Four-Year Undergraduate Program

Bachelor of Computer Application

BSc IT / (BSc IT)Honors

Faculty of

IT&CS Parul

University

Vadodara, Gujarat, India

Faculty of IT&CS
Bachelor of Computer Application

1. Vision of the Department

To make students contribute in the area of Computer Applications by developing innovative Computing professionals to achieve excellent standards of quality education by keeping Pace with rapidly changing technologies, with a promising future to bring a new level of Inspiration among the students.

2. Mission of the Department

M1	To provide students with a strong foundation in computer science fundamentals, programming languages, software development, database management, and other relevant areas of computer applications.
M2	To equip students with practical skills, hands-on experience, and problem-solving abilities essential for the IT industry.
M3	To support studentcs in their personal and professional growth, offering career guidance, mentorship, and opportunities for specialization in areas such as software development, web design, system administration, and more.

3. Program Educational Objectives

The statements below indicate the career and professional achievements that the BCA curriculum enables graduates to attain.

PEO1	To demonstrate a strong foundation in computer science principles, programming languages, software development methodologies, and other essential areas of computer applications to address real-world challenges effectively.
PEO2	To apply critical thinking, analytical skills, and innovative approaches to identify, analyze, and solve complex problems in diverse areas of computer applications, contributing to organizational success and technological advancement.
PEO3	To effectively communicate technical information, work collaboratively in multidisciplinary teams, and demonstrate interpersonal skills essential for fostering productive relationships with stakeholders, clients, and colleagues.

4. Program Learning Outcomes

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

PLO1	Communicate effectively, both orally and in writing, with technical and non-technical audiences, including the ability to document and present technical information.

PLO2	Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3	Acquire the technical, scientific, and fundamental management techniques required to assess and solve real-world problems within their work domain.
PLO4	Demonstrate proficiency in programming languages commonly used in the field of computer applications, such as Java, C++, or Python.
PLO5	Develop effective problem-solving skills to analyze and solve computing problems using appropriate algorithms and data structures.
PLO6	Design, develop, test, and maintain software applications, demonstrating a solid understanding of software development life cycle processes.
PLO7	Apply project management principles to plan, execute, and manage software development projects, including resource allocation and time management.
PLO8	Understand and implement principles of database design, including the ability to create and manage databases, and use query languages effectively.
PLO9	Understand and adhere to ethical standards in the field of computing, including issues related to privacy, intellectual property, and responsible use of technology.

5. Program Specific Learning Outcomes

PSLO1	Students will be able to design and develop algorithms and programs for computer applications and IT industry
PSLO2	Students will be able to integrate computer-based knowledge and skills/techniques in identifying, formulating, analyzing, and solving problems of programming using different languages.

6. Credit Framework

Semester wise Credit distribution of the programme	
Semester-1	22
Semester-2	22
Semester-3	22
Semester-4	22
Semester-5	22

Category wise Credit distribution of the programme	
Category	**Credit**
Major Core	88
Minor Stream	32
Multidisciplinary	12
Ability Enhancement Course	10
Skill Enhancement Courses	10

Semester-6	22
Semester-7	22
Semester-8	22
Total Credits:	**176**

Value added Courses	8
Summer Internship	8
Research Project/Dissertation	8
Total Credits:	**176**

7. Program Curriculum

Semester 1						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	MIL-1	AEC-1 (MIL-1) (Pls refer Table 1)	2	2	0	0
2	11011401VA01	VAC-1 (Climate change and sustainable environment)	2	2	0	0
3	Minor 1	Minor sub-1 (Pls refer Table 2)	4	3	2	0
4	05010101DS01	Core 1 - Fundamentals of Programming using C (Theory)	3	3	0	0
5	05010101DS02	Core 1 - Fundamentals of Programming using C (Practical)	1	0	2	0
6	05010101DS03	Core 2 - Fundamentals of Web Development (Theory)	3	3	0	0
7	05010101DS04	Core 2 - Fundamentals of Web Development (Practical)	1	0	2	0
8	SEC-1	SEC-1 (Mathematical Aptitude/ Statistical Software Package)	2	2	0	0
9	UE - 1	University Elective – 1 (Pls refer Table 3)	4	3	2	0
Total			**22**	**18**	**8**	**0**

Table 1: Semester - 1 MIL -1

Code	Subject	Credit	Lect	Lab	Tut
00019301AE01	Basic English-I	2	2	-	-
00019301AE02	Basic Hindi-I	2	2	-	-
00019301AE03	Basic Gujarati-I	2	2	-	-
	Total	6	6		

Table 2: Semester 1 – Minor Subjects

Sr. No	Subject Code	Subject Name	Credit	Lec	Lab	Tut
1	05010101AM01	Artificial Intelligence & Machine Learning – I(Theory)	3	3	-	-
2	05010101AM02	Artificial Intelligence & Machine Learning - I (Practical)	1	-	2	-
3	18010501AN01	Character Design	4	2	4	-
4	05010101CF01	Basic Cyber Security and Forensics (Theory)	4	4	-	-
5	06010101DM01	Marketing Management	4	4	0	-
6	18010201PP01	Digital Camera Mechanism	4	2	4	-
7	18010201VV01	Fundamentals of Digital Videography	4	2	4	-
		Total	24	17	14	-

Table 3: Semester - 1 University Elective -1

Code	Subject	Credit	Lect	Lab	Tut
03010501UE01	Cyber Forensic & Investigation	4	3	2	-
03010801UE01	I.T. Governance	4	3	2	-
06010101UE01	Digital and Mobile Media Marketing	4	4	-	-
09010101UE01	First Aid and Life Support	4	4	-	-
11011401UE01	Remote Sensing & GIS	4	3	2	-
	TOTAL	20	17	6	-

Semester 2						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	MIL-2	AEC-1 (MIL-2) (Pls refer Table 4)	2	2	-	-
2	00019302VA01	VAC-2 (IPDC including history and culture of India and IKS-I)	2	2	-	-
3	Minor -2	Minor sub-2 (Pls refer Table 5)	4	3	2	-
4	SEC-2	SEC-2	2	1	2	-
5	05010102DS01	Database Management Systems (Theory)	3	3	-	-
6	05010102DS02	Database Management Systems (Practical)	1	-	2	-
7	05010102DS03	System Analysis and Design (Theory)	3	3	-	-
8	05010102DS04	System Analysis and Design (Practical)	1	-	2	-
9	Multidisciplinary	Multidisciplinary Course(Pls refer Table 6)	4	4	-	-
Total			**22**	**18**	**8**	**-**

Table 4: Semester - 2 MIL -2

Code	Subject	Credit	Lect	Lab	Tut
00019302AE04	Basic English-II	2	2	-	-
00019302AE05	Basic Hindi-II	2	2	-	-
00019302AE06	Basic Gujarati-II	2	2	-	-
	Total	6	6	-	-

Table 5: Semester - 2 SEC -2

Code	Subject	Credit	Lect	Lab	Tut
05010102SE01	Data Visualization for Business Intelligence	2	1	2	-
05M10102SE01	Business Intelligence & Analytics (NPTEL)	2	1	2	-
	Total	4	2	4	

Table 5: Semester - 2 Minor -2

Code	Subject	Credit	Lect	Lab	Tut
05010102AM01	Artificial Intelligence & Machine Learning-II(Theory)	4	3	-	-
05010102AM02	Artificial Intelligence & Machine Learning-II (Practical)	1	-	2	-
18010502AN01	Story Telling & Story Boarding	4	-	6	1
05010102CF01	Advanced Cyber Security and Forensics(Theory)	4	4	-	-
06010102DM01	Fundamentals of Digital Marketing	4	4	-	-
18010202PP01	Characteristics of Lens	4	-	6	1
18010202VV01	Lighting and Camera Movement	4	-	6	1
	Total	25	11	20	3

Table 6: Semester - 2 (Multidisciplinary Course)

Code	Subject	Credit	Lect	Lab	Tut
11019102UE01	Basic Mathematics	4	4	-	-
11M19102UE01	Discrete Mathematics (NPTEL)	4	4	-	-
	Total	8	8		

Semester 3						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05102201	Introduction to Data Structures and Algorithms	4	3	2	-
2	05102202	Computer Networks	4	3	-	1

3	05102203	Fundamentals of Object-Oriented Programming using Java	5	3	2	1
4	05102204	Fundamentals of Operating System	5	3	2	1
5	05102205	Web Application Development	4	3	2	-
6	05193202	Communication & Programming Skills	2	1	0	1
Total			**24**	**16**	**8**	**4**

Semester 4						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	MEL-2	AEC-1 (MIL-2)	2	2	-	-
2	VAC-4	VAC-4 (Positive Mental Health/Physical Education: Yoga/Sports/NCC)	2	1	-	1
3	SEC-4	SEC-4 (Statistics)	2	2	-	-
4	Minor -3	Minor sub-3	4	3	2	-
5	05010104DS01	Core-10- Data Communication and Networking (Theory)	3	3	-	-
6	05010104DS02	Core-10- Data Communication and Networking (Practical)	1	-	2	-
7	05010104DS03	Core 9 - Open Source Technology using PHP (Theory)	3	3	-	-
8	05010104DS04	Core 9 - Open Source Technology using PHP (Practical)	1	-	2	-
9		Core 8 - Specialization - I (Theory)	3	3	-	-
10		Core 8 - Specialization - I (Practical)	1	-	2	-
Total			**22**	**17**	**8**	**1**

Specialization - I						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05010104DS05	Artificial Intelligence -I (T)	3	3	-	-
2	05010104DS06	Artificial Intelligence -I (P)	1	-	2	-
3	05010104DS07	Big data Analytics -I (T)	3	3	-	-
4	05010104DS08	Big data Analytics -I (P)	1	-	2	-
5	05010104DS09	Block chain Technology -I (T)	3	3	-	-

6	05010104DS10	Block chain Technology -I (P)	1	-	2	-
7	05010104DS11	Cloud Computing -I (T)	3	3	-	-
8	05010104DS12	Cloud Computing -I (P)	1	-	2	-
9	05010104DS13	Cyber Security and Forensic -I (T)	3	3	-	-
10	05010104DS14	Cyber Security and Forensic -I (P)	1	-	2	-
11	05010104DS15	Full stack web development -I (T)	3	3	-	-
12	05010104DS16	Full stack web development -I (P)	1	-	2	-
13	05010104DS17	Gaming Technology -I (T)	3	3	-	-
14	05010104DS18	Gaming Technology -I (P)	1	-	2	-
15	05010104DS19	Web Technologies -I (T)	3	3	-	-
16	05010104DS20	Web Technologies -I (P)	1	-	2	-
		Total	32	30	16	

Semester 5						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05010105DS01	Core 11 - Front End Development with .NET (Theory)	3	3	-	-
2	05010105DS02	Core 11 - Front End Development with .NET (Practical)	1	-	2	-
3		Core 12 - Specialization - II (Theory)	3	3	-	-
4		Core 12 - Specialization - II (Practical)	1	-	2	-
5	Minor sub 4	Minor sub 4	4	3	2	-
6	05010105DS03	Core 13 - Mini Project- II (from Minor/Major Stream)	4	-	8	-
7	Minor sub 5	Minor sub 5	4	3	2	-
8	SAC-5	SAC-5 Digital Literacy Financial for Everyone	2	2	-	-
Total			**22**	**14**	**16**	**0**

Specialization - II						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05010105DS04	Artificial Intelligence -II (T)	3	3	-	-
2	05010105DS05	Artificial Intelligence -II (P)	1	-	2	-
3	05010105DS06	Big data Analytics -II (T)	3	3	-	-

4	05010105DS07	Big data Analytics -II (P)	1	-	2	-
5	05010105DS08	Block chain Technology -II (T)	3	3	-	-
6	05010105DS09	Block chain Technology -II (P)	1	-	2	-
7	05010105DS10	Cloud Computing -II (T)	3	3	-	-
8	05010105DS11	Cloud Computing -II (P)	1	-	2	-
9	05010105DS12	Cyber Security and Forensic -II (T)	3	3	-	-
10	05010105DS13	Cyber Security and Forensic -II (P)	1	-	2	-
11	05010105DS14	Full stack web development -II (T)	3	3	-	-
12	05010105DS15	Full stack web development -II (P)	1	-	2	-
13	05010105DS16	Gaming Technology -II (T)	3	3	-	-
14	05010105DS17	Gaming Technology -II (P)	1	-	2	-
15	05010105DS18	Web Technologies -II (T)	3	3	-	-
16	05010105DS19	Web Technologies -II (P)	1	-	2	-
		Total	40	25	16	

Semester 6						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05010106DS01	Core 14 - Mobile Application Development (Theory)	3	3	-	-
2	05010106DS02	Core 14 - Mobile Application Development (Practical)	1	-	2	-
3	05010106DS03	Core 15 - Software Engineering (Theory)	3	3	-	-
4	05010106DS04	Core 15 - Software Engineering (Practical)	1	-	2	-
5	05010106DS05	Core-16 - Data Processing with Python (Theory)	3	3	-	-
6	05010106DS06	Core-16 - Data Processing with Python (Practical)	1	-	2	-
7	05010106IN01	Internship/Mini Project-1(from Major Stream)	4	-	8	-
8	AEC - 5	AEC - 5 Professional Ethics and Communication	2	1	-	1
9	Minor sub 6	Minor sub 6	4	3	2	-
Total			**22**	**13**	**16**	**1**

Semester 7 (BCA Honors)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1		Core 17 - Elective I (Theory)	3	3	-	-
2		Core 17 - Elective I (Practical)	1	-	2	-
3	05010107DS01	Core 18 - Internet of Things (Theory)	3	3	-	-
4	05010107DS02	Core 18 - Internet of Things (Practical)	1	-	2	-
5	05010107DS03	Core 19 - Software Testing using Selenium (Theory)	3	3	-	-
6	05010107DS04	Core 19 - Software Testing using Selenium (Practical)	1	-	2	-
7	Minor sub 7	Minor sub 7	4	3	2	-
8	05010107IN01	OJT in Major Specific Course (Field/Industry)	6	-	12	-
Total			**22**	**12**	**20**	**0**

Semester 7 (BCA Research)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1		Core 17 - Elective I (Theory)	3	3	-	-
2		Core 17 - Elective I (Practical)	1	-	2	-
3	05010107DS01	Core 18 - Internet of Things (Theory)	3	3	-	-
4	05010107DS02	Core 18 - Internet of Things (Practical)	1	-	2	-
5	05010107DS03	Core 19 - Software Testing using Selenium (Theory)	3	3	-	-
6	05010107DS04	Core 19 - Software Testing using Selenium (Practical)	1	-	2	-
7	Minor sub 7	Minor sub 7	4	3	2	-
8	05010107RP01	Research Project in Major Specific Course(Field/Industry)	6	-	12	-
Total			**22**	**12**	**20**	**0**

Semester 7 (Elective – 1)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	05010107DS05	Computer Vision (T)	4	3	-	-
2	05010107DS06	Computer Vision (P)	1	-	2	-
3	05010107DS07	Soft Computing(T)	4	3	-	-
4	05010107DS08	Soft Computing(P)	1	-	2	-
5	05010107DS09	Software Project Management(T)	4	3	-	-
6	05010107DS10	Software Project Management(P)	1	-	2	-
7	05010107DS11	Open-Source Software and Tools(T)	4	3	-	-
8	05010107DS12	Open-Source Software and Tools(P)	1	-	2	-
		Total	20	12	8	

Semester 8 (BCA Honors)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	Minor sub 8	Minor sub 8	4	3	2	-
2	05010108DS01	Core 20 - Content Management System (WordPress and Laravel)(Theory)	3	3	-	-
3	05010108DS02	Core 20 - Content Management System (WordPress and Laravel)(Practical)	1	-	2	-
4	05010108DS03	Core 21 - Machine Learning (Theory)	3	3	-	-
5	05010108DS04	Core 21 - Machine Learning (Practical)	1	-	2	-
6	05010108DS05	Core 22 - Cross-Platform Development (Theory)	3	3	-	-
7	05010108DS06	Core 22 - Cross-Platform Development (Practical)	1	-	2	-
8	05010108IN01	OJT in Major Specific Course(Internship/Project)	6	-	12	-
Total			**22**	**12**	**20**	**0**

Semester 8 (BCA Research)

Sr. No	Subject Code	Subject Name	Credit	Lect	Lab	Tut
1	Minor sub 8	Minor sub 8	4	3	2	-
2	05010108DS01	Core 20 - Content Management System (Theory)	3	3	-	-
3	05010108DS02	Core 20 - Content Management System (Practical)	1	-	2	-
4	05010108DS03	Core 21 - Machine Learning (Theory)	3	3	-	-
5	05010108DS04	Core 21 - Machine Learning (Practical)	1	-	2	-
6	05010108DS05	Core 22 - Cross-Platform Development (Theory)	3	3	-	-
7	05010108DS06	Core 22 Cross-Platform Development (Practical)	1	-	2	-
8	05010108RP01	OJT in Major Specific Course (Research Course)	6	-	12	-
Total			**22**	**12**	**20**	**0**

8. Detailed Syllabus

Semester 1

(1)

a. Course Name: Basic English-I **(MIL-I)**

b. **Course Code:** 00019301AE01

c. **Prerequisite:** Basic Knowledge of LSRW. To provide students with soft skills that complement their skills, making them more marketable when entering the workforce.

d. **Rationale**: Knowledge of LSRW is essential for Students

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand the importance of creative and critical thinking.
CLO 2	Develop four basic skills (LSRW)
CLO 3	Expand vocabulary with proper pronunciation
CLO 4	Comprehend the basics of English grammar.
CLO 5	Read & write effectively for a variety of contexts.
CLO 6	Develop confidence in speaking skills

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No	Content	Weightage%	Teaching Hours
1	**Listening Skills and Hearing** Listening Vs Hearing Types of listening Traits of good listener Barriers of listening	7	2
2	**Listening Practice** Listening Practice (Audio & Video)	10	3
3	**Presentation Skills** Defining the purpose of presentation strategies How to make an effective presentation? Knowing /Analysing audience Organizing content and preparing an outline Traits of a good speaker	3	1
4	**Activity** Crazy Scientist	7	2
5	**Speaking Practice** Speaking practice (Elocution)	24	7
6	**Reading Skills** Define reading Reading Strategies Strategies Techniques of reading Techniques to read faster	3	1
7	**Reading Practice** Reading Practice (Reading Comprehension)	13	4
8	**Writing Skills** Develop Writing Skills 7cs of communication Techniques of writing better Identifying common errors in writing	10	3
9	**Paragraph Writing** Introduction of Paragraph Writing Central components of paragraph development Techniques for paragraph development	3	1
10	**Writing Practice Note making** Picture Description	20	6

	Dialogue Writing		

	Paragraph Writing Completion of story from given points		
	Total	**100%**	**30**

i. Text Book and Reference Book:

1. Understanding and Using English Grammar
   By Betty Azar & Stacy Hagen | Pearson Education
2. Business Correspondence and Report
   Writing By Sharma R. and Mohan K.
3. Communication Skills
   By Kumar S and Lata P | New Delhi Oxford University Press
4. Technical Communication: Principles and Practice
   By Sangeetha Sharma, Meenakshi Raman | Oxford University Press
5. Practical English
   Usage By MICHAEL
   SWAN
6. A Remedial English Grammar for Foreign
   Student By F.T. WOOD
7. on Writing Well
   By William Zinsser | Harper Paperbacks, 2006 | 30th anniversary edition
8. Oxford Practice Grammar,
   By John Eastwood | Oxford University Press

(2)

a. Course Name: Basic Hindi – II **(MIL-I)**

b. **Course Code:** 00019301AE02

c. **Prerequisite:** Knowledge of Hindi-I

d. **Rationale:** Basic comprehensive skills and Hindi-I

e. Course Learning Objective:

CLOBJ 1	Understand difficult words in Hindi language.
CLOBJ 2	Comprehend Hindi language through listening
CLOBJ 3	Introduce self in Hindi language.
CLOBJ 4	Communicate at elementary level in Hindi.

f. Course Learning Outcomes:

CLO 1	Understand difficult words in Hindi language.
CLO 2	Comprehend Hindi language through listening
CLO 3	Introduce self in Hindi language.
CLO 4	Communicate at elementary level in Hindi.

CLO 5	Read and write Hindi language.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	**Content**	**Weightage%**	**Teaching Hours**
1	(Advanced vocabulary) (Advanced vocabulary) (Numbers) (51 onwards) (Telling Time) (Greetings)	13	4
2	(Listening skills) (Listening skills) ((Short Story) ((Short Conversation)	20	6
3	(Speaking Skills) (Speaking Skills) (Self Introduction) (Day to day conversation) (Elocution)	27	8
4	(Reading Skills) (Reading Skills) (Reading Comprehension) (Short Story) (Newspaper article)	20	6
5	(Writing skills) (Writing skills) (Self Introduction) (Short message)	20	6
	Total	100%	30

I. Text Book and Reference Book:

1. **Hindi for Beginners published**

By Up To School Worksheets

2. **Hindi Abhyaas Pustika Published**

By Seema Verma | Trishala Learning System pvt.

3. **NCERT Workbook of Hindi for Grade-2**
4. **Rachnatmak Vyakaran**

By Suresh Pant and Himani Joshi | Pearson.

5. **Matra Gyan**

Wonder House Books

6. **Amoli Hindi Vyakaran**

By Dr. Nirmal Dalal

(3)

a. Course Name: Basic Gujarati-II **(MIL-I)**

b. **Course Code:** 00019301AE03

c. **Prerequisite:** Knowledge of Gujarati-I

d. **Rationale:** Basic comprehensive skills and Gujarati-I

e. Course Learning Objective:

CLOBJ 1	Understand Gujarati literature and increase competency to analyse different aspects of literature.
CLOBJ 2	Develop competency to pronounce effectively and properly.
CLOBJ 3	Increase vocabulary of the students and to make use of the same.
CLOBJ 4	Acquiring a fundamental vocabulary base covering common words, phrases, and expressions used in everyday communication.

f. Course Learning Outcomes:

CLO 1	Understand difficult words in Gujarati language.
CLO 2	Comprehend Gujarati language through listening
CLO 3	Introduce self in Gujarati language.
CLO 4	Communicate at elementary level in Gujarati.
CLO 5	Read and write Gujarati language

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	(Advanced vocabulary) (Advanced vocabulary) (Numbers) (51 onwards) (Telling time) (Greetings)	13	4
2	(Listening Skills) (Listening Skills) (Short Story) (Short Conversation)	20	6
3	(Speaking Skills) (Speaking Skills) (Self Introduction) (Day to day conversation) (Elocution)	27	8
4	(Reading Skills) (Reading Skills) (reading comprehension) (Short Story) (Newspaper article)	20	6
5	(Writing skills) (Writing skills) (Self Introduction) (Short message)	20	6
	Total	100%	30

I. Text Book and Reference Book:

Technical Communication: Principles and Practice
By Sangeetha Sharma, Meenakshi Raman | Oxford University Press

2. All in One (English-Gujarati)
Manoj Publications

3. Gujarati Barakhadi by Sonika Agrawal
Published by Notion Press

4. Varna Lekhan
By Gujarati Books

5. My first Gujarati alphabets
By Priyal J. | My first Picture Book Inc

(4)

a. **Course Name:** Climate change and Sustainable Environment (VAC-1)
b. **Course Code:** 11011401VA01
C. **Prerequisite:** Shall have the basic knowledge about environmental studies
d. **Rationale:** Will understand the basic interface between climate change and sustainability.
e. **Course Learning Objective:**

CLOBJ 1	Understand climate change science and its impacts on ecosystems, society, and economy.
CLOBJ 2	Analyze mitigation strategies and adaptation measures for climate resilience.
CLOBJ 3	Evaluate international agreements and policies addressing climate change.
CLOBJ 4	Explore interdisciplinary approaches to sustainable development.

CLOBJ 5	Critically assess case studies of climate action successes and failures.

CLOBJ 6	Develop communication skills for advocating sustainable practices.

f. Course Learning Outcomes:

CLO 1	Explain the scientific basis of climate change, including the greenhouse effect, human activities that contribute to it, and the potential consequences.
CLO 2	Interpret and analyze climate data such as temperature trends, sea level rise, and extreme weather events.
CLO 3	Develop an understanding of the challenges and opportunities associated with transitioning towards a more sustainable future.
CLO 4	Critically evaluate different approaches to sustainability, such as renewable energy sources, resource conservation, and sustainable development goals (SDGs).

g. 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

h. Course Content:

Sr. No.	**Content**	**Weightage%**	**Teaching Hours**
1	**Introduction to Climate Change:** Global Climate System Climate Change: Causes and Consequences: Global warming, ozone layer depletion, acid rain, and greenhouse effect case studies: nuclear accidents, chemical disasters, and climatic episodes	**33**	**10**
2	**Sustainable Development:** Sustainable Development Goals: An overview Climate Change and Sustainable Development: National and State Policies Achieving Sustainable Development Goals: Role of Various Stakeholders Building Partnership for Climate Change and Sustainable Development	**34**	**10**
3	**Sustainable Approach to Climate Change:** Energy Conservation: Use of Renewable energies: Water, Solar, Wind, Tidal, Geothermal Water conservation techniques: Rain Water Harvesting. Environmental Ethics & Public Awareness: Role of various religions and cultural practices in environmental conservation Sustainable Human Development.	**33**	**10**

	Total	**100%**	**30**

i. Text Book and Reference Book:

1. Climate Change and Sustainable Development: Prospects for Developing Countries
   By Anil Markandya, Kirsten Halsnæs
2. Climate Change and Sustainable Development Global Prospective By R.K.Mishra, P.s.Janki Krishna & CH. Laskhmi Kumar
3. This Changes Everything: Capitalism vs The Climate By Naomi Klein
4. The Uninhabitable Earth: Life after Warming (Textbook)
   By David Wallace-Wells

(5)

a. **Course Name:** Mathematical Aptitude (SEC-1)
b. **Course Code:** 00019101SE01
c. **Prerequisite:** Basic numeracy skill
d. **Rationale:** Mathematical aptitude refers to the ability to reason, think critically, and apply mathematical principles to solve problems and make sense of the world around us.

e. Course Learning Objective:

CLOBJ 1	Strengthen your understanding of fundamental mathematical concepts like number systems (fractions, decimals, and percentages), exponents, and logarithms.
CLOBJ 2	Enhance your ability to interpret and analyze quantitative information presented in various forms (tables, graphs, charts).
CLOBJ 3	Gain a solid grasp of algebraic concepts like variables, expressions, equations, and inequalities.
CLOBJ 4	Master problem-solving strategies like breaking down complex problems into smaller, manageable steps.

f. Course Learning Outcomes:

CLO 1	Demonstrate a strong understanding of fundamental mathematical concepts like number systems, exponents, logarithms, and estimation techniques
CLO 2	Perform calculations accurately and efficiently using various mathematical operations
CLO 3	Interpret and analyze quantitative information presented in different formats (data tables, graphs, charts).
CLO 4	Calculate and interpret basic statistical measures like mean, median, mode, and standard deviation.

g. 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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	Numbers, HCF & LCM, Square Root & Cube Root, Ratio & Proportion, Permutations & Combinations, Percentage, Average-Shortcut averages, Partnership, Time -work & distance, Boats & streams, Mixtures, Logarithms	40	12
2	Progression (AM, GM, HM), Series, Interest (S.I. & C.I.) and depreciation rate, Profit-Loss & Discount, Equations (Linear & Quadratic), Probability.	40	12
3	Mensuration I (Area & Perimeter), Mensuration II(Volume & Surface area), Grouped Data, Ungrouped Data (Mean and Standard Deviation) Data interpretation: (Tabulation, Bar Graph, Pie Chart, Line Chart).	20	6
	Total	100%	30

i. Text Book and Reference Book:

1. **Quantitative Aptitude for Competitive Examinations (Textbook)**

By D. Khattar | Person Indian Education Service

2. **Verbal Reasoning and Non - Verbal Reasoning (Textbook)**

By B. S. Sijwali and Indu Sijwali | New Delhi: Arihant

3. **Quantitative Aptitude for Competitive Examinations**

By R. S. Aggarwal | S. Chand Publishing

(6)

a. **Course Name: Fundamentals of Programming using C (Theory)**
b. **Course Code:** 05010101DS01
c. **Prerequisite:** Basic approach of problem-solving methods
d. **Rationale**: The objective of this course is to familiarize students with concepts of fundamentals of information technology along with developing the logic for solving a given problem using the procedure-oriented language C for construction of code
e. **Course Learning Objective:**

CLOBJ 1	Gain a clear understanding of fundamental programming concepts such as variables, data types, operators, and expressions.
CLOBJ 2	Master the use of control flow statements, including if-else, switch, and loops
CLOBJ 3	Understand array indexing, manipulation, and common operations on strings.
CLOBJ 4	Learn how to define functions, Structure, and unions
CLOBJ 5	Understand Pointers, manipulation, and common operations on strings
CLOBJ 6	Learn how to read from and write to files using standard file handling functions

f. **Course Learning Outcomes:**

CLO 1	Interpret syntax and semantics of c programming language.
CLO 2	Develop, execute and debug programs
CLO 3	Present output on the console
CLO 4	Explain the differences between syntax errors, runtime errors, and logic errors

g. **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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Overview of C** History, Algorithm and flowchart, Structure of C Elements of C: Character set, C Tokens, Keywords Identifiers, Variables, Constant Data Types, Comments, C Programming Applications and Importance, Operators: What is operator? Types of operator, Built-in Operators: Input/output operators, Concept of header files	**13**	**6**
2	**Pre-processors, Storage Classes Introduction, Different pre-processors:** #include, #define Importance. Storage Classes: Automatic, External, Static and Register Variables, Decision Making / Control Statements: If, If Else, Nested if, Switch, Looping statements: For, Nested for, While, Do while, Other statements: Break, Continue, Go to, exit.	**13**	**6**
3	**Array:** Declaration, Initialization, And Access of one dimensional & two-dimensional arrays, Programs using one- and two- dimensional arrays: Adding multiplying, Transposing matrices: sorting and searching arrays.	**16**	**7**
4	**Function, Structure and Union** Definition, need of function, Types of function, Built-in and User define Functions, User define Functions, Categories of functions: With/without arguments, With/without return values, Recursion, Functions with arrays, The scope, visibility & lifetime of variables. Structure definition, Giving values to members, Structure initialization, Comparison of structure variables, Arrays of structures, Arrays within structures, Structures within structures, Structures & functions, Unions Size of structures.	**22**	**10**
5	**Pointer and Working with Strings** Understanding pointers, Accessing the address of a variable, Declaring & initializing pointers, accessing a variable through its pointer, Pointer expression, Pointer increments & scale factor, Pointers & arrays, Passing pointer variables as function arguments. Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings.	**18**	**8**
6	**Files: Introduction, File operations:** i. Opening a File, ii. Reading a File iii. Closing a File Text modes I/O operations on files Binary modes Command line arguments File function fprintf() ii.fscanf() iii.getc() iv. putc() v. fgetc() vi. fputc() vii. fseek() viii.feof()	**18**	**8**
	Total	**100%**	**45**

i. Text Book and Reference Book:

1. **Programming in ANSIC**
   By E. Balaguruswamy| Tata McGraw-Hill
2. **The C Programming Language (Text Book)**

By Brian W. Kerningham and Dennis M. Ritchie| PHI

3. **Programming with C**
   By K.R. Venugopal and Sudeep R Prasad | Tata McGraw-Hill Education
4. **Let Us C**
   By Yeshavant Kanetkar| BPB Publications

(7)

a. **Course Name: Fundamentals of Programming using C (Practical)**
b. **Course Code:** 05010101DS02
c. **Prerequisite:** Basic approach of problem-solving methods
d. Rationale: The objective of this course is to familiarize students with concepts of fundamentals of information technology along with developing the logic for solving a given problem using the procedure-oriented language C for construction of code.
e. **Course Learning Objective:**

CLOBJ 1	Gain a clear understanding of fundamental programming concepts such as variables, data types, operators, and expressions.
CLOBJ 2	Master the use of control flow statements, including if-else, switch, and loops
CLOBJ 3	Understand array indexing, manipulation, and common operations on strings.
CLOBJ 4	Learn how to define functions, Structure, and unions
CLOBJ 5	Understand Pointers, manipulation, and common operations on strings
CLOBJ 6	Learn how to read from and write to files using standard file handling functions

f. **Course Learning Outcomes:**

CLO 1	Interpret syntax and semantics of c programming language.
CLO 2	Develop, execute and debug programs
CLO 3	Display output on the console
CLO 4	Explain the differences between syntax errors, runtime errors, and logic errors

g. **Teaching & Examination Scheme:**

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

-	-	2	1	-	-	20	-	30	50

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

h. Course Content:

Sr. No.	List of Practical
1	Write a Following Programs 1. Find Add Two Integers 2. Find Floating Point Numbers 3. Find ASCII Value of a Character 4. Find Quotient and Remainder
2	Write a Following Programs: 1. Swap Two Numbers 2. Find Area of Circle 3. Find Simple interest 4. Find a Number is Even or Odd
3	Write a Following Programs: 1. Find Gross salary of an employee 2. Sum of 5 subjects and find total and percentage 3. Find Roots of a Quadratic equation
4	Write a Following Programs: 1. Find Sum of Natural Number 2. Find Factorial of a Number
5	Write a Following Programs: 1. Print Fibonacci Series 2. Find GCD of two Numbers 3. Find LCM of two Numbers
6	Write a Following Programs: 1. Menu-driven program using Switch case to create calculator 2. Write menu-driven program using Switch case to calculate the following Area of circle Area of square Area of sphere
7	Write a Following Programs: 1. Check Whether a Number is Palindrome or Not 2. Find Prime Numbers Between Two Intervals 3. Check Number is perfect 4. Create Pyramid and Structure
8	Write a Following Programs of Array: 1. Calculate sum of elements of 1D array using function 2. Find factorial of a number using function 3. Add two 2D arrays using function

	4. Print and display records of employee details using array of structure
9	Write a C program to create a structure student, containing name and roll. Ask user the name and roll of a student in main function. Pass this structure to a function and display the information in that function.
10	Write a Following Programs of Pointers: 1. Access addresses of different types of variable using pointer. (Include all type of variables.) 2. Swap two integers using pointers 3. Compute area and perimeter of rectangle using pointers as parameter to function 4. Store values of array and display it using pointers
11	WAP to display marks of 3 subjects for 3 students and then calculate total for subject wise and then make grand total
12	WAP to display Id, name and percentage of a student using structure and function passing by value
13	Write a C program to read string from terminal. Using scanf() , gets to read a string

i. **Text Book and Reference Book:**

1. **Programming in ANSIC**
   By E. Balaguruswamy| Tata McGraw-Hill
2. **The C Programming Language (Text Book)**
   By Brian W. Kerningham and Dennis M. Ritchie| PHI
3. **Programming with C**
   By K.R. Venugopal and SudeepR Prasad | Tata McGraw-Hill Education
4. **Let Us C**
   By Yeshavant Kanetkar| BPB Publications

(8)

a. **Course Code: Fundamentals of Web Development (Theory)**
b. **Course Code:** 05010101DS03
c. **Prerequisite:** Basic approach of Web Development
d. **Rationale:** The objective of this course is to familiarize students with concepts of fundamentals of web development and website designing.
e. **Course Learning Objective:**

CLOBJ 1	Understand the role of Internet, Network and its applications.
CLOBJ 2	Develop skills in creating web page using HTML
CLOBJ 3	Understand CSS techniques, including Web page styling techniques
CLOBJ 4	Learn to use build tools and page layouts, Forms.
CLOBJ 5	Gain knowledge of deploying web applications to servers and hosting platforms

f. **Course Learning Outcomes:**

CLO 1	Develop various front end applications using fundamentals of Internet and World Wide Web
CLO 2	Create web pages using Hyper Text Mark-up Language.
CLO 3	Use cascading style sheet for beautification and uniformity on web pages
CLO 4	Design and Develop interactive WebPages using JavaScript
CLO 5	Develop various front end applications using fundamentals of Internet and World Wide Web

g. **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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to Computer Network and it Applications** Computer Network, Type of Computer Network, Different Terminologies used in Computer Network, Internet, ISP (Internet Service Provider), Intranet, VSAT (very small aperture terminal), URL, Portal, Domain Name Server, World Wide Web (WWW), Search Engine, Remote Login, Telnet, Email, E-Commerce, E- Business, E-Governance, Mobile Commerce, Website Basics (WebPages; Hyper Text Transfer Protocol, File Transfer Protocol, Domain Names; URL; Protocol Address; Website[Static, Dynamic, Responsive etc], Web browser, Web Servers; Web Hosting	13	6
2	**Basic of HTML &Advance HTML 5 Fundamental of HTML** Basic Tag and Attribute, The Formatting Tags, The List Tags, Link Tag, inserting special characters, adding images and Sound, lists types of lists, Table in HTML, Frame in HTML, Forms, HTML 5 & Syntax HTML5 Document Structure (section, article, aside, header, footer, nav, dialog, figure), Attributes of HTML 5 Web Form (datetime, date, month, week, time, number, range, email, url) Audio / Video - Canvas	26	12
3	**Cascading Style Sheet CSS 3** Introduction to CSS, Types of Style Sheets, Class & ID Selector, CSS Pseudo, CSS Font Properties, CSS Text Properties, CSS Background Properties, CSS List Properties, CSS Margin Properties, CSS Comments, CSS 3 Border Property, Background & Gradient Property, Drop Shadow Property - 2D & 3D Transform Property, Transition Property, Box Sizing Property, Position Property, Media Query, CSS Flexbox Properties (display, flex- direction, flex-wrap, flex-flow, justify-content, align-items, align-content, gap row-gap, column-gap), CSS Advance Properties (Overflow, text-overflow, Cursor, Visibility, filter, backdrop-filter, object-fit), How to use Google Fonts & Custom Fonts (@font-face), BEM Naming Convention Animation Tag, Keyframes and its rules	26	12
4	**Java Script** Introduction to JavaScript, Variables, JavaScript Operators, Conditional Statements, JavaScript Loops, JavaScript Break and Continue Statements, Dialog Boxes JavaScript Arrays, JavaScript User Define Function, Built in Function (string, Maths, Array, Date), Events (onclick, ondblclick, onmouseover, onmouseout, onkeypress, onkeyup, onfocus, onblur, onload, onchange, onsubmit, onreset), DOM & History Object, Form Validation and E-mail Validation	22	10
5	**Bootstrap Framework.**	13	5

	Introduction to Bootstrap, Bootstrap Layout (Container, Row, Columns, Responsive, classes, Offset Column, Reordering Columns), Bootstrap Content (Typography, Tables, Images, Forms), Bootstrap Components (Navbar, Navs and tabs, Dropdowns, Buttons, Button Groups, Breadcrumb, Pagination, Labels, Alerts, Progress Bars, Accordion, Card, Modal) Bootstrap Utilities (Colors, Background, Borders, Display, Overflow, Position, Spacing, Text, Vertical align)		
	Total	**100%**	**45**

i. Text Book and Reference Book:

1. HTML in 10 steps or less - Laurie Ann Ulrich, Robert G. Fuller
2. Internet: The Complete Reference –Young.
3. World Wide Web Design with Html -C Xavier.
4. Internet for Every One –Leon.
5. Practical Html 4.O -Lee Philips.
6. MCSE Networking Essential Training Guides.

(9)

a. Course Name: Fundamentals of Web Development (Practical)

b. **Course Code:** 05010101DS04

c. **Prerequisite:** Basic approach of Web Development

d. Rationale:

e. Course Learning Objective:

CLOBJ 1	Understand the role of Internet, Network and its applications.
CLOBJ 2	Develop skills in creating web page using HTML
CLOBJ 3	Understand CSS techniques, including Web page styling techniques
CLOBJ 4	Learn to use build tools and page layouts, Forms.
CLOBJ 5	Gain knowledge of deploying web applications to servers and hosting platforms

f. Course Learning Outcomes:

CLO 1	Develop various front end applications using fundamentals of Internet and World Wide Web
CLO 2	Create web pages using Hyper Text Mark-up Language.
CLO 3	Use cascading style sheet for beautification and uniformity on web pages
CLO 4	Design and Develop interactive webpages using JavaScript

CLO 5	Develop various front end applications using fundamentals of Internet and World Wide Web

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content
1	**Write a HTML code of the following:** 1. Print your name 2. Set Title 3. Bold, italic, underline and break tag 4. Print names in different colors 5. Different style font
2	**Write a HTML code of the following:** 1. Use different font size 2. Underlined, italic and bold
3	**Write a HTML code of the following:** 1. Different heading size 2. Use superscript 3. Lists with its types
4	**Write a HTML code of the following:** 1. Horizontal lines and Preformatted text 2. Hyper Links , Link to a search engine, Link at the bottom of the page, Link at the top of the page, Hyperlinks on mail 3. Working with Image: Display Image, Image with border, Display the image in the browser
5	**Write a HTML code of the following:** 1. CSS : CSS Comment, Inline stylesheet, Internal stylesheet, External stylesheet 2. Font property by using external stylesheet 3. CSS Selector: ID Selector, Class Selector, HTML Selector 4. Insert an image via css

6	**Write a HTML code of the following:** 1. Text property by using inline stylesheet. 2. List property by using external stylesheet 3. Margin property by using internal stylesheet 4. Padding property by using external stylesheet 5. Border property by using external stylesheet
7	**Write a HTML code of the following:** 1. Border 2. Border only 3 side 3. Thumbnail 4. Hyperlink CSS Style
8	**Write a HTML code of the following:** 1. Table 2. Table formatting with background color 3. Web page 4. Validation
9	**Write an animation program to Turn on or off bulb**
10	**Write an animation program to move objects from one place to another.**

i. Text Book and Reference Book:

1. **Internet for everyone (Textbook)**
   By Alexis Leon, MathewsLeon | Leon Tech World
2. **"World Wide Web design with HTML",**
   By C Xavier,| TMH
3. **Step by Step HTML5**
   By FaitheWempen| Microsoft Press and PHI Learning| SouthAsian Edition
4. **HTML:A Beginner'sGuide5/E**
   By HTML: A Beginner'sGuide5/E | McGrawHill |5th
5. **HTML Black Book**
   By StevenHolzner| DreamtechPress
6. **Teach your self Java Scriptin24**
   By MichaelMoncurPublisher| PearsonEducation

(10)

a. **Course Name:** Artificial Intelligence & Machine Learning - I (Minor)
b. **Course Code:**05010101AM01
c. **Prerequisite:** Basic knowledge of Computer and IT
d. **Rationale**: To review and strengthen important mathematical concepts required for AI & ML. Introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms.
e. **Course Learning Objective:**

CLOBJ 1	Define Artificial Intelligence and Machine Learning and understand their applications.
CLOBJ 2	Understand the principles of supervised learning.
CLOBJ 3	Understand the principles of unsupervised learning.
CLOBJ 4	Understand the basics of reinforcement learning.
CLOBJ 5	Develop problem-solving and programming skills through hands-on projects.

f. Course Learning Outcomes:

CLO 1	Understand the principles of artificial intelligence and machine learning
CLO 2	Design and implement machine learning solutions to classification, regression and clustering problems.
CLO 3	Evaluate and interpret the results of the different ML techniques.
CLO 4	Design and implement various machine learning algorithms in a range of Real-world applications
CLO 5	Apply different techniques to analyzed, evaluated, deployed and visualized data

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

h. Mapping of Course Learning Outcomes and Program Learning Outcomes and Program Specific Learning Outcomes: NA

i. 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

j. Course Content:

Sr. No.	**Content**	**Weightage%**	**Teaching Hours**

1	**Introduction of AI & ML** Defining Artificial Intelligence, Defining AI techniques, Using Predicate Logic and Representing Knowledge as Rules, Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming, Mathematical foundations: Matrix Theory and Statistics for Machine Learning	**25**	**12**
2	**Types of Machine learning Technique** Idea of Machines learning from data, Classification of problem –Regression and Classification, Supervised and Unsupervised learning, reinforcement learning	**20**	**9**
3	**Linear Regression** Model representation for single variable, Single variable Cost Function, Gradient Decent for Linear Regression, Gradient Decent in practice.	**20**	**9**
4	**Logistic Regression** Classification, Hypothesis Representation, Decision Boundary, Cost function, Advanced Optimization, Multi-classification (One vs All), Problem of Overfitting.	**20**	**8**
5	**Clustering** Discussion on clustering algorithms and use-cases cantered around clustering and classification.	**15**	**7**
	Total	**100%**	**45**

k. Text Book and Reference Book:

1. Artificial Intelligence, Cengage Learning,
By Saroj Kaushik, | 1st, Pub. Year 2011
2. "Practical Workbook Artificial Intelligence and Soft Computing for beginners
By Anindita Das Bhattacharjee | Shroff Publisher-X team Publisher
3. "Python Machine Learning by Example"
By Yuxi (Hayden) Liu | Packet Publishing Limited, Pub. Year 2017
4. Machine Learning, McGraw Hill,2017
By Tom Mitchell, Pub. Year 2017
5. Christopher M. Bishop, —Pattern Recognition and Machine Learning‖, Springer 2011 Edition.
6. The Elements of Statistical Learning,2011
By T. Hastie, R. Tibshirani, J. Friedman | 2nd, Pub. Year 2011

(11)

a. **Course Name:** Artificial Intelligence & Machine Learning - I (Minor)

b. **Course Code:** 05010101AM02

c. **Prerequisite:** Basic knowledge of Computer and IT

d. Rationale: To review and strengthen important mathematical concepts required for AI & ML. Introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms.

e. Course Learning Objective:

CLOBJ 1	Define Artificial Intelligence and Machine Learning and understand their applications.
CLOBJ 2	Understand the principles of supervised learning.
CLOBJ 3	Understand the principles of unsupervised learning.
CLOBJ 4	Understand the basics of reinforcement learning.
CLOBJ 5	Develop problem-solving and programming skills through hands-on projects.

f. Course Learning Outcomes:

CLO 1	To Develop and Build Basic Logics in Python.
CLO 2	To Enhance Knowledge of Liner Regression, Gradient Decent, and Logistic regression.
CLO 3	To Acquire knowledge about plot under fitting and overfitting.
CLO 4	To Develop clustering using real time applications.
CLO 5	To Learn about simulate various components.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	**List of Practical**
1	Implementation of Basic Program in Python- I. 1. WAP VOLUME OF CUBOID 2. WAP VOLUME OF CUBE 3. WAP AREA OF RECTANGLE 4. WAP AREA OF CIRCLE 5. simple python program to convert Celsius to Fahrenheit
2	Implementation of Basic Program in Python- II (operator uses). 1. Arithmetic Operators. 2. Comparison (Relational) Operators.

	3. Assignment Operators. 4. Logical Operators. 5. Bitwise Operators. 6. Membership Operators. 7. Identity Operators.
3	Implementation of Basic Program in Python- III (conditional Operation). 1. if statement. 2. if-else statement. 3. if-elif-else ladder.
4	Implementation of Basic Program in Python- IV (Loop Operation). 1. while loop, 2. for loop, 3. nested loops.
5	Implementation of Function Program in Python.
6	Implementation of Math functions in Python
7	Implementation of Adding new functions, Definitions and uses, Parameters and arguments, Variables and parameters are local
8	Implementation of Fruitful functions and void functions, Recursion Function.
9	Implementation of List operations, List slices, List methods, Map, Filter and reduce, deleting elements, List arguments.
10	Implementation of Python Tuples, Accessing values in Tuples, update and delete tuples Basic tuples operation,
11	Implementation of Python to create and accessing values in a set, set Methods, Frozen set
12	Implementation of Python to perform Opening, closing and read/write operations in file.
13	Implement matplotlib operation

i. **Text Book and Reference Book:**

1. **Artificial Intelligence, Cengage Learning,**
By Saroj Kaushik, | 1st, Pub. Year 2011
2. "**Practical Workbook Artificial Intelligence and Soft Computing for beginners**
By Anindita Das Bhattacharjee | Shroff Publisher-X team Publisher
3. "**Python Machine Learning by Example"**
By Yuxi (Hayden) Liu | Packet Publishing Limited, Pub. Year 2017
4. **Machine Learning, McGraw Hill,2017**
By Tom Mitchell, Pub. Year 2017
5. **Christopher M. Bishop, —Pattern Recognition and Machine Learning‖, Springer 2011 Edition.**
6. **The Elements of Statistical Learning,2011**
By T. Hastie, R. Tibshirani, J. Friedman | 2nd, Pub. Year 2011

(12)

a. **Course Name:** Basic Cyber Security and Forensics (Minor)
b. **Course Code:**05010101CF01

c. **Prerequisite:** Basic Cyber Security and Forensics

d. **Rationale**: The objective of this course is to Aware Students about Cyber Security, Advantages of Cyber Security and To Gain the Knowledge in This Field.

e. **Course Learning Objective:**

CLOBJ 1	Define cybersecurity and its importance in protecting digital assets.
CLOBJ 2	Identify and describe common cyber threats, including malware, phishing, and ransomware.
CLOBJ 3	Explain basic concepts of network security.
CLOBJ 4	Understand the risks associated with weak or compromised passwords.
CLOBJ 5	Understand the chain of custody and legal considerations.

f. **Course Learning Outcomes:**

CLO 1	To Develop the Basic Knowledge of Computer Networks
CLO 2	Develop The Knowledge of Cyber Security and Get to Know About Its Future.
CLO 3	To develop the knowledge on Cyber Crimes and securing ideas.
CLO 4	To improve the capability on cyber forensic investigation.
CLO 5	To enhance the cybersecurity career and hands on application.

e. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**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	**Introduction To Basic Networking Fundamentals** in This Chapter Students Will Learn the Basics of Networking, Like What Is Networking, Ip Address, Mac Address, Tcp Ip Model & Udp Model, Optical Fibers, ISP.	**16**	**10**
2	**Introduction To Basic Cyber Security Fundamentals** the Chapter Will Cover What Is Cyber Security, Advantages Of Cyber	**16**	**10**

	Security, How To Make A Career In Cyber Security, Different Cyber Terms Like Hacking, Penetration Testing, Forensics, Cyber Security Analyst, Cloning, Etc		
3	**Cyber Crimes (i)** This Chapter Will Introduce to Different Types of Cyber Crimes Around the World, And How to Be Safe in That.	**20**	**11**
4	**OSINT Basics** This Chapter Will Show Students the Basic of OSINT Along Side with The Real Time Use of It. Also, Will Lead To Forensics Investigation Knowledge for The Learners	**25**	**15**
5	**Cyber Security: -** The Future This Will Explain Students Why Cyber Security Is Going to Be a Revolutionary Field In the Future, Along Side How to Make A Proper Career In Cyber Security With Field Guidance.	**23**	**14**
	Total	**100%**	**60**

k. Text Book and Reference Book:

1. Computer Networks (Textbook)

By Andrew Tanenbaum | Pearson Education | 5th Edition

2. Introduction to Cyber Security: Guide to the world Cyber Security (textbook)

By Anand Shinde | Notion Press | 1st, Pub. Year 2021

3. The Hacker Playbook 2: Practical Guide to Penetration Testing

By Peter Kim | Create space Independent Pub | 1st, Pub. Year 2015

4. THE ART OF INVISIBILITY

By Kevin Mitnick | Back Bay Books | 2, Pub. Year 2019

5. The Basics of Hacking and Penetration Testing By Patrick Engebretson | Syngress | 2, Pub. Year 201 3

(13)

a. Course Name: Fundamentals of Digital Videography

b. Course Code:18010201VV01

c. Prerequisite: 1) Understanding of Basic Computer Skills 2) Media Literacy 3) Creative Vision 4) Passion to learn

d. **Rationale**: The course introduces students to the key creative and conceptual principles for working with video and moving images. With introductions to digital video cameras, sound recording, and editing software, the course enables you to develop shooting and editing techniques relevant media arts contexts.

e. **Course Learning Objective:**

CLOBJ 1	Explain the fundamental principles of digital imaging, including pixelation, resolution, and colour depth.
CLOBJ 2	Identify and describe the key components of a digital camera, such as the lens, image sensor, processor, and storage.

CLOBJ 3	Identify and explain the mechanical components and user controls on a digital camera, including buttons, dials, and menu settings.
CLOBJ 4	Identify and explain different connectivity options in digital cameras, including USB, HDMI, and wireless technologies.

f. **Course Learning Outcomes:**

CLO 1	After the introducing this course, students will have a generic overview and would able to understand: - Technologies of workingdigitized Moving image, sound & editing setup. To disseminate important stories and provoke feelings & critical thinking.

i. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**4**	**4**	**20**	**20**	**20**	**60**	**50**	**150**

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	**Unit 1** 1) Exposure what we need to explore in a image through digital camera sensor 2) Aperture - how it corresponds with the amount of light 3) Shutter Speed how shutter speed and time exposure work. 4) ISO it determines with the sensitivity of sensor.	55	50
2	**Unit 2** Sensor	45	40

	types of sensors how it works importance of sensors CCD - charge couple device Cmos sensor Various sensor size		
	Total	100%	90

k. Text Book and Reference Book:

1. The Painted Face: India's Popular Cinema
By Chindananda Dasgupta | Roli Books
2. Digital Video Processing (textbook)
By A. Murat Tekalp | Pearson | 2nd, Pub. Year 2015

(14)

a. Course Name: Character Design (THEORY)
b. Course Code:18010501AN01
c. Prerequisite: Prerequisite: 1) Understanding of Basic drawing Skills 2) design interpretation 3) Creative Vision 4) Passion to learn
d. Rationale: They can understand & apply the basics of Characters designing. Importance of Characters designing in a visual form in Story-telling. They create the usage and importance of Characters.
e. Course Learning Objective:

CLOBJ 1	Define character design and its importance in visual storytelling.
CLOBJ 2	Develop foundational drawing skills, including anatomy, proportion, and perspective.
CLOBJ 3	Communicate character traits and personality through visual elements.
CLOBJ 4	Understand how characters contribute to visual storytelling.

f. Course Learning Outcomes:

CLO 1	Understand the art of Character Design.
CLO 2	Understand the purpose of Character designing based on the story & setting
CLO 3	Understand, learn, and apply techniques and software skills in character design.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	4	4	20	20	20	60	30	150

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Unit 1** Characters: Types & Patterns What is a story? What are the characters written Sketching Characters, different styles and anatomy Clarity of Story through Characters.	40	36
2	**Unit 2** Storyboarding - Introduction, Point of view Character Costume based on geographical location, Character Development & Design Difference between Cartoon & Caricature	60	54
	Total	100%	90

k. Reference Books

1. Design Drawing (textbook)
By Francis D. K. Ching | Wiley India Pvt. Ltd.
2. Drawing & Painting (textbook)
By A.H. Hashmi | Pustak Mahal Delhi
3. The Art of Drawing (textbook)
By Pogany, Willy | Madison Books, 1996

(15)

a. **Course Name:** Digital Camera Mechanism (Minor)
b. **Course Code:**18010201PP01
c. **Prerequisite:**1) Understanding of Basic Computer Skills 2) Media Literacy 3) Creative Vision 4) Passion to learn
d. **Rationale**: Taking a basic photography course can be incredibly helpful for anyone looking to improve their photography skills. Not only will you learn about the technical aspects of photography, but you'll also gain a greater appreciation for the art form and discover your own unique style.
e. Course Learning Objective:

CLOBJ 1	Explain the fundamental principles of digital imaging, including pixelation, resolution, and color depth.
CLOBJ 2	Identify and describe the key components of a digital camera, such as the lens, image sensor, processor, and storage.
CLOBJ 3	Analyze the stages of image processing in digital cameras, including demosaicing, color correction, and noise reduction.
CLOBJ 4	Interpret and analyze specifications such as resolution, sensor size, and lens specifications to make informed decisions when choosing a camera.

f. Course Learning Outcomes:

CLO 1	Improved technical skills: Basic photography classes will teach you the fundamentals of camera operation, exposure, and lighting.This will help you understand how to use your camera to its full potential and create images that are properly exposed and well-lit.
CLO 2	Greater artistic expression: Basic photography classes will also help you develop your creative vision and explore different stylesof photography. By learning about composition, color, and perspective, you'll be able to create images that are not only technicallyproficient but also visually compelling.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**4**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

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	**Unit 1 Human visual system** 1) Luminous 2) Chrominions Digital camera mechanism are build based on the human visual science. to understand human visual system, one should know How Rods & Cons behave How we see colors When we need to open or close entrance pupil like camera aperture.	**33**	**30**
2	**Unit 2Light** Image processing signal path Image Acquisition Image Enhancement. Image Restoration. Color Image Processing Morphological Processing	**33**	**30**
3	**Unit 3 Linear encoding & Log Encoding** Linear encoding to know the process to explore image is based on linear encoding grey scale gamma rays **Log** **Encoding** how to manipulate the light source by using log encoding. how we can shoot greater dynamic range how to get better result in post-production.	**34**	**30**
	Total	**100%**	**90**

k. Reference Books

1. Basic Photography (textbook)
By Michael Langford | Focal Press
2. Handbook of Photography (textbook)
By James A. Folts & Ronaldo P. Lovell
3. Mastering the Basics of Photography (textbook)
By McCartney, Susan | Allworth Press, Pub. Year 2001
4. Photography (textbook)
By Lee Frost | Hodder Headline

(16)

a. **Course Name:** Marketing Management (THEORY)
b. **Course Code:**06010101DM01

c. **Prerequisite:** A basic approach to problem-solving methods

d. **Rationale**: Marketing studies gives a unique competitive advantage: You can learn how to promote yourself and your work. After all, marketing studies helps you understand the true meaning of value: The value of the product and the value of the person or brand that delivers said product.

e. Course Learning Objective:

CLOBJ 1	Understand the role of marketing in the overall business strategy.
CLOBJ 2	Conduct market research to analyze consumer behavior and market trends.
CLOBJ 3	Develop a strategic marketing plan aligned with organizational goals.
CLOBJ 4	Develop pricing strategies based on market analysis and competitive positioning.
CLOBJ 5	Understand the principles of sales management and sales force effectiveness.

f. Course Learning Outcomes:

CLO 1	List key elements of a marketing plan.
CLO 2	Explain the relationship between marketing and overall business strategy.
CLO 3	Develop a pricing strategy for a new product based on market research.
CLO 4	Evaluate market segmentation strategies for a diverse target market.
CLO 5	Assess the impact of a marketing campaign on brand equity and customer loyalty.
CLO 6	Design a comprehensive marketing plan for a company entering a new international market.

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

h. Mapping of Course Learning Outcomes and Program Learning Outcomes and Program Specific Learning Outcomes: NA

i. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**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	**Introduction to Marketing Management**: Introduction, Objectives, Scope, and Importance. Types of Market, Core Concepts of Marketing, Functions of Marketing, Marketing Orientations **Marketing Environment**: Introduction, Environmental Scanning, Techniques of Environment Scanning, Analyzing the Organization's Microenvironment, Company's Macro Environment, Differences between Micro and Macro Environment, Marketing Planning, and Implementation	**20**	**12**
2	**Segmentation, Targeting, and Positioning**: Introduction, Concept of Market Segmentation, Benefits of Market Segmentation, Requisites of Effective Market Segmentation, The Process of Market Segmentation, Bases for Segmenting Consumer Markets, Targeting- Meaning, Target market strategies, Market Positioning- Meaning, Positioning Strategies, Value Proposition, Differentiation Meaning, Strategies	**20**	**12**
3	**Channel & Promotion Decision:** **Channel Decision**: Channel Decision, Nature of Marketing Channels, Types of Channel flows, Channel functions, Functions of Distribution channels, Structure and Design of Marketing Channels, Channel co-operation, conflict and competition, Retailers, and wholesalers. **Promotion Decision**: Promotion mix, Advertising Decision, Advertising objectives, Advertising and Sales Promotion, Developing Advertising Program, Role of Media in Advertising, Advertisement effectiveness Salesforce Decision	**20**	**12**
4	**Buying Behaviors:** **Consumer buying behavior**: Introduction, Characteristics, Factors affecting Consumer behavior, Types of Buying Decision behavior, Consumer Buying Decision Process, Buying Motives, Buyer Behavior Models. **Business Buyer behavior:** Introduction, Characteristics of Business Markets, Differences between Consumer and Business Buyer Behavior, Buying Situations in Industrial/Business Market, Buying Roles in Industrial Marketing, Factors that Influence Business Buyer, Steps in Business Buying Process	**20**	**12**
5	**Understanding the Marketing-Information Systems (MKIS)** Introduction, Characteristics of MKIS, Benefits, Types, Components, Marketing Research	**20**	**12**
	Total	**100%**	**60**

k. Reference Books

1. **Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India (textbook)**
2. **Marketing Management**
By Philip Kotler | Current
3. **Marketing management**
By Tapan panda | Excel Books
4. **Marketing Management – A South Asian Perspective**
By Kotler. Keller, Koshy and Jha | Pearson Education
5. **Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)**

(17)

a. **Course Name:** Cyber Forensic & Investigation
b. **Course Code:**03010501UE01
c. **Prerequisite:** Basic Computer Literacy • Reading and Research Skills • Networking
d. **Rationale**: Cyber Forensic and Investigation is an in-depth course designed to equip students with the knowledge and practical skills required to investigate and analyses cybercrimes and digital incidents. This course delves into the realms of digital evidence collection, preservation, analysis, and the legal and ethical considerations that underpin cybercrime investigations. Students will explore a variety of forensic tools and methodologies, gaining hands-on experience in handling and dissecting digital evidence.
e. **Course Learning Objective:**

CLOBJ 1	Define cyber forensics and its role in cybersecurity.
CLOBJ 2	Learn methods and best practices for the collection of digital evidence
CLOBJ 3	Analyze network traffic to identify and investigate security incidents.
CLOBJ 4	Develop skills in responding to cybersecurity incidents.
CLOBJ 5	Understand the challenges and considerations in recovering deleted or damaged data.
CLOBJ 6	Work effectively with cross-functional teams during cyber investigations.

f. **Course Learning Outcomes:**

CLO 1	Analyze a hypothetical cybercrime scenario and identify the potential digital evidence that could be collected.
CLO 2	Perform a digital evidence collection exercise on a simulated crime scene, preserving evidence following chain-of-custody Procedures.
CLO 3	Analyze a case study involving a data breach, identify the attack vector, and determine the extent of data compromise.

CLO 4	Conduct a malware analysis exercise, dissecting a provided malware sample and documenting its behavior.
CLO 5	Use forensic tools to analyses disk and file systems. Extract information and artifacts from digital storage media.
CLO 6	Learn to analyses volatile memory for digital evidence. Explore techniques for identifying malicious processes and
CLO 7	Conduct a forensic examination of mobile devices. Recover deleted data and analyze mobile app data.
CLO 8	Investigate network traffic and logs for evidence. Analyze network communication patterns and anomalies.
CLO 9	Analyze malware samples to understand their behaviors. Identify indicators of compromise (IOCs) and malware payloads.
CLO 10	Analyze a real-world cybercrime case. Identify the digital evidence related to the case.
CLO 11	Continue the analysis of the chosen cybercrime case. Document findings and prepare a preliminary forensic report.

h. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

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 Cyber Forensics and Legal Aspects:** Introduction to Cyber Forensics, Digital Evidence and Categories, Legal and Ethical Aspects of Cyber Forensics, Role of a Cyber Forensic Investigator, Legal Procedures and Chain of Custody	20	10
2	**Digital Evidence Collection and Preservation:**	20	10

	Identifying and Preserving Digital Evidence, Handling Volatile and Non-Volatile Data, Imaging and Acquisition of Digital Devices, Data Recovery and Analysis Tools, Chain of Custody and Evidence Integrity		
3	**Forensic Tools and Techniques:** Introduction to Digital Forensic Tools and Software, Disk and File System Analysis, Registry and Memory Analysis, Mobile Device and Network Forensics, Handling Encrypted Data and Password Cracking	20	10
4	**Investigating Cybercrimes:** Types of Cybercrimes, Case Studies and Practical Investigations, Malware Analysis and Reverse Engineering, Legal Aspects of Cybercrime Investigations, Preparing for Legal Proceedings and Expert Testimony	20	10
5	**Reporting & Case Study:** Documenting Findings, Preparing Forensic Reports, WannaCry attack, its impact, and spread, The Twitter Bitcoin Scam, The SolarWinds Supply Chain Attack	20	5
	Total	100%	45

j. Text Book and Reference Book:

1. **Cybersecurity and Cyberwar: What Everyone Needs to Know"** by P.W. Singer and Allan Friedman (textbook)
2. Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software" by Michael Sikorski and Andrew Honig
3. **Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet" by** Eoghan Casey.
4. **Cybersecurity and Cybercrime – An Introduction"** by Rob Wainwright.
5. **Dark Market: Cyber thieves, Cyber cops, and You"** by Misha Glenny

(18)

a. Course Name: IT Governance

b. Course Code: 03010801UE02

c. Prerequisite: Basics of computer

d. **Rationale**: IT Governance subject lies in the increasing importance of technology in modern organizations and the need to effectively manage IT resources to achieve business objectives. IT Governance is essential to ensure the effective and responsible management of IT resources within organizations. By including this subject in curricula, students can develop the necessary skills and knowledge to contribute to the success of organizations in an increasingly technology-driven world.

e. **Course Learning Objective:**

CLOBJ 1	Define IT governance and its role in organizational management.

CLOBJ 2	Identify and define the roles and responsibilities of key stakeholders in IT governance.
CLOBJ 3	Understand the relationship between IT governance and corporate governance.
CLOBJ 4	Develop strategies for ensuring compliance with relevant laws and regulations.
CLOBJ 5	Recognize the ethical considerations and professional responsibilities in IT governance.

f. **Course Learning Outcomes:**

CLO 1	Students will demonstrate a comprehensive understanding of IT governance principles
CLO 2	Learners will be able to apply major IT governance
CLO 3	Students will acquire the skills to identify, assess, and manage IT-related risks
CLO 4	Participants will be able to develop IT strategies that are closely aligned with overall business Objectives
CLO 5	Learners will understand the key components of IT Service Management.
CLO 6	Students will recognize ethical considerations in IT governance

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

h. Mapping of Course Learning Outcomes and Program Learning Outcomes and Program Specific Learning Outcomes: NA

i. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

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	**Introduction to IT Governance and Framework** Understanding IT Governance: Definition, purpose, and benefits Key principles and frameworks (e.g., COBIT, ITIL, ISO 38500) Aligning IT with business objectives and strategies COBIT (Control Objectives for Information and Related Technologies) ITIL (Information Technology Infrastructure Library) ISO/IEC 38500 (Corporate Governance of IT)	21	9
2	**IT Governance Structure and Responsibilities** Strategy and Planning Roles and responsibilities of the Board of Directors and IT Steering Committees IT organizational structures and reporting lines Defining IT decision-making processes Developing an IT strategy aligned with business goals IT portfolio management IT project prioritization and selection	16	7
3	**IT Risk Management and Compliance** Identifying and assessing IT-related risks Implementing IT risk management frameworks Ensuring compliance with regulations and industry standards	10	6
4	**IT Service Management (ITSM)** IT Governance and Cybersecurity IT Service delivery models (e.g., ITIL Service Lifecycle) Service Level Agreements (SLAs) and Key Performance Indicators (KPIs) Incident, Problem, Change, and Release Management Cybersecurity governance and best practices IT security frameworks (e.g., NIST Cybersecurity Framework) Managing cybersecurity risks and incidents	16	7
5	**Data Management and Vendor Management** Data governance and data quality management Data privacy and protection regulations (e.g., GDPR, CCPA) Data retention and disposal policies Vendor selection and assessment criteria Contract management and SLAs with third-party providers Ensuring vendor compliance and performance monitoring	16	7
6	**Business Continuity** Performance Measurement, IT Governance and Ethics IT disaster recovery planning and business continuity	21	9

	management IT resilience and redundancy strategies Testing and updating IT continuity plans Key performance indicators (KPIs) for IT Governance IT Balanced Scorecard and performance dashboards Continual improvement of IT processes Ethical considerations in IT decision-making IT governance in the context of corporate social responsibility (CSR) Promoting a culture of ethics and compliance		
	Total	100%	45

k. Text Book and Reference Book:

1. **IT Governance: How Top Performers Manage IT Decision Rights for Superior Results Authors**: Peter Weill and Jeanne W. Ross Publisher: Harvard Business Review Press.
2. **IT Governance: How to Reduce Costs and Improve Data Quality Through the Implementation of IT Governance** by Helmut Schindlwick
3. **Real Business of IT: How CIOs Create and Communicate Value** by Richard Hunter and George Westerman
4. **Implementing Effective IT Governance And IT Management** by Van Haren Publishing
5. **Executive's Guide to IT Governance: Improving Systems Processes with Service Management, COBIT, and ITIL** by Robert R. Moeller

(19)

a. **Course Name:** IT Governance Laboratory (Practical)

b. **Course Code:** 03010801UE02

c. **Prerequisite:** Basics of computer

d. **Rationale**: IT Governance subject lies in the increasing importance of technology in modern organizations and the need to effectively manage IT resources to achieve business objectives. IT Governance is essential to ensure the effective and responsible management of IT resources within organizations. By including this subject in curricula, students can develop the necessary skills and knowledge to contribute to the success of organizations in an increasingly technology-driven world.

e. Course Learning Objective:

CLOBJ 1	Define IT governance and its role in organizational management.
CLOBJ 2	Identify and define the roles and responsibilities of key stakeholders in IT governance.

CLOBJ 3	Understand the relationship between IT governance and corporate governance.
CLOBJ 4	Develop strategies for ensuring compliance with relevant laws and regulations.
CLOBJ 5	Recognize the ethical considerations and professional responsibilities in IT governance.

f. Course Learning Outcomes:

CLO 1	Students will demonstrate a comprehensive understanding of IT governance principles
CLO 2	Learners will be able to apply major IT governance
CLO 3	Students will acquire the skills to identify, assess, and manage IT-related risks
CLO 4	Participants will be able to develop IT strategies that are closely aligned with overall business objectives
CLO 5	Learners will understand the key components of IT Service Management.
CLO 6	Students will recognize ethical considerations in IT governance

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	**Content**
1	Analyse and compare different IT governance frameworks
2	Perform IT Risk Assessment and Mitigation of hypothetical organization and its IT infrastructure
3	Creating IT Policies and Procedures of hypothetical organization
4	IT Governance Case Studies

5	Perform IT Governance Audit to assess the effectiveness of existing IT governance practices, identify areas for improvement
6	Case study on Vendor Management
7	IT Governance in Cybersecurity case study
8	Case study on disaster recovery planning to keep critical systems operational during the crisis.

i. **Text Book and Reference Book:**

1 IT Governance: How Top Performers Manage IT Decision Rights for Superior Results Authors: Peter Weill and Jeanne W. Ross Publisher: Harvard Business Review Press.

2. **IT Governance: How to Reduce Costs and Improve Data Quality Through the Implementation of IT Governance** by Helmut Schindlwick

3. **Real Business of IT: How CIOs Create and Communicate Value by** Richard Hunter and George Westerman

4. **Implementing Effective IT Governance and IT Management** by Van Haren Publishing

5. **Executive's Guide to IT Governance: Improving Systems Processes with Service Management, COBIT, and ITIL** by Robert R. Moeller

(20)

a. **Course Name:** Digital and mobile media Marketing
b. **Course Code:**06010101UE01
c. **Prerequisite:** Knowledge about fundamentals of marketing and digital media
d. **Rationale**: The course equips BBA students with digital marketing fundamentals, covering topics like target audience identification, campaign planning, and social media engagement. It extends to mobile marketing, emphasizing optimization, location-based strategies, and user experience. Analytics and ethical considerations are highlighted, emphasizing the importance of data analysis and responsible digital marketing practices. Overall, it provides a well-rounded understanding of key elements in the evolving landscape of digital and mobile media marketing.

e. **Course Learning Objective:**

CLOBJ 1	Define the key concepts and components of digital marketing.
CLOBJ 2	Identify the major channels and platforms used in digital marketing.
CLOBJ 3	Formulate a comprehensive digital marketing strategy aligned with business goals.
CLOBJ 4	Identify target audiences and tailor strategies to specific market segments.
CLOBJ 5	Create and curate content that aligns with digital marketing goals.
CLOBJ 6	Understand the role of storytelling and branding in content marketing.

f. **Course Learning Outcomes:**

CLO 1	Understand the fundamentals of digital and mobile media marketing.
CLO 2	Analyse target audiences and develop tailored digital marketing strategies.
CLO 3	Utilize various digital and mobile media tools for brand promotion.
CLO 4	Evaluate the effectiveness of digital marketing campaigns through data analysis.
CLO 5	Apply ethical considerations and best practices in digital and mobile media marketing.

i. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**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	**Introduction to Digital and Mobile Media Marketing** Basics of digital marketing and its significance Overview of mobile media and its impact on marketing strategies Introduction to key digital marketing platforms and tools	20	12
2	**Digital Marketing Strategies and Planning** Identifying target audiences and consumer behavior analysis Developing effective digital marketing strategies and campaigns Integration of social media, content marketing, and SEO in strategies	20	12
3	**Social Media Marketing and Engagement** Utilizing major social media platforms for marketing Creating engaging content for social media campaigns Strategies for building brand loyalty and customer engagement	20	12
4	**Mobile Marketing and User Experience** Mobile optimization and responsive design for websites and apps Location-based marketing and personalized mobile experiences	20	12

	Mobile advertising, SMS marketing, and push notifications		
5	**Analytics, Metrics, and Ethical Considerations** Importance of data analysis in assessing marketing performance Key metrics for evaluating digital marketing campaigns Ethical considerations in digital marketing, including privacy and transparency	20	12
	Total	100%	60

k. Text Book and Reference Book:

1. Digital Marketing
By Will Rowan
2. Digital Marketing- An Overview
By Antony Puthussry, Notion Press
3. Digital Marketing,
By Seema Gupta, | Prentice Hall
4. Fundamentals of Digital Marketing,
By Puneet Singh Bhatia, | Palgrave Macmillan

(21)

a. **Course Name:** First Aid and Life Support (Theory)
b. **Course Code:**09010101UE01
c. **Prerequisite:** Shall have the basic knowledge about anatomy and physiology of human body.
d. **Rationale**: Will gain the basic knowledge about first Aid and life sciences.
e. **Course Learning Objective:**

CLOBJ 1	Demonstrate the ability to assess and prioritize medical emergencies.
CLOBJ 2	Identify life-threatening conditions and prioritize care accordingly.
CLOBJ 3	Use an automated external defibrillator (AED) effectively.
CLOBJ 4	Demonstrate proper wound care and bandaging.
CLOBJ 5	Recognize common medical emergencies such as seizures, diabetic emergencies, and allergic reactions.
CLOBJ 6	Understand legal and ethical considerations related to providing first aid.

f. **Course Learning Outcomes:**

CLO 1	Understand the importance of first aid in emergency situations.
CLO 2	Demonstrate the ability to assess the scene of an emergency.
CLO 3	Identify and prioritize different types of injuries and illnesses.

CLO 4	Learn and practice CPR techniques for adults, children, and infants and use of automated external defibrillators (AEDs) and how to use them.
CLO 5	Understand the importance of infection control in wound care.
CLO 6	Identify signs and symptoms of shock and how to provide first aid for different types of burns and how to assess and provide first

i. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**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	**Introduction to first aid** Aims of first aid The first aider First aid and the law Indian good Samaritan protection guidelines Duty of giving care Consent of the person in need Privacy Negligence Dealing with an emergency Top-to-toe assessment Hygiene and hand washing First aid overview flow char	7	4
2	**Assessment of patients with fractures, wounds, and bleeding** Brief Anatomy of the skeletal system Fractures (injuries to bones) Injuries and fractures to the head, neck and spine Injuries and fractures to the cheekbone, nose and lower jaw Fracture of the cheekbone or nose Fractures of the lower jaw Injuries to the shoulder, ribs or breastbone Injuries or fractures of the shoulder Injuries and fractures of the collarbone	10	6

	Rib injuries and fractures Fractures of the breastbone Injuries to the arm, elbow, wrist, hand or Injuries and fractures of the arm (upper arm, forearm, wrist) Injuries and fractures of hand or fingers Injuries to the pelvis, lower limbs, knee, ankle or feet Injuries and fractures of the pelvis Injuries and fractures of the leg (thigh or lower leg) or ankle Fracture of the knee cap (patella) Injuries and fractures of foot or toes Dislocations (injuries to joints) Strains and sprains (injuries to ligaments, muscles and tendons)		
3	**Respiratory emergencies** Respiration The respiratory system No breathing or difficult breathing When to refer the casualty to a healthcare facility Drowning Remove the victim out of the water Strangulation and hanging Choking Swelling within the throat 4Suffocation by smoke or gases Asthma	10	6
4	**Care of burns** The skin Burn wounds First, second and third degree burns Type of burns by origin Danger of burn Dry burns and scalds (burns from flames, hot surfaces, steam, Care of minor burns (small first and second degree burns) Specific burn locations Electrical burns and electrocution by electricity or lightning Chemical burns Sunburns, snow/welders' eyes, heat exhaustion and heat stroke Heat exhaustion Heatstroke Frostbites Prevention of burns Fever Hypothermia	8	5
5	**Lifesaving procedures in emergency & shock** the heart and the blood circulation, Heart and blood circulation, Blood pressure, Pulse, the blood, Chest discomfort, Bleeding, first aid for bleeding (in general), Resuscitation (basic CPR), Resuscitation of a person who is not breathing or not breathing normally, Resuscitation of baby/child (less than one year old)	8	5
6	**Head trauma & stroke** the nervous system, The central nervous system, The peripheral nervous system (PNS), Unconsciousness, Head injuries, Concussion, Cerebral compression, Skull fractures, Stroke, Fits – convulsions - seizures	10	6
7	**Gastrointestinal tract, diarrhea, food poisoning and diabetes** Review of anatomy and physiology of gastrointestinal tract, Diarrhea, Prevent dehydration, Food poisoning, Diabetes, Type 1 diabetes, Type 2 diabetes, Gestational diabetes (diabetes during pregnancy), Diagnosis, Hyperglycemia, Symptoms of hyperglycemic coma or diabetic coma, Hypoglycemia	10	6
8	**Senses, foreign bodies in eye, ear, nose or skin and swallowed foreign Objects** Review of anatomy and physiology of the special senses, foreign body in the eye, foreign body in the ear, foreign body in the nose, Foreign body in the skin, Swallowed foreign objects	10	6

9	**Urinary system, reproductive system and emergency childbirth** Review of anatomy and physiology of Urinary & Reproductive system, Male reproductive system, Female reproductive system, Pregnancy, Stages of labor and giving birth, Aftercare of the mother, medical conditions and pregnancy, Diabetes, High blood pressure, Infections, Prevention of sexually transmitters diseases (STD), Sexually transmitted infections, Reducing the risk of STDS/STIS, Emergency childbirth	10	6
10	**Psychological first aid** Definition of psychological first aid, Traumatic crisis, (psychological) shock phase, Reaction phase, Processing phase, Reorientation phase, behave calmly, listening to the affected person, Physical contact, Providing psychological first aid to all	7	4
11	**Specific emergency situations and disaster management** Emergencies at school, Emergencies at work, Road and traffic accidents, Emergencies in rural area, Disasters and multiple casualty accidents Emergency triage	10	6
	Total	100%	60

k. Text Book and Reference Book:

1. First aid handbook: Fast and effective emergency care (textbook)
By Dr. Pipa Keech | 3rd

2. Until Medical Help Arrives: First aid Book (textbook)
By Dr. H. V. Sardesai | 1 st Edition, Pub. Year 2022

3. First aid manual, (textbook)
By UK's Leading First aid providers | 11th edition:, Pub. Year 2021

(22)

a. **Course Name:** Remote Sensing and GIS
b. **Course Code:**11011401UE01
c. **Prerequisite:** Prior knowledge of Fundamental related to Surveying, Types and Importance of Various surveys, Global Positioning System (GPS)
d. **Rationale**: Will develop skills of Image processing and geographic Information Systems
e. **Course Learning Objective:**

CLOBJ 1	Understand the basic principles of GIS, including spatial data, layers, and spatial analysis.
CLOBJ 2	Demonstrate the ability to acquire and preprocess remote sensing data from various sensors.
CLOBJ 3	Develop skills in interpreting and analyzing remote sensing images for information extraction.
CLOBJ 4	Create, organize, and manage spatial databases using GIS.

CLOBJ 5	Apply spatial analysis techniques using GIS tools for solving real-world problems.
CLOBJ 6	Design effective maps for presenting geospatial information.

f. Course Learning Outcomes:

CLO 1	Articulate fundamentals and principles of RS techniques.
CLO 2	Demonstrate the knowledge of remote sensing and sensor characteristics.
CLO 3	Distinguish working of various spaces-based positioning systems.
CLO 4	Analyze the RS data and image processing to utilize in civil engineering.
CLO 5	Explain fundamentals and applications of RS and GIS.
CLO 6	Acquire skills of data processing and its applications using GIS.

i. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

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	**Introduction to Remote Sensing**: Definition and scope, history and development of remote sensing technology, electromagnetic radiation (EMR) and electromagnetic spectrum, EMR interaction with atmosphere and earth surface; atmospheric window, RS platforms, elements of remote sensing for visual interpretation viz. tone, shape, size, pattern, texture, shadow and association, applications in civil engineering/town planning.	**13**	**10**
2	**Remote Sensing Satellites and Sensor Characteristics**: Types and their characteristics, types of sensors, orbital and sensor characteristics of major earth resource satellites, Indian remote sensing satellite programs, introduction to various open-source	**15**	**11**

	Satellite data portals, global satellite programs, sensor classification, applications of sensor, concept of Swath & Nadir, resolutions, digital image. Introduction to spatial resolution, spectral resolution, radiometric resolution and temporal resolution, visual image interpretation, image interpretation. **GPS and GNSS:** Introduction to GNSS and Types, IRNSS, GPS, GPS components, differential GPS, types of GPS tracking, application of GNSS in surveying, mapping and navigation.		
3	**Image Processing and Analysis**: Digital image, visual image interpretation, image interpretation keys, concept of spectral signatures curve, digital image processing, preprocessing and post processing, image registration, image enhancement, image transformations, digital image classification (supervised & unsupervised). Digital elevation model (DEM) and its derivatives, triangular irregular network model (TIN) and other models & their applications. **Fundamentals of GIS**: Geographic information system, definition, spatial and non-spatial data, data inputs, data storage and retrieval, data transformation, Introduction to cloud computing (types & applications), data reporting, advantages of GIS, essential elements of GIS hardware, software GIS data types, applications of RS and GIS in civil engineering, hydrogeology, engineering geology, surveying and mapping.	**16**	**12**
4	**Introduction to GIS Software** ● Familiarization with a GIS software platform (e.g., ArcGIS, QGIS) ● Interface navigation and basic tools **Data Import and Visualization** ● Importing raster and vector data ● Symbolization and styling of data layers ● Zooming and planning **Spatial Analysis in GIS** ● Buffering and proximity analysis ● Overlay operations (union, intersection) ● Attribute queries **Spatial Query and Selection** ● Selecting features based on location and attributes Creating new layers from selections	**16**	**12**
5	Data Integration and Georeferencing Georeferencing ● Georeferencing scanned maps or images ● Transforming non-spatial data to spatial coordinates Data Integration ● Integrating remote sensing imagery into GIS projects ● Overlapping and aligning data layers Remote Sensing and GIS Integration Image Interpretation and Classification ● Identifying land cover features from satellite imagery ● Supervised and unsupervised classification	**40**	**30**

	Overlay of Remote Sensing Data Overlaying classified remote sensing data with existing GIS layers GIS Applications in Engineering and Technology Site Selection and Analysis ● Identifying suitable locations for infrastructure projects ● Analyzing environmental factors for site selection Network Analysis ● Creating and analyzing transportation networks ● Optimizing routes for delivery and transportation		
	Total	**100%**	**75**

k. Text Book and Reference Book:

1. Principles of Remote Sensing (textbook)

By Panda B C | Viva Books Private Limited, Pub. Year 2008

2. Remote Sensing & Geographical Information System (textbook)

By M. Anji Reddy | BS Publications | 4th, Pub. Year 2022

3. Fundamental of Remote Sensing and GIS

By S.K. Sinha | Ayushman Publication House

4. Remote Sensing and Image Interpretation

By Lilles and Thomas M. and Kiefer Ralph, John | 7th, Pub. Year 2015

5. Fundamentals of Remote Sensing (textbook)

By J. George | Universities Press, Hyderabad, Pub. Year 200

(23)

a. **Course Name:** Basic English-I

b. **Course Code:**00019301AE01

c. **Prerequisite:** Basic Knowledge of LSRW. To provide students with soft skills that complement their skills, making them more marketable when entering the workforce.

d. **Rationale**:

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand the importance of creative and critical thinking.
CLO 2	Develop four basic skills (LSRW)
CLO 3	Expand vocabulary with proper pronunciation
CLO 4	Comprehend the basics of English grammar.
CLO 5	Read & write effectively for a variety of contexts.
CLO 6	Develop confidence in speaking skills

I. **Teaching & Examination Scheme:**

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

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

H. **Course Content:**

Sr. No.	**Content**	**Weightage%**	**Teaching Hours**
1	**Listening Skills and Hearing** Listening Vs Hearing Types of listening Traits of good listener Barriers of listening	7	2
2	**Listening Practice** Listening Practice (Audio & Video)	10	3
3	**Presentation Skills** Defining the purpose of presentation strategies How to make an effective presentation? Knowing /Analysing audience Organizing content and preparing an outline Traits of a good speaker	3	1
4	**Activity** Crazy Scientist	7	2
5	**Speaking Practice** Speaking practice (Elocution)	24	7

6	**Reading Skills** Define reading Reading Strategies Strategies Techniques of reading Techniques to read faster	3	1
7	**Reading Practice** Reading Practice (Reading Comprehension)	13	4
8	**Writing Skills** Develop Writing Skills 7cs of communication Techniques of writing better Identifying common errors in writing	10	3
9	**Paragraph Writing** Introduction of Paragraph Writing Central components of paragraph development Techniques for paragraph development	3	1
10	**Writing Practice Note making** Picture Description Dialogue Writing Paragraph Writing Completion of story from given points	20	6
	Total	100%	30

k. Text Book and Reference Book:

1. Understanding and Using English Grammar
By Betty Azar & Stacy Hagen | Pearson Education

2. Business Correspondence and Report Writing
By SHARMA, R. AND MOHAN, K.

3. Communication Skills
By Kumar S And Lata P | New Delhi Oxford University Press

4. , Technical Communication : Principles And Practice
By Sangeetha Sharma, Meenakshi Raman | Oxford University Press

5. Practical English Usage
By MICHAEL SWAN

6. A Remedial English Grammar for Foreign Student
By F.T. WOOD

7. On Writing Well
By William Zinsser | Harper Paperbacks,2006 | 30th anniversary edition

8. Oxford Practice Grammar,
By John Eastwood | Oxford University Press

(24)

a. **Course Name:** Remote Sensing and GIS
b. **Course Code:**11011401UE01
c. **Prerequisite:** Prior knowledge of Fundamental related to Surveying, Types and Importance of Various surveys, Global Positioning System (GPS)
d. **Rationale**: Will develop skills of Image processing and geographic Information Systems
e. Course Learning Objective:

CLOBJ 1	Understand the basic principles of GIS, including spatial data, layers, and spatial analysis.
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CLOBJ 4	Create, organize, and manage spatial databases using GIS.
CLOBJ 5	Apply spatial analysis techniques using GIS tools for solving real-world problems.
CLOBJ 6	Design effective maps for presenting geospatial information.

g. Course Learning Outcomes:

CLO 1	Articulate fundamentals and principles of RS techniques.
CLO 2	Demonstrate the knowledge of remote sensing and sensor characteristics.
CLO 3	Distinguish working of various spaces-based positioning systems.
CLO 4	Analyze the RS data and image processing to utilize in civil engineering.
CLO 5	Explain fundamentals and applications of RS and GIS.
CLO 6	Acquire skills of data processing and its applications using GIS.

h. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

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 Remote Sensing**: Definition and scope, history and development of remote sensing technology, electromagnetic radiation (EMR) and electromagnetic spectrum, EMR interaction with atmosphere and earth surface; atmospheric window, RS platforms, elements of remote sensing for visual interpretation viz. tone, shape, size, pattern, texture, shadow and association, applications in civil engineering/town planning.	**13**	**10**
2	**Remote Sensing Satellites and Sensor Characteristics**: Types and their characteristics, types of sensors, orbital and sensor characteristics of major earth resource satellites, Indian remote sensing satellite programs, introduction to various open-source satellite data portals, global satellite programs, sensor classification, applications of sensor, concept of Swath & Nadir, resolutions, digital image. Introduction to spatial resolution, spectral resolution, radiometric resolution and temporal resolution, visual image interpretation, image interpretation. **GPS and GNSS:** Introduction to GNSS and Types, IRNSS, GPS, GPS components, differential GPS, types of GPS tracking, application of GNSS in surveying, mapping and navigation.	**15**	**11**
3	**Image Processing and Analysis**: Digital image, visual image interpretation, image interpretation keys, concept of spectral signatures curve, digital image processing, preprocessing and post processing, image registration, image enhancement, image transformations, digital image classification (supervised & unsupervised). Digital elevation model (DEM) and its derivatives, triangular irregular network model (TIN) and other models & their applications. **Fundamentals of GIS**: Geographic information system, definition, spatial and non-spatial data, data inputs, data storage and retrieval, data transformation, Introduction to cloud computing (types & applications), data reporting, advantages of GIS, essential elements of GIS hardware, software GIS data types, applications of RS and GIS in civil engineering, hydrogeology, engineering geology, surveying and mapping.	**16**	**12**
4	**Introduction to GIS Software** ● Familiarization with a GIS software platform (e.g., ArcGIS, QGIS) ● Interface navigation and basic tools **Data Import and Visualization** ● Importing raster and vector data	**16**	**12**

	● Symbolization and styling of data layers ● Zooming and planning **Spatial Analysis in GIS** ● Buffering and proximity analysis ● Overlay operations (union, intersection) ● Attribute queries **Spatial Query and Selection** ● Selecting features based on location and attributes Creating new layers from selections		
5	Data Integration and Georeferencing Georeferencing ● Georeferencing scanned maps or images ● Transforming non-spatial data to spatial coordinates Data Integration ● Integrating remote sensing imagery into GIS projects ● Overlapping and aligning data layers Remote Sensing and GIS Integration Image Interpretation and Classification ● Identifying land cover features from satellite imagery ● Supervised and unsupervised classification Overlay of Remote Sensing Data Overlaying classified remote sensing data with existing GIS layers GIS Applications in Engineering and Technology Site Selection and Analysis ● Identifying suitable locations for infrastructure projects ● Analyzing environmental factors for site selection Network Analysis ● Creating and analyzing transportation networks ● Optimizing routes for delivery and transportation	**40**	**30**
	Total	**100%**	**75**

k. Text Book and Reference Book:

1. Principles of Remote Sensing (textbook)

By Panda B C | Viva Books Private Limited, Pub. Year 2008

2. Remote Sensing & Geographical Information System (textbook)

By M. Anji Reddy | BS Publications | 4th, Pub. Year 2022

3. Fundamental of Remote Sensing and GIS

By S.K. Sinha | Ayushman Publication House

4. Remote Sensing and Image Interpretation

By Lilles and Thomas M. and Kiefer Ralph, John | 7th, Pub. Year 2015

5. Fundamentals of Remote Sensing (textbook)

By J. George | Universities Press, Hyderabad, Pub. Year 2005

Semester 2
MIL
(1)

a. **Course Name:** Basic English - II
b. **Course Code:** 00019302AE04

c. **Prerequisite:** Knowledge about basic arithmetic operations and geometry
d. **Rationale:** The course provides basic knowledge of mathematics which will be useful in computer application

e. Course Learning Objective:

CLOBJ 1	Grasp the meaning of basic vocabulary and grammar
CLOBJ 2	Comprehend simple spoken and written English
CLOBJ 3	Formulate basic sentences and questions
CLOBJ 4	Develop confidence in using English
CLOBJ 5	Increase exposure to the English language

f. Course Learning Outcomes:

CLO 1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
CLO 2	To give the students the tools to develop effective habits, promote personal growth, and improve their well-being, stability, and productivity
CLO 3	To allow students to establish a stronger connection with their family through critical thinking and development of qualities such as unity, forgiveness, empathy, and effective communication.
CLO 4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce
CLO 5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
CLO 6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

g. Teaching & Examination Scheme:

Teaching Scheme	**Evaluation Scheme**

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction and Remaking Yourself** Restructuring Yourself: Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients	7	2
2	**Remaking Yourself** Power of Habit: Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	7	2
3	**Learning from Legends** Tendulkar & Tata: Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies.	7	2
4	**From House to Home** Listening & Understanding: Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and hear	7	2
5	**Facing Failures** Welcoming Challenges: This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	7	2
6	**Facing Failures** Significance of Failures: Failure is a Student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	7	2

7	**My India My Pride** Glorious Past - Part 1: India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began Thousands of years ago. Students will learn the importance	7	2
	of studying India's glorious past so that they could develop a strong passion and pride for our nation.		
8	**My India My Pride** Glorious Past - Part 2: Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	7	2
9	**Learning from Legends** A.P.J. Abdul Kalam: Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others	7	2
10	**Soft Skills** Networking & Leadership: Students are taught the means of building a professional network and developing a leadership attitude.	7	2
11	**Soft Skills** Project Management: Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life.	6	2
12	**Remaking Yourself** Handling Social Media: Students will learn how social media can become addictive and they will imbibe simple methods to take back control	6	2
13	**Facing Failures** Power of Faith: Students will learn about the power and necessity of faith in our daily lives.	6	2
14	**From House to Home** Bonding the Family: Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	6	2
15	**Selfless Service** Seva: Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	6	2
	Total	100%	30

I. Text Book and Reference Book:

Integrated Personality Development Course (Textbook)

By Bochasanwasi Akshar Purushottam Swaminarayan Sanstha

MIL
(2)

a. **Course Name:** Basic Hindi - II
b. **Course Code:** 00019302AE05
c. **Prerequisite:** Knowledge of Hindi-I
d. **Rationale:** Basic comprehensive skills and Hindi-I
e. Course Learning Objective:

CLOBJ 1	To equip the learners with effective speaking and listening skills in Hindi.
CLOBJ 2	To enable the students to learn fundamental of language and its usage in different life situations.
CLOBJ 3	To develop a basic understanding of Hindi grammar, including the Devanagari script, pronunciation, sentence structure, and essential vocabulary.
CLOBJ 4	To train students to use Hindi language effectively to face interviews

f. Course Learning Outcomes:

CLO 1	Understand difficult words in Hindi language.
CLO 2	Comprehend Hindi language through listening
CLO 3	Introduce self in Hindi language.
CLO 4	Communicate at elementary level in Hindi.
CLO 5	Read and write Hindi language.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	(Advanced vocabulary) (Advanced vocabulary) (Numbers) (51 onwards) (Telling Time) (Greetings)	13	4
2	(Listening skills) (Listening skills) ((Short Story) ((Short Conversation)	20	6
3	(Speaking Skills) (Speaking Skills) (Self Introduction) (Day to day conversation) (Elocution)	27	8
4	(Reading Skills) (Reading Skills) (Reading Comprehension) (Short Story) (Newspaper article)	20	6
5	(Writing skills) (Writing skills) (Self Introduction) (Short message)	20	6
	Total	100%	30

I. **Text Book and Reference**
Book: Hindi for Beginners
published By Up To School
Worksheets

2. Hindi AbhyaasPustika Published

By Seema Verma | Trishala Learning System pvt**.**

3. NCERT Workbook of Hindi for Grade-2

4. RachnatmakVyakaran

By Suresh Pant and Himani Joshi | Pearson**.**

5. Matra Gyan

Wonder House Books

6. Amoli Hindi Vyakaran

By Dr. Nirmal Dalal

MIL
(3)

a. **Course Name:** Basic Gujarati-II
b. **Course Code:** 00019302AE06
c. **Prerequisite:** Knowledge of Gujarati-I
d. **Rationale:** Basic comprehensive skills and Gujarati-I
e. Course Learning Objective:

CLOBJ 1	Understand Gujarati literature and increase competency to analyse different aspects of literature.
CLOBJ 2	Develop competency to pronounce effectively and properly.
CLOBJ 3	Increase vocabulary of the students and to make use of the same.
CLOBJ 4	Acquiring a fundamental vocabulary base covering common words, phrases, and expressions used in everyday communication.

f. Course Learning Outcomes:

CLO 1	Understand difficult words in Gujarati language.
CLO 2	Comprehend Gujarati language through listening
CLO 3	Introduce self in Gujarati language.
CLO 4	Communicate at elementary level in Gujarati.
CLO 5	Read and write Gujarati language

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	**Content**	**Weightage%**	**Teaching Hours**
1	(Advanced vocabulary) (Advanced vocabulary) (Numbers) (51 onwards) (Telling time) (Greetings)	13	4

2	(Listening Skills) (Listening Skills) (Short Story) (Short Conversation)	20	6
3	(Speaking Skills) (Speaking Skills) (Self Introduction) (Day to day conversation) (Elocution)	27	8
4	(Reading Skills) (Reading Skills) (reading comprehension) (Short Story) (Newspaper article)	20	6
5	(Writing skills) (Writing skills) (Self Introduction) (Short message)	20	6
	Total	100%	30

I. Text Book and Reference Book:

Technical Communication: Principles and Practice

By Sangeetha Sharma, Meenakshi Raman | Oxford University Press

2. All in One (English-Gujarati)

Manoj Publications

3. Gujarati Barakhadi by Sonika Agrawal

Published by Notion Press

4. Varna Lekhan

By Gujarati Books

5. My first Gujarati alphabets

By Priyal J. | My first Picture Book Inc

VA

C

(4)

a. **Course Name:** - IPDC including history and culture of India and IKS-I

b. **Course Code:** 00019302VA01

c. **Prerequisite:** Knowledge about basic arithmetic operations and geometry

d. **Rationale:** The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles - as an ambitious student, reliable employee, caring family member, and considerate citizen

e. Course Learning Objective:

CLOBJ 1	Understand the concept of Indigenous Knowledge Systems (IKS) and their importance in India
CLOBJ 2	Explore the rich history of India, from ancient civilizations to the present day.
CLOBJ 3	Gain insights into the diverse cultures and religions of India, including their customs, traditions, and social structures.
CLOBJ 4	Explore various aspects of IKS, such as traditional medicine, agriculture, resource management, and conservation practices.

f. Course Learning Outcomes:

CLO 1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
CLO 2	To give the students the tools to develop effective habits, promote personal growth, and improve their well-being, stability, and productivity
CLO 3	To allow students to establish a stronger connection with their family through critical thinking and development of qualities such as unity, forgiveness, empathy, and effective communication
CLO 4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
CLO 5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
CLO 6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction and Remaking Yourself** Restructuring Yourself: Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients	7	2
2	**Remaking Yourself** Power of Habit: Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	7	2
3	**Learning from Legends** Tendulkar & Tata: Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies.	7	2
4	**From House to Home** Listening & Understanding: Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and hear	7	2
5	**Facing Failures** Welcoming Challenges: This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	7	2
6	**Facing Failures** Significance of Failures: Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	7	2

7	**My India My Pride** Glorious Past - Part 1: India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation.	7	2
8	**My India My Pride** Glorious Past - Part 2: Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	7	2
9	**Learning from Legends** A.P.J. Abdul Kalam: Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others	7	2
10	**Soft Skills** Networking & Leadership: Students are taught the means of building a professional network and developing a leadership attitude.	7	2
11	**Soft Skills** Project Management: Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life.	6	2
12	**Remaking Yourself** Handling Social Media: Students will learn how social media can become addictive and they will imbibe simple methods to take back control	6	2
13	**Facing Failures** Power of Faith: Students will learn about the power and necessity of faith in our daily lives.	6	2
14	**From House to Home** Bonding the Family: Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	6	2
15	**Selfless Service** Seva: Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	6	2
	Total	100%	30

I. Text Book and Reference Book:

Integrated Personality Development Course (TextBook), By Bochasanwasi Akshar Purushottam Swaminarayan Sansth

MC
(5)

a. **Course Name:** Artificial Intelligence and Machine Learning - II
b. **Course Code:** 05010102AM01
c. **Prerequisite:** Basic knowledge of AI & ML
d. **Rationale:** Provide you with the knowledge and expertise to become a proficient data scientist. Demonstrate an understanding of statistics and machine learning concepts that are vital for data science. Produce Python code to statistically analyze a dataset and critically evaluate data visualizations based on their design and use for communicating stories from data.

e. Course Learning Objective:

CLOBJ 1	Gain a solid understanding of the fundamental concepts of Artificial Intelligence (AI) and Machine Learning (ML)
CLOBJ 2	Develop proficiency in essential mathematical tools used in AI and ML, such as linear algebra, probability, and statistics
CLOBJ 3	Gain practical experience in implementing machine learning models using popular programming languages and libraries (e.g., Python, R, scikit-learn, TensorFlow).
CLOBJ 4	Develop critical thinking skills to consider the ethical implications and societal impact of AI and Machine Learning.
CLOBJ 5	Learn techniques for evaluating and analyzing the performance of machine learning models.

f. Course Learning Outcomes:

CLO 1	Understand the concept of artificial intelligence and applications in real life.
CLO 2	Develop a search algorithm for a problem and estimate its time and space complexities.
CLO 3	Recalling the knowledge representation using the appropriate technique for a given problem.
CLO 4	Apply AI techniques to solve different problems with machine learning algorithms.
CLO 5	Analyze and illustrate unsupervised learning algorithms with help of various case studies

g. 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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to Artificial Intelligence**: What is an AI Technique? The AI Problems and applications, Major areas of Artificial Intelligence	10	5
2	**Introduction to Search Algorithm** : Basic Problem Solving Methods and State Space Search Defining the Problems as a State Space Search, Exhaustive search -BFS, DFS, Bidirectional Search, Heuristic search - Hill Climbing, Best First Search, A* search algorithm	25	10
3	**Knowledge Representation**: Knowledge representation as propositional logic, predicate logic, Semantic Network, Frame based knowledge	15	8
4	**Introduction to NLP (Natural Language Processing)** What is NLP? History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP Applications of NLP, how to build an NLP pipeline? Phases of NLP, Why NLP is Difficult? NLP APIs, NLP Libraries, Difference between Natural language, and Computer language	10	5
5	**Unsupervised learning Algorithm** : Unsupervised learning, Applications, challenges, K-Nearest Neighbor Learning Locally Weighted 05 15 71 Regression, SVM, Priority Algorithm, EM Algorithm.	30	12
6	**Artificial Neural networks and Deep learning : introduction to** Artificial Neural networks and Deep learning and genetic algorithms Neural Network Representation, Appropriate problems for Neural	10	5

	Network Learning, Perceptron, Multilayer Networks and Back Propagation Algorithms, Remarks on Back Propagation Algorithms. Case Study: Face Recognition		
	Total	100%	45

I. Text Book and Reference Book:

1. Elaine Rich And Kevin Knight Artificial Intelligence (2nd Edition) Tata McGraw-Hill2. Computer Hacking Beginner Guide
2. Stuart Russel, Peter Norvig, Artificial Intelligence: A Modern Approach, ,PHI
3. Tom M Mitchel, Machine Learning, McGraw Hill

MC
(6)

a. **Course Name:** Artificial Intelligence and Machine Learning - II (Practical)
b. **Course Code:** 05010102AM02
c. **Prerequisite:** Basic knowledge of AI & ML
d. **Rationale:** Provide you with the knowledge and expertise to become a proficient data scientist. Demonstrate an understanding of statistics and machine learning concepts that are vital for data science. Produce Python code to statistically analyze a dataset and critically evaluate data visualizations based on their design and use for communicating stories from data
e. Course Learning Objective:

CLOBJ 1	Provide hands-on experience in building, training, and evaluating various machine learning models using popular programming languages and libraries (e.g., Python, R, scikit-learn, TensorFlow, PyTorch).
CLOBJ 2	Implementing supervised learning algorithms like linear regression, decision trees, and support vector machines
CLOBJ 3	Working with unsupervised learning techniques like clustering and dimensionality reduction
CLOBJ 4	Students might explore considerations for deploying machine learning models in real-world applications
CLOBJ 5	Gain experience in techniques for data acquisition, pre-processing, cleaning, and feature engineering to prepare data for machine learning models.

f. Course Learning Outcomes:

CLO 1	To get basic knowledge about BFS and DFS algorithms.
CLO 2	To design game using AI and Machine learning concepts.
CLO 3	To develop program for representation methods.

CLO 4	To understand practical concepts of clustering.
CLO 5	To understand practical concepts of regression using scillaren kit.
CLO 6	To develop and design neural network based application using ANN

g. Teaching & Examination Scheme:

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

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

h. Practical/Experimentalist:

Sr. No.	List of Practical
1	Write a program(s) to implement BFS and/or DFS algorithms.
2	Write a program(s) to implement 8 puzzle problem or Water Jug problem or Tic- tac-toe game or any AI search problem.
3	Write a program to Implement A* Algorithm.
4	Implementation of knowledge representation methods
5	Implementation of Bayesian Network
6	Classification with k-Nearest Neighbor
7	Random Forest.
8	Support vector machines.
9	Page Ran.
10	CART
11	Implementation of Neural network-based application.

MC
(7)

a. **Course Name:** Advanced Cyber Security and Forensics
b. **Course Code:** 05010102CF01
c. **Prerequisite:** Basic Cyber Security And Forensics - 2
d. **Rationale:** The objective of this course is to familiarize students with concepts of Advance Cyber Security and Ethical Hacking and to Keep Them Aware about Cyber Crime So That They Can Keep Themselves Safe on the Digital Platform.

e. Course Learning Objective:

CLOBJ 1	Master techniques for acquiring forensic evidence from various devices, including mobile devices, cloud storage, and network traffic captures.
CLOBJ 2	Learn advanced analysis methods for identifying and extracting hidden data, deleted files, and other digital artifacts.
CLOBJ 3	Gain knowledge of legal and ethical considerations surrounding digital forensics investigations, including data privacy regulations and chain of custody procedures.
CLOBJ 4	Master the use of advanced forensics tools for data acquisition, analysis, and reporting.
CLOBJ 5	Develop the ability to collect, analyze, and utilize cyber threat intelligence to proactively identify and mitigate threats

f. Course Learning Outcomes:

CLO 1	Students Will Learn The Fundamentals Of Ethical Hacking Along Side With It Good And Bad Side.
CLO 2	They Will Develop Deep Knowledge Regarding The Cyber Crimes And Its Prevention

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction To Ethical Hacking** Student Will Learn New Terms Like Hacking, Types Of Hackers, What Is Ethical Hacking. Why Do We Need Ethical Hackers And Some Terms In This Field	20	9
2	**Command Line Hacking** Will Teach Students About The Use Of Command Prompt In Ethical Hacking Along Side With Practical. It Will Have Various Commands That Will Help Gaining Knowledge For Ethical Hacking	20	9
3	**Introduction To Malwares** Students Will Know About Various Types Of Virus, Also They Will See A Live Demo For The Malwares. Also They Will Get Aware Regarding Malwares, Ransomwares To Keep Themselves Safe Digitally	20	9
4	**Basic Introduction To Kali Linux.** This Chapter Will Show The Importance Of Kali Linux In Ethical Hacking And How To Operate It. How To Operate.	20	9
5	**Cyber Crimes –**I This Will Explain Students About The Basics Of Deep Web, What Is Phishing, Email Spamming, And Various New Terms For Cyber Crimes. Also Will Learn How To Prevent Them.	20	9
	Total	100%	45

I. Text Book and Reference Book:

1. Hacking The Art Of Exploitation (Textbook)

By By Jon Erikson

2. Computer Hacking Beginner Guide

By By Alan T Norman

3. The Hacker Playbook 2.0

By Peter Kim

4. Techchip Material

By Online Material Followed By Google And YouTube Platform

M C (8)

a. **Course Name:** Story Telling & Story Boarding
b. **Course Code:** 18010502AN01
c. Prerequisite:

d. **Rationale:** They can understand & apply the basics of story-telling in their area of expertise. Importance of Story-telling in a Visual form. They can explain the usage and importance of Characters

e. Course Learning Objective:

CLOBJ 1	Understand the key elements of narrative structure, including plot, character development, theme, and conflict.
CLOBJ 2	Explore various storytelling techniques like point of view, dialogue, pacing, and suspense to engage your audience.
CLOBJ 3	Learn to create compelling characters with depth, motivation, and emotional resonance
CLOBJ 4	Develop the skills to create clear and concise storyboard layouts that convey the narrative flow

f. Course Learning Outcomes:

CLO 1	Understand the art of Story Telling.
CLO 2	Understand the purpose of Story boarding
CLO 3	Understand, learn, and apply technique in storyboarding

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**1**	**6**	**4**	**-**	**20**	**20**	**-**	**60**	**100**

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Unit – I** **Storytellin** **g:** Definition and Significance: Introduction to the art of storytelling in visual mediums. Evolution of Storytelling: Historical context and how storytelling has evolved in cinema and other visual media. **What is a Story?** Elements of a Story: Breakdown of key components such as plot, characters, setting, and theme. Narrative Structures: Exploring linear and non-linear storytelling approaches. **3 Act Structure: Beginning, Conflict, Resolution** Act 1 - Beginning: Introduction of characters, setting, and establishment of the story's foundation. Act 2 - Conflict: Development of challenges, rising action, and intensification of conflicts. Act 3 - Resolution: Climax, resolution of conflicts, and conclusion. **Characters** Character Development: Techniques for creating well-rounded and engaging characters. Character Arcs: Understanding the evolution and growth of characters throughout the story. **Scene Development** Importance of Scenes: Analyzing the role of individual scenes in advancing the plot. Pacing and Flow: Techniques for maintaining a dynamic and engaging pace in scene transitions. **Importance of Dialogues in Story** Function of Dialogues: Understanding how dialogues contribute to character development and plot advancement. Subtext and Nuances: Exploring the layers of meaning within dialogues and how they add depth to storytelling. **Acting, Working with Dialogue** Character Interpretation: Strategies for actors to understand and embody their roles.	50	45

	Dialogue Delivery: Techniques for delivering dialogues convincingly and authentically. **Clarity of Story through Characters** Character-driven Storytelling: How characters can serve as a vehicle for conveying the narrative. Visual Storytelling: Exploring how visual elements complement character actions and dialogues.		
2	**Unit - II** **Storyboarding - Introduction** Definition and Purpose: Understanding the role of storyboarding as a visual planning tool in filmmaking. Historical Context: Exploring the evolution of storyboarding and its significance in pre-visualization. **Perspective** Basics of Perspective Drawing: Introduction to one-point, two-point, and three-point perspective. Creating Depth: Techniques for using perspective to add depth and dimension to storyboard frames. **Point of View** Camera Angles and Shots: Exploring different camera angles (high angle, low angle, eye level) and shot types (wide shot, close-up, etc.). Narrative Impact of Point of View: Analyzing how the choice of point of view influences storytelling. **Composition; Visual Clarity** Rule of Thirds: Understanding and applying the rule of thirds in composition. Visual Hierarchy: Creating clear and compelling compositions for effective visual storytelling. **Dramatic Composition** Creating Tension and Emotion: Techniques for using composition to enhance the dramatic impact of a scene. Color and Lighting in Composition: Exploring how color and lighting contribute to the overall dramatic composition. **Use of Angles** Low and High Angles: The psychological impact of shooting from low or high angles. Dutch Angles: Understanding and using Dutch angles for visual storytelling purposes.	50	45

	Character Performance Expressive Poses and Gestures: Techniques for conveying character emotions and actions through poses. Storyboarding Action Sequences: Creating dynamic and visually engaging sequences to depict character performance. **Character Development & Design** Character Design Principles: Introduction to designing characters for visual storytelling. Consistency in Design: Ensuring consistency in the appearance of characters across frames.		
	Total	100%	90

I. Text Book and Reference Book:

1. **Prepare to Board! Creating Story and Characters for Animated Features and Shorts**

By by Nancy Beiman | Focal Press

2. **Dream Worlds: Production Design for Animation**

By Hans Bacher | Focal Press

M C (9)

a. **Course Name:** Lighting and Camera Movement
b. **Course Code:** 18010202VV01
c. **Prerequisite:** An understanding of Basics of Camera can be helpful. | 18010201VV01 - Fundamentals of Digital Videography
d. **Rationale:** The course introduces students to the key creative and conceptual principles for working with video and moving images. With introductions to digital video cameras, sound recording, and editing software, the course enables you to develop shooting and editing techniques relevant media arts contexts.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental properties of light, including color temperature, intensity, and diffusion
CLOBJ 2	Gain familiarity with various lighting equipment like three-point lighting setups, soft boxes, reflectors, and gels
CLOBJ 3	Learn about different camera movement techniques (pans, tilts, tracks, dollies) and their impact on storytelling
CLOBJ 4	Develop skills in manipulating aperture, shutter speed, and ISO for optimal exposure in diverse lighting conditions.
CLOBJ 5	Analyze how lighting and camera movement contribute to the visual storytelling in various films.

f. Course Learning Outcomes:

CLO 1	Technologies of working digitized Moving image, sound & editing setup
CLO 2	To disseminate important stories and provoke feelings & critical thinking

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
6	**1**	**6**	**4**	**-**	**20**	**20**	**-**	**60**	**100**

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Unit - I** **Introduction to Contrast:** - Definition and importance in imaging. - Role in distinguishing details in an image. **Types of Contrast:** - Spatial contrast vs. tonal contrast. - Contrast in different lighting conditions. **Factors Influencing Contrast:** - Lens characteristics affecting contrast. - Impact of subject matter and scene on contrast. **Contrast Enhancement Techniques:** - Use of filters and post-processing to enhance contrast. - Practical applications in photography and imaging.	55	60
2	**Unit - II** **A) Key Lighting Introduction to Key Lighting:** - Definition and fundamental role in the 3-point lighting system. - Significance in creating the primary illumination on the subject. **Placement and Direction**: - Understanding optimal positions and angles for key lights. - Techniques for controlling shadows and highlights using key lights. **Modifiers and Tools:** - Exploring various modifiers (soft boxes, barn doors, etc.) to shape key light. - Importance of key light intensity and color temperature. **Creative Applications:**	45	40

	- Case studies illustrating creative uses of key lighting in different genres. - Adapting key lighting for diverse cinematic styles. **B) Fill Lighting Introduction to Fill Lighting:** - Definition and its role in balancing shadows created by the key light. - Achieving a natural and aesthetically pleasing look with fill light. **Placement and Intensity:** - Optimal positioning of fill lights to complement the key light. - Balancing fill light intensity to control contrast. **Modifiers and Techniques:** - Exploring tools and techniques to soften or shape fill light. - Creative use of fill light for specific moods and tones. **Practical Considerations:** - Addressing challenges in fill lighting, such as avoiding overfill and flat lighting. - Adapting fill lighting setups to different shooting environments. **C) Back Lighting** **Introduction to Back Lighting:** - Definition and role in separating the subject from the background. - Creating depth and dimensionality with back lighting. Placement and Angles: - Strategic placement of back lights to achieve desired effects. - Experimenting with various angles for backlighting. **Rim Lighting and Halos:** - Understanding rim lighting as a subset of back lighting. - Creating halos and highlights to enhance the subject's outline. **Enhancing Visual Interest:**		

	- Practical tips for maximizing the impact of back lighting in storytelling. - Case studies showcasing creative uses of back lighting in cinematography		
	Total	100%	100

I. Text Book and Reference Book:

1. **Cinematography: Theory and Practice: Image Making for Cinematographers and Directors,** By Blain Brown | Routledge
2. **Understanding Exposure,** By Peterson, B. | Amphoto Books, New Delhi India | 4 th Edition,, Pub. Year 2016

MC (10)

a. **Course Name:** Characteristics of Lens
b. **Course Code:** 18010202PP01

c. **Prerequisite:** An understanding of Basic Camera Mechanism can be helpful. | 18010201PP01 - Digital Camera Mechanism
d. **Rationale:** Taking a basic photography course can be incredibly helpful for anyone looking to improve their photography skills. Not only will you learn about the technical aspects of photography, but you'll also gain a greater appreciation for the art form and discover your own unique style.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental principles of light, including refraction, reflection, and dispersion
CLOBJ 2	Grasp the concept of focal length and its impact on image magnification, field of view, and perspective.
CLOBJ 3	Explore different types of lenses (prime vs. zoom, wide-angle, telephoto, macro) and their specific functionalities.
CLOBJ 4	Gain basic knowledge of common lens aberrations (chromatic aberration, distortion) and their impact on image quality.
CLOBJ 5	Develop the ability to select the appropriate lens based on desired image characteristics (framing, perspective, depth of field) and shooting conditions (lighting, distance to subject)
CLOBJ 6	Learn how focal length influences image composition and storytelling by affecting perspective and compression.

f. Course Learning Outcomes:

CLO 1	Improved technical skills: Basic photography classes will teach you the fundamentals of camera operation, exposure, and lighting. This will help you understand how to use your camera to its full potential and create images that are properly exposed and well-lit.
CLO 2	Greater artistic expression: Basic photography classes will also help you develop your creative vision and explore different styles of photography. By learning about composition, color, and perspective, you'll be able to create images that are not only technically proficient but also visually compelling

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	1	6	-	-	20	20	-	60	100

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Unit - I** **Introduction to Concave Lenses:** - Definition and basic properties. - Comparison with convex lenses. **Concave Lens Structures:** - Explanation of the curved surfaces and thickness of concave lenses. - Variations in concave lens shapes. **Ray Diagrams for Concave Lenses:** - Construction and interpretation of ray diagrams for concave lenses. - Understanding the behavior of light rays passing through concave lenses. **Applications of Concave Lenses:** - Real-world applications in various optical devices. Significance in corrective lenses	50	45
2	**Unit - II** **Image Formation:** Understanding how images are formed by lenses. Differentiating between real and virtual images. **Image Size:** Explanation of image size in relation to object size and lens properties. Mathematical expressions for calculating image size.	50	45

	Magnification: Definition and formula for magnification. Significance of magnification in optical systems. **Factors Affecting Magnification:** Exploring how changes in object distance, image distance, and focal length impact magnification. Real-world examples illustrating magnification variations. **Applications of Magnification:** Practical applications in microscopy, telescopes, and other optical devices. Importance of magnification in scientific and industrial fields.		
	Total	100%	90

I. Text Book and Reference Book:

1. **The Digital Photography Book: The Step-By-Step Secrets For How To Make Your Photos Look Like The Pros ,**By Scott Kelby | Rocky Nook
2. **Understanding Exposure,** By Peterson, B. | Amphoto Books, New Delhi India | 4 thEdition,, Pub. Year 2016

MC (11)

a. **Course Name:** Fundamentals of Digital Marketing
b. **Course Code:** 06010102DM01
c. **Prerequisite:** Curiosity and willingness to learn about new technologies and digital trends is important in the field of digital marketing
d. **Rationale:** Fundamentals of digital marketing equip professionals with essential skills in leveraging online platforms, analytics, and strategies to reach target audiences effectively, enabling businesses to thrive in the digital age by maximizing their online presence and driving measurable results

e. Course Learning Objective:

CLOBJ 1	Define digital marketing and its importance in today's business landscape
CLOBJ 2	Understand consumer behavior in the digital space, including how consumers search for information, make purchasing decisions, and interact with brands online
CLOBJ 3	Learn the basics of website optimization for search engines (SEO) and user experience (UX).
CLOBJ 4	Understand the role of storytelling, branding, and engagement in content marketing efforts.
CLOBJ 5	Develop social media marketing campaigns to engage with target audiences and drive brand awareness, engagement, and conversions.

f. Course Learning Outcomes:

CLO 1	List common digital marketing channels and platforms.
CLO 2	Explain the customer journey in the digital marketing context.
CLO 3	Create a social media content calendar for a specific target audience.
CLO 4	Analyze website traffic data to identify patterns and trends.
CLO 5	Assess the ROI of a digital advertising campaign using key performance indicators (KPIs).
CLO 6	Develop a comprehensive digital marketing plan for a new product launch, including budget allocation and channel selection

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to digital marketing** : digital marketing, internet users, digital marketing strategy, digital advertising market in India, skills required in digital marketing, digital marketing plan	15	10
2	**Social Media Social media marketing** : listen, goal setting, strategy, implementation, measure, improve Facebook marketing : Facebook for business, anatomy of an ad campaign, digital marketing strategy roadmap, adverts, Facebook insights, other marketing tools Mobile marketing : mobile usage, mobile advertising, mobile marketing toolkit, mobile marketing features, campaign development process, mobile analytics Twitter marketing : getting started with Twitter, building a content strategy, Twitter usage, Twitter ads, Twitter analytics, Twitter for marketers Instagram and Snapchat : Instagram content strategy, Instagram style guidelines, hashtags, videos, sponsored ads, apps, generate leads, what is snapchat?, how does Snapchat work?	25	10
3	**Display and Social Media Display advertising :** concept of display advertising, types of display ads, buying models, targeting, making a good ad, programmatic digital advertising, analytics tools, YouTube advertising LinkedIn marketing : LinkedIn strategy, sales lead generation using LinkedIn, content strategy, LinkedIn analytics, targeting, and ad campaigns	20	10
4	**Search engine: Search engine advertising** : ad placement, managing consumer demand, integrated marketing communication, impact of digital channels on IMC, ad ranks, creating an ad campaign, enhance your ad campaign, performance reports Search engine optimization : search	20	10

	engine, concept of Search Engine Optimization (SEO), SEO phases, on page optimization, off page optimization, social media reach, maintenance		
5	**Web analytics** Data collection, key metrics, making web analytics actionable, multi-channel attribution, types of tracking codes, mobile analytics, and competitive intelligence.	20	5
	Total	100	45

I. Text Book and Reference Book:

1. Fundamentals of Digital Marketing, (Textbook)
By Puneet Singh Bhatia, | Palgrave Macmillan

2. Digital Marketing,
By Seema Gupta, | Prentice Hall

3. Marketing Management
By Philip Kotler | Current

DSC (14)

a. **Course Name:** Database Management Systems
b. **Course Code:** 05010102DS01
c. **Prerequisite:** Basic knowledge of Data and Data Processing
d. **Rationale:** Provide Conceptual insight about how database design and implementation takes place and relational operations of database.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental concepts of relational databases, including data models, entities, attributes, relationships, and normalization.
CLOBJ 2	Become familiar with Structured Query Language (SQL) for data manipulation and retrieval.
CLOBJ 3	Design and implement databases, including defining tables, constraints, and indexes.
CLOBJ 4	Understand and utilize basic concepts of data security and access control in a DBMS.
CLOBJ 5	Understand the role of a database administrator (DBA) and their responsibilities.

f. Course Learning Outcomes:

CLO 1	Understand fundamental concepts and terminologies related to DBMS and RDBMS.
CLO 2	Model and represent relationships between database entities
CLO 3	acquire skills and working knowledge in RDBMS domain
CLO 4	explain relational algebra and ORDBMS concepts
CLO 5	perform normalization of provided data and develop relational databases
CLO 6	Apply PL/SQL Techniques such as cursors, stored procedures, and triggers to solve given data-driven problems.

g. 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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to Database System** Data, Information, Data Management, File-based Data Management, Database, Database Systems, Organization of a Database, Characteristics of Data in a Database, DBMS, Benefits of DBMS , Functions ,Components of DBMS, Data dictionary, Database Users, Database Architecture, Data abstraction, ANSI/SPARC Architecture, Logical and Physical data independence, Database languages, Database Design, Database constraints	21	10
2	**Data Model and Entity Relationship Modeling** Data Model Conceptual, Physical and Logical Database Models, Database relationships, Hierarchical model, Network Model, Relational Model, E-R model Entity Relationship Modeling E-R Model, Components of an E-R Model, E-R conventions, Relationships, Composite entities, Entity list, E-R diagrams, E-R Modeling symbols, Super class, Subclass entity types, Attribute inheritance, Specialization, Generalization Specialization/ generalization constraints, Categorization	21	10

3	**Relational Database Design and Relational Algebra and Calculus** Relational Database Design Relational Algebra operations, Aggregate functions, Update operations, Types of relational calculus, Domain Relational calculus Relational Algebra and Calculus Relational Data structure, Relational data manipulation, Integrity constraints, Pitfalls of Relational database design, Decomposition, Functional dependencies, Normalization, Keys, Relationships, First Normal Form(1NF), Second Normal form(2NF), Third normal Form (3NF), Boyce-Codd Normal Form (BCNF), Fourth Normal Form (4NF) Fifth Normal Form (5NF), Lossless join dependency, Domain-Key Normal Form (DCNF), Demoralization	21	10
4	**Object Relational and Extended Relational Database** Database design for an ORDBMS, Nested relations and collections, Storage and access methods, An overview of SQL3, Systems comparison of RDBMS, OODBMS and ORDBMS.	16	5
5	**PL/SQL, Cursor and Trigger and Stored Procedures** PL/SQL, Cursor and Trigger Basic code structure, Variables, Conditional statements, looping (loop statements, while loops, for loops, cursor FOR loops), Triggers. Stored Procedures Understanding the main features of stored procedures, stored procedure architecture, Advantages of using procedures. Stored procedures - functions, procedures and packages.	21	10
	Total	100%	45

I. Text Book and Reference Book:

1. Database System Concepts

By Silberschatz, Korth, Sudarshan | McGraw Hill Publication | 4th Edition

2. An Introduction to Database Systems

By C. J. Date, A. Kannan, S. Swamynathan | Pearson Education | 8th Edition

3. Database Systems: Concepts, Design and Applications

By S. K. Singh | Pearson Education

4. SQL, PL/SQL – The Programming Language

By Ivan Bayross | BPB Publications

5. Database Management Systems

By Raghu Ramakrishnan, Johannes Gehrke | McGraw Hill Publication

DSC (15)

a. **Course Name:** Database Management Systems (Practical)
b. **Course Code:** 05010102DS02
c. **Prerequisite:** Basic knowledge of Data and Data Processing
d. **Rationale:** Provide Conceptual insight about how database design and implementation takes place and relational operations of database

e. Course Learning Objective:

CLOBJ 1	Normalize database tables to eliminate redundancy and ensure data integrity.
CLOBJ 2	Practice using SQL functions and operators for data manipulation and retrieval.
CLOBJ 3	Set up and configure database management systems (e.g., MySQL, PostgreSQL).
CLOBJ 4	Implement stored procedures, triggers, and user-defined functions for automating tasks.
CLOBJ 5	Develop and execute SQL queries for generating reports and dashboards

f. Course Learning Outcomes:

CLO 1	Understand fundamental concepts and terminologies related to DBMS and RDBMS.
CLO 2	Model and represent relationships between database entities
CLO 3	acquire skills and working knowledge in RDBMS domain
CLO 4	explain relational algebra and ORDBMS concepts
CLO 5	perform normalization of provided data and develop relational databases
CLO 6	Apply PL/SQL Techniques such as cursors, stored procedures, and triggers to solve given data-driven problems.

g. Teaching & Examination Scheme:

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

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

h. Practical/Experiment List:

Sr. No.	List of Practical
1	Create a table for Customer. Column Name Format cust_id char(5) Lname char(15) Fname char(15) Area char(2) phone_no number(8)
2	Create a table for Movie and insert records in to it. Column Name Format mv_no number (5) Title char(25) Type char(10) Star char(25) Price number(8,2)
3	Simple Query Solving.
4	Complex Query Solving.
5	Basic PL/SQL Programs
6	PL/SQL Cursor Programs
7	Trigger Programs
8	Procedure Programs

DSC (14)

a. **Course Name:** System Analysis and Design
b. **Course Code:** 05010102DS03
c. **Prerequisite:** Basic knowledge about fundamentals of Computers
d. **Rationale:** The objective of this course is to familiarize students with various concepts of System development like planning, analysis, design, deployment and maintenance

e. Course Learning Objective:

CLOBJ 1	Gain a deep understanding of what constitutes a system, including its components, boundaries, and interactions with the environment.
CLOBJ 2	Develop skills in gathering, documenting, and analyzing system requirements from stakeholders using techniques such as interviews, surveys, and observation.
CLOBJ 3	Learn to create data models using techniques such as Entity-Relationship Diagrams (ERDs) and Data Flow Diagrams (DFDs) to represent the structure and flow of data within the system.
CLOBJ 4	Recognize ethical responsibilities in system development.
CLOBJ 5	Foster communication skills for effective teamwork.
CLOBJ 6	Apply testing methodologies to verify system designs.

f. Course Learning Outcomes:

CLO 1	To learn a solid foundation of systems principles and an understanding of how business function
CLO 2	To learn concepts related to information systems development in a systematic approach including foundations, planning,

g. 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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to System Analysis and Design** Definition of System. Importance of System analysis and design, role of system analyst. **SDLC:** Overview of System Development Life Cycle (SDLC), stages of systems analysis: Problem identification, Feasibility study and cost benefit analysis, System	25	11
	Requirement analysis Stages of systems design: System design specification and programming, System implementation, follow up, maintenance, Evaluation of a system. **SDLC Models:** Waterfall Model, V-process model, spiral model, Agile model.		
2	**System Requirement Analysis and Information system Building Blocks** **System Requirement Analysis and Information system Building Blocks** Requirement Analysis: Function requirements and non-Function requirements. Requirement Identification: Interview, Surveys, Prototyping, Use case Modeling **Information system Building Blocks:** Introduction to Information system, A framework for system development architecture, Knowledge Building Blocks, Process Building Blocks, Communication Building Blocks. Network technology and Information Building Blocks	25	11
3	**Data Modelling, Process Modelling and Object Modeling** Introduction to Data Modeling, Entity-Relationship Diagram. Data Dictionary. Introduction to Process Modeling, Data Flow Diagram. Object Modeling: Structured Chart, HIPO chart.	25	11

4	**Project Management** Introduction to Project Management, the Causes of Failed Projects, Project Manager Competencies, Business Achievement Competencies, Problem Solving Competencies, Influence Competencies, People Management Competencies, Self- Management Competencies, Project Management Functions Project Management Tools and Techniques: Project Evaluation and Review Technique (PERT chart), Gantt chart, The Project Management Life Cycle.	25	12
	Total	100%	45

I. Text Book and Reference Book:

1. System Analysis and Design

By S. Parthasarthy& B. W. Khalkar | 1st Edition

2. Analysis & Design of Information System

By James A. Senn | Second Edition

a. **Course Name:** System Analysis and Design (Practical)
b. **Course Code:** 05010102DS04
c. Prerequisite:
d. **Rationale:** The objective of this course is to familiarize students with various concepts of System development like planning, analysis, design, deployment and maintenance.
e. Course Learning Objective:

CLOBJ 1	Identify areas for improvement or redesign.
CLOBJ 2	Conduct interviews, surveys, and observations to gather system requirements from stakeholders.
CLOBJ 3	Create Entity-Relationship Diagrams (ERDs) to represent the data structure of the system.
CLOBJ 4	Translate requirements into a detailed system design, including architecture, interfaces, and modules.
CLOBJ 5	Develop test cases to verify the correctness and completeness of the system design.

f. Course Learning Outcomes:

CLO 1	To understand and design system development life cycle.
CLO 2	To solve challenges associated with the analysis, design, and construction phases of information systems.
CLO 3	Acquire a comprehensive understanding of analysis and development methodologies
CLO 4	To formulate the requirements for a system using modeling techniques.

g. Teaching & Examination Scheme:

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

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

h. Practical/Experiment List:

Sr. No.	List of Practical
1	Design an Information System on any Business requirement. Do the Requirement Analysis, identify the modules and users of the system.
2	Develop SRS as per IEEE standard
3	For the same system, do the feasibility study and check for the various feasibility aspects
4	Design the E-R diagram for the system
5	Design the Data Flow diagram and Data Dictionary for the system
6	Create Decision table and decision tree for Bill preparation or account creation.
7	Design Use case, Sequence Diagram and Activity Diagram for Payroll Management System
8	For a Student management system design, DFD, ERD, Use case, Sequence Diagram and Activity Diagram.

SEC (16)

a. **Course Name:** Data Visualization for Business Intelligence
b. **Course Code:** 05010102SE01
c. **Prerequisite:** Basic knowledge of computer with popular Microsoft excel technologies
d. **Rationale:** Data visualization for business intelligence enhances decision-making by presenting complex data in intuitive visual formats, enabling efficient interpretation and strategic insights, crucial for modern enterprises to leverage data effectively and gain competitive advantage.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental principles of data visualization for effective communication of business intelligence insights.
CLOBJ 2	Apply data visualization best practices to select the most appropriate chart types for different data and analytical goals.
CLOBJ 3	Effectively clean, prepare, and transform data for visualization using appropriate tools and techniques
CLOBJ 4	Critically evaluate the strengths and weaknesses of different data visualization techniques for specific business intelligence needs.
CLOBJ 5	Present data visualizations in a professional and impactful manner, considering audience needs and objectives.

f. Course Learning Outcomes:

CLO 1	Students can Explore, analyze, and visualize data. Sift data using slicers in multiple pivot tables. Produce aggregate reports using formula-based techniques. Collect and transform data from multiple sources. Also able to understand available visualization tool and technique and there uses.
CLO 2	Students can understand how Power BI service is a secure Microsoft hosted cloud service that lets users view dashboards, reports, and Power BI apps — a type of content that combines related dashboards and reports — using a web browser or via mobile apps for Windows, iOS, and Android.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	2	2	20	20	20	60	30	150

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

h. Course Content:

Sr. No.	Content	Weightage %	Teaching Hours
1	**Get started with data analytics** In this learning path, you will learn about the life and journey of a data analyst, the skills, tasks, and processes they go through in order to tell a story with data so trusted business decisions can be made. You will learn how the suite of data analytics tools and services are used by a data analyst to tell a compelling story through reports and dashboards, and the need for true business intelligence in the	15	4
2	**Overview of data analysis** Learn Data-driven businesses make decisions based on the story that their data tells, and in today data-driven world, data is not being used to its full potential, a challenge that most businesses face. Data analysis is, and should be, a critical aspect of all organizations to help determine the impact to their business, including evaluating customer sentiment, performing market and product research, and identifying trends or other data insights	15	4
3	**Introduction: Started building with current available technology** Learn how Power BI services and applications work together. Explore how Power BI can make your business more efficient. Learn how to create compelling visuals and reports. Create and use analytics reports with Power BI Get started with Microsoft data analytics Get started with Power BI	15	5

4	**Tour and use the Power BI service** The common flow of work in Microsoft Power BI is to create a report in Power BI Desktop, publish it to the Power BI service, and then share it with others, so that they can view it in the service or on a mobile app	15	5
5	**Identify foundational components of Microsoft Power Platform** The common flow of work in Microsoft Power BI is to create a report in Power BI Desktop, publish it to the Power BI service, and then share it with others, so that they can view it in the service or on a mobile app	15	5
6	**Introduction to creating measures using Data Analysis Expressions** Data Analysis Expressions (DAX) is a programming language that is used throughout Microsoft Power BI for creating calculated columns, measures, and custom tables. It is a collection of functions, operators, and constants that can be used in a formula, or expression, to calculate and return one or more values. You can use DAX to solve a number of calculations and data analysis problems, which can help you create new information from data that is already in your model.	15	7
	Total	90%	30

Sr. No.	**List of Practicals**
1	Design Dashboard for Marketing Campaign Insights Analysis using Microsoft Excel
2	Design Dashboard for Marketing Campaign Insights Analysis using Microsoft Excel
3	Design Dashboard for Healthcare Sales Analysis using Microsoft Excel
4	Design Dashboard for Global Health Expenditure Analysis using PowerBI
5	Design Dashboard for Loan Application Analysis using PowerBI
6	Design Dashboard for Movie Sales Visualization using PowerBI
7	Design Dashboard for Covid-19 Insights Analysis using PowerBI

I. Text Book and Reference Book:

1. Mining of Massive Datasets

By Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman

2. Data Analytics: Become a Master in Data Analytics

By Richard Dorsey

3. Data Smart: Using Data Science to Transform Information into Insight

By John W. Foreman

SEC (17)

a. **Course Name:** Business Intelligence and Analytics (NPTEL)
b. **Course Code:** 05M10102SE01
c. **Prerequisite:** A core course on Business statistics desirable
d. **Rationale:** Analytics and data science industry, IT services industry, Manufacturing and services operations and marketing

e. Course Learning Objective:

CLOBJ 1	To learn about the fundamentals and ethics of decision support systems and business intelligence
CLOBJ 2	Define mathematical models, data preparation, and data mining
CLOBJ 3	To explain clustering techniques and classification challenges
CLOBJ 4	To research data envelopment analysis, logistic and manufacturing models, and marketing models
CLOBJ 5	Determine the estimated costs, implications for operations, finances, and ethics of a data-driven solution created in unclear, organized, or unstructured setups.

f. Course Learning Outcomes:

CLO 1	This course equips students with necessary knowledge and skills on the thought process, modelling approaches and toolsrequired to use data from the enterprise databases and other sources for business decisions
CLO 2	In turn, the course prepares participants for a career in data science, business analytics and market research.
CLO 3	This course will introduce the context of data mining, and cover important modelling techniques such as regression, decision trees, clustering, ANN and text mining

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
1	**-**	**2**	**2**	**40**	**20**	**20**	**60**	**30**	**150**

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Introduction to Business Intelligence & Analytics** Introduction to Business Intelligence & Analytics (BIA), drivers of BIA, types of analytics: descriptive to prescriptive, vocabulary of business analytics, course plan and resources, technical architecture of BIA, case analysis of AT&T Long distance, fundamentals of data management, Online Transaction Processing (OLTP), design process of databases	17	5
2	**Relational Databases to Customer Analytics** Relational databases, normalization, SQL queries, Shop Sense case of management questions, data warehousing, Online Analytical Processing (OLAP), data cube, Descriptive analytics, and visualization, customer analytics, survival analysis, customer lifetime value, case study	17	5
3	**Navigating the Data Mining Process and Statistical Learning** Data mining process, introduction to statistical learning, data pre-processing, data quality, overview of data mining techniques, case study using regression analysis, Introduction to classification, classification techniques, scoring models, classifier performance, ROC and PR curves	18	5
4	**Decision Trees and Cluster Analysis** Introduction to decision trees, tree induction, measures of purity, tree algorithms, pruning, ensemble methods, Tree implementation in Python: problem of targeted mailing, Cluster analysis, measures of distance, clustering algorithms, K-means and other techniques, cluster quality	18	5
5	**Insights with Clustering, Neural Networks, and Text Mining** A store segmentation case study using clustering, implementation in Python, profiling clusters, cluster interpretation and actionable insights, RFM sub-segmentation for customer loyalty, Machine learning, Artificial Neural Networks (ANN), topology and training algorithms, back propagation, financial time series modelling using ANN, implementation in Python, Text mining, process, key concepts, sentiment scoring, text mining using R-the case of a movie discussion forum	30	10

	Total	100%	30

I. Text Book and Reference Book:
https://nptel.ac.in/courses/106106361

Multidisciplinary Course
(18)

a. **Course Name:** Basic Mathematics
b. **Course Code:** 11019102UE01
c. **Prerequisite:** Knowledge about basic arithmetic operations and geometry
d. **Rationale:** The course provides basic knowledge of mathematics which will be useful in computer application.
e. Course Learning Objective:

CLOBJ 1	Develop critical thinking and problem-solving skills by applying mathematical concepts to real-world scenarios
CLOBJ 2	Analyze and interpret data presented in tables, charts, and graphs.
CLOBJ 3	Develop a strong understanding of the number system, including whole numbers, integers, fractions, decimals, and percentages.
CLOBJ 4	To assist students in developing the ability to solve aptitude problems using basic techniques (mostly dependent on demonstration)
CLOBJ 5	Examine the significance of logarithmic properties comparative with working inside different number frameworks
CLOBJ 6	Gain proficiency in formulating and assessing hypotheses

f. Course Learning Outcomes:

CLO 1	Ability to know and to understand various types of sequences and series.
CLO 2	Study about set theory.
CLO 3	Solve Problems related to Determinant and Matrices.
CLO 4	Solve problems of combination and Permutation.
CLO 5	Understand concept of geometry.
CLO 6	Understand concept of Trigonometry

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	**Set theory** Introduction, Representation of sets, Types of Sets, Venn Diagrams, Operations on Sets, Cartesian Product of two Sets	12	7
2	**Determinants and Matrices** Determinants, Expansion of a determinant, Properties of determinants, Minors and Cofactors, Cramer's Rule Matrices, Types of matrices, Arithmetic operations on Matrices, Cramer's rule, Determinants of a Square Matrix, Adjoin of Matrix, Inverse of matrix (up to 3x3 matrix using adjoin matrix)	26	15
3	**Arithmetic and Geometric Progression Concept** of a sequence, Concept of Series, The sum of an arithmetic series, General term of an A.P, Sum upto 'n' terms of an A.P, General term of a G.P, Sum upto 'n' terms of a G.P, Sum upto infinite terms of a G.P.	12	7
4	**Permutations and Combinations** Introduction of Factorial, Fundamental Principle of Counting, Permutation vs. Combination, Types of Permutations, Circular Permutations, Combinations, Different formulas on combination & It's Applications	18	11
5	**Trigonometry** Measurement of Angles (Degree to Radian and Radian to Degree), The trigonometric functions, Graphs of circular functions, Trigonometric identities, Applications of trigonometry	16	10
6	**Co–ordinate Geometry** Point: Distance formula, Mid-point formula, Section formula. Line : Forms of equation of straight line, slope point form, Two point form, Parallel and perpendicular lines	16	10
	Total	100%	60

I. Text Book and Reference Book:

1. B.C.A. Mathematics VOL II

By J.P. Chauhan | Krishna Prakashan Media (P) Ltd.,Meerut

2. SystematicModern Mathematics- Part-I & Part-II

By L.R. Dhanda, G.K. Saini and Suranjan Saha | Kalyani Publishers.

3. **The Elements of Coordinate Geometry, Part-1 Cartesian Coordinates & Plane Trigonometry Part-1**By Loney, Arihant
4. **Schaum's Outline of Combinatorics**By V. K. Balakrishnan, Mc GrawHill

Multidisciplinary Course
(19)

a. **Course Name:** Discrete Mathematics (NPTEL)
b. **Course Code:** 11M19102UE01
c. **Prerequisite:** Knowledge about basic arithmetic operations and geometry
d. **Rationale:** The course provides basic knowledge of mathematics which will be useful in computer application.

e. Course Learning Objective:

CLOBJ 1	Introduce mathematical logic principles such as proposition analysis and theorem proof.
CLOBJ 2	Use sets to solve practical issues and apply set operations algebraically.
CLOBJ 3	Work with relations and examine their properties.
CLOBJ 4	Investigate functions as relationships and their attributes.
CLOBJ 5	Introduce basic concepts of graphs, digraphs and trees.

f. Course Learning Outcomes:

CLO 1	Ability to know and to understand various types of sequences and series.
CLO 2	Study about set theory.
CLO 3	Solve Problems related to Determinant and Matrices.
CLO 4	Understand concept of geometry.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Content	Weightage%	Teaching Hours
1	Counting	8	5
2	Set theory	8	5
3	Logic	8	5
4	Relations	8	5
5	Functions	8	5
6	Mathematical Induction and Pigeon hole Principle	8	5
7	Graph Theory - 01	9	5
8	Graph Theory - 02	9	5
9	Graph Theory - 03 and Generating Functions	9	5
10	Principle of Inclusion-Exclusion	9	5
11	Recurrence relations	9	5
12	Advanced Topics	9	5
	Total	102%	60

I. Text Book and Reference Book:

1. Discrete Mathematical & it's Applications with Combinatory and Graph Theory
By Kenneth H Rosen | Tata McGraw-Hill

2. Graph Theory with Applications to Engineering and Computer Science
By Narsingh Deo | PHI

3. Discrete Mathematics with Graph Theory and Combinatory
By T. Veerarajan | The McGraw Hill Company

4. Discrete Mathematics
By Swapan Kumar and BikashSarkar | Oxford University Press

Semester 3
(20)

a. Course Name: Introduction to Data Structures and Algorithms

b. Course Code: 05102201

c. Prerequisite: Knowledge of programming C

d. Rationale: This subject is to gives knowledge of different operations to be performed on various types of data structures to the students.

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Describe the significance of various linear and non-linear data structure such as arrays, stack, queue, linked list, trees and graph
CLO 2	Identify the appropriate data structure for a given problem
CLO 3	Construct most suitable data structure to solve a problem by considering various problem characteristic such as data size and various type of operation.
CLO 4	Design and implement various techniques for searching, sorting and hashing.

g. 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

h. Course Content:

Sr.	Content	Weightage%	Teaching Hours
1	**Introduction to Data Structures** Data, Data Organization, Data Access methods • Basics of Algorithm, , Asymptotic Notations, Complexity of Algorithms, Greedy algorithm, Divide and Conquer , Dynamic Programming , Introduction to data structures, their usage, Data structure bifurcation , General Application	11	5
2	**Linear Data Structures** Introduction, Types of Linear DS , Limitations and Advantages of Linear Data structure Array : Characteristics, Limitations , Features, Different Applications, Sparse Matrix Linked list : Characteristics, Limitations , Features, Different Applications, Different types of linked list and its operations (Singly , Doubly , Circular) Stack : Characteristics, Limitations , Features, Different Applications , Operations with algorithms, Expression Parsing with stack application ,Recursion with examples & algorithms Queue : Characteristics, Limitations , Features, Different Applications , Operations, Characteristics of different types of queue and its operations with algorithms.	32	18
3	**Non-Linear Data Structures** Introduction, Types of Linear DS , Limitations and Advantages of Non Linear Data structure Tree: Characteristics, Limitations , Features, Different Applications , Representation of tree, Traversal(in order, preorder, post order with algorithms), Characteristics of different types of tree (Binary tree and its sub types, AVL tree, Spanning tree , Heap tree excluding algorithms) Graph: Characteristics, Limitations , Features, Different Applications, Traversal (BFS , DFS), Types of graph (brief)	29	13
4	**Sorting, Searching and File Structure** Sorting Algorithms: Selection, Bubble, Insertion, Shell, Quick sort , Merge sort Searching Algorithms: Sequential and Binary Search File: Operations on files, Types of files • File Organizations: Sequential files, Indexed Sequential file(ISAM), • Directed files and multi-key files • File performance criteria and terms Hash Table :Overview & Operations	28	12
	Total	**100%**	**48**

i. List of Practical

1. **Write a C program to perform following operations on strings. (Use library functions for all operations) a) Find length of given string b) Copy string c) Compare given strings d) Concatenate given strings**
2. **Perform following programs using array. a) Search element in array. b) Sort given array. c) Reverse elements of Array. d) Addition of elements of array. e) Find largest element from given array. f) Find smallest element from given array.**
3. **Write a program to perform the following operations on a stack. Implement the stack using array). a) PUSH b) POP c) PEEP**
   d) CHANGE
4. **Write a program to convert an infix arithmetic expression into postfix notation.**
5. **Write a program to evaluate a postfix expression.**
6. **Write a program to perform the following operation on a simple queue. (Implement the queue using array)**

7. **Write a program to perform the following operation on a circular queue. (Implement the queue using array) a) Insert an element b) Remove an element**

8. **Write a program perform the following operations on a singly linked list. a) Create Linked list b) Insert element at first position c) Insert element at last position d) Insert element in Linked list in sorted order e) Delete element from Linked list**
f) Copy Linked list g) Find the sum of elements of linked list e) Count number of nodes of linked list f) Search given element in linked list

9. **Write program to sort a given list using Selection sort.**

10. **Write program to sort a given list using Bubble sort.**

11. **Write program to sort a given list using Quick sort.**

12. **Write program to sort a given list using Insertion sort.**

13. **Write program to sort a given list using Shell sort.**

14. **Write program to search an element in a given list using Linear Search.**

15. **Write program to search an element in a given list using Binary Search.**

j. Text Book and Reference Book:

1. **An Introduction to Data Structures with Applications**
2. **Data Structures with C**

a. **Course Name:** Computer Networks
b. **Course Code:** 05102202
c. **Prerequisite:** Basic Knowledge of Network
d. **Rationale**: Basic skills for Computer Science Student

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand basics of data communications and computer network
CLO 2	Describe OSI reference model and basic functionalities of DNS, WWW and Selected protocols
CLO 3	Identify relevant data transmission technique and media
CLO 4	Implement framing error handling and congestion control techniques
CLO 5	Describe need for computer network security
CLO 6	Describe need for computer network security

g. 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

h. Course Content:

Sr.	Topics	Weightage%	Teaching Hours
1	**Network Basics**What is network?, Use of network, Network hardware, Network software, Reference models.	12	6
2	**The physical layer- I**Transmission media, Magnetic media, Twisted pair , coaxial cable, Fiber optic , Wirelesstransmission, Electromagnetic spectrum, Radio transmission, Microwave transmission, Infrared, light wave.	13	6
3	**The physical layer -II**The Telephone system structure, Local loop, Transmission impairment, Modem, Fibre in local loop, Trunks and multiplexing, FDM, TDM, Switching, Circuit switching, cross bar and space division multiplexing, Time division switching, Cellular radio, Cordless phone, Analog phone, Advance telephone system, Communicationsatellite, Geosynchronous satellite, low-orbit satellite, satellite versus fiber.	20	10
4	**Data link layer**Design issues, Framing, Error control , Flow control, Error-detection and correction static, Sliding window protocol.	10	5
5	**Network Layer**Routing algorithm, Shortest path, Flooding, Flow based, Distance vector, Link state , Hierarchical, broadcast ,Multicast routing, Network layer in internet, The IP protocol, IP address, subnets, internet control protocol, IGRP, OSPF, EIGRP,BGP,CIDR, IPV6.	20	9
6	**Transport layer**Transport services, Element of transport protocol, The internet transport protocol (TCP and UDP), Congestion control, Principle of reliable data transfer	15	7
7	**Application layer**Network security, DNS, Electronic Mail, The world wide web.	100%	5

i. Text Book and Reference Book:

1. **Computer Networks**
2. **Data Communication and Networking**

a. **Course Name:** Object Oriented Development with JAVA

b. **Course Code:** 05010103DS01

c. **Prerequisite:** Basic Knowledge of Object-Oriented Technology

d. **Rationale:** OOPs helps in organizing and structuring code in a more manageable way, making it easier to maintain and scale Java applications. It also promotes code reusability, modularity, and flexibility, leading to efficient and robust software development

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand the importance of creative and critical thinking.
CLO 2	Develop four basic skills (LSRW)
CLO 3	Expand vocabulary with proper pronunciation
CLO 4	Comprehend the basics of English grammar.
CLO 5	Read & write effectively for a variety of contexts.
CLO 6	Develop confidence in speaking skills

g. 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

h. Course Content:

Sr.	Content	Weightage%	Teaching Hours
1	**Introduction to JAVA** Java History, Java Features, How Java Differs from C and C++Overview of JAVA Language Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Arrays Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if …..else Statement, Nesting of if……Else Statements, The else if Ladder, The Switch Statement, The?: Operator. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.	**15**	**7**
2	**Introduction to Object Oriented Concepts** OOP Concepts (Class, Object, Encapsulation, Inheritance, Polymorphism) Overloading (Constructor and Methods) Static members Varargs Inheritance: Extending a Class Overriding Methods abstract and final keywords Interface	**25**	**12**
3	**Packages, Multithreading, Exception Handling** Packages, Packages and Member Access, Understanding Protected members, Importing packages, Java's standard packages (util, lang) The Exception Hierarchy, Exception Handling Fundamentals, try and catch, The Consequences of an Uncaught Exception, Using Multiple catch statements, Catching Subclass Exceptions, nested try blocks, Throwing an Exception, Rethrowing an Exception, Using finally, Using throws, Java's Built-in Exceptions, Creating Exception Subclasses Multithreading fundamentals, The Thread Class and Runnable Interface, Creating a Thread, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, Using Synchronized Methods, The synchronized Statement, Thread Communication Using notify(), wait() and notifyAll(), Suspending, Resuming, and Stopping Threads	**29**	**14**
4	**Event Handling, AWT and Swing** Using AWT controls, Layout managers and menus. Control Fundamentals - Labels, Buttons, Checkboxes, Checkbox Group, Choice Controls, Lists, Scroll Bars, Text Field, Text Area. Layout Managers: FlowLayout, BorderLayout, GridLayout, Menu Bars and Menus Introducing Swing: The Origins and Design Philosophy of Swing, Swing Components and Containers, Layout Introduction to event handing Event Delegation Model Event classes and event Listeners	**31**	**15**
	Total	**100%**	**30**

i. List of Practical

1. **Write a java program to display ''Hello World".**
2. **WAP to perform arithmetic operation.**
3. **WAP to calculate simple interest.**
4. **WAP to check the given no is odd or even.**
5. **WAP to find the area of circle.**
6. **WAP to find the largest no amongst three number.**
7. **WAP to draw following pattern**
8. **WAP for simple if statement.**
9. **WAP for If. Else statement**
10. **WAP for nested if statement.**
11. **WAP for if.else..if statement.**
12. **WAP for while loop statement.**
13. **WAP for for loop statement.**
14. **WAP for do while loop statement.**
15. **WAP for switch case statement.**
16. **WAP for constructor.**
17. **WAP for constructor overloading.**
18. **WAP for single inheritance.**
19. **WAP for multilevel inheritance.**
20. **WAP for hierarchical inheritance.**
21. **WAP to find area of circle, square and rectangle. (Method Overloading)**

j. Text Book and Reference Book:

1. **JAVA 2: The Complete Reference**
2. **JAVA The Complete Reference**
3. **Java: A Beginner's Guide**
4. **Programming with JAVA**
5. **JAVA2 Black Book**

a. **Course Name:** Operating Systems with Linux and Shell programming

b. **Course Code:** 05010103DS05

c. **Prerequisite:** Basic knowledge of computer hardware and software. Knowledge of Programming languages like C, C++ etc.

d. **Rationale:** To understand and learn the fundamentals of Operating System including Deal with memory management, process management, CPU scheduling, deadlocks and file management.

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand the importance of creative and critical thinking.
CLO 2	Develop four basic skills (LSRW)
CLO 3	Expand vocabulary with proper pronunciation
CLO 4	Comprehend the basics of English grammar.
CLO 5	Read & write effectively for a variety of contexts.
CLO 6	Develop confidence in speaking skills

g. 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

h. Course Content:

Sr.	Content	Weightage%	Teaching Hours
1	**Operating System Overview & Processes** Operating system objectives and functions Types of OS: real time, batch, multiprogramming/multitasking, multiprocessing, multithreading. Process management: Process, Process state diagram, Control and execution Threads: Threads, Types of threads	14	7
2	**Scheduling** Uni-processor Scheduling: Types of scheduling, Scheduling algorithms, **Multiprocessor and Real time scheduling:** Multiprocessor scheduling, Real time scheduling	17	8
3	**Memory Management** Memory management requirements, Memory partitioning, Paging, Segmentation, Virtual Memory: Virtual Memory, Demand paging, Page replacement algorithms	17	8
4	**Input/output and Files** I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, OS Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk cache. **File Management:** Overview, File Organization, File Directories, File Sharing, Record Blocking, Secondary Storage Management	17	8
5	**Concurrency control and Deadlock** Mutual Exclusion and Synchronization: Principles of concurrency, Mutual exclusion: Mutual exclusion, hardware support, Semaphores, Monitors, Message passing, Reader/writer problem. Deadlock and Starvation: Principles of deadlock, Deadlock prevention, Deadlock avoidance, Deadlock detection, Dining Philosophers problem	17	8
6	**Linux** Introduction to Linux System & History, Features of Linux, Basic Commands: login, logout, date, man, pwd, who, whoami, dir, ls, cd, mkdir, rmdir Use of Wild card characters and introduction to vi editor Introduction to environment variable like HOME, PATH, PS1 Types of FAP, use of chmod command Basic commands like cp, mv, rm, rev, file redirection, grep, cut, paste, find sort commands with example Introduction to shell script: execution of it, shell script variable, expr, test commands Control structure: if, if..else, case structure Iteration: while, for construct, break, continue, exit commands	18	9
	Total	**100%**	**48**

i. List of Practical

1. **General Purpose & File system GENERAL-PURPOSE UTILITIES**

1.	cal	8.	who
2.	date	9.	uname
3.	echo	10.	tty
4.	banner	11.	stty
5.	bc	12.	exit
6.	script	13.	clear
7.	passwd		

THE FILE SYSTEM

1. pwd
2. cd
3. mkdir
4. rmdi
5. ls

2. **Handling ordinary files and Process**

HANDLING ORDINARY FILES

1.	cat	7.	file
2.	cp	8.	wc
3.	rm	9.	od
4.	mv	10.	cmp
5.	more	11.	comm
6.	lp	12.	Diff

THE PROCESS

1. Ps
2. kill
3. **at**
4. **batch**
5. **time**

3. **SIMPLE FILTERS**

SIMPLE FILTERS

1. **pr**
2. **head**
3. **tail**
4. **cut**
5. **paste**
6. **sort**
7. **uniq**
8. **tr**

4. **File attributes & FILTERS USING REGULAR EXPRESSION**

FILTERS USING REGULAR EXPRESSION-GREPAND SED

1. **grep**
2. **sed**
3. **egrep**
4. **fgrep**

BASIC FILE ATTRIBUTES

1. **chmod**
2. **chown**
3. **chgrp**

5. Basic programming using shell script

1. Write a script to read four integer numbers from the user and find sum, product and average of these four numbers.

2. Write a script to implement simple calculator, which can perform basic mathematical operations to implement using menu driven:

a. Addition
b. Subtraction
c. Multiplication
d. Divison

3. Write a script to calculate gross salary.
4. Write a script to find factorial of given number.
5. Write a script to find max and min number from the data passed through command line.

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6. Shell programming based on use of loops

1. **Write a script to calculate sum of series. 1+x+x^2+x^3+x^4**
2. **Write a script to find sum of any no. from command line argument.**
3. **Write a script to print reverse string.**
4. **Write a script to sum of digits of an entered number.**
5. **Write a script to perform following string operation :**
   a. **Find length of string**
   b. **Extract substring**
   c. **Find location of any character**

7. Shell programming based on control structure

1. **Write a script to check given string is palindrome or not.**
2. **Write a script to check whether a number is prime or not.**
3. **Write a script to read a character from user. Determine whether it is upper case letter, lower case letter or digit.**
4. **Write a script to sort the given numbers in ascending order.**
5. **Write a script to check whether the file is or dinary or not.**

8. Shell programming based on use of files & database

1. Write shell script to manage(add/update/view/delete) Judge database with Fields: JudgeName, CourtName, City,Cases_ judged,TotalCasses :

a. Display No of records
b. Find Judge with highest cases judged
c. Calculate total Cases of CourtAhmedabad
d. List All Judge

Names Exit

9. Shell programming based on file & database

1. Write a Script for Simple LIBRARY Management System Operation. Database File Contains Following Fields. AccNo, Title, Author, Edition, Publisher.

a. VIEW RECORD BASED ON QUERY
b. ADD RECORD
c. DELETE RECORD
d. COUNT TOTAL NUMBER OF RECORDS

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i. Text Book and Reference Book:

1. **Operating Systems**
2. **Operating System Principles**
3. **Modern Operating Systems**
4. **Understanding Operating Systems**
5. **The Design of UNIX Operating System**

a. **Course Name:** Web Application Development

b. **Course Code:** 05102205

c. **Prerequisite:** Basic Knowledge of C#.NET or VB.NET

d. **Rationale:** Dynamic ASP.NET websites or web application skill for Computer Science Student.

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Understand .NET framework architecture and its features
CLO 2	Build dynamic web applications to demonstrate event handling, state management and content manipulation using C#
CLO 3	Develop data driven applications using ADO.NET, LINQ , XML and web services

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**3**	**20**	**20**	**20**	**60**	**30**	**150**

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

h. Course Content:

Sr.	Topics	Weightage%	Teaching Hours
1	**Overview of ASP.NET Framework** Introduction Overview of Asp.NET Framework, Client Server Architecture, Application Web Servers, Installation of IIS server, Types of Files in ASP.NET, Types of controls in ASP.NET, Page Architecture, Page Class, Introduction to standard Controls : Buttons, Textbox, Checkbox, Label, Panel, List box, Dropdown list, File Upload Control, Creating Asp.Net Application & Adding Controls to a Webpage, Running an ASP.Net Application,	17	8
2	**ASP.NET Validation Controls** Introduction to Validation, Client Side Validation, Server Side Validation, Types of Control: Required Field Validator, Range Validator, Compare Field Validator, Regular Expression Validator, Custom Validator, Validation Summery Control.	13	6
3	**State Management** Introduction to State, Requirement of State in Asp.Net, Client Side State Management, Server Side State Management, Various State Management Techniques : View State, Query String, Cookie, Session State, Application State.	17	8
4	**ADO.NET** Architecture of ADO.NET :Connected Architecture & Disconnected Architecture, ADO.NET Classes & Objects : Connection, Command, Data Reader, Data Adapter, Dataset, Data Column, Data Row, Data Constraints, Data View, Grid view Control, Repeater Control, Binding Data to Data Bound Controls, SQL Data Source Control, Databinding Expressions	21	10
5	**Master page & Theme** Overview of Master Page, Requirement of a Master Page in an Asp.NET application, Designing Website with Master Page, Theme and CSS	4	2
6	**Caching Application & Data** Overview of Caching, Page Output Caching, Partial Page Caching, Absolute Cache Expiration, Sliding Cache Expiration, Data Caching	4	2
7	**Working with XML** Introduction to XML, Creating XML file, Reading Datasets From XML, Writing Datasets With XML.	4	2
8	**Web services** Introduction to web service, Standards & Protocols : HTTP, SOAP, UDDI,XML, Creating a Web Service, Consuming a Web Service	10	5
9	**ASP.NET Application Configuration and Deployment of Application** Introduction To Web.Config, Common Configuration Sections, AppSettings, Tracing, Custom Errors, Authentication And Authorization, Deployment of Application in web server	10	5

i. List of Practical

1. **Create a first ASP.NET Website and execute it on a web browser.**
2. **Write ASP.NET program that will display "HelloWorld" on page load event.**
3. **Write ASP.NET program that will display "HelloWorld" in Label control on form load event.**
4. **Write ASP.NET program that will display "HelloWorld" in division tag or paragraph tag on click of button.**
5. **Write ASP.NET program that will do following operations:**

   Take two string values from textbox control, contacted it &display it.
6. **Write ASP.NET program that will take two int values & calculate a^b**
7. **Write ASP.NET program that will take 3 subject marks & find Total & Average.**
8. **Create ASP.NET Webpage that will take feedback details from user and Display it as testimonial. Feedback Name, email and feedback desc.**
9. **Create ASP.NET Web page that will upload any file to web server.**
10. **Create ASP.NET web page that will display Sleeve Items in a list box control. On the selection of display image and cost of item.**
11. **In the above ASP.NET Web page, all users to add quantity in textbox control (i.e Read only) on click of+&-button controls quantity should be increment & decrement then calculate payment.**
12. **Write an asp.net web page that will make student exam details from exam form and generate fee receipt. Exam details: name, exam type year, sem subject's fees.**
13. **Create ASP.NET Webpage that will test the Database connection.**
14. **Create ASP.NET web page that will display data in Grid view Control using Sql Data Source.**
15. **Create ASP.NET web page that will display data in Grid view Control using C# code.**
16. **Create ASP.NET Web page that will display data into Repeater control.**
17. **Create ASP.NET Web page that will display data into List box and drop-down list control using SqlDataSource.**
18. **Create ASP.NET Webpage that will display data into List box and dropdown list control on button click event using c# code.**
19. **Create ASP.NET webpage that will take User's Name & Favorite Color from Textbox & Dropdown list. before submitting values check whether values are empty or not using required Field Validator.**
20. **CreateASP.NET Webpage that will take validate from the user into text box control using Range validator.**
21. **Create ASP.NET Webpage that will check validation using Compare Validation: 1.Check the DataType Of Bdate 2.Check Bdate must be greater than now/today. 3.Check End Date Must be Greater than Start Date.**
22. **Create ASP.NET Webpage that will take valid mail addresses and valid URLs using Regular Expression Validation Control.**
23. **Create ASP.NET Webpage that will not all users to enter more than10 characters Using custom validator.**
24. **Create ASP.NET Webpage that registration details like Username, Password, and Confirm Password from the user, assign validation controls on all the fields and display a validation error message.**
25. **Create an ASP.NET Webpage that will take username and password from the user and create session a session for username and display it on a webpage.**
26. **Create an ASP.NET webpage that will allows users to add product details to the product master table and upload product image to the server.**
27. **Create ASP.NET web page that will display products from the product master table.**
28. **Create a webpage that will show full details of the product on click.**
29. **Create ASP.NET webpage that will display all the records into grid view control. Create Employee Table EmpID, EmpName, Bdate, and Contact.**
30. **In above ASP.NET webpage adds web controls that will insert data into grid view control.**
31. **In the above ASP.NET webpage added it button in to grid view control that will edit/update data of grid view control.**
32. **In the above ASP.NET web page add delete but not to grid view control that will delete data of grid view control.**

33. **Create ASP.NET web page that will display the current date & time and create an output cache of the webpage and create a cache by param.**
34. **Create ASP.NET webpage that will display the current date & time from user control and create a partial cache of the webpage.**
35. **Create ASP.NET web pages that will display the current date & time using absolute expiration cache.**
36. **Create ASP.NET web pages that will display the current date & time using absolute expiration cache.**
37. **Create ASP.NET a web page that will display data into grid view control and create data caching.**
38. **Create an XML file that will store student information.**
39. **Create ASP.NET Web page that will read XML file and display XML data into GridView control.**
40. **Create ASP.NET Webpage that will read data from the database and write on XML on button click.**

i. Text Book and Reference Book:

1. **Asp.Net 4.0– Unleashed**
2. **Beginning ASP.NET4.5 in C.Sharp**

a. **Course Name:** Web Application Development

b. **Course Code:** 05102205

c. **Prerequisite:** Basic Knowledge of C#.NET or VB.NET

d. **Rationale:** Dynamic ASP.NET websites or web application skill for Computer Science Student.

e. Course Learning Objective:

CLOBJ 1	Understanding and responding to basic questions and statements.
CLOBJ 2	Learning essential words and phrases for daily communication.
CLOBJ 3	Understanding and applying basic grammar rules (e.g., verb tenses, articles, prepositions).
CLOBJ 4	Overcoming language barriers through practice and exposure.
CLOBJ 5	Responding appropriately to spoken prompts.
CLOBJ 6	Understanding spoken English in common, everyday situations.

f. course Learning Outcomes:

CLO 1	Comprehend day to day English
CLO 2	Respond to familiar issues / topics in English
CLO 3	Speak confidently on stage
CLO 4	Able to solve aptitude questions
CLO 5	Able to crack the technical exam for IT companies

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**3**	**20**	**20**	**20**	**60**	**30**	**150**

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

h. Course Content:

Sr.	Topics	Weightage%	Teaching Hours
1	Articles, Prepositions and Interrogatives	5	3
2	Listening-Skill Building IL16-01W	2	1
3	Clocks, Calendars, Direction sense and Cubes	3	3
4	Listening-Skill Building IL16-02W	2	1
5	Data arrangements and Blood relations	5	3
6	Listening-Skill Building IL16-03W	3	1
7	Data Interpretation, Data Sufficiency	3	3
8	Speaking-Skill Building IS 16-01W	2	1
9	C - Programming - Part 1	3	2
10	Speaking-Skill Building IS 16-02W	2	1
11	C - Programming - Part 2	2	2
12	Speaking-Skill Building IS 16-03W	5	1
13	C worksheets	5	2
14	Paragraph Completion Worksheet	5	1
15	C++ Programming - Part 1	2	2
16	Paragraph Jumble Worksheet	5	1
17	C++ Programming - Part 2	3	2
18	Reading Comprehension Worksheet	5	1
19	C++ Worksheets	5	2
20	Sentence Completion Worksheet	5	1
21	Data Structures - Part 1	2	2
22	Reading-Skill Building16-01	2	1
23	Data Structures - Part 2	3	2
24	Writing-Skill Building IW 16-01W	2	1
25	Data Structures Worksheets	5	2
26	Writing-Skill Building IW 16-02W	3	1
27	Writing-Skill Building IW 16-03W	5	1
		94	45

i. Text Book and Reference Book:

1. Word Power Made Easy
2. Understanding and Using English Grammar
3. Let Us C
4. Let us C++
5. Fundamentals of Data Structure