate arrays and strings. Write functions to perform operations on arrays and strings effectively.
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f) Course Learning Outcomes:

CLO 1	Recognize arrays in c Programming.
CLO 2	Perform various tasks like sorting, searching operations.
CLO 3	To work with textual information, characters and strings.
CLO 4	Computationally formulate basic problems and write code snippets to execute them.
CLO 5	Focus of the course as mentioned above should be on example-based learning.
CLO6	Use a pointer, function, array and string.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Recognize arrays in c Programming.
CLO 2	Perform various tasks like sorting, searching operations.
CLO 3	To work with textual information, characters and strings.
CLO 4	Computationally formulate basic problems and write code snippets to execute them.
CLO 5	Focus of the course as mentioned above should be on example-based learning.
CLO6	Use a pointer, function, array and string.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	4	2	-	-	100	-	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i) Text Book and Reference Book:

1. Programming in C (Textbook)

By E. Balagurusamy | Tata McGraw-Hill

2. Computer Programming in 'C

By Rajaraman V | Prentice Hall of India Pvt.Ltd., New Delhi.

j) Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	1. Write a program that, given an array A of n numbers and another number x, determines whether or not there exist two elements in A whose sum is exactly x. 2. Write a C program to find the second largest integer in a list of integers. 3. Write a C program to perform the following. Addition of two matrices. Multiplication of two matrices.
2	1. Write an efficient program to find the sum of contiguous subarray within a one-dimensional array of numbers that has the largest sum. 2. Given an array, rotate the array by one position in clock-wise direction. 3. Given an array of size N-1 such that it only contains distinct integers in the range of 1 to N. Find the missing element.
3	1. Given an array of integer elements and we have to reverse elements (like, swapping of first element with last, second element with second last and so on) using C program. 2. Write a C Program To find the biggest and smallest number and positions in the given array. 3. Write a C program to count frequency of each element in an array.
4	1. Given an array of N elements and we have to find nearest lesser and nearest greater element using C program. 2. C program to merge two arrays in third array which is creating dynamically. 3. Creating an Array of N Integer Elements & Display of Array Elements with Suitable Headings and Inserting an Element (ELEM) at a given valid Position (POS). 4. Creating an Array of N Integer Elements & Display of Array Elements with Suitable Headings and Deleting an Element at a given valid Position (POS).
5	1.C Program to Find the Frequency of Characters in a String. 2.C program to find total number of alphabets, digits or special characters in a string. 3.C program to reverse order of words in a string.
6	1. C Program to read a string and print Capitalize string, capitalize string is a string in which first character of each word is in Uppercase (Capital) and other alphabets (characters) are in Lowercase (Small). 2. C program read a string, like "Hi there how are you?" and it will print the word length of each word like 2, 5, 3, 3, 4. 3. Write, test, debug and execute programs using String functions strlen (), strcpy, strcmp (), strlwr (),strupr (), strchr (), strcat ()
7	1.find the square of any number using the function in c programming. 2.Write a program in C to swap two numbers using function. Input 1st number: 2 Input 2nd number: 4 3. check a given number is even or odd using the function. Input any number: 5
8	1. Write a program in C to find the sum of the series $1! / 1+2! / 2+3! / 3+4! / 4+5! / 5$ using the function. Expected Output: The sum of the series is: 34 2. find out maximum and minimum of some values using function which will return an array. 3. Find a factorial of given number by using recursive function in c.

Exp. No.	Name of the Experiment
9	1. C program to create, initialize, assign and access a pointer variable. 2. Make a Program to swap two numbers using pointers. 3. Program to read and print student details using structure pointer, demonstrate example of structure with pointer.
10	1. C program to illustrate differences between structure and Union 2. C program to read and print an Employee's Details using Structure - In this program, we will read employee's details like name, employee id and salary using structure and then print the entered values 3.C program to demonstrate example of structure pointer (structure with pointer).
11	1. Print Fibonacci series of particular element by using of recursive function in c. 2. Write a program in C to store n elements in an array and print the elements using pointer. (USE ARRAY OF POINTER). 3. C program to demonstrate example of structure pointer (structure with pointer)
12	1. Write a program to display content s of file on screen using file functions. 2. Write to program to count number of characters in file.
13	1. Write a program to write a text file using open () function. 2. Write a program to read from a text file.
14	1. Write a c program to read name and marks of n numbers of students and stored them in a file. 2. Write a c program to write a all the members of array of structure to file using write () function. read the array file and display on screen.

3)

a) **Course Name:** Python Programming

b) **Course Code:** 03606157

c) **Prerequisite:** Advanced Computer Programming

d) **Rationale:** This course aims to teach students advanced knowledge of computer programming

e) **Course Learning Objective:**

CLOBJ 1	Understand the steps involved in setting up a Python environment. Install and configure necessary software such as Python interpreter, code editor, and debugger. Create, run, and debug Python programs using the configured environment
CLOBJ 2	Understand the concept of variables in Python and their role in storing information. Learn how to declare and initialize variables to store different types of data. Practice retrieving and manipulating data stored in variables.
CLOBJ 3	Understand the syntax and usage of if-else statements and switch-case statements in Python. Write programs to handle various decision-making scenarios using if-else statements and switch-case statements. Develop proficiency in structuring code to execute different blocks based on specified conditions.

CLOBJ 4	Explore and understand the functionality of inbuilt Python functions available in the standard library. Learn how to use built-in functions for common tasks such as string manipulation, mathematical operations, and data processing. Use inbuilt functions effectively in Python programs to enhance productivity and code readability.
CLOBJ 5	Understand the role of PIP (Python Package Index) in managing Python packages and dependencies. Learn how to install and manage packages using PIP. Explore the NumPy library for numerical computing in Python. Practice using NumPy functions and data structures for tasks such as array manipulation, mathematical operations, and data analysis.

f. Course Learning Outcomes:

CLO 1	Setup python environment to create run and debug python programs.
CLO 2	Evaluate to Store and retrieve information using variables.
CLO 3	Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario.
CLO 4	Classify inbuilt functions in python
CLO 5	Set up PIP environment and use NumPy library

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Setup python environment to create run and debug python programs.
CLO 2	Evaluate to Store and retrieve information using variables.
CLO 3	Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario.
CLO 4	Classify inbuilt functions in python
CLO 5	Set up PIP environment and use NumPy library

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

I. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	UNIT-1 BASICS OF PYTHON: History of python, comparison of different versions of python, difference versus c and python, different python editors, Installation of IDLE and setting up python environment, Basic python syntax, Comments in python, Features of Python, creating variables, assigning values to a variable, rules to name a variable Keywords, Taking user input.	20%	8
2	UNIT - 2 Data Type & Operator: Data Types in python, Types casting, Strings methods, Operators in python, list, Tuples and sets in python, Dictionaries in python, Mutable and Immutable Type	20%	8
3	UNIT - 3 CONTROL STATEMENTS: If. else, while loops, for loops, break, Continue	10%	5
4	UNIT-4 FUNCTION AND LIBRARY: Introduction to functions, Defining user function, function documentation, optional parameter, variable no. of argument, scope of variable in function, Lambda	30%	11
5	UNIT - 5 Modules: Sys, Math, Date, Time, Random	20%	08

j. Text Book and Reference Book:

1. Introducing Python by Lobanova Bill, O' Reilly (Textbook)
2. Beginning Python: Using Python 2.6 and Python 3.1 By James Payne | Worx Publication

4)

- a) **Course Name:** Python Programming Lab
- b) **Course Code:**03606158
- c) **Prerequisite:** Advanced Computer Programming
- d) **Rationale:** This course aims to teach students advanced knowledge of computer programming
- e) **Course Learning Objective:**

CLOBJ 1	Learn the process of setting up a Python environment including installing Python interpreter, code editor, and debugger. Understand how to configure and customize the Python environment according to specific requirements. Gain proficiency in navigating and utilizing the Python development environment for programming tasks.
CLOBJ 2	Develop the skills to create Python programs from scratch, including writing code, saving files, and executing programs. Practice running Python programs in various environments and platforms. Learn debugging techniques to identify and fix errors in Python code effectively.

CLOBJ 3	Understand the concept of variables and their role in storing data in Python. Learn how to declare and initialize variables to store different types of data such as integers, floats, strings, and lists. Gain proficiency in retrieving and manipulating data stored in variables.
CLOBJ 4	Learn to use if-else statements and switch-case statements to make decisions in Python programs. Practice writing programs to handle different decision-making scenarios based on specific conditions. Develop the ability to structure code effectively using decision-making statements for better readability and maintainability.
CLOBJ 5	Explore the various inbuilt Python functions available in the standard library for common tasks such as string manipulation, mathematical operations, and data processing. Learn how to effectively use inbuilt functions to streamline coding processes and improve efficiency. Practice incorporating inbuilt functions into Python programs to perform specific tasks.

f) Course Learning Outcomes:

CLO 1	Setup python environment to create run and debug python programs.
CLO 2	Evaluate to Store and retrieve information using variables.
CLO 3	Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario.
CLO 4	Classify inbuilt functions in python
CLO 5	Set up PIP environment and use NumPy library

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Setup python environment to create run and debug python programs.
CLO 2	Evaluate to Store and retrieve information using variables.
CLO 3	Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario.
CLO 4	Classify inbuilt functions in python
CLO 5	Set up PIP environment and use NumPy library

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	100	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i) Text Book and Reference Book:

1. Introducing Python by Lubanovic Bill, O' Reilly (Textbook)
2. Beginning Python: Using Python 2.6 and Python 3.1 By James Payne | Worx Publication

j) Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Installation of IDLE and setting up environment for python 3
2	WAP to print Hello word.
3	WAP to demonstrate use of comments.
4	WAP which accepts the radius of a circle from the user and compute the area
5	WAP which accepts the user's first and last name and print them in reverse order with a space between them
6	WAP to demonstrate all data type in Python
7	WAP to do arithmetical operations.
8	WAP to do Logical operations
9	WAP to do assignment operation.
10	WAP to find area of circle, rectangle & Triangle.
11	WAP to find average of three numbers
12	WAP to find square of given number.
13	WAP to Perform Type Conversion: i) convert kilometres to miles & ii) convert Celsius to Fahrenheit

Exp. No.	Name of the Experiment
14	WAP to demonstrate list datatype slicing & indexing operator & also any 10 inbuilt function list
15	WAP to demonstrate list datatype slicing & indexing operator & also any 10 inbuilt function tuples.
16	WAP to demonstrate list datatype slicing & indexing operator & also any 10 inbuilt function dictionaries.
17	WAP to demonstrate list datatype slicing & indexing operator & also any 10 inbuilt function set
18	WAP to create a set & perform insertion and Deletion operation over that.
19	WAP to sort (ascending and descending) a dictionary by value
20	WAP to get a single string from two given strings, separated by a space and swap the first two characters of each string
21	WAP to calculate the length of a string
22	WAP to Create list & WAP to display the first and last colours from the following list.
23	WAP to demonstrate 10 functions of string.
24	WAP to find the Maximum number from three numbers
25	WAP to find given number odd or even
26	WAP to display grade of students
27	WAP to make a simple calculator using if.... else as per user choice
28	WAP to find given number is prime or not.
29	WAP to count the total number of digits in a number using for loop
30	WAP to Print Right Triangle using While Loop
31	WAP to check if a given number is an Armstrong number.
32	WAP to print a specified list after removing the 0th, 4th and 5th elements. Go to the editor Sample List: ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow'] Expected Output: ['Green', 'White', 'Black']"
33	WAP to find factorial of given number.
34	WAP to find reverses number of given number.

Exp. No.	Name of the Experiment
35	WAP to swap two number using function.
36	WAP function that accept a string and calculate the number of upper- and lower-case letters.
37	WAP to demonstrate variable number & optional parameter.
38	WAP to display the current date and time.
39	WAP to print the calendar of a given month and year.
40	WAP to use of Random module.
41	WAP to use of math module

5)

- a) **Course Name:** Computer Workshop Lab
- b) **Course Code:** 03606160
- c) **Prerequisite:** Basic Knowledge about computer
- d) **Rationale:** This course aims to teach students basic knowledge of computer hardware, internet, MS office applications, Effective use of internet for better use of digital services with all google services, etc.
- e) **Course Learning Objective:**

CLOBJ 1	Gain knowledge about the fundamental components of a computer system including hardware (e.g., CPU, memory, storage devices) and software (e.g., operating systems). Understand the interaction between hardware and software components to perform computing tasks effectively.
CLOBJ 2	Acquire skills necessary for navigating the internet, including web browsing, conducting searches, and engaging in online communication. Learn how to use internet resources responsibly and ethically while ensuring privacy and security.
CLOBJ 3	Develop the ability to identify and troubleshoot common hardware and software problems that may arise during computer usage. Learn troubleshooting techniques to diagnose and resolve issues related to hardware malfunctions, software errors, and system crashes.
CLOBJ 4	Develop proficiency in using common applications for word processing, spreadsheets, and presentations, such as Microsoft Office or Google Workspace. Learn how to create, edit, format, and share documents, spreadsheets, and presentations for various purposes.

CLOBJ 5	Acquire the necessary skills and knowledge to effectively use Google Tools including Google Drive, Google Classroom, Google Sheet, Google Docs, Google Slides, and Google Meet. Learn how to leverage these tools for personal, academic, and professional purposes, such as document collaboration, online learning management, data analysis, and virtual meetings.
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f) Course Learning Outcomes:

CLO 1	Gain a foundational understanding of computer hardware, software, and operating systems.
CLO 2	Acquire essential skills for effective internet usage, including web browsing, searching, and online communication.
CLO 3	Develop skills for identifying and troubleshooting common hardware and software issues.
CLO 4	Develop proficiency in using common applications for word processing, spreadsheets, and presentations
CLO5	Participants with the necessary skills and knowledge to effectively utilize Google Tools such as Google Drive, Google Classroom, Google Sheet, Google Docs, Google Slides, and Google Meet for various personal, academic, and professional purposes.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Gain a foundational understanding of computer hardware, software, and operating systems.
CLO 2	Acquire essential skills for effective internet usage, including web browsing, searching, and online communication.
CLO 3	Develop skills for identifying and troubleshooting common hardware and software issues.
CLO 4	Develop proficiency in using common applications for word processing, spreadsheets, and presentations
CLO5	Participants with the necessary skills and knowledge to effectively utilize Google Tools such as Google Drive, Google Classroom, Google Sheet, Google Docs, Google Slides, and Google Meet for various personal, academic, and professional purposes.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	

0	-	2	1	-	-	50	-	-	50
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L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i) Text Book and Reference Book:

1. Basic Computer Engineering (Textbook) By Sanjay Silakari and Rajesh K Shukla | Wiley India Pvt. Limited, Pub. Year 2011
2. Computer Fundamentals by P.K. Sinha | BPB Publications
3. Basic Computer Course Made Simple by Satish Jain | BPB Publication

j) Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Knowledge of Computer Components: CPU, MONITOR, KEYBOARD, MOUSE
2	Study and Demonstrate Hardware's: Input Devices (i.e. KEYBOARD, MOUSE, SCANNER, JOYSTICK, LIGHT PENS, BARCODE READER, WEB CAMERA) Output Devices (i.e. MONITOR, PRINTER, PROJECTOR, SPEAKERS, HEADPHONES)
3	Detail Study of Software's: System Software's (i.e. OS) and Application Software's (i.e. User Developed Program-MS OFFICE, PHOTOSHOP.)
4	Study and Demonstration of Storage Devices: Pen drive, Memory Card, Hard Disk, RAM, ROM, DVD, CD.
5	Study and Demonstration of Peripheral Devices: Printer, Scanner, Web Cam, Speakers.
6	Study Practical of Types of Computer Memories: Primary Memory, Secondary Memory and Prepare a Document on it.
7	Detail Study of Types of Mouses: Wired Mouse, Wireless Mouse, Laser Mouse and Create one Presentation on it.
8	Study Practical of Motherboard: MEMORY STICKS, PROCESSORS, GPU, VIDEO CARD, HDD, SDD.
9	Practical Knowledge of MS OFFICE: MS Word, MS Excel, MS PowerPoint
10	Demonstration of OS installation
11	Features of different types of OS: Windows, Linux, IOS, Android etc.
12	Knowledge of Computer Network and Types of Networks: PAN, LAN, WAN, MAN.
13	Study Practical of How to create a small Local Area Network.

Exp. No.	Name of the Experiment
14	Demonstration of Google Tools: Google Drive, Google Classroom, Google Sheet, Google Docs, Google Slides, Google Meet.

5)

a) **Course Name: Basic Physics**

b) **Course Code:03692155**

c) **Prerequisite:** Basic understanding of scientific notation and units of measurement.

d) **Rationale:** It provides the fundamental principles necessary for further scientific exploration, interdisciplinary connections, and practical applications in various fields, ultimately empowering individuals to navigate and contribute to an increasingly complex world.

e) **Course Learning Objective:**

CLOBJ 1	Understand fundamental and derived physical quantities and their units in various systems (FPS, CGS, SI). Understand concepts related to errors in measurements, including systematic and random errors, absolute and relative errors, error propagation, and error estimation.
CLOBJ 2	Understand Coulomb's law and electric field, and their application in Gauss's law. Explore concepts related to electric current, resistance, Ohm's law, Kirchhoff's laws, and Wheatstone bridge.
CLOBJ 3	Understand different types of magnetic materials and their properties.
CLOBJ 4	Understand energy bands in solids and different types of materials (insulator, semiconductor, conductor). Explore the principles and working of diodes, rectifiers, and transistors.
CLOBJ 5	Understand the principles of lasers, including energy levels, ionization, and excitation potentials. Explore different types of lasers and their characteristics, as well as their engineering and medical applications.

f) **Course Learning Outcomes:**

CLO 1	Understand fundamental principles of physics and their application in explaining the physical world, including units and measurements, enhancing quantitative reasoning skills and scientific literacy.
CLO 2	Demonstrate proficiency in electrostatics and current electricity, including concepts such as Coulomb's law, electric fields, electric potential, Ohm's law, and circuit analysis, enabling the analysis and design of electrical circuits and systems.

CLO 3	Analyse electromagnetism and magnetic materials, including concepts such as magnetic fields, electromagnetic induction, and magnetic properties of materials, fostering an understanding of electromagnetic phenomena and their applications in technology.
CLO 4	Explore semiconductor physics, including semiconductor materials, p-n junctions, diodes, and transistors, and their applications in electronic devices, developing skills in semiconductor device analysis and design.
CLO 5	Investigate modern physics topics such as quantum mechanics, relativity, nuclear physics, and particle physics, gaining insight into the forefront of contemporary physics research and its implications for technology and society.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand fundamental principles of physics and their application in explaining the physical world, including units and measurements, enhancing quantitative reasoning skills and scientific literacy.
CLO 2	Demonstrate proficiency in electrostatics and current electricity, including concepts such as Coulomb's law, electric fields, electric potential, Ohm's law, and circuit analysis, enabling the analysis and design of electrical circuits and systems.
CLO 3	Analyse electromagnetism and magnetic materials, including concepts such as magnetic fields, electromagnetic induction, and magnetic properties of materials, fostering an understanding of electromagnetic phenomena and their applications in technology.
CLO 4	Explore semiconductor physics, including semiconductor materials, p-n junctions, diodes, and transistors, and their applications in electronic devices, developing skills in semiconductor device analysis and design.
CLO 5	Investigate modern physics topics such as quantum mechanics, relativity, nuclear physics, and particle physics, gaining insight into the forefront of contemporary physics research and its implications for technology and society.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-		3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

I. Course Content:

Sr.	Topic	Weightage	Teaching Hrs.
1.	Unit 1: Physical world, Units and Measurements Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units), Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis. Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.	15 %	6
2	UNIT - 3: Electrostatics Current Electricity Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law. Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical), dielectric and its effect on capacitance, dielectric break down. Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and color coding. Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only), Concept of terminal potential difference and Electro motive force (EMF) Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy.	25 %	10
3.	UNIT - 5: Electromagnetism and Magnetic materials Types of magnetic materials; Dia, para and ferromagnetic with their properties, Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization. Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field. Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.	20%	8

4.	UNIT - 6: Semiconductor Physics Energy bands in solids, Types of materials (insulator, semiconductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (center taped). Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only). Photocells, Solar cells; working principle and engineering applications.	20%	10
5.	UNIT - 7: Modern Physics Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission; population inversion, pumping methods, optical feedback, Types of lasers; Ruby, He-Ne and semiconductor, laser characteristics, engineering and medical applications of lasers. Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors. Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology, and nanotechnology-based devices and applications.	20%	8

j. References:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
5. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
6. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
7. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University Press India Pvt. Ltd, New Delhi.
8. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd. New Delhi.
9. Nanotechnology: Importance and Applications, M.H. Fulekar, IK
10. International Publishing House Pvt. Ltd, New Delhi.

6)

a) Course Name: Basic Physics Lab

b) Course Code:03692154

c) Prerequisite: The ability to think critically, identify potential sources of error, and troubleshoot experimental setups is crucial in a physics lab.

d) Rationale: Physics involves quantitative analysis and mathematical modelling to describe physical phenomena. Basic physics education helps students develop quantitative and analytical skills that are valuable in a wide range of academic and professional settings.

e) Course Learning Objective:

CLOBJ 1	Students will demonstrate an understanding of basic electrical circuits, including Ohm's law, resistances in series and parallel combinations, and Kirchhoff's laws.
CLOBJ 2	Students will develop practical laboratory skills through hands-on experimentation, including the use of equipment such as galvanometers, voltmeters, ammeters, and Vernier callipers.
CLOBJ 3	Students will gain an understanding of semiconductor devices and their characteristics, including the V-I characteristics of semiconductor diodes made of different materials (e.g., Ge, Si).
CLOBJ 4	Students will use physics principles to real-world situations, such as measuring AC frequency with a sonometer, determining energy and power in electrical circuits, and understanding nanotechnology concepts through SA/V ratio calculations.
CLOBJ 5	Students will learn to make accurate measurements using precision instruments such as Vernier callipers and screw gauges, and use mathematical concepts to calculate physical quantities such as volume and diameter.

f) Course Learning Outcomes:

CLO 1	Validate Ohm's law through experimental verification by plotting a graph between current and potential difference, demonstrating the linear relationship between them and understanding the concept of resistance.
CLO 2	Confirm the laws of resistances in series and parallel combinations experimentally, illustrating how resistance values add up in series and combine inversely in parallel configurations.
CLO 3	Characterize the V-I (voltage-current) curve of semiconductor diodes (Ge, Si), identifying the knee voltage that signifies the onset of significant current flow, essential for understanding diode behavior in electronic circuits.
CLO 4	Convert a galvanometer into an ammeter, enhancing practical skills in modifying electrical instruments for specific measurement tasks, demonstrating understanding of current measurement principles.
CLO 5	Convert a galvanometer into a voltmeter, further developing practical skills in instrument modification and understanding of voltage measurement principles, allowing accurate voltage measurements across various circuits.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Validate Ohm's law through experimental verification by plotting a graph between current and potential difference, demonstrating the linear relationship between them and understanding the concept of resistance.

CLO 2	Confirm the laws of resistances in series and parallel combinations experimentally, illustrating how resistance values add up in series and combine inversely in parallel configurations.
CLO 3	Characterize the V-I (voltage-current) curve of semiconductor diodes (Ge, Si), identifying the knee voltage that signifies the onset of significant current flow, essential for understanding diode behavior in electronic circuits.
CLO 4	Convert a galvanometer into an ammeter, enhancing practical skills in modifying electrical instruments for specific measurement tasks, demonstrating understanding of current measurement principles.
CLO 5	Convert a galvanometer into a voltmeter, further developing practical skills in instrument modification and understanding of voltage measurement principles, allowing accurate voltage measurements across various circuits.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	-	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

i) Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	To verify Ohm's law by plotting graph between current and potential difference.
2	To verify laws of resistances in series and parallel combination
3	To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee voltage
4	To convert a galvanometer into an ammeter.
5	To convert a galvanometer into a voltmeter.
6	To verify Kirchhoff's law using electric circuits.
7	To determine A.C. frequency with the help of sonometer
8	To Measure A.C. Power using resistive load.
9	To calculate SA/V ratio of simple objects to understand nanotechnology
10	To determine focal length and magnifying power of a convex lens.

Exp. No.	Name of the Experiment
11	To verify inverse square law of radiations using a photo-electric cell
12	To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier calliper and find volume of each object To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.

7)

a. Course Name: Mathematics - II

b. Course Code: 03691151

c. Prerequisite: Knowledge of Basic concept of mathematics studied till first semester

d. Rationale: This course is designed to give a comprehensive coverage at an introductory level to the subject of matrices, Integral Calculus coordinate geometry, Basic elements of vector algebra and First Order Differential Equations.

e. Course Learning Objective:

CLOBJ 1	Understand elementary properties of determinants up to 3rd order, Use Cramer's rule to solve equations, learn algebra of matrices and matrix inverse method for solving linear equations
CLOBJ 2	Define vectors and their notation, perform vector addition and subtraction, calculate scalar and vector products, solve problems related to work, moment, and angular velocity using vectors.
CLOBJ 3	Determine inclination and slope of a line, Express equations of a straight line in various forms, Understand the general equation of a straight line and conditions for concurrency of lines, Define and work with circles, including equations and properties.
CLOBJ 4	Learn integration as the inverse operation of differentiation, integrate simple functions using various methods, apply definite integrals and understand their properties. Solve problems related to area bounded by curves and volume of solids using integration.
CLOBJ 5	Solve first-order and first-degree differential equations using variable separation method, Work with exact and linear differential equations, gain a simple introduction to MATLAB for solving differential equations.

f. Course Learning Outcomes:

CLO 1	Students will be able to understand the elementary properties of determinants up to 3rd order, consistency of equations, and Cramer's rule. They will also learn the algebra of matrices, inverse of a matrix, and matrix inverse method for solving a system of linear equations in 3 variables.
CLO 2	Students will be able to define and notate vectors, resolve vectors in rectangular form, add and subtract vectors, and calculate scalar and vector products. They will also learn

	to apply vector algebra to simple problems related to work, moment, and angular velocity.
CLO 3	Students will be able to understand the properties of lines and circles, including slope, intercepts, equations, and conditions for concurrency. They will also learn to calculate equations of chords and tangents for circles
CLO 4	Students will be able to understand integration as the inverse operation of differentiation, integrate simple functions, and apply integration by substitution, by parts, and by partial fractions. They will also learn to solve problems related to area and volume using definite integrals.
CLO 5	Students will be able to solve first-order and first-degree differential equations using variable separation method, exact differential equations, and linear differential equations. They will also gain a simple introduction to MATLAB for solving differential equations.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Students will be able to understand the elementary properties of determinants up to 3rd order, consistency of equations, and Cramer's rule. They will also learn the algebra of matrices, inverse of a matrix, and matrix inverse method for solving a system of linear equations in 3 variables.
CLO 2	Students will be able to define and notate vectors, resolve vectors in rectangular form, add and subtract vectors, and calculate scalar and vector products. They will also learn to apply vector algebra to simple problems related to work, moment, and angular velocity.
CLO 3	Students will be able to understand the properties of lines and circles, including slope, intercepts, equations, and conditions for concurrency. They will also learn to calculate equations of chords and tangents for circles
CLO 4	Students will be able to understand integration as the inverse operation of differentiation, integrate simple functions, and apply integration by substitution, by parts, and by partial fractions. They will also learn to solve problems related to area and volume using definite integrals.
CLO 5	Students will be able to solve first-order and first-degree differential equations using variable separation method, exact differential equations, and linear differential equations. They will also gain a simple introduction to MATLAB for solving differential equations.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	-	4	20	20	-	60	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **MSE**- Mid-Semester Evaluation, **P** - Practical, **CE** – Continuous Evaluation, **T** - Theory, **P** – Practical

I. Course Content:

Sr.	Topic	Weightage	Teaching Hrs.
1.	Unit I: Determinants and Matrices Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.	22%	8
2.	Unit II: Vector Algebra Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.	13%	5
3	Unit III: Co-Ordinate Geometry Straight line Inclination and slope of a line, different forms of equations to a straight line (i) Slope-intercept form (ii) Point- slope form (iii) Two-point form (iv) Intercept form. General equation of a Straight line, Family of lines. Conditions for concurrency of lines. Circle Definition, Equation of a circle with given center and radius, General form of equation of circle, Equation of a circle when intercepts are given, circle passing through three points, Equation of chord, Equations of tangents and normal at a point on a circle.	15%	7
4.	Unit IV: Integral Calculus Integration as inverse operation of differentiation, Integration of simple functions, Integration by substitution, by parts and by partial fractions (for linear factors only). Definite integral: Definition, Properties of Definite integral, Odd and Even functions, Use of formulas $\int_0^{\frac{\pi}{2}} \sin^n x \, dx$, and $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x \, dx$ for solving problems Where m and n are positive integers. Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes. ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems).	37 %	14

5.	Unit V: Differential Equations Solution of first order and first-degree differential equation by variable separation method (simple problems), Exact differential equations (simple problems), Linear differential equations (simple problems), MATLAB – Simple Introduction.	13%	5
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j. References:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics (Diploma Stream), H.K. Dass, S. Chand Publishing
3. Mathematics for Polytechnic, S.P. Deshpande, Pune Vidyarthi Griha Prakashan.
4. Polytechnic Mathematics (Made Easy) (Applied Mathematics), Manjeet Singh

8)

- a. **Course Name:** COMMUNICATION SKILLS-II
- b. **Course Code:** 03693153
- c. **Prerequisite:** Inclination to improve speaking & listening skills. Basic speaking & writing skills
- d. **Rationale:** Communication skills are essential for all Diploma Engineers
- e. **Course Learning Objective:**

CLOBJ 1	Develop learning & establish a platform for the students that they can easily learn through various life skills required in the organization for becoming an asset for the organization.
CLOBJ 2	Make them understand how new words are formed, role of syllable, vowel, consonant in pronunciation of word.
CLOBJ 3	Enables students to engage in formal communication as well as to participate in events like debate, extempore etc, and to introduce them to various international Language testing systems
CLOBJ 4	Co-relating of sentence through para jumble concepts.
CLOBJ 5	Encourage students to overcome stage fear through classroom activities.
CLOBJ 6	Make learning fun through the usage of comprehension units.

f. Course Learning Outcomes:

CLO 1	Develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.
CLO 2	Evaluate and analyses the right kind of pronunciation with regards to speech sounds and able to get different types of pronunciations.
CLO 3	Able to read, understand, and interpret a text intrinsically as well as extrinsically. The learner can browse a text quickly to come-up with a gist and personal interpretation.

	One is able to create a healthy work-environment and prove to be an asset or one of the most reliable resources to the Organization. As a professional, one is mature to bridge the gulf between the existing behaviour/ lifestyle and the expected corporate behaviour cum lifestyle with the help of learning life skills.
CLO 4	Evaluate the concepts of grammar, various strategies and the usage of formal language in written expression. By using synonyms rewrite the same text in the same format and meaning. Write the gist of the given text.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts of listening its importance & its implication in proper way.
CLO 2	Understanding basic formation & concept of antonym, synonyms, and One-word substitutes.
CLO 3	Understand speaking skills & bringing out the best from through various activities which make them confident
CLO 4	Understand how life skills are important & utilize the knowledge for becoming competent & asset for the organization

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-		1		100	-	-	-	100

Lect. - Lecture, **Tut.** - Tutorial, **Lab** - Lab, **MSE**- Mid-Semester Evaluation, **P** - Practical, **CE** – Continuous Evaluation

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Listening skills: Listening Process and Practice: Introduction, importance of good Listening skills, difference between listening and hearing, types of listening, Barriers to effective listening, traits of a good listener.	10%	6
2	Listening Skills – Questions: With audio aids, students will be able to listen to dialogues, improve in gathering information and to summarize the content. To listen and understand day-to-day conversations and to solve questions based on audio files.	2%	1

3	Building Vocabulary Synonyms, Antonyms, Homophones, Homonyms, Homographs, Phrasal verbs, idioms & phrases, One word substitution	2%	1
4	Introduction to Phonetics Sounds: Consonant, Vowel, Diphthongs, transcription of words (IPA) weak forms, syllable division, word stress, intonation and voice	10%	6
5	Speaking Skill Building Introduction: To enable students to eliminate stage fright and engage in conversation with others.	3%	2
6	Speaking Skill Building Activity: Enables students to engage in formal communication as well as to participate in events like debate, extempore etc, and to introduce them to various international Language testing systems	2%	1
7	Tourism Pitch: Classroom activity which helps students to express their feelings and experiences in English. Encouraging students to overcome stage fear.	2%	1
8	Lifeboat: Classroom Activity to encourage Communication and Convincing Skills	5%	1
9	Reporter: Classroom Activity to encourage Communication and Convincing Skills.	5%	1
10	Paragraph jumble: Enhance the skill of writing by completing the paragraph in appropriate and sensible form	5%	4
11	Life skills: Self-Awareness, Empathy, Sympathy, Emotional Intelligence	5%	4
12	Reading Comprehension: A Day's Wait – Ernest Hemingway, My Lost Dollar- Stephen Leacock	10%	2

j. References:

1. Technical Communication –Principles & Practice-IInd Edition by Meenakshi Raman & Sangeeta Sharma.
2. Effective Technical Communication by Dr. Bharti Kukreja & Dr. Anupama Jain
3. Daniel Johns: The Pronunciation of English. Cambridge: Cambridge University Press, 1956
4. James Hartman & et al. Ed. English Pronouncing Dictionary. Cambridge University Press, 2006.
5. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi 00 (Revised Ed. 2018)
6. Active English –Almas Juneja and Vaseem Qureshi-Macmillan Publishers India Ltd
7. English- Prof. Pradyuman Raj, Prof. Rakhi Moghe, Ms. Anisha Modi
8. J.D. O's Connor. Better English Pronunciation Cambridge University Press, 1980
9. Lindley Murry. An English Grammar: Comprehending Principles and Rules. London: Wilson and sons, 1908.

10. Margaret M. Maison. Examine your English Orient Longman: New Delhi, 1964
11. J. Sethi & et al. A Practice Course in English Pronunciation, New Delhi: Prentice Hall, 2004
12. Pfeiffer, William Sanborn and T.V.S. Padmaja. Technical Communication: A Practical Approach 6th ed Delhi: Pearson, 2007.

Semester 3

1)

a. Course Name: Entrepreneurship and Start-ups

b. Course Code: 03600201

c. Prerequisite: Zeal to learn Subject

d. Rationale: The main objective of this course is to understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation and learning the process and skills of creation. This subject provides detail information about Acquiring Entrepreneurial spirit and resourcefulness, Familiarization with various uses of human resource for earning dignified means of living, Acquiring entrepreneurial quality, competency, and motivation and management of entrepreneurial venture.

e. Course Learning Objective:

CLOBJ 1	The goals of this programme are to inspire students and help them imbibe an entrepreneurial mind-set.
CLOBJ 2	The students will learn what entrepreneurship is and how it has impacted the world and their country.
CLOBJ 3	They will be introduced to key traits and the DNA of an entrepreneur, and be given an opportunity to assess their own strengths and identify gaps that need to be addressed to become a successful entrepreneur.
CLOBJ 4	The programme comprises several short courses, each focusing on a specific entrepreneurial knowledge or skill requirement such as creative thinking, communication, risk taking, and resilience and helping them become career ready, whether it is entrepreneurship or any other career.

f. Course Learning Outcomes:

CLO 1	Understanding the dynamic role of entrepreneurship and small businesses
CLO 2	Organizing and Managing a Small Business
CLO 3	Financial Planning and Control
CLO 4	Forms of Ownership for Small Business
CLO 5	Strategic Marketing Planning
CLO 6	New Product or Service Development
CLO 7	Business Plan Creation

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding the dynamic role of entrepreneurship and small businesses
CLO 2	Organizing and Managing a Small Business
CLO 3	Financial Planning and Control
CLO 4	Forms of Ownership for Small Business
CLO 5	Strategic Marketing Planning
CLO 6	New Product or Service Development
CLO 7	Business Plan Creation

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	-	1	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Entrepreneurship and Start – Ups Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation, Types of Business Structures, Similarities/differences between entrepreneurs and managers.	15	8
2	Business Ideas and their implementation Discovering ideas and visualizing the business, Activity map, Business Plan	15	8
3	Idea to Start-up Market Analysis – Identifying the target market, Competition evaluation and Strategy Development, Marketing and accounting, Risk analysis	20	10
4	Management Company's Organization Structure: Recruitment and management of talent	20	8

5	Financing and Protection of Ideas Financing methods available for start-ups in India, Communication of Ideas to potential investors – Investor Pitch, Patenting and Licenses	20	7
6	Exit strategies for entrepreneurs Exit strategies for entrepreneurs, bankruptcy, succession and harvesting strategy	10	7

j. Text Book and Reference Book:

1. Entrepreneurial Development by Srinivasan. N. P | New Delhi: S. Chand 1999
2. ENTREPRENEURIAL DEVELOPMENT By Vasant Desai | Himalaya Publication
3. Entrepreneurial Development by David Holt

2)

- a. Course Name:** Data Structures
- b. Course Code:** 03606201
- c. Prerequisite:** Basic knowledge of Algorithms
- d. Rationale:** To provide a strong foundation for implementing programming language to formulate, analyse and develop solutions related to various data structures problems.

e. Course Learning Objective:

CLOBJ 1	Define and comprehend key terms related to data structures, such as arrays, linked lists, stacks, queues, trees, and graphs.
CLOBJ 2	Understanding of stack data structures, be proficient in implementing stack operations, and be capable of applying stack-based solutions to a variety of computational problems.
CLOBJ 3	To understand the importance of data structures in the context of writing efficient programs.
CLOBJ 4	Explore real-world applications of linked lists in data structures and algorithms.
CLOBJ 5	Use algorithmic thinking to design and analyse sorting and searching algorithms.
CLOBJ 6	Implement graph data structures and algorithms to solve real-world problems.

f. Course Learning Outcomes:

CLO 1	Demonstrate an understanding of basic data structures (such as an array-based list, linked list, stack, queue, binary search tree) and algorithms.
CLO 2	Use stack-based solutions to solve computational problems and understand the practical applications of stacks in various domains.
CLO 3	Evaluate the time and space complexity of queue algorithms, comparing and contrasting the efficiency of different queue-based solutions.

CLO 4	Explore and Understand dynamic memory allocation concepts in the context of linked list operations.
CLO 5	Understanding of the comparative strengths and weaknesses of different sorting algorithms, enabling them to choose the most suitable algorithm for a given problem.
CLO 6	Implement and analyse basic operations on binary search trees, including insertion, deletion, and searching.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding of basic data structures (such as an array-based list, linked list, stack, queue, binary search tree) and algorithms.
CLO 2	Implement stack-based solutions to solve computational problems and understand the practical applications of stacks in various domains.
CLO 3	Evaluate the time and space complexity of queue algorithms, comparing and contrasting the efficiency of different queue-based solutions.
CLO 4	Explore and Understand dynamic memory allocation concepts in the context of linked list operations.
CLO 5	Understanding of the comparative strengths and weaknesses of different sorting algorithms, enabling them to choose the most suitable algorithm for a given problem.
CLO 6	Implement and analyse basic operations on binary search trees, including insertion, deletion, and searching.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	0	3	20	-	20	-	20	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Data Structures Basic Terminology, Classification of Data Structures, Basic Terminology of Algorithms.	7	4
2	Linear Data Structures - Stack Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks -Infix-to-Postfix Transformation, evaluating Postfix Expressions.	14	6
3	Linear Data Structures - Queue Introduction to Queues, Array Representation of Queues, Operations on a Queue, Circular Queue, Applications of Queues	14	6
4	Linked Lists Basics of Pointers and Structures, Singly Linked List, Representation in Memory, Operations on a Single Linked List, Circular Linked Lists, Doubly Linked List	20	8
5	Sorting and Searching Sequential search, Binary Search Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Radix Sort Methods.	20	8
6	Non-Linear Data Structures - Trees and Graph Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree -Insertion, Deletion, Traversals, Types of Binary Trees. GRAPHS: Graph Terminologies, Representation of Graphs, Graph Traversals.	25	10

j. Text Book and Reference Book:

1. Data Structures by R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C by Reema Thareja, Oxford University Press India.
3. Classic Data Structures by SamantaDebasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C by Horowitz, Ellis, Sahni, Sart aj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudocode approach with C by Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications by G. A. V. Pai, McGraw-Hill Education, India.

3)

- a. **Course Name:** Data Structures Lab
- b. **Course Code:** 03606202

c. **Prerequisite:** Basic knowledge of Algorithms

d. **Rationale:** To provide a strong foundation for implementing programming language to formulate, analyse and develop solutions related to various data structures problems.

e. **Course Learning Objective:**

CLOBJ 1	Define and comprehend key terms related to data structures, such as arrays, linked lists, stacks, queues, trees, and graphs.
CLOBJ 2	Understanding of stack data structures, be proficient in implementing stack operations, and be capable of applying stack-based solutions to a variety of computational problems.
CLOBJ 3	To understand the importance of data structures in the context of writing efficient programs.
CLOBJ 4	Explore real-world applications of linked lists in data structures and algorithms.
CLOBJ 5	Use algorithmic thinking to design and analyse sorting and searching algorithms.
CLOBJ 6	Implement graph data structures and algorithms to solve real-world problems.

f. **Course Learning Outcomes:**

CLO 1	Demonstrate an understanding of basic data structures (such as an array-based list, linked list, stack, queue, binary search tree) and algorithms.
CLO 2	Use stack-based solutions to solve computational problems and understand the practical applications of stacks in various domains.
CLO 3	Evaluate the time and space complexity of queue algorithms, comparing and contrasting the efficiency of different queue-based solutions.
CLO 4	Explore and Understand dynamic memory allocation concepts in the context of linked list operations.
CLO 5	Understanding of the comparative strengths and weaknesses of different sorting algorithms, enabling them to choose the most suitable algorithm for a given problem.
CLO 6	Implement and analyse basic operations on binary search trees, including insertion, deletion, and searching.

g. **Mapping of Course Learning Outcomes and Bloom's Taxonomy:**

Course Learning Outcomes	
CLO 1	Understanding of basic data structures (such as an array-based list, linked list, stack, queue, binary search tree) and algorithms.
CLO 2	Use stack-based solutions to solve computational problems and understand the practical applications of stacks in various domains.
CLO 3	Evaluate the time and space complexity of queue algorithms, comparing and contrasting the efficiency of different queue-based solutions.

CLO 4	Explore and Understan dynamic memory allocation concepts in the context of linked list operations.
CLO 5	Understanding of the comparative strengths and weaknesses of different sorting algorithms, enabling them to choose the most suitable algorithm for a given problem.
CLO 6	Implement and analyze basic operations on binary search trees, including insertion, deletion, and searching.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	0	2	1	0	0	50	0	0	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Text Book and Reference Book:

1. Data Structures by R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C by Reema Thareja, Oxford University Press India.
3. Classic Data Structures by SamantaDebasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C by Horowitz, Ellis, Sahni, Sart aj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudocode approach with C by Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications by G. A. V. Pai, McGraw-Hill Education, India

i. Mapping of Experiment List with Course Learning Outcomes

Sr. NO.	Experiment List
1	Write a program to Implement Stack operations using arrays
2	Write a program to Implement Queue operations using arrays.
3	Write a program to Implement insert, delete algorithms of circular queue.
4	Write a program to insertion of nodes in the beginning of a single linked list.
5	Write a program to insertion of nodes at the end of a single linked list.
6	Write a program to insertion of nodes in the middle of a single linked list

7	Write a program to delete nodes in the beginning of a single linked list.
8	Write a program to delete nodes at the end of a single linked list.
9	Write a program to delete nodes in the middle of a single linked list.
10	Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique.
11	Write a program for Search operation in a given list of integers using binary search technique.
12	Write a program to implement insertion sorting for a given random data
13	Write a program to implement bubble sorting for a given random data
14	Write a program to implement quick sorting for a given random data.
15	Write a program to implement selection sorting for a given random data
16	Write a program to implement Merge Sorting for a given random data.
17	Write a program to implement Radix Sorting for a given random data.
18	Write a program to implement Breadth First Search (BFS).
19	Write a program to implement Depth First Search (DFS)
20	Write a program to implement a binary search tree of integers.
21	Implement inorder, preorder and postorder traversal methods in binary search tree.

4)

a. Course Name: Operating Systems

b. Course Code: 03606205

c. Prerequisite: Basic Knowledge of Computer Architecture.

d. Rationale: A general introduction to various ideas in implementation of operating systems, particularly UNIX. Introduce to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different design choices.

e. Course Learning Objective:

CLOBJ 1	Fundamental concepts is crucial for anyone studying or working with computer systems and operating systems. It forms the basis for more in-depth exploration of advanced operating system topics and computer science principles.
CLOBJ 2	Understanding these concepts is essential for efficient management and execution of processes within an operating system. Process management plays a critical role in the overall performance and responsiveness of a computer system.
CLOBJ 3	File management is crucial for organizing and managing data on computer systems, ensuring efficient access, sharing, and protection of information. Different file systems offer varying features and are suited to different operating environments.

CLOBJ 4	Understanding the I/O system is essential for optimizing data access and storage in a computer system. Efficient disk scheduling, swap space management, and the implementation of RAID are critical aspects of enhancing performance, reliability, and fault tolerance in mass storage systems.
CLOBJ 5	Understanding Unix/Linux architecture, the kernel, services, system calls, and system programs is fundamental for anyone working with these operating systems. The flexibility, power, and robustness of Unix/Linux make them widely used in various environments, including servers, embedded systems, and development environments.

f. Course Learning Outcomes:

CLO 1	To Understand basics of operating system.
CLO 2	To Examine operation in processes.
CLO 3	Understand Concept of File Management
CLO 4	Analyse storage structure and various scheduling algorithms.
CLO 5	Understand to configure OS in an efficient and secure manner.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	To Understand basics of operating system.
CLO 2	To Examine operation in processes.
CLO 3	Understand Concept of File Management
CLO 4	Analyse storage structure and various scheduling algorithms.
CLO 5	Understand to configure OS in an efficient and secure manner.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	0	3	20	-	20	60		100

L- Lectures; T- Tutorial; P- Practical; C- Credit; **MSE**- Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE**- End Semester Examination.

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Basics of Operating System Overview of Operating System, Computer system components, Goals of Operating System, Types of OS, Characteristics and services of OS.	10%	4
2	Process Management Process concepts, operations on processes, IPC, Process Scheduling Algorithm, Memory management: Memory allocation, Swapping, Paging, Segmentation, Virtual Memory.	24%	10
3	File management Concept of a file, access methods, directory structure, file system mounting, file sharing and protection, file system structure and implementation, directory implementation, free space management, efficiency and performance, Different types of file systems.	28%	12
4	I/O System Mass storage structure - overview, Disk structure, Disk attachment, Disk scheduling algorithms, Swap space management, RAID types.	24%	10
5	Introduction of Unix/Linux Unix/Linux Architecture, kernel, Services, system call, system programs.	14%	6

j. Text Book and Reference Book:

1. Operating System Concepts Essentials By byAviSilberschatz, Peter Galvin, Greg Gagne | 9th Edition Wiley Asia Student Edition.
2. Modern Operating Systems by Andrew S. Tanenbaum | Prentice Hall
3. Operating Systems by Harvey M Deital | Addison Wesley

5)

- a. **Course Name:** Operating Systems Lab
- b. **Course Code:** 03606206
- c. **Prerequisite:** Basic Knowledge of Computer Architecture.
- d. **Rationale:** The lab course is intended to practice and do experiments on concepts taught in theory class of 'Operating Systems' and gain insight into functioning of the Operating Systems.

e. Course Learning Objective:

CLOBJ 1	Fundamental concepts is crucial for anyone studying or working with computer systems and operating systems. It forms the basis for more in-depth exploration of advanced operating system topics and computer science principles.
CLOBJ 2	Understanding these concepts is essential for efficient management and execution of processes within an operating system. Process management plays a critical role in the overall performance and responsiveness of a computer system.
CLOBJ 3	File management is crucial for organizing and managing data on computer systems, ensuring efficient access, sharing, and protection of information. Different file systems offer varying features and are suited to different operating environments.
CLOBJ 4	Understanding the I/O system is essential for optimizing data access and storage in a computer system. Efficient disk scheduling, swap space management, and the implementation of RAID are critical aspects of enhancing performance, reliability, and fault tolerance in mass storage systems.
CLOBJ 5	Understanding Unix/Linux architecture, the kernel, services, system calls, and system programs is fundamental for anyone working with these operating systems. The flexibility, power, and robustness of Unix/Linux make them widely used in various environments, including servers, embedded systems, and development environments.

f. Course Learning Outcomes:

CLO 1	To Understand basics of operating system.
CLO 2	To Examine operation in processes.
CLO 3	Understand Concept of File Management
CLO 4	Analyse storage structure and various scheduling algorithms.
CLO 5	Understand to configure OS in an efficient and secure manner.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	To Understand basics of operating system.
CLO 2	To Examine operation in processes.
CLO 3	Understand Concept of File Management
CLO 4	Analyse storage structure and various scheduling algorithms.
CLO 5	Understand to configure OS in an efficient and secure manner.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	0	2	1	0	0	50	0	0	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Practice of various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc
2	Practice various commands/utilities such as catnl, uniq, tee, pg, comm, cmp, diff, tr, tar cpio, mount, umount, find, umask, ulimit, sort, grep, egrep, fgrep cut, paste, join, du, df, ps, who, etc and many more.
3	Create a shell script to print "Parul University"
4	Create a Shell script to multiply two numbers.
5	Create a Script to check a string is palindrome
6	Create a Shell script to append content of one file to another
7	Implement two-way process communication between pipes.
8	Implement message queue form of IPC
9	Simulate the CPU scheduling algorithms- Round Robin, SJF.
10	Simulate the CPU scheduling algorithms- FCFS, priority.
11	Simulate all FIFO Page Replacement Algorithms using C program
12	Simulate all LRU Page Replacement Algorithms using C program

6)

- a. **Course Name:** Introduction to DBMS
- b. **Course Code:** 03606207
- c. **Prerequisite:** Basic knowledge of Database and Algorithm
- d. **Rationale:** It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modelling, relational database design and database query languages.

e. Course Learning Objective:

CLOBJ 1	This course provides an introduction to relational database systems.
CLOBJ 2	The topics covered include the relational model, SQL, transactions, database design, and concepts and algorithms for building database management systems.
CLOBJ 3	Summarize the how to organize, maintain and retrieve - efficiently, and effectively data from database
CLOBJ 4	To implement database system using different data models
CLOBJ 5	To show the various real time concepts of data is used for analysis

f. Course Learning Outcomes:

CLO 1	Understand basic fundamentals and working of DBMS.
CLO 2	Implement database design and different queries.
CLO 3	Evaluate SQL functions and operators.
CLO 4	Analyse the critical role of the database system and understand types of models.
CLO 5	Understand forms of normalization.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand basic fundamentals and working of DBMS.
CLO 2	Implement database design and different queries.
CLO 3	Evaluate SQL functions and operators.
CLO 4	Analyse the critical role of the database system and understand types of models.
CLO 5	Understand forms of normalization.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	0	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Database System Introduction to database and database systems and database environment; Basic terminology of database like Data, Information, Data Item, Records, Files, Metadata, Data Warehouse, Data dictionary and it's components, Role of Data Administrator and Database Administrator Database, Database Architecture	15%	6
2	Introduction to SQL List data types in DBMS, Perform Data Definition Language (DDL) Commands for creating tables, Perform Data Manipulation Language (DML) commands for managing table, Transaction control commands (TCL), Data Control Commands (DCL)	20%	8
3	Working with SQL Functions and Operators Execute various SQL operators and Functions, perform queries on 'Group by', 'Having' and 'Order by' clause, defining constraints – Primary key, foreign key, unique, not null, check, various joins	25%	10
4	Introduction to various Data models Data Modelling using the Entity-Relationship Model, Network Model, The Enhanced Entity-Relationship (EER) model, Mapping Cardinalities	20%	8
5	Function Dependency & Normalization Functional dependencies, Inference Rule (IR), and Normalization for relational databases and Different types of Normal Forms	20%	10

j. Text Book and Reference Book:

1. Fundamentals of Database Systems, Elmasri&Navathe, Pearson Education
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw-Hill.
3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGrawHill, New Delhi, India.

7)

a. Course Name: Introduction to DBMS Lab

b. Course Code: 03606208

c. Prerequisite: Basic knowledge of Database and Algorithm

d. Rationale: It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modelling, relational database design and database query languages.

e. Course Learning Objective:

CLOBJ 1	This course provides an introduction to relational database systems.
CLOBJ 2	The topics covered include the relational model, SQL, transactions, database design, and concepts and algorithms for building database management systems.
CLOBJ 3	Summarize the how to organize, maintain and retrieve - efficiently, and effectively data from database
CLOBJ 4	To implement database system using different data models
CLOBJ 5	To show the various real time concepts of data is used for analysis

f. Course Learning Outcomes:

CLO 1	Understand basic fundamentals and working of DBMS.
CLO 2	Implement database design and different queries.
CLO 3	Evaluate SQL functions and operators.
CLO 4	Analyze the critical role of the database system and understand types of models.
CLO 5	Understand forms of normalization.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	. Understand basic fundamentals and working of DBMS.
CLO 2	Implement database design and different queries.
CLO 3	Evaluate SQL functions and operators.
CLO 4	Analyse the critical role of the database system and understand types of models.
CLO 5	Understand forms of normalization.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	0	4	2	0	0	100	0	0	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Perform various DDL and DML commands on the student table.
2	Create table and insert sample data in tables. Create Table Job (job_id, job_title, min_sal, max_sal)
3	Perform queries involving predicates LIKE, BETWEEN, IN etc. Perform queries involving predicates LIKE, BETWEEN, IN etc. • Display all employee whose name start with 'A' and third character is 'a'. • Display name, number and salary of those employees whose name is 5 characters long and first three characters are 'Ani'. • Display the non-null values of employees and also employee name second character should be 'n' and string should be 5 character long. • Display the null values of employee and also employee name's third character should be 'a'. • What will be output if you are giving LIKE predicate as '%_%' ESCAPE '\
4	To Perform various data manipulation commands, aggregate functions and sorting concept on all created tables. 1. To Perform various data manipulation commands, aggregate functions and sorting concept on all Printed on: 10-04-2024 09:28 AM Page 1 of 3 Subject Syllabus 03606208 - Introduction to DBMS Lab created tables. • List total deposit from deposit. • List total loan from Karabagh branch • Give maximum loan from branch vice. • Count total number of customers • Count total number of customer's cities. • Create table supplier from employee with all the columns. • Create table sup1 from employee with first two columns. • Create table sup2 from employee with no data • Insert the data into sup2 from employee whose second character should be 'n' and string should be 5 characters long in employee name field. • Delete all the rows from sup1. • Delete the detail of supplier whose sup_no is 103. • Rename the table sup2. • Destroy table sup1 with all the data. • Update the value dept_no to 10 where second character of emp. name is 'm'. • Update the value of employee name whose employee number is 103.

5	To study Single-row functions: String functions, Numeric Functions, Date Functions, and Date Conversion Functions.
6	To apply the concept of Aggregating Data using Group functions.
7	To solve queries using the concept of sub query.
8	To study Date Functions, Date Conversion Functions
9	To study Transaction control commands
10	To study Data control commands
11	Implement SQL queries using Group by, Having and Order by clause.
12	Retrieve data spread across various tables or same table using various Joins
13	Practice on functional dependencies
14	Practice on Normalization – using any database performs various normal forms.

8)

- a. **Course Name:** Object Oriented Programming with C++
- b. **Course Code:** 03606213
- c. **Prerequisite:** Knowledge of Computer and Programming in C
- d. **Rationale:** This course provides the basic concepts of object-oriented programming. It promotes solving real life examples with programming. This course builds with examples and programming with a problem-solving approach.
- e. **Course Learning Objective:**

CLOBJ 1	To define the concepts of object-oriented programming with real world view and programmatic view.
CLOBJ 2	To describe programming examples using object-oriented programming concepts.
CLOBJ 3	Summarize the features of object-oriented programming and procedural oriented programming
CLOBJ 4	To implement programs using class with different approaches
CLOBJ 5	To show the various real time concepts of inheritance and polymorphism in programmatically
CLOBJ 6	To explain the capability of one class relay with another class

f. **Course Learning Outcomes:**

CLO 1	State the concepts of object-oriented programming with examples.
CLO 2	Explain various programming examples using object-oriented programming concepts.

CLO 3	Solve the basic mathematical operations using functions and different approaches of OOP.
CLO 4	Define functions and classes by writing code
CLO 5	Develop the programs using functions, class and using pointers.
CLO 6	Organize the structure of C++ with concepts of OOP

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	State the concepts of object-oriented programming with examples.
CLO 2	Explain various programming examples using object-oriented programming concepts.
CLO 3	Solve the basic mathematical operations using functions and different approaches of OOP.
CLO 4	Define functions and classes by writing code
CLO 5	Develop the programs using functions, class and using pointers.
CLO 6	Organize the structure of C++ with concepts of OOP

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Principles of Object-Oriented Programming Object Oriented Languages, Applications of Object-Oriented Programming, C++ Concepts, Structure of C++ program, Basic Data types in C++, User defined Data types, Derived Data types, Declaration of variables and Dynamic initialization of variables, Reference variables, Operators in C++, Scope Resolution Operators, Differentiate OOP and POP, Access Specifiers: Public, Private, Protected.	25%	8

2	Functions, Class and Objects Concept of Functions in C++, Function prototyping, Function Defining, Function Calling, Inline Function, Default Arguments, Constant Arguments, Function Overloading, Defining Class and Creating Objects, Defining Member function, Nesting of Member functions, Private Member functions, Friend function.	25%	9
3	Constructor and Destructor Define Constructor, Types of Constructors: Default constructor, Parameterized constructor, Copy constructor, Destructor	20%	7
4	Inheritance Define Inheritance, Defining Derived Classes, Types of Inheritance: Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance, function overriding, function overloading v/s function overriding, Virtual Base Class, Abstract Classes.	20%	8
5	Pointer & Virtual Functions Pointers to objects, Pointer to Derived Classes, Virtual Functions, Pointer to Virtual Functions, 'this' Pointer,	10%	6

j. Text Book and Reference Book:

1. Programming in ANSI C++ By E. Balaguruswamy
2. C++: The Complete Reference Fourth Edition by Herbert Schildt
3. Object-Oriented Programming In C++ 4th Edition by Robert Lafore

9)

- a. Course Name:** Object Oriented Programming with C++ Lab
- b. Course Code:** 03606214
- c. Prerequisite:** Knowledge of Computer and Programming in C
- d. Rationale:** This course aims to teach students advanced knowledge of Object-Oriented programming.

e. Course Learning Objective:

CLOBJ 1	To define the concepts of object-oriented programming with real world view and programmatic view.
CLOBJ 2	To describe programming examples using object-oriented programming concepts.
CLOBJ 3	Summarize the features of object-oriented programming and procedural oriented programming
CLOBJ 4	To implement programs using class with different approaches

CLOBJ 5	To show the various real time concepts of inheritance and polymorphism in programmatically
CLOBJ 6	To explain the capability of one class relay with another class

f. Course Learning Outcomes:

CLO 1	State the concepts of object-oriented programming with examples.
CLO 2	Explain various programming examples using object-oriented programming concepts.
CLO 3	Solve the basic mathematical operations using functions and different approaches of OOP.
CLO 4	Define functions and classes by writing code
CLO 5	Develop the programs using functions, class and using pointers.
CLO 6	Organize the structure of C++ with concepts of OOP

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	State the concepts of object-oriented programming with examples.
CLO 2	Explain various programming examples using object-oriented programming concepts.
CLO 3	Solve the basic mathematical operations using functions and different approaches of OOP.
CLO 4	Define functions and classes by writing code
CLO 5	Develop the programs using functions, class and using pointers.
CLO 6	Organize the structure of C++ with concepts of OOP

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	0	4	2	0	0	100	0	0	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Mapping of Experiment List with Course Learning Outcomes :

Sr. NO.	Experiment List
1	Write a program to Display Hello World on your Output Screen in C++.
2	Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3	Write a C++ Program to generate first n terms of Fibonacci sequence.
4	Write a program for recursive functions.
5	Write a C++ program to find both the largest and smallest number in a list of integers.
6	Write a C++ Program to take two values from the user side and perform all kinds of Arithmetic Operation.
7	Write a C++ program to sort a list of numbers in ascending order
8	Write a program to check Given Number is Even or Odd Using if-else in C++.
9	Write a Program that shows the use of call by reference and Call by Value in C++.
10	Write a Program to Demonstrate Friend Function and Friend Class
11	Write a Program to show the use of Inline Function.
12	Create a Class named as “STUDENT”, Create two data members of that class:sid, smarks and Take two member Function of that class i.e.:GetData() to get the value of datamember and ShowData() to Display the value of Datamembers and call that function from the main function.
13	Create a Class named as “EMPLOYEE”, Declare Three Data Members i.e.: eid,ename and e-salary and create two member functions of that class i.e.: GetDetails() to get the input of all the datamembers and PrintDetails() to Display all the details of the Employee. (note: create eid of int datatype, e-name is of char array data type and e-salary is of float data type
14	Write a Program to show the use of Function Overloading.
15	Write a Program to show the use of single level inheritance
16	Write a Program to show the use of multilevel inheritance
17	Write a Program to show the use of multiple inheritance.
18	Write a Program to show the use of Hybrid inheritance.
19	Write a Program to show the use of Virtual Base Class.
20	Write a Program to show the use of a Default Constructor.
21	Write a Program to show the use of a Parameterized Constructor.
22	Write a Program to show the use of a Copy Constructor.

23	Write a Program to show the use of 'this' pointer.
24	Develop a program using pointers to derived classes.

10)

- a. **Course Name:** Computer Organization & Architecture
- b. **Course Code:** 03606215
- c. **Prerequisite:** Basic knowledge of Number Systems, Logic Gates, microprocessor
- d. **Rationale:** To have a thorough understanding of the basic structure and operation of a digital computer, its architectures and computational designs.
- e. **Course Learning Objective:**

CLOBJ 1	This chapter equip students with a solid understanding of the fundamental concepts and principles that govern the architecture and functioning of computers, laying the groundwork for more in-depth exploration in subsequent chapters or courses.
CLOBJ 2	This chapter contribute to a comprehensive understanding of the internal workings of a computer's CPU, laying the foundation for subsequent studies in computer organization, digital design, and advanced processor architectures. Students should be well-equipped to analyse and design basic digital circuits and comprehend the intricacies of data manipulation at the micro architectural level.
CLOBJ 3	This chapter, students should be equipped with the knowledge and skills to program a basic computer at the machine language and assembly language levels. They should be able to write, debug, and optimize programs, and understand the fundamental principles of low-level programming. This knowledge forms the basis for further exploration of computer organization and system programming.
CLOBJ 4	This chapter, students should have a comprehensive understanding of memory organization principles, enabling them to make informed decisions about memory configurations and usage in computer systems. This knowledge forms the basis for further exploration of computer architecture, operating systems, and system design.
CLOBJ 5	This chapter, students should have a comprehensive understanding of parallel processing, pipelining, and vector processing concepts. This knowledge equips them with the skills to design and analyse advanced computer architectures, paving the way for further exploration of parallel computing and high-performance computing environments.

f. Course Learning Outcomes:

CLO 1	Have a good understanding of the functioning of the computer system as such and its various sub components.
CLO 2	Student will be able to understand computing requirement for a specific purpose, analyse performance bottlenecks of the computing device and choose appropriate computing device for a given use case.
CLO 3	Understanding computer systems' fundamental components and their interactions.

CLO 4	Familiarity with different Instruction Set Architectures (ISAs).
CLO 5	Developing skills to design computer systems at various levels.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Have a good understanding of the functioning of the computer system as such and its various sub components.
CLO 2	Student will be able to understand computing requirement for a specific purpose, analyse performance bottlenecks of the computing device and choose appropriate computing device for a given use case
CLO 3	Understanding computer systems' fundamental components and their interactions.
CLO 4	Familiarity with different Instruction Set Architectures (ISAs).
CLO 5	Developing skills to design computer systems at various levels.

h. Teaching & Examination Scheme:

i.

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	-	4	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

j. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Structure of Computers Computer Functional units, Von-Neumann architecture, Bus structures, Basic Operational Concepts, Data representation (Fixed and Floating point), Error detecting codes.	15	7
2	Overview Of Register Transfer and Micro operations Logic Micro-operations, Arithmetic Micro-operations., Bus and Memory transfer, Register Transfer Language, register transfer, Shift Micro-operations, Arithmetic Logic Shift Unit.	15	7

3	Programming the Basic Computer Machine language instruction format: Single byte, two-byte, three-byte instructions, Various addressing modes, Data transfer operation and instruction, Arithmetic operation and instruction, Logical operation and instruction, Branch operation and instruction, Stack operation and instruction, Input/output and machine control operation and instruction. Brief of Assembly level language programming	30	12
4	Memory Organization Memory classifications: RAM ROM, PROM, EPROM, Memory Hierarchy, Main Memory and Auxiliary Memory, Associative Memory, Cache Memory, Virtual memory.	15	7
5	Pipeline And Vector Processing Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.	25	9

k. Text Book and Reference Book:

1. Computer System Architecture, M. Moris Mano, Pearson/PHI, India.
2. Microprocessors Interface, Douglas V. Hall, Tata McGraw-Hill.
3. Computer Organization, Carl Hamacher, ZvonksVranesic, Saretzky, McGraw-Hill

11)

- a. **Course Name:** PROFESSIONAL COMUNICATION & CRITICAL THINKING
- b. **Course Code:** 03693203
- c. **Prerequisite:** Inclination to improve personality traits for development & basic communication
- d. **Rationale:** Advance level of communication and personality development is crucial for and afterplacement
- e. **Course Learning Objective:**

CLOBJ 1	Develop basic speaking and writing skills including proper use of language & vocabulary so that they become highly confident & skilled speakers & writers
CLOBJ 2	Be informed of the latest trends in basic verbal activities such as presentations, facing interviews & other forms of oral communication.
CLOBJ 3	Also develop skills of group presentation & communication in team.
CLOBJ 4	Develop non-verbal communication such as proper use of body language & gestures.
CLOBJ 5	Understand basic reading skills
CLOBJ 6	Understand format & basic to write professionally through emails & reports

f. Course Learning Outcomes:

CLO 1	Develop their Personality
CLO 2	Analyse various concepts included in competitive exams.
CLO 3	Imply their knowledge for appearing in Interview
CLO 4	Writing & Communication is improved by their efforts.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts of Body language, verbal & nonverbal communication for understanding the basic psychology behind a person's behaviour.
CLO 2	Use their knowledge & learn more about different competitive exams, patterns, content asked in it.
CLO 3	Develop personality & learn presentation skills
CLO 4	Understand types of formal communication & speaking skills through different activities.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	-	1	-	-	-	100	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Story Mason: Classroom activity to encourage students to speak on topics they are good at, hence boosting confidence of students.	09%	5
2	Determiners, Articles, and Interrogatives This session will enable students to understand proper usage of Determiners and Articles. It will also enhance their daily speaking conversational/ communications skills. Preparation of verbal section in company's aptitude exam	14%	8
3	Subject-Verb Agreement: This will enable students to understand the formation of sentence with the usage of subject-verb agreement	05%	3

4	Reading-Skill Building: Types of Reading – reading for different purposes An Astrologer's Day-Malgudi Days Enhance reading skills by collecting information, know the importance of reading	07%	4
5	Reading Comprehension: Learn to solve the reading comprehension questions in an easy manner and also in less amount of time Introduction, Factual & Inferential comprehension, Reasons for Poor Comprehension Able to solve reading comprehension in less amount of Time by practicing	10%	6
6	Mafia The art of observation and convincing: The interesting activity is targeted toward improving observation and convincing skills. A team activity in which every single Individual is very important person of his team to win	10%	6
7	Direct and Indirect Speech This session will enable students to understand proper usage of narration	09%	5
8	Industry Expectation: In this class the students will be made to understand what will be the world after their college life will be, how they should prepare themselves from that competitive world with full of challenges for them	03%	2
9	Mirror & Water Images Reflection of an object into a mirror and water It is obtained by inverting an object laterally (mirror) & vertically (water).	05%	3
10	Sentence Correction It will also enhance their daily speaking conversational/communication skills. Preparation of verbal section in company's aptitude exam	03%	2
11	Play Teacher: Classroom activity to encourage students to speak on topics they are good at, hence boosting confidence of students.	10%	6
12	Professional Writing Email and report	05%	3
13	Group Discussion It is a systematic exchange of information, views and opinions about a topic, problem, issue or situation among the members of a <i>group</i> who share some common objectives.	10%	6
	Total	100	30

j. Text Book and Reference Book:

1. " Active English –Almas Juneja and Vaseem Qureshi-Macmillan Publishers India Ltd
2. English- Prof. Pradyuman Raj, Prof. Rakhi Moghe, Ms. Anisha Modi
3. Verbal and Non-Verbal Reasoning-B.S. Sijwali and Indu Sijwali
4. Competitive English- Azahar Siddiqui, Shaily Kaviya, Amisha Pathak, Mayank Barot, Gautam Nayak, Ankit Pandya
5. The Functional Aspects of Communication Skills-Dr. P. Prasad-.K. Kataria and Sons.
6. Malgudi Days by R.K. Narayan

Semester-4

1)

- a. **Course Name:** Essence of Indian Knowledge and Tradition
- b. **Course Code:** 03600251
- c. **Prerequisite:** Zeal to learn Subject
- d. **Rationale:** The course aims at imparting basic principles of thought process, reasoning and inference. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature. Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature is also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.
- e. **Course Learning Objective:**

CLOBJ 1	Gain knowledge about the Vedas and Unvedas, including Ayurveda, Dhanu Veda, Gandharva Veda, and Sthanya, and their significance in the Indian knowledge system.
CLOBJ 2	Learn about Vedangas such as Education, Kalpa, Nirukta, Grammar, and Jyotisha, and their importance in supporting and enriching the understanding of Vedic texts.
CLOBJ 3	Understand the purpose and relevance of Upangas such as Dharma Shastras, Itihasas, Puranas, and Tantras in providing supplementary knowledge and guidance in various aspects of life.
CLOBJ 4	Examine how modern scientific approaches are applied to ancient Indian practices like Yoga and Holistic Healthcare, exploring their effectiveness and potential benefits.
CLOBJ 5	Analyse real-world case studies demonstrating the practical implementation and outcomes of Yoga and Holistic Healthcare practices, including their effects on physical, mental, and emotional well-being.

- f. **Course Learning Outcomes:**

CLO 1	Analyse the significance of rituals, practices, and traditions within the context of Indian culture and spirituality.
CLO 2	Utilize traditional Indian practices or methods in creative or problem-solving contexts.
CLO 3	Compare and contrast different schools of thought within Indian philosophy and their approaches to various concepts.
CLO 4	Evaluate the influence of Indian knowledge and tradition on other cultures and vice versa.
CLO 5	Critically evaluate the ethical implications of certain practices or beliefs within Indian traditions.
CLO 6	Analyse the significance of rituals, practices, and traditions within the context of Indian culture and spirituality.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Analyse the significance of rituals, practices, and traditions within the context of Indian culture and spirituality.
CLO 2	Utilize traditional Indian practices or methods in creative or problem-solving contexts.
CLO 3	Compare and contrast different schools of thought within Indian philosophy and their approaches to various concepts.
CLO 4	Evaluate the influence of Indian knowledge and tradition on other cultures and vice versa.
CLO 5	Critically evaluate the ethical implications of certain practices or beliefs within Indian traditions.
CLO 6	Analyse the significance of rituals, practices, and traditions within the context of Indian culture and spirituality.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	0	20	20	-	-	-	40

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr.	Topics	W	T
1	Basic Structure of Indian Knowledge System: i) Vedas, (ii) Unveda (Ayurveda, Dhanu Veda, Gandhveda, Sthanya etc.) (iii) Vedanga (Education, Kalna, Nanrut, Grammar, Jyotish verses), (iv) Upaayaga (Dharma level, Vivamsa, Purana, Takma level)	60	12
2	Modern Science and Indian Knowledge System:	15	5
3	Yoga and Holistic Health care	15	5
4	Case Studies	10	4

- a. **Course Name:** Computer Networks
- b. **Course Code:** 03606251
- c. **Prerequisite:** Basic knowledge of transmission and distribution system.
- d. **Rationale:** The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: Maintain the proper functioning of the electrical transmission and distribution systems.
- e. **Course Learning Objective:**

CLOBJ 1	Gain a comprehensive understanding of computer networks, including their structure, operation, common issues, inherent limitations, and the range of available options for networking technologies and protocols.
CLOBJ 2	Develop an awareness of the critical considerations and best practices involved in the development of applications intended for use over computer networks, including factors such as security, reliability, scalability, and interoperability.
CLOBJ 3	Acquire the skills necessary to configure a basic Local Area Network (LAN), including setting up network hardware, configuring network settings, and connecting computers to the LAN infrastructure.

f. Course Learning Outcomes:

CLO 1	State of computer networks, issues, limitations, options available.
CLO 2	Understanding of the care that needs to be taken while developing applications designed to work over computer networks
CLO 3	Able to configure basic LAN and connect computers to it.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	State of computer networks, issues, limitations, options available.
CLO 2	Understanding of the care that needs to be taken while developing applications designed to work over computer networks
CLO 3	Able to configure basic LAN and connect computers to it.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Basics of Computer Network Introduction to computer networks; Network Models- OSI Reference Model, TCP/IP Model	22	6
2	Transmission Media Transmission Media – principles, issues and examples; Wired Media – Coaxial, UTP, STP, FiberOpticCables; Wireless Media – HF, VHF, UHF, Microwave, Network topologies, Data Link Layer –design issues, example protocols (Ethernet, WLAN, Bluetooth)	29	8
3	Network Layer Network Layer - design issues, example protocols (IPv4); Routing - principles/issues, algorithms (Distance-vector, Link-state) and protocols (RIP, OSPF)	17	5
4	Transport Layer Transport Layer - design issues, example protocols (TCP); Application Layer Protocols (SMTP, DNS)	15	4
5	Network Devices and its Protocol Functioning of Network Devices – NIC, Hub, Switch, Router, Network Management System and example protocol (SNMP)	17	5

j. Text Book and Reference Book:

1. “An Engineering Approach to Computer Networking” By S. Keshav | Pearson Education
2. “Data and computer communications”, By William Stallings | Prentice Hall
3. Computer Networks (Textbook) By Andrew S. Tanenbaum | Fifth edition
4. Computer Networks by Andrew S. Tanenbaum and David J. Wetherall | PEARSON Edition

3)

a) Course Name: Computer Networks Lab

b) Course Code: 03606252

c) Prerequisite: Basics of network

d) Rationale: This course aims to teach students advanced knowledge of computer network.

e) Course Learning Objective:

CLOBJ 1	Gain a thorough understanding of computer networks, encompassing their architecture, functionalities, and components, as well as an awareness of common issues, limitations, and challenges encountered in network design and implementation
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CLOBJ 2	Develop a comprehensive understanding of the considerations and precautions necessary when developing applications intended for deployment over computer networks.
CLOBJ 3	Gain hands-on experience in LAN configuration and troubleshooting, fostering competence in network administration tasks essential for managing small-scale network environments effectively.

f) Course Learning Outcomes:

CLO 1	status of computer networks, issues, limitations, options available.
CLO 2	Understanding of the care that needs to be taken while developing applications designed to work over computer networks
CLO 3	Able to configure basic LAN and connect computers to it.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Status of computer networks, issues, limitations, options available.
CLO 2	Understanding of the care that needs to be taken while developing applications designed to work over computer networks
CLO 3	Able to configure basic LAN and connect computers to it.

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	50	-	-	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i) Text Book and Reference Book:

1. "An Engineering Approach to Computer Networking" By S. Keshav | Pearson Education
2. "Computer Networks and Internet/TCP-IP" By D. Comer | Prentice Hall
3. "Data and computer communications", By William Stallings | Prentice Hall 4
4. Computer Networks (Textbook) By Andrew Tanenbaum | Pearson Education | 5th Edition

j) Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Showing various types of networking cables and connectors, identifying them clearly
2	Looking at specifications of cables and connectors of various companies on Internet, find out differences
3	Preparing straight and cross cables.
4	Study of various LAN topologies and their creation using network devices, cables and computers
5	Configuring computing devices (PC, Laptop, Mobile, etc) for network, exploring different options and their impact – IP address, gateway, DNS, security options, etc
6	Showing various networking devices – NICs, Hub, Switch, Router, Wi-Fi access point, etc.
7	Looking at specifications of various networking devices various companies on Internet, find out differences.
8	Network simulation tool (e.g. Cisco Packet Tracer)
9	Setting up a small wired LAN in the Lab
10	Setting up a small wireless LAN in the Lab

4)

- a. Course Name:** Software Engineering
- b. Course Code:**03606253
- c. Prerequisite:** Software Engineering
- d. Rationale:** This course aims to teach students acquaint with systematic and organized approach for developing the software. Provide a scope to students where they can solve small, real-life problems learn an individual as well as teamwork approach for project development understand various software quality assurance as well as testing approaches.

e. Course Learning Objective:

CLOBJ 1	Define and elucidate the concepts of software and software engineering, including their significance, principles, and practices in the development of software systems.
CLOBJ 2	Compare and contrast various project process models, such as Waterfall, Agile, Spiral, and Incremental, to understand their characteristics, advantages, and limitations.
CLOBJ 3	Identify and articulate software requirements through elicitation, analysis, documentation, and validation processes
CLOBJ 4	Analyse software requirements to derive functional and non-functional specifications, translating user needs into system features and constraints.
CLOBJ 5	Develop schedules for various software development activities, including requirement gathering, analysis, design, implementation, testing, and deployment.

f. Course Learning Outcomes:

CLO 1	Compare various project process models and use in project planning.
CLO 2	Identify software requirement
CLO 3	Analyse and design requirement
CLO 4	Prepare and manage Schedule for different software development activities
CLO 5	Prepare software Documentation and test cases and test the software

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Compare various project process models and use in project planning.
CLO 2	Identify software requirement
CLO 3	Analyse and design requirement
CLO 4	Prepare and manage Schedule for different software development activities
CLO 5	Prepare software Documentation and test cases and test the software

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Introduction to Software and Software Engineering Introduction to Software Engineering, Software Myths, Software Engineering: A Layered Technology, Lifecycle, Process Models.	20	8
2	Software Design Development Activities - Requirements Gathering and Analysis, Software Requirement Specification (SRS), Design process, Cohesion and Coupling, Basic UI design – ER Diagram, Data-Flow Diagrams, Use case Diagram, Activity Diagram, Software architecture and Architectural styles	20	8
3	Software Project Planning, Scheduling and Tracking Project management concepts, Metrics for Size Estimation - Line of Code and Function Points, Project Estimation Technique-	20	8

	Empirical Estimation Technique, Heuristic Technique Scheduling-Work breakdown structure, Activity network and critical path Method, Gantt Chart, Project Monitoring and control.		
4	Software Requirements Specification Requirement Gathering and Analysis, Software Requirement Specification (SRS), Formal requirements specification and verification	10	4
5	Risk Analysis & Management Reactive versus Proactive Risk Strategies, Software Risks (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation), Risks Monitoring and Management	15	7
6	Software Testing Code review-Code Work through, Code Inspection, Software Documentation Internal Documentation, External Documentation Software Testing Basics, Unit, Integration, Black box Testing, White Box testing Writing and executing test cases.	15	7

j. Text Book and Reference Book:

1. Software Engineering: A Practitioner's Approach (Textbook) By Pressman R.S | TMH
2. Software Engineering by Ian Sommerville | Pearson Education Ltd. | Ninth Edition
3. Software Engineering - An Engineering Approach by Peters &Pedrycz | Wiley-India

5)

a. Course Name: Java Programming

b. Course Code:03606255

c. Prerequisite: Basic knowledge of programming

d. Rationale: This course aims to teach students basics of Java programming

e. Course Learning Objective:

CLOBJ 1	Establish a functional Java development environment, including installation and configuration of necessary software tools such as JDK, IDEs, and build systems.
CLOBJ 2	Develop the skills to create, execute, and debug Java programs using industry-standard Integrated Development Environments (IDEs) or command-line tools. Learn techniques for compiling, running, and troubleshooting Java code to ensure program correctness and functionality.
CLOBJ 3	Use object-oriented programming (OOP) concepts, including encapsulation, inheritance, polymorphism, and abstraction, in the design and implementation of Java programs.

CLOBJ 4	Implement exception handling mechanisms in Java programs to gracefully manage runtime errors, handle exceptional situations, and ensure robustness and reliability.
CLOBJ 5	Develop multithreaded Java programs using thread-based concurrency primitives, synchronization mechanisms, and thread-safe data structures.
CLOBJ 6	Design and develop Java applet programs leveraging the capabilities of the Java Applet API.

f. Course Learning Outcomes:

CLO 1	Setup JAVA environment
CLO 2	Create run and debug java programs
CLO 3	Able to use object-oriented concepts in your program.
CLO 4	Able to use exception handling in program.
CLO 5	Able to create thread & multithreading program in JAVA
CLO 6	Create applet programs & use its different methods

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Setup JAVA environment
CLO 2	Create run and debug java programs
CLO 3	Able to use object-oriented concepts in your program.
CLO 4	Able to use exception handling in program.
CLO 5	Able to create thread & multithreading program in JAVA
CLO 6	Create applet programs & use its different methods

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Introduction	15	5

	History of Java, C++ vs JAVA, Java and Internet, Java environment setup, Different editors for JAVA, Java Runtime Environment		
2	Basics Of JAVA Java Virtual Machine (JVM), JDK, Data types, Operator, array, type conversion & casting, Control Statements, break, continue, garbage collection, types of comments, wrapper class, command line argument, Basics of thread	20	8
3	Object Oriented Programming Concepts Class, objects, abstraction, polymorphism, inheritance, encapsulation, constructor, this keyword, static keyword	15	7
4	Inheritance & Interface Simple inheritance, multilevel inheritance, hierarchical inheritance, basics of interface, inheritance in interface	15	7
5	Package & Exception Handling Basics of package, accessing rules, package creation, import package, types of exception handling, Use of try...catch, throw, throws keyword, finally	20	8
6	File Handling & Basics of Applet Basics of stream class, I/O class, creation of text file, reading and writing, Introduction of applet, life cycle of applet, creation of applet, Methods of applet	15	7

j. Text Book and Reference Book:

1. Programming with Java by E Balagurusamy | Tata McGraw Hill
2. Complete Reference Java 2 (Textbook) By Herbert Scheldt | TMH

6)

- a. **Course Name:** Java Programming Lab
- b. **Course Code:** 03606256
- c. **Prerequisite:** Basic knowledge of programming.
- d. **Rational:** This course aims to teach students basics of Java programming
- e. **Course Learning Objective:** This Course aims to teach students basics of java Programming.

CLOBJ 1	Demonstrate a thorough understanding of electrical installations and safety practices by adhering to the guidelines set forth in the National Electrical Code 2011, ensuring compliance and promoting a safe working environment.
CLOBJ 2	Provide a comprehensive description of the various types of installation tenders and contracts, emphasizing the legal and contractual aspects associated with electrical installations.
CLOBJ 3	Develop the skills necessary to estimate the scope of work for non-industrial electrical installations, including the ability to assess materials, labour, and associated costs for accurate project planning and budgeting.

CLOBJ 4	Implement estimation techniques specific to industrial software installations, considering the unique requirements, complexities, and scale of industrial projects to ensure precise cost assessments.
CLOBJ 5	Explain the process of estimating the work involved in Distribution Line and Substation Components, covering the various elements such as equipment, materials, and labour required for the successful implementation of electrical distribution infrastructure projects.

f. Course Learning Outcomes:

CLO 1	Setup JAVA environment & Create run and debug java programs
CLO 2	Able to use object-oriented concepts in your program.
CLO 3	Able to use exception handling in program.
CLO 4	Able to create thread & multithreading program in JAVA
CLO 5	Create applet programs & use its different methods

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Setup JAVA environment & Create run and debug java programs
CLO 2	Able to use object-oriented concepts in your program.
CLO 3	Able to use exception handling in program.
CLO 4	Able to create thread & multithreading program in JAVA
CLO 5	Create applet programs & use its different methods

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	100	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Text Book and Reference Book:

1. Complete Reference Java 2 (Textbook) By Herbert Scheldt | TMH
2. Programming with Java By E Balagurusamy | Tata McGraw Hill

j. Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	1.1 Write a program to print "Welcome to Java" 1.2 Write a program to print student details

Exp. No.	Name of the Experiment
2	2.1 Write a program to perform mathematical operations 2.2 Write a program to print total and average of five numbers
3	3.1 Write a program to find prime number 3.2 Write a program to find factorial of a number
4	4.1 Write a program to take input from user 4.2 Write a program to show the use of type conversion
5	5.1 Write a program to find maximum number out of three 5.2 Write a program to arrange number in ascending order
6	6.1 Write a program to display multiplication table 6.2 Write a program to display reverse of a number
7	7.1 Write a program to demonstrate “this” keyword 7.2 Write a program to demonstrate “static” keyword
8	8.1 Write a program for simple inheritance 8.2 Write a program for multilevel inheritance
9	9.1 Write a program to create a package 9.2 Write a program to demonstrate scope of access specifier
10	10.1 Write a program to demonstrate use of interface 10.2 Write a program to demonstrate inheritance in interface
11	11.1 Write a program to demonstrate divide by zero exception 11.2 Write a program to demonstrate throw and throws keyword
12	Write a program to demonstrate thread synchronization
13	Write a program to copy one content of file into another
14	14.1 Write a program to create applet 14.2 Write a program to demonstrate applet(graphics) methods

7)

- a. **Course Name:** Algorithms
- b. **Course Code:** 03606257
- c. **Prerequisite:** basic knowledge of data structure
- d. **Rationale:** This course aims to teach students knowledge of Algorithms.
- e. **Course Learning Objective:**

CLOBJ 1	Develop problem-solving skills by applying various algorithmic techniques such as brute force, divide and conquer, dynamic programming, and greedy algorithms.
CLOBJ 2	Learn to evaluate algorithms based on their time and space complexity to make informed design choices.
CLOBJ 3	Understand the trade-offs between optimization and efficiency in algorithm design and implementation.
CLOBJ 4	Explore real-world applications of algorithms in various domains such as computer graphics, artificial intelligence, bioinformatics, and network optimization.

CLOBJ 5	Understand the relationship between data structures and algorithms and how to choose appropriate data structures to solve different problems efficiently.
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f. Course Learning Outcomes:

CLO 1	Develop proficient problem-solving skills by applying various algorithmic techniques
CLO 2	Evaluating algorithmic solutions
CLO 3	Trade-offs between optimization and efficiency in algorithm design and implementation.
CLO 4	Explore real-world applications of algorithms across diverse domains
CLO 5	Develop an understanding of the interplay between data structures and algorithms
CLO6	fundamental algorithmic concepts such as efficiency, correctness, and complexity analysis.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Develop proficient problem-solving skills by applying various algorithmic techniques
CLO 2	Evaluating algorithmic solutions
CLO 3	Trade-offs between optimization and efficiency in algorithm design and implementation.
CLO 4	Explore real-world applications of algorithms across diverse domains
CLO 5	Develop an understanding of the interplay between data structures and algorithms
CLO6	fundamental algorithmic concepts such as efficiency, correctness, and complexity analysis.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Dictionaries Definition: Array, types of Arrays, Pointer, Recursion function Data Abstraction. Sets, Multisets	10	7
2	Fundamentals Programming Models and String	10	7

	Stacks, Queues. Time Complexity: Best case, Average case, worst-case analysis of algorithms, Introduction for string, types of string Operation.		
3	Analysis of Sorting and Searching Analysis of Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort. Binary Search Trees: construction, insertion, Searching, Deletion, Balanced Search Trees, AVL tree, 2-3 Tree	30	14
4	Graphs Definition of a directed and undirected graph. Paths, Cycles. Directed Acyclic Graphs. Topological Sorting. Shortest Path: Breadth first search, Depth First Search, Greedy Algorithms (Prim's Algorithm, Kruskal Algorithm, Dijkstra Algorithm).	30	14
5	Hashing Hashing Function, Hash Table, Hashing Techniques, Rehashing, Collision Resolution Techniques.	20	14

j. Text Book and Reference Book:

1. The Design and Analysis of Computer Algorithms (Textbook)
By Aho, Hopcroft, Ullman
2. Data structures and Algorithms
By Alfred Aho, Jeffrey Ullman, John Hopcroft | Pearson Education

8)

- a. Course Name:** Web Development Using PHP
- b. Course Code:** 03606265
- c. Prerequisite:** Fundamentals of HTML and CSS
- d. Rationale:** This course introduces students to web development using PHP, a widely used server-side scripting language for creating dynamic web pages and applications. Students will learn the fundamentals of PHP programming, including syntax, data types, control structures, functions, and object-oriented programming. The course will also cover topics such as form handling, database connectivity, session management, and security best practices. By the end of the course, students will be able to design and develop interactive web applications using PHP.
- e. Course Learning Objective:**

CLOBJ 1	Gain proficiency in explaining the basic syntax of PHP, including variables, constants, operators, and expressions. Understand various data types supported by PHP such as integers, floats, strings, arrays, and booleans. Learn control structures in PHP including if-else statements, switch-case statements, loops (for, while, do-while), and function declarations.
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CLOBJ 2	Demonstrate proficiency in writing PHP scripts to solve a variety of programming problems. Develop skills in implementing algorithms and logic using PHP syntax and control structures to accomplish specific tasks or solve problems efficiently.
CLOBJ 3	Learn to embed PHP code within HTML to create dynamic and interactive web pages. Understand how to use PHP to generate dynamic content, handle form submissions, and interact with users through web-based interfaces.
CLOBJ 4	Gain proficiency in implementing operations on arrays in PHP, including sorting, searching, and iteration. Learn to use built-in array functions and control structures to manipulate array data efficiently and effectively.
CLOBJ 5	Acquire skills in reading from and writing to files using PHP file handling functions. Understand how to open, read, write, and close files in various formats (text files, CSV files, etc.) using PHP file handling capabilities.

f. Course Learning Outcomes:

CLO 1	Explain the basic syntax, data types, and control structures of PHP. Demonstrate proficiency in writing PHP scripts to solve various programming problems.
CLO 2	Create interactive web pages by embedding PHP code within HTML.
CLO 3	Implement operations on arrays, including sorting, searching, and iteration.
CLO 4	Read from and write to files using PHP file handling functions.
CLO5	Create dynamic Website/ Web based Applications. using HTML, PHP, and MYSQL databases.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Explain the basic syntax, data types, and control structures of PHP. Demonstrate proficiency in writing PHP scripts to solve various programming problems.
CLO 2	Create interactive web pages by embedding PHP code within HTML.
CLO 3	Implement operations on arrays, including sorting, searching, and iteration.
CLO 4	Read from and write to files using PHP file handling functions.
CLO 5	Create dynamic Website/ Web based Applications. using HTML, PHP, and MYSQL databases.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to PHP Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.	04	10
2	Control Structure-Decisions and loop Conditional statements: if, else, else if Looping constructs: for, while, do-while, foreach Mixing Decisions and looping with Html	08	20
3	Functions and Strings What is a function, define a function, Call by value and Call by reference, Recursive function String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function	08	20
4	PHP Arrays and. Handling Html Form with Php Array: Types of Arrays, Arrays definition, creating arrays; using arrays () function, using Array identifier, defining start index value, adding more elements to array, Associative Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.	08	20
5	Session and Cookie Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.	06	10
6	PHP Database Input through Form controls- using Text Box, Text Area, List Box, Check Box, Radio Box, submitting form values, using \$_Get and \$_Post Methods. Overview of Database: Creating Database using phpMyAdmin & Console(using query, using Wamp server), Connecting with PHP/ Database Connection, creating and executing queries using MySQL query(),creating tables, inserting data in to table, inserting data through HTML Forms	08	20

j. Text Book and Reference Book:

1. "PHP and MySQL Web Development" by Luke Welling and Laura Thomson
2. "PHP: The Complete Reference", Steven Holzner
3. "Web programming- Building Internet Application", Chris Bales

9)

a. Course Name: Web Development Using PHP - Lab

b. Course Code: 03606266

k. C. prerequisite: Fundamentals of HTML and CSS

l. Rationale: This course introduces students to web development using PHP, a widely used server-side scripting language for creating dynamic web pages and applications. Students

will learn the fundamentals of PHP programming, including syntax, data types, control structures, functions, and object-oriented programming. The course will also cover topics such as form handling, database connectivity, session management, and security best practices. By the end of the course, students will be able to design and develop interactive web applications using PHP.

e. course Learning Objective:

CLOBJ 1	Gain a solid understanding of the fundamentals of PHP programming language including syntax, variables, data types, operators, and control structures.
CLOBJ 2	Acquire proficiency in manipulating arrays and strings in PHP, including sorting, searching, iterating, and performing operations such as concatenation, substring extraction, and pattern matching.
CLOBJ 3	Develop skills in working with files and directories using PHP file handling functions.
CLOBJ 4	Understand how to connect to databases using PHP and perform CRUD (Create, Read, Update, Delete) operations on database records.
CLOBJ 5	Learn to implement session management and cookies in PHP to maintain state and track user interactions across multiple requests.

f. course Learning Outcome:

CLO 1	Explain the basic syntax, data types, and control structures of PHP. Demonstrate proficiency in writing PHP scripts to solve various programming problems.
CLO 2	Create interactive web pages by embedding PHP code within HTML.
CLO 3	Implement operations on arrays, including sorting, searching, and iteration.
CLO 4	Read from and write to files using PHP file handling functions.
CLO 5	Create dynamic Website/ Web based Applications. using HTML, PHP, and MYSQL databases.

g. Mapping Of Course Learning Outcome and Bloom's Taxonomy:

Course Learning Outcomes		Bloom's Level
CLO 1	Explain the basic syntax, data types, and control structures of PHP. Demonstrate proficiency in writing PHP scripts to solve various programming problems.	1, 2
CLO 2	Create interactive web pages by embedding PHP code within HTML.	6

CLO 3	Implement operations on arrays, including sorting, searching, and iteration.	5
CLO 4	Read from and write to files using PHP file handling functions.	1,5
CLO 5	Create dynamic Website/ Web based Applications. using HTML, PHP, and MYSQL databases.	6

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	100	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

i. Text Book and Reference Book:

1. "PHP and MySQL Web Development" by Luke Welling and Laura Thomson
2. "PHP: The Complete Reference", Steven Holzner
3. "Web programming- Building Internet Application", Chris Bales

j. Mapping of Experiment List with Course Learning Outcomes

Exp. No.	Name of the Experiment
1	Create A Feedback Form Using Form handling.
2	Create a contact form using form handling.
3	Write a code for designing a menu system using a list tag.
4	Write a PHP script to display a Welcome message.
5	Write PHP Script to print Fibonacci series.
6	Write PHP Script to calculate total marks of student and display grade.
7	Write PHP Script to find the maximum number out of three given numbers.
8	write a program to show the day of the week using a switch.
9	Write a program to calculate Electricity bill in PHP
10	Write PHP Script using two dimensional arrays such as addition of two 2x2 matrices.
11	Write a PHP Script to show different looping structures.
12	Write a PHP script to demonstrate Array functions.
13	Write a PHP script to call by reference and call by value.
14	Write PHP Script to demonstrate use of associative arrays and for FOR EACH loop execution.
15	Write PHP script Using user defined function.

Exp. No.	Name of the Experiment
16	Create form using text box, check box, radio button, select, submit button. And display user inserted values in the new PHP page.
17	Write a PHP Script for performing function that takes arguments, returns arguments, default argument and variable length argument.
18	Write two different PHP scripts to demonstrate passing variables through a URL.
19	Write two different PHP scripts to demonstrate passing variables through Hidden Variables.
20	Write a PHP script to connect to the MYSQL server from your web application.
21	Write a PHP script to create and drop databases.
22	Create a database using phpMyAdmin. Write a program to read input data from the table and display all this information in tabular form on the output screen.
23	Write a program to manipulate data from tables and display all this information using table format.
24	Develop small PHP application(s) using forms and databases.

10)

- a) **Course Name:** Employability Skills
- b) **Course Code:** 03693251
- c) **Prerequisite:** Inclination to learn the importance of critical thinking & Interview Skills.
- d) **Rationale:** Cracking aptitude is the first step towards cracking placements and competitive exams
- e) **Course Learning Objective:**

CLOBJ 1	Improve their critical thinking
CLOBJ 2	Prepares them for Campus Placement & Competitive Exams.
CLOBJ 3	Builds up their confidence level
CLOBJ 4	Understanding ways to present the points in Group Discussions & how it plays an important role in cracking interviews.(selection process)
CLOBJ 5	Learning Entrepreneur skills which promotes them to learn selling techniques.
CLOBJ 6	Grasping the knowledge for preparing resume.

f) **Course Learning Outcomes:**

CLO 1	Application of the knowledge learnt in resume building
CLO 2	Building confidence & cracking interviews.
CLO 3	Improve competency in Competitive exams through various topics learnt
CLO 4	Selling skills are focused helping them to become an entrepreneur in future.

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the concepts of various competitive topics
CLO 2	Analyse various skills required in resume building & updating it & adding it in linked in.
CLO 3	Understand & implication of entrepreneur skills
CLO 4	Understand interview skills, questions asked in it & their formations.

h) Teaching & Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				T	P	MSE	CE	P	
2	0	-	0	-	-	-	100	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

i) Course Content:

Sr.	Topic	Weightage	Teaching Hrs.
1	Critical Thinking -Case Studies: Critical thinking is based on pure logical thinking. Solving a criticalreasoning question requires nothing but reasoning ability of the candidate. This session deals with the basic logic involved in critical reasoning questions and covers all the type of questions inCT. Worksheets would be provided to students for further practice.	10%	6
2	Coding & decoding, Alphabetical Series - Understand various types of questions which they can comeacross in the given topic. - Tips and tricks to solve questions on the above-mentionedtopics.	8%	4
3	Analogy and odd man out - Understand various types of questions which they can comeacross in the given topic. - Tips and tricks to solve questions on the above-mentionedtopics.	8%	4
4	Direction sense: Able to solve all the direction sense question in competitive exams and aptitude exams of different	8%	4

	companies		
5	Blood relations: Able to solve all the Blood Relation questions in competitive exams and aptitude exams of different companies	8%	4
6	Paper Folding In this section of nonverbal reasoning a figure is obtained by folding a piece of paper containing same design along the dottedline.	4%	2
7	Seating Arrangement Candidates are required to arrange the objects either in a row or circle on the basis of information given Questions are presented in distorted form to create confusion and to test the candidate's ability to analyze the information step by step in order to answer the question	3%	2
8	Completion of Figure In each of the following figure, a part of figure is missing. Find out from the given options, the right figure to fit in the missing figure	3%	2
9	Completion of Series In these questions a series of figures is given as problem figure & the candidate are asked to select one of the figure from the set of answer figure which will continue the given sequence.	8%	4
10	Entrepreneurship skills (SELLING THE CONCEPT): This topic will help students develop the skills necessary to develop into Self- Sufficient business leaders through Entrepreneurship studies.	4%	2
11	Resume Building The students will have a proper understanding of the content and how it is to be presented in resume	8%	4
12	Group Discussion It is a systematic exchange of information, views and opinions about a topic, problem, issue or situation among the members of a group who share some common objectives.	14%	8
13	Interview Skills Students are prepared for their interviews, question and answers, how to react on some unique questions, body language & grooming is taken into account.	14%	8
	Total	100	60

j) Reference Book:

1. Verbal & Non-Verbal Reasoning, Indu Sijwali & B.S. Sijwali
2. Contributor Personality Development by i-become Critical Thinking Skills for Engineers

11)

- a) **Course Name:** Minor Project
- b) **Course Code:** 03606264
- c) **Prerequisite:** Zeal to learn the Subject.
- d) **Rationale:** The main aim of this subject is to transform theoretical knowledge into practical.

Semester- 5

1)

- a. **Course Name:** Information Security
- b. **Course Code:** 03606305
- c. **Prerequisite:** Mathematical concepts: Random numbers, Number theory, finite fields.
- d. **Rationale:** The use of the Internet for various purpose including social, business, communication and other day to day activities has been in common place. The information exchanged through Internet plays vital role for their owners and the security of such information/data is of prime importance. Knowing the concepts, principles and mechanisms for providing security to the information/data is very important for the students of Computer Engineering/Information technology. The subject covers various important topics concern to information security like symmetric and asymmetric cryptography, hashing, message and user authentication, digital signatures, key distribution and overview of the malware technologies. The subject also covers the applications of all of these in real life applications.

e. Course Learning Objective:

CLOBJ 1	It includes understanding the importance of securing information, implementing security measures, recognizing and responding to different types of threats, and gaining a comprehensive understanding of the security landscape.
CLOBJ 2	It aims to equip participants with the knowledge and skills necessary to understand, implement, and analyse cryptographic methods, which are essential in the field of information security and cybersecurity.
CLOBJ 3	Students can develop a solid foundation in both asymmetric and symmetric encryption, enabling them to make informed decisions regarding the selection and implementation of cryptographic solutions in various contexts.

CLOBJ 4	It aims to equip participants with a comprehensive understanding of public key cryptography, its applications, key infrastructure models, and the security considerations involved. It prepares individuals to make informed decisions in deploying and managing public key cryptographic systems in various contexts, considering both theoretical and practical aspects.
CLOBJ 5	It aims to provide participants with a comprehensive understanding of various network security technologies and methodologies. It prepares individuals to design, implement, and manage effective security measures to protect information and communication in diverse network environments.

f. Course Learning Outcomes:

CLO 1	Define the concepts of Information security and their use.
CLO 2	Describe the principles of symmetric and asymmetric cryptography.
CLO 3	Understand the concepts of digital signature and digital certificates.
CLO 4	Understand and use the various key management mechanism.
CLO 5	Understand security risk.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Define the concepts of Information security and their use.
CLO 2	Describe the principles of symmetric and asymmetric cryptography.
CLO 3	Understand the concepts of digital signature and digital certificates.
CLO 4	Understand and use the various key management mechanisms.
CLO 5	Understand security risk.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	-	3	-	-	-	100	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Contents:

Unit No.	Topic	Weightage	Teaching Hrs.
1.	Introduction to Information Security What is Information Security? Security Services, Security Mechanism, Security Basics – Confidentiality, Integrity, Availability, Types of attack, steps in attack, The OSI Security Architecture, Threats to security: Viruses and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare.	15	6
2.	Symmetric & Asymmetric Encryption Basic terminology of cryptography, Symmetric encryption: Caesar's cipher, Playfair cipher, shift, cipher, shift cipher, Vigenère cipher, one time pad (vermin cipher), Hill cipher & Asymmetric encryption: Rail fence Steganography.	15	8
3	Encryption Algorithm Asymmetric Encryption Algorithm: Describe RSA Algorithm, its approach, block diagram, Symmetric Encryption Algorithm: Data Encryption Standard (DES), Initial and Final Permutation, Round Function, Key Generation	10	12
4.	Public Key System Principles of public key cryptosystems, Centralized and Decentralized Key infrastructures, Applications of Public Key cryptosystems, Requirements for Public-Key Cryptography, Digital Certificate	15	6
5.	Network & Web Security Firewall, IDS/IPS, VPN Concentrator, Content Screening Gateways, Network Security Topologies, IP security, Email Security, Web Security Threats, Secure Socket Layer (SSL), Transport Layer Security (TLS), Digital Signatures	15	10

j. Reference Books:

1. Cryptography And Network Security, Principles and Practice Sixth Edition, William Stallings, Pearson

2. Cryptography & Network Security, Forouzan, Mukhopadhyay, McGraw-Hill
3. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House
4. RFCs of protocols listed in content (<https://www.ietf.org>)
3. Various Acts, Laws and Standards (IT Act, ISO27001 Standard, IPR and Copyright Laws, etc.)
4. Security Guideline documents of Operating Systems (OS Manual, Man Pages, etc)

2)

a. Course Name: Information Security Lab

b. Course Code: 03606306

c. Prerequisite: Mathematical concepts: Random numbers, Number theory, finite fields.

d. Rationale: The use of the Internet for various purpose including social, business, communication and other day to day activities has been in common place. The information exchanged through Internet plays vital role for their owners and the security of such information/data is of prime importance. Knowing the concepts, principles and mechanisms for providing security to the information/data is very important for the students of Computer Engineering/Information technology. The subject covers various important topics concern to information security like symmetric and asymmetric cryptography, hashing, message and user authentication, digital signatures, key distribution and overview of the malware technologies. The subject also covers the applications of all of these in real life applications.

e. Course Learning Objective:

CLOBJ 1	It includes understanding the importance of securing information, implementing security measures, recognizing and responding to different types of threats, and gaining a comprehensive understanding of the security landscape.
CLOBJ 2	It aims to equip participants with the knowledge and skills necessary to understand, implement, and analyse cryptographic methods, which are essential in the field of information security and cybersecurity.
CLOBJ 3	Students can develop a solid foundation in both asymmetric and symmetric encryption, enabling them to make informed decisions regarding the selection and implementation of cryptographic solutions in various contexts.
CLOBJ 4	It aims to equip participants with a comprehensive understanding of public key cryptography, its applications, key infrastructure models, and the security considerations involved. It prepares individuals to make informed decisions in deploying and managing public key cryptographic systems in various contexts, considering both theoretical and practical aspects.
CLOBJ 5	It aims to provide participants with a comprehensive understanding of various network security technologies and methodologies. It prepares individuals to design, implement, and manage effective security measures to protect information and communication in diverse network environments.

f. Course Learning Outcomes:

CLO 1	Define the concepts of Information security and their use.
CLO 2	Describe the principles of symmetric and asymmetric cryptography.
CLO 3	Understand the concepts of digital signature and digital certificates.
CLO 4	Understand and use the various key management mechanism.
CLO 5	Understand security risk.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Define the concepts of Information security and their use.
CLO 2	Describe the principles of symmetric and asymmetric cryptography.
CLO 3	Understand the concepts of digital signature and digital certificates.
CLO 4	Understand and use the various key management mechanisms.
CLO 5	Understand security risk.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	30	-	20	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

k. Mapping of Experiment List with Course Learning outcomes:

Sr. NO.	Experiment List
1	List and practice various "net" Commands on DOS & Linux.
2	Demonstrate traffic analysis of different network protocols using tool. i.e. Wire-shark. (Atleast one of them should be recorded and included in term work.)

3	Write, test and debug Ceaser cipher algorithm.
4	Write, test and debug Shift Cipher algorithm.
5	Write, test and debug Play fair cipher algorithm.
6	Write, test and debug Hill Cipher algorithm in Python
7	Case Study on Modern Enterprise PKI Use Cases.
8	Prepare case study on single round of DES.
9	Configure Web browser security settings.
10	Configure your e-mail account against various threats. i.e. spam attack, phishing, spoofing etc.
11	Study of the features of firewall in providing network security and to set Firewall Security in windows.
12	Analysis the Security Vulnerabilities of E-commerce services.

4)

a. Course Name: Internet of Things

b. Course Code: 03606301

c. Prerequisite: Basic knowledge computer networks and related courses.

d. Rationale: Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

e. Course Learning Objective:

CLOBJ 1	Analyse, design, and discuss practical applications of IoT in various domains, considering both technical and ethical considerations. This knowledge forms the basis for further exploration of advanced IoT topics and applications.
CLOBJ 2	Understand and also provides a solid foundation for further exploration of advanced topics in IoT networking and related fields.

CLOBJ 3	Compute solid foundation in Arduino programming, allowing them to work on a variety of embedded systems projects. They should be well-equipped to continue exploring advanced topics in electronics, programming, and the broader field of embedded systems development.
CLOBJ 4	Able to demonstrate practical of implementing IoT solutions using Raspberry Pi. They should be equipped with the skills to work on a variety of IoT projects, integrate different devices, handle data, and implement analytics using this popular single-board computer.
CLOBJ 5	Able to understand the ethical dimensions of IoT technologies, enabling them to critically assess, discuss, and contribute to the responsible development and deployment of IoT solutions in a variety of contexts.

f. Course Learning Outcomes:

CLO 1	Students will demonstrate proficiency in fundamental IT concepts, including programming languages, databases, networking principles, and systems analysis.
CLO 2	Students will develop the ability to analyse complex problems in IT and understand appropriate methodologies to devise effective solutions.
CLO 3	Students will critically evaluate information systems, technologies, and strategies, considering their implications for businesses, organizations, and society.
CLO 4	Students will effectively communicate technical information, both orally and in writing, to diverse audiences including technical and non-technical stakeholders.
CLO 5	Students will understand and adhere to ethical standards and professional codes of conduct relevant to the IT profession, including issues of privacy, security, and intellectual property.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Students will demonstrate proficiency in fundamental IT concepts, including programming languages, databases, networking principles, and systems analysis.
CLO 2	Students will develop the ability to analyse complex problems in IT and understand appropriate methodologies to devise effective solutions.
CLO 3	Students will critically evaluate information systems, technologies, and strategies, considering their implications for businesses, organizations, and society.
CLO 4	Students will effectively communicate technical information, both orally and in writing, to diverse audiences including technical and non-technical stakeholders.

CLO 5	Students will understand and adhere to ethical standards and professional codes of conduct relevant to the IT profession, including issues of privacy, security, and intellectual property.
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h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

I. Contents:

Unit No.	Topic	Weightage	Teaching Hrs.
1.	Introduction to IoT Definition and characteristics of IoT, Physical design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT communication Models, IoT communication API's, IoT enabling Technologies, Big Data Analytics, IoT Levels, Sensing	20	6
2.	Basics of IoT Networking Communication Protocols, Sensor networks, Wireless sensor networks, Cloud Computing, embedded systems	20	5
3.	Introduction to Arduino programming Micro-Controller, Arduino, Types of Arduinos, Integration of Sensors, Actuators to Arduino, Arduino UNO board, Sensors, Coding Structure	20	5
4.	Implementation of IoT with Raspberry Pi Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Other IoT devices, Data Handling Analytics	25	7
5.	Ethics in IoT Characterizing the IoT, Privacy, Control – Disrupting Control, Crowd sourcing; Environment – Physical thing, Electronics, Internet service; Solutions – The IoT as a part of the solution, cautious optimism.	15	5

j. Reference Books:

1. “The Internet of Things: Enabling Technologies, Platforms, and Use Cases”, by Pethuru Raj and Anupama C. Raman (CRC Press)
2. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
3. “Internet of Things: A Hands-on Approach”, by Arshdeep Bahga and Vijay Madisetti (Universities Press)
4. Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill

5)

a. Course Name: Internet of Things Lab

b. Course Code: 03606302

c. Prerequisite: Basic knowledge computer networks and related courses.

d. Rationale: Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

e. Course Learning Objective:

CLOBJ 1	Able to analyse, design, and discuss practical applications of IoT in various domains, considering both technical and ethical considerations. This knowledge forms the basis for further exploration of advanced IoT topics and applications.
CLOBJ 2	Understand and also provides a solid foundation for further exploration of advanced topics in IoT networking and related fields.
CLOBJ 3	Compute solid foundation in Arduino programming, allowing them to work on a variety of embedded systems projects. They should be well-equipped to continue exploring advanced topics in electronics, programming, and the broader field of embedded systems development.
CLOBJ 4	Able to demonstrate practical of implementing IoT solutions using Raspberry Pi. They should be equipped with the skills to work on a variety of IoT projects, integrate different devices, handle data, and implement analytics using this popular single-board computer.
CLOBJ 5	Able to understand the ethical dimensions of IoT technologies, enabling them to critically assess, discuss, and contribute to the responsible development and deployment of IoT solutions in a variety of contexts.

f. Course Learning Outcomes:

CLO 1	Students will demonstrate proficiency in fundamental IT concepts, including programming languages, databases, networking principles, and systems analysis.
CLO 2	Students will develop the ability to analyse complex problems in IT and understand appropriate methodologies to devise effective solutions.
CLO 3	Students will critically evaluate information systems, technologies, and strategies, considering their implications for businesses, organizations, and society.
CLO 4	Students will effectively communicate technical information, both orally and in writing, to diverse audiences including technical and non-technical stakeholders.
CLO 5	Students will understand and adhere to ethical standards and professional codes of conduct relevant to the IT profession, including issues of privacy, security, and intellectual property.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Students will demonstrate proficiency in fundamental IT concepts, including programming languages, databases, networking principles, and systems analysis.
CLO 2	Students will develop the ability to analyses complex problems in IT and understand appropriate methodologies to devise effective solutions.
CLO 3	Students will critically evaluate information systems, technologies, and strategies, considering their implications for businesses, organizations, and society.
CLO 4	Students will effectively communicate technical information, both orally and in writing, to diverse audiences including technical and non-technical stakeholders.
CLO 5	Students will understand and adhere to ethical standards and professional codes of conduct relevant to the IT profession, including issues of privacy, security, and intellectual property.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	30	-	20	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Reference Books:

1. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)

2. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
3. “Internet of Things: A Hands-on Approach”, by Arshdeep Bahga and Vijay Madisetti (Universities Press)
- 4.

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Sketch the architecture of IoT Toolkit and explain each entity in brief.
2	Explain working of Arduino.
3	Explain working of Raspberry Pi.
4	Connect Raspberry Pi with your existing system components.
5	Give overview of Zetta.
6	Give overview of Putty.
7	Start Raspberry Pi and try various Linux commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.
8	Write Run some c++ programs on Arduino like: a) Read your name and print Hello message with name. b) Read two numbers and print their sum, difference, product and division. c) Word and character count of a given string.
9	Run some c++ programs on Arduino like: a) Print a name 'n' times, where name and n are read from standard input, using for and b) while loops. c) Handle Divided by Zero Exception. d) Print current time for 10 times with an interval of 10 seconds.
10	LED bilking using Arduino on Proteus using Flowchart.
11	LED bilking without push button using Arduino on Proteus using Flowchart.
12	Design a Flowchart Weather Station with Arduino.

6)

- a. **Course Name:** Data Mining
- b. **Course Code:** 03606331
- c. **Prerequisite:** Basic knowledge of different types of data & datasets.
- d. **Rationale:** This course aims to teach students different kinds of data mining and data warehousing techniques and enables the students to extract the patterns from knowledge for better and faster decision making.
- e. **Course Learning Objective:**

CLOBJ 1	Introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation & Major issues of data mining.
CLOBJ 2	Comprehensive understanding of the fundamental concepts, principles, and practical aspects of data warehousing and OLAP. Be familiar with mathematical foundations of data mining tools.
CLOBJ 3	Examine and handle diverse datasets, clean and preprocess data effectively, and understand the importance of quality data in the context of data mining applications.
CLOBJ 4	Use classification and clustering techniques to solve practical problems, make informed decisions about algorithm selection, and critically evaluate the results of data mining analyses.
CLOBJ 5	Introducing big data in data mining typically aim to provide students with a foundational understanding of key concepts, tools, and techniques in the intersection of big data and data mining.
CLOBJ 6	Define how to install WEKA tool, which type of File formats supported in WEKA Data Visualization & Filtering in WEKA, and Using Data Mining Techniques in WEKA.

f. Course Learning Outcomes:

CLO 1	Understanding of what is Data Mining, different techniques & its applications, major Issues in data mining.
CLO 2	Examine the strengths and limitations of various data mining and data warehousing models
CLO 3	Evaluate the couple of data mining tools and how they can be used for large data.
CLO 4	Describe different methodologies used in data mining and data ware housing. Compare different approaches of data ware housing and data mining with various technologies.

CLO 5	Define Comprehensive understanding of web mining and other data mining techniques, preparing them for practical applications in various industries and research domains.
CLO 6	Able to use WEKA tool for practical implementation, Develop the ability to interpret and communicate the results of data mining analyses conducted using WEKA.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation & Major issues of data mining.
CLO 2	Comprehensive understanding of the fundamental concepts, principles, and practical aspects of data warehousing and OLAP. Be familiar with mathematical foundations of data mining tools.
CLO 3	Examine and handle diverse datasets, clean and preprocess data effectively, and understand the importance of quality data in the context of data mining applications.
CLO 4	Use classification and clustering techniques to solve practical problems, make informed decisions about algorithm selection, and critically evaluate the results of data mining analyses.
CLO 5	Introducing big data in data mining typically aim to provide students with a foundational understanding of key concepts, tools, and techniques in the intersection of big data and data mining.
CLO 6	Define how to install WEKA tool, which type of File formats supported in WEKA Data Visualization & Filtering in WEKA, and Using Data Mining Techniques in WEKA.

h. Teaching & Examination Scheme:

i.

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

j. Contents:

Sr. No.	Topic	Weightage	Teaching Hrs.
1.	Basics of Data Mining History of data mining, Definition, Functionalities, Applications, Techniques, Major issues.	15%	7
2.	Data Warehousing & Online Analytical Processing Data Warehouse, Data Warehouse Models (Enterprise Warehouse, Data mart, Virtual Warehouse), OLAP vs OLTP, Data Cubes and its operations, Defining Schemas (Star, Snowflake, Fact Constellation).	20%	8
3	Attributes, Statistical Description & Pre-processing of Data Data Attributes (Nominal, Binary, Ordinal, Numerical, Discrete & Continuous), Statistical Calculations (Mean, Median, Mode, Range), KDD Process, Data Pre-processing Overview (Cleaning, Integration, Transformation, Reduction).	25%	8
4.	Classification & Clustering Classification & Prediction Introduction (2-step Process), Classification & Prediction Issues, Clustering (Introduction, Application & Requirements).	15%	7
5	Web Mining & Other Data Mining Web Mining, Text Mining, Spatial Mining, Big Data Introduction, Importance of Big Data.	15%	7
6	Data Mining Tool: WEKA Installation, File formats supported in WEKA, Data Visualization & Filtering in WEKA, Using Data Mining Techniques in WEKA.	10%	5

j. Reference Books:

1. Data Mining Concepts and Techniques by Jiawei Han and Micheline Kamber, Kaufmann Publishers, 2011.
2. Fundamentals of Data Warehouses by Marek, M Langerin.
3. Principles of Data Mining by David Hand, Heikki Mannila, Padhraic Smyth, PHI.

7)

a. Course Name: Data Mining Lab

b. Course Code: 03606332

- c. Prerequisite:** Basic knowledge of different types of data & datasets.
- d. Rationale:** This course aims to teach students different kinds of data mining and data warehousing techniques and enables the students to extract the patterns from knowledge for better and faster decision making.
- e. Course Learning Objective:**

CLOBJ 1	Introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation & Major issues of data mining.
CLOBJ 2	Comprehensive understanding of the fundamental concepts, principles, and practical aspects of data warehousing and OLAP. Be familiar with mathematical foundations of data mining tools.
CLOBJ 3	Examine and handle diverse datasets, clean and preprocess data effectively, and understand the importance of quality data in the context of data mining applications.
CLOBJ 4	Use classification and clustering techniques to solve practical problems, make informed decisions about algorithm selection, and critically evaluate the results of data mining analyses.
CLOBJ 5	Introducing big data in data mining typically aim to provide students with a foundational understanding of key concepts, tools, and techniques in the intersection of big data and data mining.
CLOBJ 6	Define how to install WEKA tool, which type of File formats supported in WEKA Data Visualization & Filtering in WEKA, and Using Data Mining Techniques in WEKA.

f. Course Learning Outcomes:

CLO 1	Understanding of what is Data Mining, different techniques & its applications, major Issues in data mining.
CLO 2	Examine the strengths and limitations of various data mining and data warehousing models
CLO 3	Evaluate the couple of data mining tools and how they can be used for large data.
CLO 4	Describe different methodologies used in data mining and data ware housing. Compare different approaches of data ware housing and data mining with various technologies.
CLO 5	Define Comprehensive understanding of web mining and other data mining techniques, preparing them for practical applications in various industries and research domains.

CLO 6	Able to use WEKA tool for practical implementation, Develop the ability to interpret and communicate the results of data mining analyses conducted using WEKA.
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g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation & Major issues of data mining.
CLO 2	Comprehensive understanding of the fundamental concepts, principles, and practical aspects of data warehousing and OLAP. Be familiar with mathematical foundations of data mining tools.
CLO 3	Examine and handle diverse datasets, clean and preprocess data effectively, and understand the importance of quality data in the context of data mining applications.
CLO 4	Use classification and clustering techniques to solve practical problems, make informed decisions about algorithm selection, and critically evaluate the results of data mining analyses.
CLO 5	Introducing big data in data mining typically aim to provide students with a foundational understanding of key concepts, tools, and techniques in the intersection of big data and data mining.
CLO 6	Define how to install WEKA tool, which type of File formats supported in WEKA Data Visualization & Filtering in WEKA, and Using Data Mining Techniques in WEKA.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	30	-	20	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Create an excel file convert it to .csv format and prepare ARFF files of it

2	Write the use of ARFF files taking input and display the output of the files.
3	Study various Data Mining tool and their applications.
4	Install and Configure WEKA Tool.
5	Compare various Data Mining techniques available in WEKA
6	Use filters on the customer dataset using WEKA.
7	Preprocess the data using WEKA Mining Tool. Use at least two preprocessing methods on at least three datasets.
8	Perform Preprocessing, Classification techniques on Agriculture dataset. (http://archive.ics.uci.edu/ml/)
9	Preprocess and classify Customer dataset. http://archive.ics.uci.edu/ml/
10	Preprocess and classify Weather dataset. http://archive.ics.uci.edu/ml/
11	Classify the dataset using decision tree. www.kdnuggets.com/datasets/
12	To perform Classification on various datasets and Compare the accuracy of various Algorithms.
13	Perform Association technique on Weather dataset. Perform Association technique on Agriculture dataset. http://archive.ics.uci.edu/ml/ , www.kdnuggets.com/datasets/
14	Demonstration of Weka Explorer, Mining techniques and Attribute Relation File Format (ARFF). http://archive.ics.uci.edu/ml/

8)

a. Course Name: ADVANCE JAVA PROGRAMMING

b. Course Code: 03606303

c. Prerequisite: Basic knowledge of core java language.

d. Rationale: Advanced Java programming encompasses various advanced concepts, libraries, and frameworks that enable developers to build such applications efficiently. The rationale behind advanced Java programming lies in the need to develop complex and sophisticated applications that require a higher level of functionality, scalability, and performance.

e. Course Learning Objective:

CLOBJ 1	Define a comprehensive understanding of Understanding Applet Lifecycle, including initialization, start, stop, and destruction phases. Mastering graphics
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	programming in applets, including drawing shapes, images, and text on the applet's surface using the Graphics class.
CLOBJ 2	Explain the Abstract Window Toolkit (AWT) is a part of the Java Foundation Classes (JFC) that provides a set of GUI components and tools for building graphical user interfaces (GUIs) in Java.
CLOBJ 3	Describe comprehensive understanding of fundamental database concepts, including tables, relationships, normalization, and SQL (Structured Query Language).
CLOBJ 4	Aim to equip students with the necessary knowledge and skills to understand, develop, and troubleshoot networked applications using Java. Understand the fundamentals of networking concepts including TCP/IP, UDP, sockets, and network protocols.
CLOBJ 5	Gain a comprehensive understanding of what Servlets are, their role in web development, and how they fit into the Java EE (Enterprise Edition) ecosystem. Explore the lifecycle of a Servlet, including initialization, service, and destruction phases. Understand how Servlet containers manage Servlet instances.

f. Course Learning Outcomes:

CLO 1	Students will have good understanding of fundamental concepts of Java applets, including their lifecycle, structure, and integration with web pages.
CLO 2	Students should grasp the fundamental concepts of AWT, including its architecture, components, and event handling mechanism.
CLO 3	Students should be able to demonstrate a comprehensive understanding of database concepts, including tables, relationships, SQL querying, and normalization.
CLO 4	Students will grasp fundamental networking concepts including TCP/IP protocols, sockets, client-server architecture, and network communication protocols.
CLO 5	Students will comprehend the fundamental concepts of servlets, including their role in web development, lifecycle, and how they handle HTTP requests and responses.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Students will have good understanding of fundamental concepts of Java applets, including their lifecycle, structure, and integration with web pages.
CLO 2	Students should grasp the fundamental concepts of AWT, including its architecture, components, and event handling mechanism.

CLO 3	Students should be able to demonstrate a comprehensive understanding of database concepts, including tables, relationships, SQL querying, and normalization.
CLO 4	Students will grasp fundamental networking concepts including TCP/IP protocols, sockets, client-server architecture, and network communication protocols.
CLO 5	Students will comprehend the fundamental concepts of servlets, including their role in web development, lifecycle, and how they handle HTTP requests and responses.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Contents:

Sr. No.	Topic	Weightage	Teaching Hrs.
1.	Java Applet Introduction of applet, applet & Application, life cycle of applet, HTML tags for Applet. Parameter passing to applet, graphics class, various methods of applet	10%	5
2	Abstract Window Toolkit Introduction of AWT, AWT vs Swing, Component and Containers. Layout management: No Layout Flow Layout, Border layout, grid Layout, grid bag layout, group layout. GUI controls; Text Fields, Password Fields, text areas, Scroll Panels, labels check boxes, Sliders. Menu, menu item, icons in menu item, check box and radio buttons in menu items, pop-up menus, keyboard mnemonics. Event handling concept, listener Interfaces, using action Commands.	20%	13
3	Database Connectivity JDBC Architecture, JDBC Driver, types, JDBC Connections, statements, result set, SQL Exception, java programing using JDBC, JDBC advantage & disadvantage.	15%	6

4	Network Programming Transmission Control Pannel, user datagram protocol, ports, IP address network classes in JDK. Socket Programming using TCP, Socket Programming using UDP, working with URL`S, working with URL`S, working with URL Connection class, java programing for Network.	15%	8
5	Servlets Web container, introduction to servlets, Life cycle of servlets, the servlet APIs writing servlet programs, reading from parameters, processing forms, handling HTTP request and response (GET/POST request), database access with servlets, handling cookies and session. Servlets vs JSP, JSP access model, JSP Syntax, (Directions, Declarations, Expression, Scrip lets, Comments), Writing JSP Program	20%	10

j. Reference Books:

1. "Effective Java" by Joshua Bloch: This book covers best practices and advanced techniques for writing efficient, maintainable, and robust Java code.
2. Java Concurrency in Practice" by Brian Goetz, Tim Peers, Joshua Bloch, Joseph.
3. "Java Performance: The Definitive Guide" by Scott Oaks.

9)

a. Course Name: ADVANCE JAVA PROGRAMMING LAB

b. Course Code: 03606304

c. Prerequisite: Basic knowledge of core java language.

d. Rationale: Advanced Java programming encompasses various advanced concepts, libraries, and frameworks that enable developers to build such applications efficiently. The rationale behind advanced Java programming lies in the need to develop complex and sophisticated applications that require a higher level of functionality, scalability, and performance.

e. Course Learning Objective:

CLOBJ 1	This chapter, students should have a comprehensive understanding of Understanding Applet Lifecycle, including initialization, start, stop, and destruction phases. Mastering graphics programming in applets, including drawing shapes, images, and text on the applet's surface using the Graphics class.
CLOBJ 2	This chapter, students should have a The Abstract Window Toolkit (AWT) is a part of the Java Foundation Classes (JFC) that provides a set of GUI components and tools for building graphical user interfaces (GUIs) in Java. Mastery over layout managers

	like Border Layout, Flow Layout, Grid Layout, etc., and understanding how to use them effectively to arrange components within containers.
CLOBJ 3	This chapter, Students should Gain a comprehensive understanding of fundamental database concepts, including tables, relationships, normalization, and SQL (Structured Query Language). Understand best practices for implementing security measures within database-connected Java applications, including authentication, authorization, and secure communication. Learn how to manage database transactions effectively to ensure data integrity and consistency.
CLOBJ 4	This chapter, typically aim to provide students to equip students with the necessary knowledge and skills to understand, develop, and troubleshoot networked applications using Java. Understand the fundamentals of networking concepts including TCP/IP, UDP, sockets, and network protocols.
CLOBJ 5	This chapter, typically aim to Gain a comprehensive understanding of what Servlets are, their role in web development, and how they fit into the Java EE (Enterprise Edition) ecosystem. Explore the lifecycle of a Servlet, including initialization, service, and destruction phases. Understand how Servlet containers manage Servlet instances.

f. Course Learning Outcomes:

CLO 1	Students will have good understanding of fundamental concepts of Java applets, including their lifecycle, structure, and integration with web pages.
CLO 2	Students should grasp the fundamental concepts of AWT, including its architecture, components, and event handling mechanism.
CLO 3	Students should be able to demonstrate a comprehensive understanding of database concepts, including tables, relationships, SQL querying, and normalization.
CLO 4	Students will grasp fundamental networking concepts including TCP/IP protocols, sockets, client-server architecture, and network communication protocols.
CLO 5	Students will comprehend the fundamental concepts of servlets, including their role in web development, lifecycle, and how they handle HTTP requests and responses.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Students will have good understanding of fundamental concepts of Java applets, including their lifecycle, structure, and integration with web pages.

CLO 2	Students should grasp the fundamental concepts of AWT, including its architecture, components, and event handling mechanism.
CLO 3	Students should be able to demonstrate a comprehensive understanding of database concepts, including tables, relationships, SQL querying, and normalization.
CLO 4	Students will grasp fundamental networking concepts including TCP/IP protocols, sockets, client-server architecture, and network communication protocols.
CLO 5	Students will comprehend the fundamental concepts of servlets, including their role in web development, lifecycle, and how they handle HTTP requests and responses.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	60	-	40	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Installation of NetBeans on Windows.
2	WAP to demonstrate lifecycle of Applet.
3	WAP to draw the line, rectangle, oval using graphic class.
4	WAP to draw the smiley using graphics class.
5	WAP to perform addition of two numbers using PARAM keyword.
6	Draw ten circles in a horizontal and fill with random colour in the centre of the applet.
7	WAP to change background colour of Applet using three button RED, GREEN, BLUE. If user click on red background should be red and so on.
8	WAP to prepare registration form of students in which add following information like student no, name, address, phone no, gender, hobbies, city, college etc. and click on submit button all information should be display on Applet.

9	Write a program using awt to create a menu bar where menubar contains menu items such as file, edit, view and create a submenu under the file menu: new and open.
10	WAP to demonstrate flow layout, border layout, card layout, Grid Layout.
11	Write a program to design simple calculator with the use of grid layout.
12	WAP to create Dialog Box.
13	Develop an applet that contains one button. Initialize the label on the button to “start”, when the user presses the button, which changes the label between these two values each time the button is pressed.
14	Create chat application using either TCP or UDP protocol.
15	Implement TCP Server for transferring files using Socket and Server Socket of each string.
16	Develop a database application that uses ODBC JDBC driver
17	Develop a database application that insert, delete, update data from database using type 4 JDBC driver
18	WAP to make a data base student. Enter the Student detail like En no, name, three subject marks and store the all details with percentage in database using JDBC driver.
19	Develop a program to present a set of choice for user to select a product and display the price of product.
20	WAP to display Hello World using Servlet.
21	Design a web page that takes the Username from user and if it is a valid username prints “Welcome Username”.
22	WAP to prepare login page using Servlet.
23	Create login form and perform state management using Cookies, HttpSession and URL Rewriting.
24	WAP to display Hello World using JSP.

10)

- a. **Course Name:** Cloud Computing–
- b. **Course Code:** 03606333
- c. **Prerequisite:** Basic Programming Skills.

d. Rationale: This course aims to teach students fundamental concepts of cloud storage and analyze various cloud models.

e. Course Learning Objective:

CLOBJ 1	To understand fundamental Concepts of Virtualization that includes Application, Server, Desktop and Storage
CLOBJ 2	To impart fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability, benefits, as well as current and future challenges
CLOBJ 3	To provide students a sound foundation of the Cloud Application Architecture
CLOBJ 4	To gain knowledge on various security issues in cloud architecture.
CLOBJ 5	To provide practical in-sight to the students in developing cloud applications

f. Course Learning Outcomes:

CLO 1	Obtain knowledge on cloud components, infrastructure and services
CLO 2	Demonstrate different virtualization technologies
CLO 3	Analyse various cloud application architectures.
CLO 4	Use various security measures on cloud architecture in solving real time security issues
CLO 5	Analyse various cloud application architectures.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Obtain knowledge on cloud components, infrastructure and services
CLO 2	Demonstrate different virtualization technologies
CLO 3	Analyse various cloud application architectures.
CLO 4	Use various security measures on cloud architecture in solving real time security issues
CLO 5	Analyse various cloud application architectures.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme		
L	T	P	C	Internal Evaluation	ESE	Total

				MSE	CE	P	Theory	P	
-	-	4	2	-	-	60	-	40	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Contents:

Sr. No.	Topic	Weightage	Teaching Hrs.
1.	Introduction to Cloud Technologies Introduction to the Cloud Computing, History of cloud computing, Cloud services, Applications of cloud computing, System models for Distributed and cloud computing,	20	08
2.	Virtualization Cloud issues and challenges, Properties, Characteristics, Service models, Deployment models. Virtualization concepts – Types of Virtualizations- Introduction to Various Hypervisors – High Availability (HA)/Disaster Recovery (DR) using Virtualization, Moving VMs, Comparison of Cloud providers	25	10
3.	Cloud Architecture Exploring the Cloud Computing Stack, connecting to the Cloud, Infrastructure as a Service, Platform as a Service, SaaS Vs. Paas, Using PaaS Application Frameworks, Software as a Service	15	07
4.	Cloud Security and Privacy Cloud Security Challenges and Risks, Software-as-a Service Security, Cloud computing security architecture: <i>Architectural</i> Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Privacy Issues, Data Life Cycle, Key Privacy Concerns in the Cloud	25	10
5.	Introduction to AWS Overview of AWS, AWS history, AWS Infrastructure, AWS services, AWS ecosystem	15	07

j. Reference Books:

1. “Cloud Computing: Principles, Systems and Applications” By Nikos Antonopoulos, Lee Gillam (Springer, 2012)
2. “Cloud Computing Bible” By Barrie Sosinsky (Wiley India Pvt Ltd)

11)

- a. **Course Name:** Cloud Computing–LAB
- b. **Course Code:** 03606334
- c. **Prerequisite:** Basic Programming Skills.
- d. **Rationale:** This course aims to teach students fundamental concepts of cloud storage and analyse various cloud models.
- e. **Course Learning Objective:**

CLOBJ 1	To understand fundamental Concepts of Virtualization that includes Application, Server, Desktop and Storage
CLOBJ 2	To impart fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability, benefits, as well as current and future challenges
CLOBJ 3	To provide students a sound foundation of the Cloud Application Architecture
CLOBJ 4	To gain knowledge on various security issues in cloud architecture.
CLOBJ 5	To provide practical in-sight to the students in developing cloud applications

f. Course Learning Outcomes:

CLO 1	Obtain knowledge on cloud components, infrastructure and services
CLO 2	Demonstrate different virtualization technologies
CLO 3	Analyse various cloud application architectures.
CLO 4	Use various security measures on cloud architecture in solving real time security issues
CLO 5	Analyse various cloud application architectures.

g. Mapping of Course Learning Outcomes and Bloom’s Taxonomy:

Course Learning Outcomes	
CLO 1	Obtain knowledge on cloud components, infrastructure and services
CLO 2	Demonstrate different virtualization technologies

CLO 3	Analyse various cloud application architectures.
CLO 4	Use various security measures on cloud architecture in solving real time security issues
CLO 5	Analyse various cloud application architectures.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	30	-	20	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Mapping of Experiment List with Course Learning Outcomes:

Sr. No.	Experiment List
1	Install VirtualBox/VMware Workstation with different flavours of Linux or windows on top of windows7 or 8.
2	Installation and Configuration of Hadoop.
3	Install Google App Engine. Create hello world app and other simple web applications using python/java.
4	Use GAE launcher to launch the web applications.
5	Case Study: PAAS (Face book, Google App Engine)
6	Create a Java Hello World Example with Google App Engine in Eclipse.
7	Develop a Windows Azure Hello World application.
8	Find a procedure to transfer the files from one virtual machine to another virtual machine.
9	Find a procedure to launch virtual machine using try stack (Online OpenStack Demo Version)
10	Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.

12)

a. **Course Name:** Major Project-1

b. **Course Code:** 03606310

c. **Prerequisite:** Software Engineering

d. **Rationale:** This syllabus offers hands-on experience in applying theoretical concepts to real-world problems, fostering practical skills in software/hardware development, problem-solving, and project management. It cultivates creativity, critical thinking, and teamwork, preparing students for the dynamic demands of the technology industry.

e. **Course Learning Objective:**

CLOBJ 1	Implement theoretical knowledge to real-world scenarios, equipping students with the skills to transform abstract concepts into practical applications, showcasing a nuanced understanding of implementation across diverse contexts.
CLOBJ 2	Generate innovative solutions by fostering creative thinking and problem-solving skills, empowering students to approach challenges with inventive strategies, thus contributing to advancements and ingenuity in their field.
CLOBJ 3	Demonstrate effective leadership and problem-solving skills within collaborative environments.

f. **Course Learning Outcomes:**

CLO 1	Learn to follow a formal development process to complete a project in a team.
CLO 2	Students will implement their software and/or hardware project in a schedule-driven process based on their requirements and specification documents.
CLO 3	To prepare a final report (both oral and written) and poster describing their project
CLO 4	Present a final project presentation and demonstration that clearly shows that all project requirements were met and an analysis (cost, trade-offs, etc.) of how well they were met.
CLO 5	Demonstrate knowledge of all aspects of product development with a focus on the development process by correctly answering questions on a mini-exam.

g. **Mapping of Course Learning Outcomes and Bloom's Taxonomy:**

Course Learning Outcomes	
CLO 1	Learn to follow a formal development process to complete a project in a team.
CLO 2	Students will implement their software and/or hardware project in a schedule-driven process based on their requirements and specification documents.
CLO 3	To prepare a final report (both oral and written) and poster describing their project.

CLO 4	Present a final project presentation and demonstration that clearly shows that all project requirements were met and an analysis (cost, trade-offs, etc.) of how well they were met.
CLO 5	Demonstrate knowledge of all aspects of product development with a focus on the development process by correctly answering questions on a mini-exam.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	12	6	-	-	60	-	40	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

Semester 6

1)

a. Course Name: Indian Constitution

b. Course Code: 03600351

c. Prerequisite: Zeal to learn Subject

d. Rationale: The course aims to give brief knowledge of Indian Constitution and administration of different bodies of India. To make governance better an engineer must conduce to E-governance through computers and knowledge of cyber laws. An engineer must know the limits of state action and regulations by acquainting himself with the laws that applied by the bureaucrats. Since an engineer works at different places and sights, he must have the basic knowledge of centre – state relations with reference to policy of financing the key projects. The knowledge of Constitution is necessary for him in order to ensure that the rules and regulations under which public and private sector works, do not violate the provisions of the Constitution. Knowledge of corporate culture is necessary for him. He must understand the compulsions of the public private partnership and philosophy of state ownership of key industries.

e. Course Learning Objective:

CLOBJ 1	Develop the ability to select appropriate accessories, wires, cables, and wiring systems for electrification projects, considering factors such as voltage requirements, load capacity, and environmental conditions.
CLOBJ 2	Gain proficiency in determining the suitable size of wires and cables for specific applications, and learn various jointing methods to ensure reliable and safe electrical connections.
CLOBJ 3	Acquire skills in designing electrical wiring installation systems tailored for residential units, adhering to industry standards and safety regulations.
CLOBJ 4	Understand the principles of residential electrification, including the necessary tests and inspections required to ensure compliance and safety.
CLOBJ 5	Analyse load calculations for both single-floor and multistorey buildings, considering factors such as appliance usage, lighting requirements, and HVAC systems.

CLOBJ 6	Design proper illumination schemes for residential units, taking into account factors such as room size, function, and aesthetic considerations, to optimize lighting efficiency and comfort.
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f. Course Learning Outcomes:

CLO 1	Select accessories, wires, cables and wiring systems for electrification.
CLO 2	Selection of suitable size of wires and cables and their jointing methods.
CLO 3	Design electrical wiring installation system for residential units.
CLO 4	To understand about residential electrification and different tests to be carried out.
CLO 5	To analyses load calculation for floor wise and multistorey buildings.
CLO 6	Design proper illumination scheme for residential units.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Select accessories, wires, cables and wiring systems for electrification.
CLO 2	Selection of suitable size of wires and cables and their jointing methods.
CLO 3	Design electrical wiring installation system for residential units.
CLO 4	To understand about residential electrification and different tests to be carried out.
CLO 5	To analyses load calculation for floor wise and multistorey buildings.
CLO 6	Design proper illumination scheme for residential units.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
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1	The Constitution – Introduction The History of the Making of the Indian Constitution Preamble and the Basic Structure, and its interpretation Fundamental Rights and Duties and their interpretation, State Policy Principles.	25%	7
2	Union Government Structure of the Indian Union, President – Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha.	20%	5
3	State Government Governor – Role and Power, Chief Minister and Council of Ministers, State Secretariat.	20%	4
4	Local Administration District Administration, Municipal Corporation, Zila Panchayat.	15%	4
5	Election Commission Role and Functioning, Chief Election Commissioner, State Election Commission	20%	4

j. Text Book and Reference Book:

1. **An Introduction to the Constitution of India** by D.D. Basu | Prentice Hall, New Delhi
2. **An Introduction to the Constitution of India** by M. V. Pyle | VikasNew Delhi

(2)

- a. Course Name:** Android Programming
- b. Course Code:** 03606351
- c. Prerequisite:** Basic Knowledge of java programming.
- d. Rationale:** The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know how to build mobile apps for the android operating system. This course covers the necessary concepts which are required to understand to develop Android Applications. Thus, it is a key course for computer engineers, who want to work in the area of communication.
- e. Course Learning Objective:**

CLOBJ 1	Gain an understanding of the functioning of different mobile technologies, including their architectures, communication protocols, and hardware components.
CLOBJ 2	Demonstrate proficiency in understanding and explaining the Android activities life cycle, including the various states and transitions involved in the lifecycle of an Android application.

CLOBJ 3	Execute operations on GUI (Graphical User Interface) objects in Android applications, including creating, manipulating, and interacting with UI elements such as buttons, text fields, and images.
CLOBJ 4	Develop skills in event-driven programming for Android applications, including handling user interactions, responding to system events, and implementing event listeners.
CLOBJ 5	Implement various techniques for working with menus in Android applications, including creating options menus, context menus, and popup menus, and incorporating them into the user interface effectively.

f. Course Learning Outcomes:

CLO 1	Explain functioning of different mobile technology
CLO 2	Demonstrate Android activities life cycle
CLO 3	Execute operations on GUI objects
CLO 4	Perform Event driven programming
CLO 5	Use various techniques on working with menu

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Explain functioning of different mobile technology
CLO 2	Demonstrate Android activities life cycle
CLO 3	Execute operations on GUI objects
CLO 4	Perform Event driven programming
CLO 5	Use various techniques on working with menu

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	0	0	2	20	20	0	60	0	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Contents:

Unit No.	Topic	Weightage	Teaching Hrs.
1.	Introduction to Android and Architecture framework brief history of Mobile, Types of mobile phone generations, Types of Mobile Applications, Mobile Information Architecture Android Versions, Features of Android, Open Handset Alliance, Android Development Environment setup, Installing Android SDK Tools, Configuring Android Studio, Android Development Tools (ADT), Creating Android Virtual Devices (AVD), Application Framework, Applications, Android Debug bridge, Android Permission model, Android Manifest File, Android Project Framework	15	8
2.	Android Activities Creating first android application, Anatomy of android application, Deploying Android app on USB connected Android device, Android application components, Activity life cycle, understanding activities, Exploring Intent objects, Intent Types, linking activities using intents	20	8
3.	Android GUI Design Concepts and UI programming Android application components Intent, Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest, Understanding the components of a screen(Layouts),Drawable Resources, Resolution and density independence (px,dp,sp), Adapting to display orientation, Action Bar, Views(UI Widgets)-Button, Toggle Button, Checkbox, Radio Button, Spinner, WebView, Edit Text, Date Picker, Time Picker, List View, Progress-Bar, Analog and Digital clock, Spinner, Handling UI events(Text Edit, Button clicked etc.), Toast	30	13
4.	Working with Menu and Internal Application Menus-Option, Context, Popup, Images-Image View, Alert Dialog, Alarm manager, SMS, E-mail, Media Player, using camera, recording video, Handling Telephony Manager	20	8
5.	Working with SQLite Database Storing the data persistently-Data Storage Options: preferences, Internal Storage, External Storage, Content Provider, The SQLite database, Connecting with SQLite database and operations-Insert, Delete, Update, Fetch	15	5

j. Reference Books:

1. Beginning Android (Textbook) By Mark L Murphy, | Wiley India Pvt Ltd. (2009)
2. Professional Android 2 Application Development by Reto Meier | Wiley India Pvt Ltd, 2011
3. Beginning Android™ 4 Application Development by Wei-Meng Lee | John Wiley & Sons, Pub. Year 2012

3)

- a. **Course Name:** Android Programming Lab
- b. **Course Code:** 03606352
- c. **Prerequisite:** Basic Knowledge of java programming.
- d. **Rationale:** The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know how to build mobile apps for the android operating system. This course covers the necessary concepts which are required to understand to develop Android Applications. Thus, it is a key course for computer engineers, who want to work in the area of communication.
- e. **Course Learning Objective:**

CLOBJ 1	Gain an understanding of the functioning of different mobile technologies, including their architectures, communication protocols, and hardware components.
CLOBJ 2	Demonstrate proficiency in understanding and explaining the Android activities life cycle, including the various states and transitions involved in the lifecycle of an Android application.
CLOBJ 3	Execute operations on GUI (Graphical User Interface) objects in Android applications, including creating, manipulating, and interacting with UI elements such as buttons, text fields, and images.
CLOBJ 4	Develop skills in event-driven programming for Android applications, including handling user interactions, responding to system events, and implementing event listeners.
CLOBJ 5	Use various techniques for working with menus in Android applications, including creating options menus, context menus, and popup menus, and incorporating them into the user interface effectively.

f. Course Learning Outcomes:

CLO 1	Explain functioning of different mobile technology
CLO 2	Demonstrate Android activities life cycle
CLO 3	Execute operations on GUI objects
CLO 4	Perform Event driven programming

CLO 5	Use various techniques on working with menu
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g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Explain functioning of different mobile technology
CLO 2	Demonstrate Android activities life cycle
CLO 3	Execute operations on GUI objects
CLO 4	Perform Event driven programming
CLO 5	Implement various techniques on working with menu

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	2	1	-	-	30	-	20	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Reference Books:

1. Beginning Android (Textbook) By Mark L Murphy, | Wiley India Pvt Ltd. (2009)
2. Professional Android 2 Application Development by Reto Meier | Wiley India Pvt Ltd, 2011
3. Beginning Android™ 4 Application Development by Wei-Meng Lee | John Wiley & Sons, Pub. Year 2012

j. Mapping of Experiment List with Course Learning Outcomes:

Sr. NO.	Experiment List
1	Installation and setup of java development kit (JDK), setup android SDK, setup eclipse IDE, setup android development tools (ADT) plugins, create android virtual device
2	Create a "Hello World" application. That will display "Hello World" in the middle of the screen using Text View Widget in the red colour.
3	Create an application for demonstration of android activity life cycle

4	Create Registration page to demonstrate Basic widgets available in android.
5	Create an application for demonstration of different Layouts in android
6	Create a sample application with a login module. (Check username and password) On successful login, Change Text View “Login Successful”. And on failing login, alert the user using Toast “Login fail”.
7	Create a login application where you will have to validate username and passwords Till the username and password is not validated, login button should remain disabled and Validate login data and display Error to user using set Error() method..
8	Create an application for demonstration of Scroll view (Horizontal and Vertical) in android.
9	Create an application for Explicitly Starting New Activity using Intent in android.
10	Create an application that will pass two numbers using Text View to the next screen, and on the next screen display the sum of that number.
11	Create an application that will get the Text Entered in Edit Text and display that Text using toast (Message)
12	Create an application that will Demonstrate Button on Click () Event and change the Text View Colour based on button Clicked.
13	The Simple Calculator app has two edit texts and four buttons. When you enter two numbers and click a button, the app performs the calculation for that button and displays the result.
14	Create an UI such that, one screen has a list of all the types of cars. On selecting any car name, the next screen should show Car details like: name, launch date, company name.
15	Use content providers and permissions by implementing read phonebook contacts with content providers and display in the list.
16	Create an application to provide option menu and context menu in Android.
17	Create an application that will create a database to store username and password.
18	Create an application to insert, update and delete a record from the database.

4)

- a. **Course Name:** .Net Programming with C#
- b. **Course Code:** 03606315
- c. **Prerequisite:** Basics of C programming

- d. **Rationale:** This course aims to teach students to enhance the practical knowledge in .Net Programming

e Course Learning Objective:

CLOBJ 1	Identify the fundamentals of application development
CLOBJ 2	Develop simple and complex applications using .Net framework
CLOBJ 3	To develop web application with ASP.Net
CLOBJ 4	Implement state management and optimize the performance of a Web application
CLOBJ 5	Using Web Services, Remoting and WCF to create distributed applications
CLOBJ 6	Deploy a Web application.

f. Course Learning Outcomes:

CLO 1	Understand the fundamentals of application development.
CLO 2	Create both simple and complex applications utilizing the .NET framework.
CLO 3	Build web applications using ASP.NET.
CLO 4	Implement effective state management and optimize web application performance.
CLO 5	Develop distributed applications using Web Services, Remoting, and WCF.
CLO 6	Successfully deploy web applications for production use.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the fundamentals of application development.
CLO 2	Create both simple and complex applications utilizing the .NET framework.
CLO 3	Build web applications using ASP.NET.
CLO 4	Implement effective state management and optimize web application performance.
CLO 5	Develop distributed applications using Web Services, Remoting, and WCF.
CLO 6	Successfully deploy web applications for production use.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; **MSE**- Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE**- End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Unit I – Introduction to .NET Framework . Net Architecture, Components of .Net, Features of .Net Programming, CLR Execution, and Difference between OOP, POP and Event Driven Programming, C #IDE Layout, Namespace.	15%	6
2	Introduction to C# Language Data Types, Type Casting, Boxing and Unboxing, Operators, Conditional Structure, Looping Structure, Arrays, Params Parameter, Pass arguments by value, ref and out, method overloading, Access Modifier.	20%	6
3	GUI Application using WinForms MessageBox, InputBox, Controls with Properties, Methods and Events (Button, Textbox, Label, Checkbox, Radio Button, Listbox, Combobox, Timer control, PictureBox, Prograssbar, Scroll Bar), Dialog Boxes (Font , Color, Open, Save and Print).	20%	4
4	Advanced Features of C# with ADO.Net Exception Handling, Structured and Unstructured Exception Handling, Throwing Exceptions, Menu strip and Context Menu strip, MDI Form. ADO.Net Architecture, ADO.Net Components (Dataset, Data Adapter, Data Set, Data Table)	25%	4
5	Windows Forms and Controls in details and Visual Inheritance in Web Forms: The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms	20%	8

j. Text Book and Reference Book:

1. Professional ASP.NET 4.5 in C# , (Textbook)By by Jason N. Gaylord, Christian Wenz, Pranav Rastogi, Todd Miranda, Scott Hanselman, Scott Hunter | Wiley publication
2. Programming Ms Visual C# 2008 By Donis Marshall/Microsoft press

5)

- a. **Course Name:** .Net Programming with C# Lab
- b. **Course Code:** 03606316
- c. **Prerequisite:** Basics of c programming
- d. **Rationale:** This course aims to teach students to enhance the practical knowledge in .Net Programming
- e. **Course Learning Objective:**

CLOBJ 1	Identify the fundamentals of application development
CLOBJ 2	Develop simple and complex applications using .Net framework
CLOBJ 3	To develop web application with ASP.Net
CLOBJ 4	Implement state management and optimize the performance of a Web application
CLOBJ 5	Using Web Services, Remoting and WCF to create distributed applications
CLOBJ 6	Deploy a Web application.

f. Course Learning Outcomes:

CLO 1	Understand the fundamentals of application development.
CLO 2	Create both simple and complex applications utilizing the .NET framework.
CLO 3	Build web applications using ASP.NET.
CLO 4	Implement effective state management and optimize web application performance.
CLO 5	Develop distributed applications using Web Services, Remoting, and WCF.
CLO 6	Successfully deploy web applications for production use.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understand the fundamentals of application development.
CLO 2	Create both simple and complex applications utilizing the .NET framework.
CLO 3	Build web applications using ASP.NET.
CLO 4	Implement effective state management and optimize web application performance.
CLO 5	Develop distributed applications using Web Services, Remoting, and WCF.
CLO 6	Successfully deploy web applications for production use.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	30	-	20	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

1. Professional ASP.NET 4.5 in C# and VB, (Textbook) By Jason N. Gaylord, Christian Wenz, Pranav Rastogi, Todd Miranda, Scott Hanselman, Scott Hunter | Wiley publication
2. Programming Ms Visual C# 2008 By Donis Marshall/Microsoft press

j. Mapping of Experiment List with Course Learning Outcomes:

Ex No.	Name of the Experiment
1	Write a study practical for .Net Framework with neat diagram
2	Write a C# Sharp program to print self-Introduction in a separate line
3	Write a C# program to sum and divide the two numbers and display the result.
4	Write a C# program to enter three subjects' marks and display its result
5	Write a C# program to perform Swap two numbers using Pass by value, Ref and out
6	Write a C# program to display a 2x2 matrix using an array.
7	Write a C# program to count the total number of words in a string
8	Create a windows application for calculator to perform sum, subtract, multiplication and divide operations
9	Create a windows application to use necessary controls to develop registration form and display the details in List box control.
10	Create a windows application for alarm clock using timer control
11	Create a windows application to change the background colour of the form using scroll Bars.
12	Create a windows application to load the picture in the picture box.
13	Create a windows application to open the file, to save the file and change colour and font using different dialog boxes.
14	Write a study practical for ADO.Net Architecture
15	Write a windows application to display the records of students in DataGrid View control.
16	Write, test and debug applications using MDI
17	Create and test connection using ado.net to view SQL express server/Microsoft Access data in textbox etc controls

6)

- a) **Course Name:** Advanced Database Management System
- b) **Course Code:** 03606381
- c) **Prerequisite:** Basic knowledge of Database management system
- d) **Rationale:** The rationale for an Advanced Database Management System (DBMS) stems from the increasing complexity and demands of modern data management needs. Here are several key points justifying the need for an advanced DBMS
- e) **Course Learning Objective:**

CLOBJ 1	Students will develop a comprehensive understanding of advanced database concepts, including data modelling, database normalization, concurrency control, and database management system architectures.
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CLOBJ 2	Upon completion of the course, students will demonstrate proficiency in optimizing database performance through query optimization, indexing strategies, database tuning, and other performance-enhancing techniques.
CLOBJ 3	Students will gain expertise in designing and implementing scalable database architectures capable of handling large volumes of data and accommodating increasing demands for data processing and storage.
CLOBJ 4	Students will learn to implement advanced security measures to protect sensitive data stored within databases, including authentication mechanisms, access controls, encryption techniques, and auditing capabilities.
CLOBJ 5	Upon completing the course, students will be competent in integrating data from heterogeneous sources using advanced data integration techniques such as ETL (Extract, Transform, Load), data federation, and data virtualization.
CLOBJ 6	Students will develop proficiency in advanced data analysis and reporting techniques, including data mining, predictive analytics, OLAP (Online Analytical Processing), and advanced reporting tools to derive actionable insights from large datasets.

f) Course Learning Outcomes:

CLO 1	Understanding of Advanced Database Concepts
CLO 2	Proficiency in Database Performance Optimization
CLO 3	Expertise in Scalable Database Architectures
CLO 4	Ability to Implement Advanced Security Measures
CLO 5	Competence in Advanced Data Integration Techniques
CLO 6	Proficient in Advanced Data Analysis and Reporting

g) Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding of Advanced Database Concepts
CLO 2	Proficiency in Database Performance Optimization
CLO 3	Expertise in Scalable Database Architectures
CLO 4	Ability to Implement Advanced Security Measures
CLO 5	Competence in Advanced Data Integration Techniques
CLO 6	Proficient in Advanced Data Analysis and Reporting

h) Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i) Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Advanced SQL Transactional Control: Commit, save point, Rollbacked Commands: Grant and Revoke Types of locks: i. Row level locks, eatable level locks, discarded lock, iv. Exclusive lock, v. Deadlock Synonym: Create synonym Sequences: Create and alter sequences Index: Unique and composite Views: Create/Replace, Update and alter views	30	12
2	PL / SQL and Triggers Basics of PL / SQL: Datatypes, Advantages Control Structures: Conditional, Iterative, Sequential Exceptions: Predefined Exceptions, User defined exceptions Cursors: Static (Implicit & Explicit), Dynamic Procedures & Functions Packages: Package specification, Package body, Advantages of package Fundamentals of Database Triggers, Creating Triggers Types of Triggers: Before, after for each row, for each statement	30	12
3	Decomposition Definition, types, lossy, lossless, dependency preserving decomposition.	10	4
4	Transaction Processing Introduction to transaction concepts, Concurrency, Methods for Concurrency control: i. Locking Methodsii.Timestamp methods iii. Optimistic methods	20	10
5	Storage strategies: Indices, B-trees, hashing	10	4

j) Text Book and Reference Book:

1. Database Systems Concepts, design and Applications by Singh, S. K. | Pearson Education, New Delhi, 2012
2. An Introduction to Database System by Date, C. J. | Pearson Education, New Delhi, 2012
3. Database System Concepts by Abraham Silberschatz, Henry Korth, S, Sudarshan | McGraw Hill International

7)

- a. **Course Name:** Advanced Database Management System Lab
- b. **Course Code:** 03606382
- c. **Prerequisite:** Basic knowledge of Database management system
- d. **Rationale:** The rationale for an Advanced Database Management System (DBMS) stems from the increasing complexity and demands of modern data management needs. Here are several key points justifying the need for an advanced DBMS
- e. **Course Learning Objective:**

CLOBJ 1	Students will develop a comprehensive understanding of advanced database concepts, including data modelling, database normalization, concurrency control, and database management system architectures.
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CLOBJ 2	Upon completion of the course, students will demonstrate proficiency in optimizing database performance through query optimization, indexing strategies, database tuning, and other performance-enhancing techniques.
CLOBJ 3	Students will gain expertise in designing and implementing scalable database architectures capable of handling large volumes of data and accommodating increasing demands for data processing and storage.
CLOBJ 4	Students will learn to implement advanced security measures to protect sensitive data stored within databases, including authentication mechanisms, access controls, encryption techniques, and auditing capabilities.
CLOBJ 5	Upon completing the course, students will be competent in integrating data from heterogeneous sources using advanced data integration techniques such as ETL (Extract, Transform, Load), data federation, and data virtualization.
CLOBJ 6	Students will develop proficiency in advanced data analysis and reporting techniques, including data mining, predictive analytics, OLAP (Online Analytical Processing), and advanced reporting tools to derive actionable insights from large datasets.

f. Course Learning Outcomes:

CLO 1	Understanding of Advanced Database Concepts
CLO 2	Proficiency in Database Performance Optimization
CLO 3	Expertise in Scalable Database Architectures
CLO 4	Ability to Implement Advanced Security Measures
CLO 5	Competence in Advanced Data Integration Techniques
CLO 6	Proficient in Advanced Data Analysis and Reporting

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding of Advanced Database Concepts
CLO 2	Proficiency in Database Performance Optimization
CLO 3	Expertise in Scalable Database Architectures
CLO 4	Ability to Implement Advanced Security Measures
CLO 5	Competence in Advanced Data Integration Techniques
CLO 6	Proficient in Advanced Data Analysis and Reporting

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	-	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

1. “Database Systems Concepts, design and Applications By Singh, S. K. | Pearson Education, New Delhi, 2012
2. An Introduction to Database System By Date, C. J. | Pearson Education, New Delhi, 2012
3. Database System Concepts By Abraham Silberschatz, Henry Korth, S, Sudarshan | McGraw Hill International

j. Mapping of Experiment List with Course Learning Outcomes:

Ex No.	Name of the Experiment
1	Perform queries for DCL Commands and Locks
2	Implement authorization, authentication, and privileges on database.
3	Perform queries to Create synonyms, sequence and index
4	Perform queries to Create, alter and update views.
5	Implement PL/SQL programmes using control structures.
6	Implement PL/SQL programmes using Cursors.
7	Implement PL/SQL programmes using exception handling
8	Implement user defined procedures and functions using PL/SQL blocks.
9	Perform various operations on packages
10	Implement various triggers
11	Practice on functional dependencies
12	Practice on transaction processing

8)

a. Course Name: Advanced Computer Network

b. Course Code: 03606383

c. Prerequisite: basic knowledge of computer network

d. Rationale: Advanced Computer Network course lies in the increasing complexity and criticality of computer networks in modern society.

e. Course Learning Objective:

CLOBJ 1	Students will develop a thorough understanding of fundamental concepts, theories, and algorithms underlying computer networks, including network protocols, architectures, routing algorithms, congestion control mechanisms, and network security principles.
CLOBJ 2	Through practical exercises and laboratory sessions, students will gain hands-on experience with a variety of network devices, including routers, switches, firewalls, and network monitoring tools. They will learn how to configure, troubleshoot, and manage these devices effectively.
CLOBJ 3	By the end of the course, students will have the skills and knowledge necessary to design and implement computer networks of varying sizes and complexities. They will learn about network topology design, addressing schemes, subnetting, VLAN configuration, and network security protocols.

f. Course Learning Outcomes:

CLO 1	Understanding core concepts/theories/algorithms of computer networks
CLO 2	Some hands-on capability on various network devices and tools
CLO 3	Capability to design and implement a computer network

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding core concepts/theories/algorithms of computer networks
CLO 2	Some hands-on capability on various network devices and tools
CLO 3	Capability to design and implement a computer network

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Review of Networking Basics Advance Topics in IPv4 – Subnetting and masking, Multicasting, Multicast Routing Protocols (IGMP, PIM, DVMRP)	25	10

2	Telecom Networks Switching Techniques; Introduction to Frame Relay, ATM, MPLS; VSAT Communication – Star and Mesh architectures	20	8
3	Wireless Networks Wi-Fi, WiMAX, Cellular Phone Technologies –GSM, CDMA, 3G, 4G Network Monitoring – SNMP, RMON	25	10
4	Introduction to Network Security LAN, VPN, Firewall, IPS, Proxy Servers	15	7
5	IP Addressing schema Address Space, Notations, class full addressing, classless addressing, Protocol Analysers (Wireshark)	15	7

j. **Text Book and Reference Book:**

1. Communication Networking: An Analytical Approach By Anurag Kumar, D. Manjunath and Joy Kuri | Morgan Kaufman Publishers, Pub. Year 2004
2. TCP/IP Illustrated by Richard Stevens
3. Data Networks by D. Bertsimas and R. Gallager | Prentice Hall | 1992
4. “An Engineering Approach to Computer Networking” By S. Keshav | Pearson Education

9)

- a. **Course Name:** Advanced Computer Network Lab
- b. **Course Code:** 03606383
- c. **Prerequisite:** basic knowledge of computer network
- d. **Rationale:** Advanced Computer Network course lies in the increasing complexity and criticality of computer networks in modern society.
- e. **Course Learning Objective:**

CLOBJ 1	Students will develop a thorough understanding of fundamental concepts, theories, and algorithms underlying computer networks, including network protocols, architectures, routing algorithms, congestion control mechanisms, and network security principles.
CLOBJ 2	Through practical exercises and laboratory sessions, students will gain hands-on experience with a variety of network devices, including routers, switches, firewalls, and network monitoring tools. They will learn how to configure, troubleshoot, and manage these devices effectively.
CLOBJ 3	By the end of the course, students will have the skills and knowledge necessary to design and implement computer networks of varying sizes and complexities. They will learn about network topology design, addressing schemes, subnetting, VLAN configuration, and network security protocols.

f. **Course Learning Outcomes:**

CLO 1	Understanding core concepts/theories/algorithms of computer networks
CLO 2	Some hands-on capability on various network devices and tools
CLO 3	Capability to design and implement a computer network

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Understanding core concepts/theories/algorithms of computer networks
CLO 2	Some hands-on capability on various network devices and tools
CLO 3	Capability to design and implement a computer network

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	-	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

1. Communication Networking: An Analytical Approach by Anurag Kumar, D. Manjunath and Joy Kuri | Morgan Kaufman Publishers, Pub. Year 2004
2. TCP/IP Illustrated By Richard Stevens
3. Data Networks by D. Bertsimas and R. Gallager | Prentice Hall | 1992
4. "An Engineering Approach to Computer Networking" By S. Keshav | Pearson Education

j. Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Explain working of IGMP protocol.
2	Explain working of PIM, DVMRP protocols.
3	Explain Functional Reference Model of the Asynchronous Transfer Mode (ATM).
4	Subnet a Network in Packet Tracer.
5	Bus, Star, mesh, ring and Hybrid topology using cisco packet tracer
6	Analyse working of WI-FI and WI-MAX.
7	Describe working of Wireshark.
8	Packet capture and Protocol Analyzer using Wireshark.
9	Capturing Password using Wireshark.

Exp. No.	Name of the Experiment
10	Configure SNMP using relevant software.
11	Configure DNS using relevant software.
12	Analyse the working of Firewall.
13	Analyse How a proxy server Operates.
14	Analyse IP subnet Calculator.

10)

- a. **Course Name:** Artificial Intelligence and Machine Learning
- b. **Course Code:** 03606387
- c. **Prerequisite:** Knowledge of Programming Techniques, Basic knowledge of Python
- d. **Rationale:** The lab course is intended to practice and do experiments on concepts taught in theory class of 'Fundamental of Artificial Intelligence and Machine learning' and gain insight into functioning of the AI and Machine Learning.
- e. **Course Learning Objective:**

CLOBJ 1	Gain a deep understanding of fundamental concepts in artificial intelligence (AI) and machine learning (ML).
CLOBJ 2	Identify and analyses different problem-solving approaches within state space search, such as production systems, generate and test, hill climbing, depth-first search (DFS), breadth-first search (BFS), problem reduction, constraint satisfaction, and means-end analysis.
CLOBJ 3	Students will develop a comprehensive understanding of various machine learning algorithms, including supervised learning, unsupervised learning, and reinforcement learning.
CLOBJ 4	Gain hands-on experience in implementing AI and ML solutions using programming languages (such as Python) and libraries/frameworks
CLOBJ 5	Students will learn how to formulate problems, collect and preprocess data, build predictive models, evaluate model performance, and deploy solutions in practical settings.

f. **Course Learning Outcomes:**

CLO 1	Comprehensive understanding of fundamental AI and ML concepts.
CLO 2	Identification and analysis of problem-solving approaches in state space search.
CLO 3	Familiarity with diverse machine learning algorithms.
CLO 4	Hands-on implementation experience in Python.
CLO 5	Ability to formulate, preprocess, evaluate, and deploy ML solutions effectively.

g. **Mapping of Course Learning Outcomes and Bloom's Taxonomy:**

Course Learning Outcomes	
CLO 1	Comprehensive understanding of fundamental AI and ML concepts.
CLO 2	Identification and analysis of problem-solving approaches in state space search.
CLO 3	Familiarity with diverse machine learning algorithms.
CLO 4	Hands-on implementation experience in Python.
CLO 5	Ability to formulate, preprocess, evaluate, and deploy ML solutions effectively.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Basic of AI Definition: Artificial Intelligence, types of Artificial Intelligence, Evolving Stages of Artificial Intelligence, The AI Problems, Difference - Artificial Intelligence vs. Machine Learning, Application of Artificial Intelligence.	15	6
2	State Space Search & Heuristic Search Techniques: Defining The Problems As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics, Generate and Test, Hill Climbing, , Depth first search (DFS), Breadth first search (BFS), Problem reduction, Constraint satisfaction, Means-end analysis	20	10
3	Knowledge Representation Issues: Representations And Mappings, Approaches To Knowledge Representation.	15	5
4	Introduction to Machine Learning: Overview of Human Learning and Machine Learning, Types of Machine Learning, Applications of Machine Learning, Tools and Technology for Machine Learning, Type of Machine Learning	15	6
5	Supervised & Unsupervised: Supervised Learning, Overview of Classification - K-nearest Neighbours, Applications of Classification Algorithms, Overview of Regression - Linear	35	15

	regression, Application of Regression, Advantage and Disadvantages of supervised Learning, Unsupervised Learning, Overview of Clustering - K-Means, Applications of Clustering, Overview of Association - Apriorism Algorithms, Applications of Association, Advantage and Disadvantages of Unsupervised Learning, Basic structure of Neural Networks, Neural Network Elements, Application of Neural Network		
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j. **Text Book and Reference Book:**

- a. Introduction to Machine Learning By Ethem Aladdin | MIT Press
- b. Machine Learning by Tom Mitchell | McGraw-Hill Science

11)

- a. **Course Name:** Artificial Intelligence and Machine Learning-Lab
- b. **Course Code:** 03606388
- c. **Prerequisite:** Knowledge of Programming Techniques, Basic knowledge of Python
- d. **Rationale:** The lab course is intended to practice and do experiments on concepts taught in theory class of 'Fundamental of Artificial Intelligence and Machine learning' and gain insight into functioning of the AI and Machine Learning.
- e. **Course Learning Objective:**

CLOBJ 1	Gain a deep understanding of fundamental concepts in artificial intelligence (AI) and machine learning (ML).
CLOBJ 2	Identify and analyses different problem-solving approaches within state space search, such as production systems, generate and test, hill climbing, depth-first search (DFS), breadth-first search (BFS), problem reduction, constraint satisfaction, and means-end analysis.
CLOBJ 3	Students will develop a comprehensive understanding of various machine learning algorithms, including supervised learning, unsupervised learning, and reinforcement learning.
CLOBJ 4	Gain hands-on experience in implementing AI and ML solutions using programming languages (such as Python) and libraries/frameworks
CLOBJ 5	Students will learn how to formulate problems, collect and preprocess data, build predictive models, evaluate model performance, and deploy solutions in practical settings.

f. **Course Learning Outcomes:**

CLO 1	Comprehensive understanding of fundamental AI and ML concepts.
CLO 2	Identification and analysis of problem-solving approaches in state space search.
CLO 3	Familiarity with diverse machine learning algorithms.
CLO 4	Hands-on implementation experience in Python.
CLO 5	Ability to formulate, preprocess, evaluate, and deploy ML solutions effectively.

g. **Mapping of Course Learning Outcomes and Bloom's Taxonomy:**

Course Learning Outcomes	
CLO 1	Comprehensive understanding of fundamental AI and ML concepts.
CLO 2	Identification and analysis of problem-solving approaches in state space search.
CLO 3	Familiarity with diverse machine learning algorithms.
CLO 4	Hands-on implementation experience in Python.
CLO 5	Ability to formulate, preprocess, evaluate, and deploy ML solutions effectively.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	-	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

i. Text Book and Reference Book:

- Introduction to Machine Learning by Ethem Aladdin | MIT Press
- Machine Learning by Tom Mitchell | McGraw-Hill Science

j. Mapping of Experiment List with Course Learning Outcomes:

Exp. No.	Name of the Experiment
1	Write a program to implement Tic-Tac-Toe game problem
2	Write a program to implement BFS (for Water Jug problem or any AI search problem)
3	Write a program to implement DFS (for Water Jug problem or any AI search problem)
4	Write a program to implement Single Player Game (Using Heuristic Function)
5	Analysis on various tools for machine learning and explore it
6	Study most useful packages for machine learning and How to install packages in python.

Exp. No.	Name of the Experiment
7	Study how to download and load any datasets
8	Study how to divide dataset into training set and testing set.
9	Create your own linear regression model in python.
10	Implement K-nearest Neighbours Algorithm in any suitable dataset.
11	Implement Linear Regression Algorithm in any suitable dataset.

12)

- a. **Course Name:** Multimedia Technologies
- b. **Course Code:** 03606385
- c. **Prerequisite:** Multimedia Technologies typically include foundational knowledge and skills in several areas
- d. **Rationale:** Multimedia Technologies is grounded in the increasing importance and pervasive nature of multimedia in various aspects of modern life.
- e. **Course Learning Objective:**

CLOBJ 1	The course aims to assess students' proficiency in creating multimedia content by evaluating their skills in graphics editing, audio editing, video editing, animation, and interactive multimedia authoring. Students will be required to demonstrate their ability to produce high-quality multimedia content that meets specified criteria and standards.
CLOBJ 2	Students will develop a deep understanding of fundamental principles and theories underlying multimedia, including visual design principles, audio production techniques, storytelling, user interface (UI) design, and user experience (UX) design. They will be able to apply these principles effectively in their multimedia creations.
CLOBJ 3	Upon completion of the course, students will be able to apply multimedia technologies to solve real-world problems and address communication needs across various domains and industries. They will have the skills to design and produce multimedia content for websites, mobile apps, digital marketing campaigns, e-learning materials, presentations, and entertainment media.
CLOBJ 4	The course will develop students' critical thinking and evaluation skills by engaging them in the analysis and evaluation of multimedia content. Students will learn to assess the effectiveness, usability, accessibility, and ethical implications of multimedia designs and productions. They will be able to identify strengths, weaknesses, opportunities, and threats (SWOT analysis) in multimedia projects and propose evidence-based improvements.
CLOBJ 5	Students will learn project management principles and techniques for organizing, scheduling, budgeting, and coordinating multimedia projects effectively. They will understand the importance of project planning, risk management, quality assurance, and client/stakeholder communication in ensuring project success. Students will also

	develop skills in leadership, teamwork, and communication essential for managing multimedia projects in diverse environments.
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f. Course Learning Outcomes:

CLO 1	Measure Proficiency in Multimedia Creation
CLO 2	Understanding of Multimedia Principles
CLO 3	Ability to understand Multimedia Technologies
CLO 4	Critical Thinking and Evaluation Skills
CLO 5	Multimedia Project Management

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Measure Proficiency in Multimedia Creation
CLO 2	Understanding of Multimedia Principles
CLO 3	Ability to Understand Multimedia Technologies
CLO 4	Critical Thinking and Evaluation Skills
CLO 5	Multimedia Project Management

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination.

i. Course Content:

Sr.	Topics	Weightage (%)	Teaching hours
1	Introduction to Multimedia Multimedia Foundation and Concepts: Multimedia Hardware, Multimedia Software, Multimedia operating systems, Multimedia communication system	10	6
2	Basic Compression Techniques Video and Audio Data Compression Techniques – Lossy and Lossless. Example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4	15	6
3	Multimedia System Architecture Introduction to Multimedia PC/Workstation Architecture, Multimedia Database Design, Content Based Information Retrieval: Image Retrieval, Video Retrieval	15	4
4	Image Basic and tools for creating professional grade Images in Photoshop Steps to create documents & optimizing images in	20	10

	Photoshop, Photoshop tools, layers in photoshop, colour corrections in documents and apply in created documents.		
5	Flash Fundamentals basic concepts of vector graphics and flash environment, basic tools of flash to create simple documents, steps to develop small flash applications	15	8
6	Introduction To ActionScript importance of ActionScript, Steps to create movies. ActionScript using loops, variables and arrays, scripts to modify existing objects of movie, steps to publish flash movie.	25	8

j. **Text Book and Reference Book:**

- i. Fundamentals of Multimedia by Drew | Pearsons
- ii. Adobe Flash CS4 Professional by Robert Reinhardt, Snow Dowd | Bible | Willy India Edition

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- a. **Course Name:** Multimedia Technologies Lab
- b. **Course Code:** 03606386
- c. **Prerequisite:** Multimedia Technologies typically include foundational knowledge and skills in several areas
- d. **Rationale:** Multimedia Technologies is grounded in the increasing importance and pervasive nature of multimedia in various aspects of modern life.
- e. **Course objective**

CLOBJ 1	The course aims to assess students' proficiency in creating multimedia content by evaluating their skills in graphics editing, audio editing, video editing, animation, and interactive multimedia authoring. Students will be required to demonstrate their ability to produce high-quality multimedia content that meets specified criteria and standards.
CLOBJ 2	Students will develop a deep understanding of fundamental principles and theories underlying multimedia, including visual design principles, audio production techniques, storytelling, user interface (UI) design, and user experience (UX) design. They will be able to apply these principles effectively in their multimedia creations.
CLOBJ 3	Upon completion of the course, students will be able to apply multimedia technologies to solve real-world problems and address communication needs across various domains and industries. They will have the skills to design and produce multimedia content for websites, mobile apps, digital marketing campaigns, e-learning materials, presentations, and entertainment media.
CLOBJ 4	The course will develop students' critical thinking and evaluation skills by engaging them in the analysis and evaluation of multimedia content. Students will learn to assess the effectiveness, usability, accessibility, and ethical implications of multimedia designs and productions. They will be able to identify strengths, weaknesses, opportunities, and threats (SWOT analysis) in multimedia projects and propose evidence-based improvements.

CLOBJ 5	Students will learn project management principles and techniques for organizing, scheduling, budgeting, and coordinating multimedia projects effectively. They will understand the importance of project planning, risk management, quality assurance, and client/stakeholder communication in ensuring project success. Students will also develop skills in leadership, teamwork, and communication essential for managing multimedia projects in diverse environments.
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f. Course Learning Outcomes:

CLO 1	Measure Proficiency in Multimedia Creation
CLO 2	Understanding of Multimedia Principles
CLO 3	Ability to Understand Multimedia Technologies
CLO 4	Critical Thinking and Evaluation Skills
CLO 5	Multimedia Project Management

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Measure Proficiency in Multimedia Creation
CLO 2	Understanding of Multimedia Principles
CLO 3	Ability to Understand Multimedia Technologies
CLO 4	Critical Thinking and Evaluation Skills
CLO 5	Multimedia Project Management

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
0	-	2	1	-	-	50	-	-	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

i. Text Book and Reference Book:

- Introduction to Machine Learning by Ethem Aladdin | MIT Press
- Machine Learning by Tom Mitchell | McGraw-Hill Science

j. Mapping of Experiment List with Course Learning Outcomes:

Ex No.	Name of the Experiment
1	Download and Install Photoshop.
2	Study different toolbox of Photoshop.
3	Write, test and debug open image, create image in Photoshop, save image and close document in Photoshop.
4	Write and Test different tools of Photoshop on image.
5	Create graphics – change colour of an object using Photoshop
6	Make passport size photo in Photoshop (12pcs in A4 size page)
7	Develop a collage of different images of different sizes and properties.
8	Write test and debug a Photoshop document illustrating the working of different Photoshop drawing and image tools
9	Create documents based on layers
10	Develop a banner of recent activity in your college or any festival in Photoshop.
11	Download and Install Flash player
12	Write, test and debug small applications using Basic Flash concepts using shapes, colours, text and images
13	Write, test and debug small applications with flash layers
14	Write, test and debug small applications with simple action script.
15	Write, test and debug small applications of movie using action script.

13)

a. Course Name: Major Project-2

b. Course Code: 03606362

c. Prerequisite: Software Engineering

d. Rationale: The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired in his/her academic program to real-world issues and problems. This final project affirms students' ability to think critically and creatively, to solve practical problems, to make reasoned and ethical decisions, and to communicate effectively

e. Course Learning Objective:

CLOBJ 1	Develop the ability to use theoretical knowledge effectively in practical settings, demonstrating proficiency in transforming theoretical concepts into real-world applications.
CLOBJ 2	To think critically and creatively about academic, professional, or social issues
CLOBJ 3	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.
CLOBJ 4	Enhance leadership and teamwork abilities, equipping students with the skills necessary to lead and collaborate effectively in group settings, while also developing strategies for solving complex problems through collective effort and cooperation.

f. Course Learning Outcomes:

CLO 1	Makes Transformation of Theoretical Knowledge and its Applications.
CLO 2	Communicate in the way industry demands in oral and documented way.
CLO 3	Demonstrate teamwork and leadership qualities.
CLO 4	Demonstrate professional and ethical conduct as per industrial expectations.

g. Mapping of Course Learning Outcomes and Bloom's Taxonomy:

Course Learning Outcomes	
CLO 1	Makes Transformation of Theoretical Knowledge and its Applications.
CLO 2	Communicate in the way industry demands in oral and documented way.
CLO 3	Demonstrate teamwork and leadership qualities.
CLO 4	Demonstrate professional and ethical conduct as per industrial expectations.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	12	6	-	-	60	-	40	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination