Nallamuthu Gounder Mahalingam College (Autonomous)

Accredited by NAAC with A++ in IV Cycle

ISO 9001:2015 Certified Institution

Pollachi-642001

Department of BCA

SYLLABUS

(Effective for 2025–2028 Batch and onwards)

CDC / 25 R 1.4

UG DEPARTMENT OF COMPUTER APPLICATIONS

SYLLABUS

BATCH: 2025–2028

FACULTY MEMBERS

Dr. K.Haridas,M.C.A.,M.Phil.,Ph.D.,

Dr.R.Malathi Ravindran,M.C.A.,M.Phil.,Ph.D.,

Mr.S.DilipKumar,M.C.A.,M.Phil.,(Ph.D).,

Dr.T.Sumathi, M.C.A., M.Phil., Ph.D.,

Dr.S.Sathiyapriya, M,Sc.,M.Ed.,Ph.D.,

Ms.A.Priyadharshini, M.C.A.,M.Phil.,

Ms.N.AmirthaGowri, M.Sc.,M.Phil.,(Ph.D).,

Mr.K.M.Thiyagarajan, M.C.A.,M.Phil.,M.B.A.,(Ph.D).,

Ms.S.Lavanya,M.C.A.

Nallamuthu Gounder Mahalingam College

An Autonomous Institution affiliated to Bharathiar University

Accredited by NAAC with A++ in IV Cycle

ISO 9001:2015 Certified Institution

Pollachi – 642 001

CDC / 25 R 1.4

Department of Computer Applications

Vision

The Department of Computer Applications (U.G) is dedicated to sustain excellence in teaching, to compete global markets for computer professionals, to structure the students to articulate, principled, innovative and confident which leads to be good leaders and decision makers with passion.

Mission

- Increasing the dimensional of education through the effective use of Information Technology.
- Provide comprehensive environment to improve the individual proficiency.
- Persuade the students to explore to create to challenge and to lead.
- Inclusive of industry and life oriented subjects based on the current scenario.

Program Educational Objectives:

PEO1	To develop skilled manpower in the various areas of information technology like Data Base Management, Software Development, Computer-Languages, Software Engineering and Web Based Applications etc.
PEO2	To prepare our graduate to start the career as an Application Developer , Network Administrator , Software Tester, Software Engineer, Junior Programmer, Web Developer.
PEO3	To pursue higher studies such as MCA, M.Sc. Computer Science, M.Sc. Data Science,MBA.
PEO4	To impart high professionalism among the students by providing technical and softskills with ethical standards.
PEO5	To encourage students for research activities and entrepreneurial skills by inculcating interactive quality teaching and organizing symposiums, conferences, seminars, workshops and technical discussions.

Program Outcomes:

PO1	**Disciplinary Knowledge-** Demonstrate the aptitude of Computer Programming and Computer based problem solving skills.
PO2	**Critical Thinking-**Display the knowledge of appropriate theory, practices and toolsfor the specification, design, implementation
PO3	**Problem Solving**– Ability to link knowledge of Computer Science with other two chosen auxiliary disciplines of study.
PO4	**Moral & Ethical Awareness/Reasoning**- Demonstrate ethical awareness, integrity, and responsibility in computing by adhering to professional codes, ensuring fairness, cyber security, and data privacy while fostering sustainable and socially responsible innovations.
PO5	**Lifelong Learning –** Ability to pursue higher studies of specialization and to take up technical employment.
PO6	**Analytical Reasoning-** Ability to formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate.
PO7	**Scientific Reasoning –** Ability to operate, manages, deploy, configure computer network, hardware, software operation of an organization.
PO8	**Digital and Emerging Technological skills –** Demonstrate proficiency in understanding, evaluating, and applying emerging technologies such as Artificial Intelligence, Block chain, IoT, Cloud Computing, and Quantum Computing to develop innovative, sustainable, and ethically responsible solutions for real-world challenges.
PO9	**Multicultural Competence –**Ability to appreciate emerging technologies and tools.
PO10	**Co-operation/ Teamwork –** The ability to work independently on a substantial software project and as an effective team member.

Program Specific Outcomes:

PSO - 01	**Software Proficiency:** To cultivate skills for a successful career in software development, entrepreneurship, and higher studies, it's essential to explore technical knowledge across diverse areas of computer applications and gain experience in an IT environment conducive to growth.
PSO - 02	**Latest Technology:** Expertise to face the challenges of latest trends and career opportunities as per local and global industry needs.

Mapping

PEOs / POs \ PSOs	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	H	H	H	H	H
PO2	H	H	H	H	H
PO3	M	M	H	M	M
PO4	M	M	H	H	H
PO5	M	H	M	M	M
PO6	H	H	H	H	H
PO7	M	M	H	H	H
PO8	H	H	H	H	H
PO9	H	H	M	M	M
P10	H	H	H	H	H
PSO1	H	M	H	H	H
PSO2	H	H	H	H	M

B.Sc. / B.Com.– For Computer Science / Commerce Cluster

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2025 - 2026 ONWARDS)

I to VI SEMESTERS

SCHEME OF EXAMINATIONS

SEMESTER - I										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL1C1	Tamil Paper-I	5	-	-	3	25	75	100	3
	25UHN1C1	Hindi Paper-I								
	25UFR1C1	French Paper-I								
II	25UEN101	Communication Skills – I	5	-	-	3	25	75	100	3
III	25UBC101	**CC I :** Programming In C	5			3	25	75	100	4
	25UBC102	**CC II :** Data Structures and Algorithms	4			3	25	75	100	4
	25UBC1A1/ 25UBC1A2	**GE I – Allied:** Mathematics I- Computer Oriented Numerical And Statistical Methods / Discrete Mathematics - I	4			3	25	75	100	4
	25UBC103	**CC Lab -I:** Programming In C		4		3	20	30	50	2
IV	25EVS101	**AECC I:** Environmental Studies	2			2	-	50	50	2
	25HEC101	Human Excellence - Personal Values & Indian Yoga Practice - I	1	-	-	2	20	30	50	1
EC		Online Course (Optional) (MOOC / NPTEL / SWAYAM)								Grade
Total			**30**						**650**	**23**

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

CC – Core Course; GE – Generic Elective; AECC - Ability Enhancement Compulsory Course

SEMESTER - II										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL2C2	TamilPaper-II	5	-	-	3	25	75	100	3
	25UHN2C2	Hindi Paper-II								
	25UFR2C2	French Paper-II								
II	25UEN202	Communication Skills – II	5	-	-	3	25	75	100	3
III	25UBC204	**CC III :**Object Oriented Programming With C++	5			3	25	75	100	4
	25UBC205	**CC IV :**Core-IV: Digital Computer Fundamentals	4			3	25	75	100	4
	25UBC2A1/ 25UBC2A2	**GE II - Allied :**Mathematics II– Mathematical Foundations Of Computer Applications / Discrete Mathematics - II	4			3	25	75	100	4
	25UBC206	**CC Lab - II :** Programming In C++		4		3	20	30	50	2
	25UBC2S1/ 25UEL2S2	**SEC** I: Naan Mudhalvan : Graphic Design and Multimedia / Profession Skills		2		3	20	30	50	2
IV	25HEC202	Human Excellence - Family Values & Indian Yoga Practice - II	1			2	20	30	50	1
EC	25CMM201	**IKS:**Manaiyiyal Mahathuvam - I			15 Hrs.	2	-	50	50	Grade
	25CUB201	**IKS:**Uzhavu Bharatham - I			15 Hrs.	2	-	50	50	Grade
		Online Course (Optional) (MOOC / NPTEL / SWAYAM)								Grade
Total			**30**						**650**	**23**

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

CC – Core Course; GE – Generic Elective; AECC - Ability Enhancement Compulsory Course;

SEC – Skill Enhancement Course; IKS – Indian Knowledge System;

SEMESTER - III										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL3C3	TamilPaper-III	3	-	-	3	25	75	100	3
	25UHN3C3	Hindi Paper-III								
	25UFR3C3	French Paper-III								
II	25UEN3C3	Communication Skills – III	3	-	-	3	25	75	100	3
III	25UBC307	**CC V:**Relational Database management System and Oracle	5			3	25	75	100	4
	25UBC308	**CC VI:** Operating System & Linux	4			3	25	75	100	4
	25UBC3A1/ 25UBC3A2	**GE III-Allied:** Organizational Behaviour / Corporate Systems	4			3	25	75	100	4
	25UBC309	**CC Lab - III:** Relational Database ManagementSystem and Oracle		4		3	20	30	50	2
	25UBC310	**CC Lab- IV:** Programming in Linux		4		3	20	30	50	2
IV	25UBC3N1 / 25UBC3N2	Non Major Elective-I: Web Designing Lab Non Major Elective-I: Desktop Publishing Lab	-	2	-	2	-	50	50	1
	25HEC303	Human Excellence - Professional Values &Ethics - Indian Yoga Practice - III	1	-	-	2	20	30	50	1
V	25UHW301	Health and Wellness	2#	-	-	-	100 Reduce To 25	-	25	1
EC	25CMM302	**IKS:**ManaiyiyalMahathuvam - II			15 Hrs.	2	-	50	50	Grade
	25CUB302	**IKS:**Uzhavu Bharatham - II			15 Hrs.	2	-	50	50	Grade
	25UBC3VA	**VAC I:** Digital Marketing			30 Hrs.					2*
					45 Hrs.					3*
Total			**30**						**725**	**25**

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course
CC – Core Course; GE – Generic Elective; VAC-Department Specific Value Added Course;

*Extra Credits; IKS – Indian Knowledge System;
30 hours outside the Regular Hours

SEMESTER - IV										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL4C4	TamilPaper-IV	3	-	-	3	25	75	100	3
	25UHN4C4	Hindi Paper-IV								
	25UFR4C4	French Paper-IV								
II	25UEN4C4	Communication Skills – IV	3	-	-	3	25	75	100	3
III	25UBC411	**CC VIII** Visual Programming	3			3	25	75	100	3
	25UBC412	**CC IX:** Java Programming	4			3	25	75	100	4
	25UBC4A1/ 25UBC4A2	**GE IV-Allied:** Mathematics III- Computer Based Optimization Techniques/ BusinessMathematics	4			3	25	75	100	3
	25UBC413	**CC Lab V** Visual Programming		4		3	20	30	50	2
	25UBC414	**CC Lab VI:** Java Programming		4		3	20	30	50	2
	25UBC4S1/ 25UBC4S2	**SEC II**: Naan Mudhalvan: Advanced Excel/ Data Science Foundation		2		2	20	30	50	2
	25UBC4N1 / 25UBC4N2	Non Major Elective-II: Illustration Effects Lab/Non Major Elective –II: Animation Techniques Lab	-	2	-	2	-	50	50	1
IV	25HEC404	Human Excellence - Social Values & Indian Yoga Practice – IV	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	50 Reduce To 25	-	25	1
EC	25CMM403	**IKS:** Manaiyiyal Mahathuvam - III			15 Hrs.	2	-	50	50	Grade
	25CUB403	**IKS:** UzhavuBharatham - III			15 Hrs.	2	-	50	50	Grade
	25UBC4VA	**VAC II:** Digital Media Planning			30 Hrs.					2*
					45 Hrs.					3*
Total			**30**						**775**	**25**

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented CourseCC – Core Course; GE – Generic Elective; SEC – Skill Enhancement Course; VAC-Department Specific Value Added Course; IKS – Indian Knowledge System; *Extra Credits;

SEMESTER - V									
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
III	25UBC515	**CC XI:** Python Programming	5			3	25	75	100	5
	25UBC516	**CC XII:** AI-Driven Low-Code Applications using Zoho creator	5			3	25	75	100	5
	25UBC5E1 / 25UBC5E2 / 25UBC5E3	**DSE -I:**	6			3	25	75	100	5
	25UBC517	**CC Lab VII :**Python Programming		5		3	20	30	50	2
	25UBC518	**CC Lab VIII :** AI-Driven Low-Code Applications using Zoho creator		5		3	20	30	50	2
	25UBC519	**Project:** Mini Project					25	75	100	2
	25UBC5S1 / 25UBC5S2	**SEC III**: Mobile Application Development Lab /R Programming Lab		3		2	-	50	50	2
IV	25HEC505	Human Excellence - National Values & Indian Yoga Practice -V	1	-	-	2	20	30	50	1
EC	25CSD501	Soft Skills Development - I								Grade
	25GKL501	General Awareness - Self Study	SS		-	2	-	50	50	Grade
	25UBC5AL	**ALC - I**: Adhoc and Sensor Networks- Self Study	SS					100	100	2*
Total			**30**						**600**	**24**

DSE -I:
25UBC5E1 – Internet Of Things(IOT)/
25UBC5E2 – Networks /
25UBC5E3-Data Science

SEC III
25UBC5S1–Mobile Application Development Lab/
25UBC5S2 – R Programming

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course
CC – Core Course; DSE – Discipline-Specific Elective; SEC – Skill Enhancement Course
ALC-Advanced Learner Course (Optional)

*Extra Credits;**Credits – Based on course content maximum of 4 credits

SEMESTER - VI										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
III	25UBC620	**CC XIV:** Software Engineering and Testing	5			3	25	75	100	3
	25UBC6E4 / 25UBC6E5 / 25UBC6E6	**DSE -II:**	6			3	25	75	100	5
	25UBC6E7/ 25UBC6E8 / 25UBC6E9	**DSE -III:**	6			3	25	75	100	5
	25UBC621	**CC Lab IX:** Software Testing		4		3	20	30	50	2
	25UBC622	**CC Lab X:** PHP Programming		5		3	20	30	50	2
	25UBC6S3/ 25UBC6S4/	Skill Enhancement Course **(SEC)** IV: **NaanMudhalvan :** InterviewReadiness / A 360° Interview Preparation Course	3			2	25	25	50	2
IV	25HEC606	Human Excellence - Global Values & Indian Yoga Practice - VI	1	-	-	2	20	30	50	1
EC	25CSD602	Soft Skills Development - II								Grade
	25UBC6AL	Advanced Learner Course **ALC - II**: Disaster Management	SS					100	100	2*
Total			**30**						**500**	**20**
Grand Total									**3900**	**140**

Discipline Specific Elective (DSE) – II 25UBC6E4-StorageManagement 25UBC6E5 -Artificial Intelligence and Expert system 25UBC6E6-InformationSecurity	**Discipline Specific Elective (DSE) – III** 25UBC6E7-DataMining and Warehousing 25UBC6E8-Cloud Computing 25UBC6E9- DSE -III: Data Analytics Essentials : Power BI, Tableau and Pandas	**SEC-IV** –25UBC6S3 – Interview Readiness 25UBC6S4-A 360° InterviewPreparation Course

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

CC – Core Course; DSE – Discipline-Specific Elective; SEC – Skill Enhancement Course

ALC-Advanced Learner Course (Optional)

*Extra Credits;**Credits – Based on course content maximum of 4 credits

List of Abbreviations:

CC – Core Course
AECC –Ability Enhancement Compulsory Course
DSE – Discipline-Specific Elective
ALC – Advanced Learner Course
GE – Generic Elective
SEC – Skill Enhancement Course
VAC –Value Added Course

Grand Total = 3900; Total Credits = 140

Question Paper Pattern

(Based on Bloom's Taxonomy)

K1-Remember; **K2**- Understanding; **K3**- Apply; **K4**-Analyze; **K5**- Evaluate

1. Theory Examinations: 75 Marks (Part I, II, & III)

(i) Test- I & II, ESE:

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1 - 10)	A (Q1 – 5 MCQ) (Q6 – 10 Define / Short Answer / MCQ)	10 * 1 = 10	MCQ / Define	**75**
K3 (Q11-15)	B (Either or pattern)	5 * 5 = 25	Short Answers	
K4 & K5 (Q16 – 20)	C (Either or pattern)	5 * 8 = 40	Descriptive/ Detailed	

2. Theory Examinations: 38 Marks (3 Hours Examination) (Part III: If applicable)

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1 - 10)	A (Q 1 – 10 MCQ)	10 * 1 = 10	MCQ	**50 (Reduced to 38)**
K3 (Q11 – 15)	B (Either or pattern)	5 * 3 = 15	Short Answers	
K4 & K5 (Q16-20)	C (Either or pattern)	5 * 5 = 25	Descriptive/ Detailed	

3. Theory Examinations: 38 Marks (2 Hours Examination) (Part IV: If applicable)

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1-10)	A (Q1 – 5 MCQ) (Q6–10 Define / Short Answer)	10 * 1 = 10	MCQ / Define	**50 (Reduced to 38)**
K3, K4 & K5 (Q11-15)	B (Either or pattern)	5 * 8 = 40	Descriptive/ Detailed	

4. Practical Examinations:

Paper	Maximum Marks	Marks for		Components for CIA		
		CIA	CEE	Tests	Observation Note	Record Note
Practical (Core / Elective)	50	20	30	10	05	05
Practical (Core / Elective)	75	30	45	20	05	05
Practical (Core / Elective)	100	40	60	30	05	05

5. Project:

Paper	Maximum Marks	Marks for		
		CIA	CEE	
			Evaluation	Viva-voce
Project	100	25	50	25
Project	150	40	75	35
Project	200	50	100	50

***** CIA – Continuous Internal Assessment & CEE – Comprehensive External Examinations

Components of Continuous Internal Assessment (CIA)

THEORY

Maximum Marks: 100; CIA Mark: 25; CEE Mark: 75;

Components		Calculation	CIA Total
Test 1	75	(75+75+15+10)/7	25
Test 2 / Model	75		
Assignment / Digital Assignment	15		
Others*	10		

*Others may include the following: Seminar / Socratic Seminars, Group Discussion, Role Play, APS, Class participation, Case Studies Presentation, Field Work, Field Survey, Term Paper, Workshop / Conference Participation, Presentation of Papers in Conferences, Quiz, Report / Content Writing, etc.

Maximum Marks: 50; CIA Mark: 12; CEE Mark: 38; (Part III: If applicable)

Components		Calculation	CIA Total
Test 1	50	(50+50+10+10)/10	12
Test 2 / Model	50		
Assignment / Digital Assignment	10		
Seminar	10		

PROJECT

Maximum Marks: 100; CIA Mark: 25; CEE Mark: 75;

Components		Calculation	CIA Total
Review I	5	5+5+5+10	25
Review II	5		
Review III	5		
Report Submission	10		

Maximum Marks: 200; CIA Mark: 50; CEE Mark: 150;

Components		Calculation	CIA Total
Review I	10	10+ 10+10+20	50
Review II	10		
Review III	10		
Report Submission	20		

** Components for 'Review' may include the following:*

Originality of Idea, Relevance to Current Trend, Candidate Involvement, and Presentation of Report for Commerce, Management & Social Work.

Synopsis, System Planning, Design, Coding, Input form, Output format, Preparation of Report & Submission for Computer Science cluster.

Continuous Internal Assessment for Project

For Commerce, Management & Social Work Programme

The Final year Commerce, Management & Social Work students should undergo a project work during (V/VI) semester

- The period of study is for 4 weeks.
- Project / Internship work has to be done in an industrial organization (or) work on any industrial problem outside the organization is allowed.
- Students are divided into groups and each group is guided by a Mentor.
- The group should not exceed four students, also interested student can undergo individually.
- A problem is chosen, objectives are framed, and data is collected, analyzed and documented in the form of a report / Project.
- Viva – Voce is conducted at the end of this semester, by an External Examiner and concerned Mentor (Internal Examiner).
- Project work constitutes 100 marks, out of which 25 is CIA and 75 is CEE Marks.

Mark Split UP

CIA	CEE	Total
25	75	100

S. No	Components for CIA	Marks
1	Review – I *	5
2	Review – II *	5
3	Review – III *	5
4	Rough Draft Submission	10
Total		**25**

* Review includes Objectives and Scope, Research Methodology, Literature Review, Data Analysis and Results, Discussion and Interpretation, Recommendations and Implications, Presentation and Format, Creativity and Originality, and Overall Impact and Contribution.

S. No	Components for CEE	Marks
1	Evaluation*	50
2	Viva-Voce	25
Total		**75**

* Evaluation includes Originality of Idea, Relevance to Current Trend, Candidate Involvement, Thesis Style / Language, and Presentation of Report.

Continuous Internal Assessment for Project

For Science Stream

The Final year Science students should undergo a project work during (V/VI) semester

- The period of study is for 4 weeks.
- Project / Internship work has to be done in an industrial organization (or) work on any industrial problem outside the organization is allowed.
- Students are divided into groups and each group is guided by a Mentor.
- The group should not exceed four students, also interested student can undergo individually.
- A problem is chosen, objectives are framed, and data is collected, analyzed and documented in the form of a report / Project.
- Viva – Voce is conducted at the end of this semester, by an External Examiner and concerned Mentor (Internal Examiner).
- Project work constitutes 200 marks, out of which 50 is CIA and 150 is CEE Marks.

Mark Split UP

CIA	CEE	Total
50	150	200

S. No	Components for CIA	Marks
1	Review – I *	10
2	Review – II *	10
3	Review – III *	10
4	Rough Draft Submission / Report Submission	20
Total		**50**

*** Review I: -** Problem Analysis

*** Review II: -** Data collection & Design

*** Review III: -** Data Analysis

S. No	Components for CEE	Marks
1	Evaluation *	100
2	Viva-Voce	50
Total		**150**

* Evaluation includes Problem and Hypothesis, Experimental Design / Materials / Procedure, Variables / Controls / Sample Size, and Data Collection / Analysis.

Continuous Internal Assessment for Project

For Computer Science Cluster

Maximum Marks: 100 Marks

Components for CIA: 25 Marks

Criterion	Mode of Evaluation	Marks	Total
I	Synopsis, Company Profile, System Specification, Existing System, Proposed System OR (For Android Developments) Planning Stage	05	25
II	Supporting Diagrams like system flowchart, ER, DFD, Usecase and Table Design OR UI and UX Design Application Architect and Prototyping	05	
III	Coding, Input forms, Output format, Testing OR Development, Testing	05	
IV	Preparation of Report & Submission	10	

ComponentsforCEE: 75 Marks

ComponentsforCEE	Marks	Total	Grand Total
Evaluation			75
Title Relevance of the Industry/Institute	10	50	
Technology	10		
Design and Development Publishing	10		
Testing, Report	20		
Viva Voce			
Project Presentation	10	25	
Q&A Performance	15		

HEALTH AND WELLNESS COURSE

Scheme of Evaluation

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
	Total	100

COMPUTER SCIENCE PROJECT and VIVA VOCE

Guidelines

Introduction

The title of the project work and the organization will be finalized at the end of the fifth Semester. Each student will be assigned with a Faculty for guidance. The Project work and coding will be carried by using the facility of the computer science lab as well as in the organization. The periodical review will be conducted to monitor the progress of the project work. The project report will be prepared and submitted at the end of the semester. An external examiner appointed by the Controller of Examination will conduct the viva voce examination along with a respective guide.

Area of Work

- Web Based Development
- Mobile app development
- Website development
- IoT Projects
- Big Data and Data Mining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python, R, Tableau etc.
- System Software
- Web Security Projects
- Image Processing

Methodology

Arrangement of Contents:

The sequence in which the project report material should be arranged and bound is as follows:

1. Cover Page & Title Page
2. Bonafide Certificates
3. Declaration
4. Acknowledgement
5. Synopsis
6. Table of Contents
7. Chapters
8. Appendix
9. References

Format of Table of Contents

TABLE OF CONTENTS

Size of the Project

The Project Report contents should be a maximum of not exceeding 70 pages.

STUDENT SEMINAR EVALUATION RUBRIC

Grading Scale:

A	B	C	D
8-10	5-7	3-4	0-2

CRITERIA	A - Excellent	B - Good	C - Average	D - Inadequate
Organization of presentation	Information presented as an interesting story in a logical, easy-to-follow sequence	Information presented in logical sequence; easy to follow	Most of the information is presented in sequence	Hard to follow; sequence of information jumpy
Knowledge of the subject & References	Demonstrated full knowledge; answered all questions with elaboration **&** Material sufficient for clear understanding **AND** exceptionally presented	At ease; answered all questions **but** failed to elaborate **&** Material sufficient for clear understanding **AND** effectively presented	At ease with information; answered most questions **&** Material sufficient for clear understanding **but** not clearly presented	Does not have a grasp of information; answered only rudimentary Questions **&** Material not clearly related to the topic **OR** background dominated seminar
Presentation Skills using ICT Tools	Uses graphics that explain and reinforce text and presentation	Uses graphics that explain the text and presentation	Uses graphics that relate to text and presentation	Uses graphics that rarely support text and presentation
Eye Contact	Refers to slides to make points; engaged with the audience	Refers to slides to make points; eye contact the majority of the time	Refers to slides to make points; occasional eye contact	Reads most slides; no or just occasional eye contact
Elocution – (Ability to speak English language)	Correct, precise pronunciation of all terms The voice is clear and steady; the audience can hear well at all times	Incorrectly pronounces a few terms Voice is clear with few fluctuations; the audience can hear well most of the time	Incorrectly pronounces some terms Voice fluctuates from low to clear; difficult to hear at times	Mumbles and/or Incorrectly pronounces some terms Voice is low; difficult to hear

WRITTEN ASSIGNMENT RUBRIC

Grading Scale:

A	B	C	D	F
13-15	10-12	7-9	4-6	0-3

CRITERION	A - Excellent	B - Good	C - Average	D - Below Average	F - Inadequate
Content & Focus	Hits on almost all content exceptionally clear	Hits on most key points and the writing is interesting	Hits in basic content and writing are understandable	Hits on a portion of content and/or digressions and errors	Completely off track or did not submit
Sentence Structure & Style	* Word choice is rich and varies * Writing style is consistently strong * Students own formal language	* Word choice is clear and reasonably precise * Writing language is appropriate to the topic * Words convey intended message	* Word choice is basic * Most writing language is appropriate to the topic * Informal language	* Word choice is vague * Writing language is not appropriate to the topic * Message is unclear	* Not Adequate
Sources	Sources are cited and are used critically	Sources are cited and some are used critically	Some sources are missing	Sources are not cited	Sources are not at all cited
Neatness	Typed; Clean; Neatly bound in a report cover; illustrations provided	Legible writing, well-formed characters; Clean and neatly bound in a report cover	Legible writing, some ill-formed letters, print too small or too large; papers stapled together	Illegible writing; loose pages	Same as below standard
Timeliness	Report on time	Report one class period late	Report two class periods late	Report more than one week late	Report more than 10 days late

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC101			Title	Batch:	2025-2028
				CC I : Programming In C	Semester:	I
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	5		Credits:	4

Course Objective

To provide a student with a thorough grounding in the basics of a Subject and make them to learn the fundamental programming concepts and methodologies which are essential to build good C programs. To develop programming skills in order to meet the day to day IT demands.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Tell the basic terminology used in computer programming	K1
CO2	Understand and debug programs in C language.	K2
CO3	Inference programming concepts such as Arrays, Functions and Structures	K3
CO4	Analyze the dynamics of memory by the use of pointers and Structures.	K4
CO5	Design different data structures and create/ update basic data files.	K5

Mapping

PO\PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	M	M	M	H	H	H
CO2	H	H	M	H	H	H	M	H	M	M	H	H
CO3	H	H	M	H	H	H	M	M	H	H	H	H
CO4	H	H	M	H	H	H	M	M	M	M	H	H
CO5	H	H	M	H	H	H	M	M	M	M	H	H

Units	Content	Hrs
Unit I	Overview of C-Introduction-Importance of C-Basic Structure of C Program-Character Set- Tokens-Keywords and Identifiers-Constants-Variables - Data Types-Declaration of Variables-Assigning Values to Variables-Defining Symbolic Constants-Operations & Expressions-Arithmetic Operators-Relational – Logical-Assignment- Increment & Decrement- Conditional Operator-Bitwise and Special Operator-Arithmetic Expressions-Evaluation of Expressions-Precedence of Arithmetic Operators-Type Conversions in Expressions-Operator Precedence and Associativity - Mathematical Functions.	15
Unit II	Managing I/O operations - Reading a character - Writing a Character - Formatted Input - Formatted Output - Decision Making and Branching - Decision Making with IF Statement-Simple IF Statement - IF…ELSE - Nesting of IF…ELSE Statements - ELSE…IF LADDER - Switch Statement - ?: - GOTO Statement - Decision Making and Looping-WHILE Statement-DO Statement-FOR Statement - JUMP IN LOOPS.	15
Unit III	Arrays-One Dimensional Array-Two Dimensional Arrays-Initializing Two Dimensional Arrays-Multi Dimensional Arrays-Handling of Character Strings-Declaring and 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-User Defined Functions-Need for User Defined Functions-Form of C Functions-Return Values and their Types-Calling a Function-Category of Functions-No Arguments and No	15

	Return Types-Argument but No Return Types-Arguments with Return Values-Handling of Non-Integer-Functions- Nesting of Functions-Recursion-Function with Arrays-*Scope and Life Time of Variables in Functions.*	
Unit IV	Structures and Unions-Structure Definition-Giving Values to members- Str cture Initialization- Comparison of Structure Variables-Arrays of Structures- Arrays with Structures - Structures and Functions-Unions-Size of Structures-Bitwise Fields-Pointers-Understanding Pointers-Accessing the Address of Variables- Declaring and Initializing Pointers-Increments and Scale Factor-Pointer and Arrays- Pointer and Character Strings- Pointers and Functions- Pointers and Structures-Points on Pointers.	15
Unit V	File Management in C-Defining and Opening a File-Closing a File-I/O Operation on Files-Error Handling during I/O Operations-Random Access Files-File Inclusion-*Compiler Control Directives*.	15
	Total Contact Hrs	**75**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	E. Balagurusamy	Programming in ANSI C(Unit1 to 5)	Tata McGraw-Hill publications, FourthEdition	2007

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Yashavant Kanetkar	Let Us C	BPB Publications,8th Edition	2004
2	Yashavant Kanetkar	Test Your C Skills	BPB Publications, Second Edition	2009

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.Haridas Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC102			Title	Batch:	2025-2028
				CC II : Data Structures and Algorithms	Semester:	I
Lecture Hrs./Week	4	Tutorial Hrs./Sem.	5		Credits:	04

Course Objective

The course is designed for understanding the basic concepts, terminologies in data structures.To enthuse students knowledge on computer algorithms and able to develop efficient program.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remembering the concepts to use linear and non-linear data structures Like stacks, queues, linked list etc.	K1
CO2	Understand and analyze to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures	K2
CO3	Enhance the knowledge to solve problems like sorting, searching, Insertion and deletion of data Operations.	K3
CO4	Analyze the concepts of trees, graphs and its applications.	K4
CO5	Evaluate to learn a number of algorithm design techniques and to Analyze the efficiency and the accuracy of algorithms.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	M	M	H	L	L	M	H	H	M
CO2	H	H	H	M	H	M	M	L	M	H	H	M
CO3	H	H	H	L	H	H	M	M	M	H	H	H
CO4	H	H	H	H	H	H	M	M	M	H	H	H
CO5	H	H	M	M	H	H	M	M	M	H	H	H

Units	Content	Hrs
Unit I	Introduction- Linear data structures: Arrays-Representation of Array-Operations of Array- Stacks - Queues. Linked Lists-Types of Linked Lists-Linked List Operations- Linked Stacks and Queues.	12
Unit II	Trees - Definitions and Concepts- Binary Trees – Representations-Operations-Traversals: Inorder -Preorder-Post order- Threaded Binary Trees – Binary SearchTrees.	12
Unit III	GRAPHS-Terminology –Representations: Adjacency Matrix- Adjacency Lists - Adjacency Multi lists -Depth First Search-Breadth First Search-Shortest paths Dijkstra algorithm- *Minimum spanning Tree*- Kruskal's Algorithm & Prim's Algorithm.	12
Unit IV	Basic Steps- Greedy method- The traveling salesperson problem- Knapsack problem- Job Scheduling Problem- Backtracking- Divide and conquer Algorithms-The 8 Queens problem-Sum of subsets.	12
Unit V	Sorting Techniques: Insertion sort –Merge sort–Quick sort–Heap sort. Searching-Searching Techniques: Linear search –Binary Search.	12
	Total Contact Hrs	60

- The topics given in **Italics** are noted as Self-Study topics.

Text Book

25UBC102

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	EllizHorowitz, SartajSahani	Fundamentals of Data Structures, (Unit 1, 2&3).	Galgotia Publishers	1984
2	Elliz Horowitz, SartajSahani,Sanguthevar Rajasekaran,	Fundamentals of Computer Algorithms,(Unit 4&5).	Galgotia Publishers,	2008

Reference Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	SeymourLipschutz	DataStructures	Mc-Graw-Hill, Indian Adapted Edition	2006
2	Jean-PaulTrembly, PaulG.Sorenson	An Introduction todatastructures with application	Mc-Graw-Hill, Second Edition	1991

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC1A1			Title	Batch:	2025-2028
				GE I – Allied : Mathematics I- Computer Oriented Numerical and Statistical Methods	Semester:	I
Lecture Hrs./Week	4	Tutorial Hrs./Sem			Credits:	04

Course Objective

This course provides an introduction to the basic concepts and techniques of numerical solution of algebraic equation, system of algebraic equation, numerical solution of differentiation, integration. It also delivers knowledge of various significant and fundamental concepts to inculcate an adequate understanding of the application of Statistical Methods.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall numerical methods to find out the solution of algebraic equations using different methods like Bisection method, Newton Raphson method under different conditions and numerical solution of system of Algebraic equations.	K1
CO2	Understand the properties of Correlation, Regression and compute Karl-Pearson's coefficient of correlation.	K2
CO3	Apply numerical differentiation and Integration whenever and wherever routine methods are not applicable and understand the importance of Interpolation and its application to solve problems for equal intervals and Unequal intervals.	K3
CO4	Analyze the system of linear equations by applying different methodologies.	K4
CO5	Compute and interpret the result so Regression and Correlation Analysis.	K5

25UBC1A1

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H		M	H					M	
CO2	H	L			H	M				M	H	M
CO3	H	M	H		H	H				M	H	M
CO4	H	M	H		M	M				M	M	
CO5	H	L			M	M				M	M	

Units	Content	Hrs
Unit I	Introduction – Bisection Method –Method of Successive Approximations or the Iteration Method- Method of False Position- Newton Raphson Method – Horner's Method	15
Unit II	System of Linear Algebraic Equations- Gauss Elimination- Inverse of Matrix using Gauss Elimination- Gauss Jordan – Triangularization-Gauss Jacobi and Gauss Seidal Method.	15
Unit III	Interpolation and Approximation – Newton, Lagrange's Method- Numerical Differentiation and Integration- Method's Based on Interpolation-Trapezoidal Rule-*Simpson's 1/3 and 3/8th rule*.	15
Unit IV	Correlation Analysis-Meaning-*Types*-Degrees of Correlation-Scatter Diagram-Correlation Graph-Karl Pearson's Coefficient of Correlation- Rank Correlation-Coefficient of Concurrent Deviations-Methods of Least Squares.	15
Unit V	Regression Analysis-Meaning- *Types of Regression* –Regression Equations-Regression Equations from Mean-Regression Coefficients-Properties of Regression Coefficients-Correlation and Regression, a Comparison.	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	P.Kandasamy, K.Thilagavathy, K.Gunavathi	NumericalMethods (Unit 1,2,3)	S.Chand&CompanyLtd, First Edition	1999
2	S.PGupta	StatisticalMethods (Unit 4, 5).	SultanaChand&Sons, Thirty-FourthEdition	2004

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	MarkL. Crossley	The Desk Reference of Statistical Quality Methods	American Society for Quality, Quality Press,Second Edition	2008
2	RaoV.Dukkipati	Numerical Methods	New Age International, First Edition	2010

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.R.MALATHI RAVINDRAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC1A2			Title	Batch:	2025-2028
				GE I – Allied: DISCRETE MATHEMATICS - I	Semester:	I
Lecture Hrs./Week	5	Tutorial Hrs./Sem	5		Credits:	04

Course Objective

Understand sets and perform operations and algebra on sets. Determine properties of relations identify equivalence and partial order relations, sketch relations. Identify functions and determine their properties. Define graphs, digraphs and trees, and identify their main properties.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Ability to apply mathematical logic to solve Problems.	K1
CO2	Understand sets, relations, functions and discrete structures	K2
CO3	Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions	K3
CO4	Able to formulate problems and solve recurrence relations	K4
CO5	Able to model and solve real world problems using graphs and trees	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H		M	H					M	
CO2	H	L			H	M				M	H	M
CO3	H	M	H		H	H				M	H	M
CO4	H	M	H		M	M				M	M	
CO5	H	L			M	M				M	M	

25UBC1A2

Units	Content	Hrs
Unit I	Fundamental and Mathematics Logic Fundamental- Sets and Subsets- Operations on Sets-Sequences- Properties of Integers- Matrices. Logic- Proposition and Logical Operations- Conditional Statements- Methods of Proof- Mathematical Induction. Mathematical Logic- Statements and Notation, Connectives, Normal Forms.	15
Unit II	The Theory of Inference for the Statement Calculus - The Predicate Calculus, Inference Theory of the Predicate Calculus. Counting- Relation and Diagraph, Function Counting- Permutations- Combinations- The Pigeonhole Principle, Recurrences Relations.	15
Unit III	Relations and Digraphs- Product Sets and Partitions, Relations and Digraphs, Paths in Relations and Digraphs- Properties of Relations, Equivalence Relations,Manipulation of Relations- Transitive Closure and Wars Hall‟s Algorithm. Functions- Definition and Introduction - Function for Computer Science, Permutation Functions.	15
Unit IV	Graph Theory- Boolean and Tree - Graph Theory- Basic Concept of Graph Theory- Euler Paths and Circuits- Hamiltonian Paths and Circuits- Other Relations and Structure- Partially Ordered Sets- Lattices- Finite Boolean Algebras- Functions of Boolean Algebras- Boolean Functions As Boolean Polynomials.	15
Unit V	Semi Group and Groups Semi Group and Groups- Binary Operations Revisited Semi Groups- Products and Quotients of Semi Groups- Groups- Products and Quotients of Groups. Introduction to Computability Theory- Languages- Finite-State Machines, Semi Groups- Machines and Languages.	15
	Total Contact Hrs	**75**

The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar,PowerPoint Presentation,Chalk and talk,Quiz,Assignments, GroupTask.

Text Books

25UBC1A2

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	J.P. Tremblay and R. Manohar,	"Discrete Mathematical Structure with Applications to computer Science", Unit 1, 2,3).	Tata McGraw-Hill , First Edition	2005
2	Bernard Kolman, Robert C. Busby and Sharon Ross,	"Discrete Mathematical Structure", (Unit 4, 5).	Tata McGraw-Hill , First Edition	2005

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Kenneth H. Rosen	Discrete Mathematics and its Applications	McGraw Hill education (India) Private Limited. 7th Edition	2008
2	C. L. Liu and D. P. Mohapatra	Elements of Discrete Mathematics	4th edition, McGraw Hill education (India) Private Limited.	2010

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.S.SATHIYAPRIYA Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	BachelorofComputer Applications	
Course Code:	25UBC103			Title	Batch:	2025-2028
				CC Lab -I: Programming In C	Semester:	I
Practical Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To practice the fundamental programming methodologies in the C programming language via laboratory experiences. To code, document, test, and implement a well-structured, robust computer program using the C programming language. To prepare students to face the challenges andopportunities in the IT industry by building strong foundations in C programming language.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the structure and significance of the C Programming Language.	K1
CO2	Acquire the knowledge about C Programming for various programming technologies.	K2
CO3	Role of constants, variables, identifiers, operators, type conversion and Other building blocks of C Language.	K3
CO4	Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.	K4
CO5	Role of Functions involving the idea of modularity.	K5

Mapping

PO\ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H		M				M	L	H	M
CO2	H	H	H		H	H	M	H	H	H	H	M
CO3	H	H	M	H	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	H	H	H	H	H	H	H
CO5	H	H	M	H	H	H	H	H	H	H	H	H

1. Write a C program to check to whether the given number is Armstrong number or not.
2. Write a C program to find whether the given number is prime or not.
3. Write a C program to check the greatest among three numbers using the conditional operator.
4. Write a C program to generate the Fibonacci series for the given number.
5. Write a C program to find the addition of matrix.
6. Write a C program to find the matrix multiplication of the given number.
7. Write a C program to display the transpose of a Matrix.
8. Write a C program to find the given string is palindrome or not.
9. Write a C program to count the number of words, characters and lines in a given text.
10. Write a C program using types of functions for the arithmetic operations.
11. Write a C program to calculate the factorial value for the given number using recursion.
12. Write a C program to process a student detail using structures.
13. Write a C program to add the arrays using pointers.
14. Write a C program to create a student file with regno, name, mark1, mark2.
15. Write a C program to create and process an employee file.

Total Contact Hrs 60

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.HARIDAS Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MANICKACHEZIAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC204			Title	Batch:	2025-2028
				CC III :Object Oriented Programming With C++	Semester:	II
Lecture Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	4

Course Objective

To develop a greater understanding of the issues involved in programming language design and implementation. To develop an in-depth understanding of functional, logic and object-oriented programming paradigms. To implement several programs in languages other than the one emphasized in the core curriculum. To understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. To train them to meet day-to-day demands of IT industry.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain the basic knowledge on Object Oriented concepts.	K1
CO2	Ability to demonstrate applications using Object Oriented Programming Concepts	K2
CO3	Develop the differences between traditional imperative design and object-oriented Design	K3
CO4	Examine class structures as fundamental, modular building blocks	K4
CO5	Explain the role of inheritance, polymorphism, dynamic binding and Generic structures in building reusable code.	K5

Mapping

–PO\PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	H	H	H	M	H	M	H	H	H
CO2	H	H	M	H	H	H	M	H	H	H	H	H
CO3	H	H	M	H	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	M	L	H	M	H	H	H
CO5	H	H	M	H	H	M	L	H	M	H	H	H

25UBC204

Units	Content	Hrs
Unit I	Procedure Oriented Programming-Object Oriented Programming Paradigm- Basic Concepts of Object -Oriented Programming-Benefits of OOP-Object Oriented Languages-Applications of OOP-Steps in Object Oriented Analysis-Steps in Object Oriented Design.	12
Unit II	Tokens-Keywords-Identifiers and Constants-Data Types-Reference Variables-Operators in C++ - Scope Resolution Operator-Member Dereferencing Operator-Memory Management Operators-Manipulators-Type Cast Operators-Expression and Their Types- Control Structures.	12
Unit III	Functions: Function Prototype-Call By Reference-Return By Reference-InlineFunctions-Default and Constant Arguments-Function Overloading-Friend and Virtual Functions-*Classes and Objects*- Constructors and Destructors.	12
Unit IV	Operator Overloading–Inheritance–Pointers- Virtual Functions and Polymorphism.	12
Unit V	Managing Console Input / Output operations: C++ Streams-C++ Stream Classes-Formatted and Unformatted I/O Operations-Managing Output Manipulations-*Working Files*.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation ,Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Object Oriented Programming with C++ (Unit 1 to 5)	Tata McGraw-Hill Education, Fourth Edition	2008

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	C.Ravichandran	Programming in C++	Tata McGraw Hill Publications, Fourteenth Edition	2001
2	K.RVenugopal, Rajkumar Buyya	Mastering C++	Tata McGraw-Hill Education	2017

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.HARIDAS Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC205			Title	Batch:	2025-2028
				CC IV : Digital Computer Fundamentals	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem			Credits:	04

Course Objective

To provide a comprehensive introduction to digital logic design leading to the ability to understand the principles, methods and applications of digital computer organization and design.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember how to represent numbers in computers and use problem solving techniques such as flowcharts.	K1
CO2	Acquire knowledge about Boolean algebra and analyze IC digital logic Families.	K2
CO3	Compare various combinational logic circuits.	K3
CO4	Analyze various sequential circuits such as flip–flops, counters and registers.	K4
CO5	Evaluate various components in designing the digital logic circuits.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H		L	M	M		M			M	H
CO2	M	H				H			M		L	M
CO3		H				H	M					
CO4		H				H	M					
CO5	M	M		M	M	H	H	M	H	M	M	H

Units	Content	Hrs
Unit I	Flowchart and Number Systems: Logic and Flowcharting - Flowcharting-Flowcharting Symbols-Program Specification Analysis - Program Specification - Introduction- Input-Output - Throughput. Number system – Digital Computers and Digital Systems – Binary Numbers – Number Based Conversions – Octal and Hexadecimal Numbers – Complements – Binary Codes.	12
Unit II	Boolean Algebra: Boolean Algebra and Logic Gates-Basic Definition – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Other Logic Operations – Digital Logic Gates – IC Digital Logic Families – Semi conductor Memory– Bipolar MDS – ROM – RAM – PROM – EPROM - Simplification using the Map method-Product of Sums.	12
Unit III	Combinational Logic: Introduction – Adders – Full Adder – Half Adder-Subtractor – Half Subtractor - Full Subtractor – Multilevel NAND circuits – Multilevel NOR Circuits – Binary Parallel Adder– Decimal Adder – *BCD Adder*– Decoders – Encoder – Multiplexers – De Multiplexers.	12
Unit IV	Introduction – Flip Flops – Triggers of Flip Flops – Flip Flops Excitation Table – Design Procedure – Design Counters – Registers, Counters and Memory Unit. Registers – Shift Registers – Ripple Counters – Synchronous Counters – Timing Sequence.	12
Unit V	Input-Output Devices**:** Punched Tape, Tape Readers – Punched Cards – Card Readers – Alphanumeric Codes – Character Recognition – MICR – OCR – Output Equipment - Printers – CRT Output Devices – Output Offline Operation – Error Detecting and Error Correcting Codes – Keyboards – Terminals – Floppy Disks – Magnetic tape – *Tape Cassettes & Cartridges.*	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk,Quiz, Assignments,GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Morris Mano	Digital Logic and Computer Design	Prentice Hall Of India, Third Edition(UnitItoIV)	January2004
2	J.Maynard	Computer Programming	International Edition(UnitV)	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Donald P Leach, Albert Paul Malvino, Goutam Saha	Digital Principles and Applications	TataMcGraw-Hill, Sixth Edition	2006

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: MS.A.PRIYADHARSHINI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
CourseCode:	25UBC2A1			Title	Batch:	2025-2028
				GE II - Allied: Mathematics II –Mathematical Foundations Of Computer Applications	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

Course Objective

Throughout the course, students will be expected to demonstrate their understanding of Discrete Mathematics by being able to use mathematically correct terminology and notation, to construct correct direct and indirect proofs, to use division into cases in a proof, to use counterexamples and to apply logical reasoning to solve a variety of problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Ability to define mathematical logic to solve problems.	K1
CO2	Understand sets, relations, functions and discrete structures.	K2
CO3	Able to use logical notations to discover and reason about fundamental mathematical concepts such as sets relations and functions.	K3
CO4	Able to examine problems and solve matrix.	K4
CO5	Able to evaluate and solve real world problems using graphs and probability.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	M		H	H	H	L	M	M	H	H	H
CO2	M	M		H	H	M		M	M	H	M	H
CO3	M	M		H	H	H		M	M	H	M	H
CO4	M	H		H	H	M		M	M	H	M	H
CO5	M	H	H	H	H	H	L	M	H	H	H	H

25UBC2A2

Units	Content	Hrs
Unit I	**Set Theory:** Introduction - SET - Finite Set-Cardinality - SubSet-Equal Sets - Null Set (or) Empty Set- Singleton Set - Universal Set – Union –Intersection - Disjoint Sets – Difference Set-Complement Set-Power Set-Principle of Inclusion and Exclusion-Ordered Pair-Cartesian Products-Partition of Set-MinSets -MaxSet.	12
Unit II	**Functions:** Introduction - Types of Functions - Classification of functions - Algebraic function - Transcendental function - Composition of functions(Simple Problems Only)-Identity function- Inverse of a function(Simple Problems Only) -Characteristic function of a Set (Properties only) -Hashing functions. **Relations:** Binary Relation - Complementary Relation - Inverse Relation-Union and Intersection of two relations – Symmetric Relation-Anti-Symmetric Relation-Reflexive Relation-Transitive Relation-Equivalence Relation (Simple Problems only).	12
Unit III	**Graph Theory:** Graph: Undirected Graph -Directed Graph -Multi Graph - PseudoGraph - Simple Graph - General Graph - Degree of Vertex - Finite Graph -Order ofa Graph - Size of a Graph - Null Graph - Isolated Graph - Regular Graph - Isomorphic Graphs (Simple Problems Only). **Matrix Representation of Graphs:** Adjacency Matrices-Incidence Matrix-*Sub Graph*-Euler Graph-Hamiltonian Graph (Simple Problems Only).	12
Unit IV	**Matrices:** Introduction - Definition - Rank of a Matrix - Elementary Transformations-Solution of a System of linear equations (Simple Problems Only). Eigen values and Eigen Vectors-Singular and Non Singular Matrix–Inverse (or reciprocal)of a Square Matrix– Adjoint of a Square Matrix (Simple Problems Only).	12
Unit V	**Discrete Probability :**Introduction - Sample space – Event - Exhaustive event - Favorable event - Mutually exclusive events - Equally likely events – Independent events– Probability -Axioms of probability - Extension of general law of addition of probabilities - Conditional Probability - Multiplication law of Probability – Multiplication law of Probability for independent events - *Extension of multiplication law of probability*- Total Probability- Baye'stheorem (Simple Problems only).	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	P.Geetha	DiscreteMathematics (Unit 1 to 4)	Scitech Publications (india) pvt. Ltd., chennai	2011
2	Dr.M.K.Venkataraman, Dr.N.Sridharan,	DiscreteMathematICS (Unit 5)	National Publishing Company,First Edition	2000

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	RalphP.Grimaldi	Discrete and Combinatorial Mathematics-An applied introduction,	Fifth Edition, AddisonWesley Publishing Company	2006
2	TremblayJ.Pand Manohar R,	Discrete Mathematical Structures with Applications to Computer Science	TataMcGrawHill	2001

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Dr.R.MALATHI RAVINDRAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC2A2			Title	Batch:	2025-2028
				GE II-Allied: Mathematics II – Discrete Mathematics - II	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

Course Objective

Throughout the course, students will be expected to demonstrate their understanding of Discrete Mathematics by being able to use mathematically correct terminology and notation, to construct correct direct and indirect proofs, to use division into cases in a proof, to use counterexamples and to apply logical reasoning to solve a variety of problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Ability to define mathematical logic to solve problems.	K1
CO2	Understand sets, relations, functions and discrete structures.	K2
CO3	Able to use logical notations to discover and reason about fundamental mathematical concepts such as sets relations and functions.	K3
CO4	Able to examine problems and solve matrix.	K4
CO5	Able to evaluate and solve real world problems using graphs andprobability.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	M		H	H	H	L	M	M	H	H	H
CO2	M	M		H	H	M		M	M	H	M	H
CO3	M	M		H	H	H		M	M	H	M	H
CO4	M	H		H	H	M		M	M	H	M	H
CO5	M	H	H	H	H	H	L	M	H	H	H	H

25UBC2A2

Units	Content	Hrs
Unit I	Set theory-Introduction-Set & its Elements-Set Description-Types of sets- Venn-Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-minsets- Algebra of sets and Duality-Inclusion and Exclusion principle.	12
Unit II	Mathematical logic – Introduction- prepositional calculus –Basic logical operations-Tautologies-Contradiction-Argument-Method o f proof- Predicate calculus.	12
Unit III	Relations – Binary Relations – Set operation on relations-Types of Relations – Partial order relation – Equivalence relation – Composition of relations – Functions – Types of functions – Invertible functions – Composition of functions.	12
Unit IV	Graph Theory – Basic terminology – paths, cycle & Connectivity – Sub Graphs – Types of graphs – Representation of graphs in compute memory - Trees – Properties of trees – Binary trees – traversing Binary trees – Computer Representation of general trees.	12
Unit V	Event - Exhaustive event - Favorable event - Mutually exclusive events - Equally likely events – Independent events – Probability -Axioms of probability - Extension of general law of addition of probabilities - Conditional Probability.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation,Chalk and talk,Quiz, Assignments,GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	J. P Tremblay R Manohar	Discrete Mathematics Structures with Applications to computer science- (Unit 1 to 4)	Mc Graw Hill International Edition	2011
2	Dr.M.K.Venkata raman, Dr.N.Sridharan,	Discrete Mathematics (Unit 5)	National Publishing Company,First Edition	2000

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dr M. K. Venketaramen, Dr N.Sridharan, N.Chandarasekaran	Discrete Mathematics	Fifth Edition, The National publishing Company Chennai.	2006
2	TremblayJ.Pand Manohar R,	Discrete Mathematical Structures with Applications to Computer Science	TataMcGrawHill	2001

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.R.MALATHI RAVINDRAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC206			Title	Batch:	2025–2028
				CC Lab - II : Programming In C++	Semester:	II
Practical Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To provide in-depth coverage of object oriented programming principles and techniques using C++. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features. To develop competent technical writing skills using C++ programming so as to enable the graduate to meet the requirement.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the structure and significance of the C++ Programming Language.	K1
CO2	Acquire the knowledge about C++ Programming for various programming technologies.	K2
CO3	Demonstrate the ability to analyze, use and create functions, classes, to overload operators.	K3
CO4	Demonstrate the ability to understand and use inheritance and Pointers when creating or using classes and create templates.	K4
CO5	Demonstrate the ability to understand and use Exception handling and file handling mechanism.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M	H		M				M	L	H	M
CO2	H	H	H		H	H	M	H	H	H	H	M
CO3	H	H	M	H	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	H	H	H	H	H	H	H
CO5	H	H	M	H	H	H	H	H	H	H	H	H

1. Write a program in C++ to exchange the content of two variables using call by reference.
2. Write a program in C++ to create the class shape, and overload the function to return the perimeters of the different shapes.
3. Write a program in C++ to sort the integer array.
4. Write a program in C++ to demonstrate constructor with default argument.
5. Write a program in C++ to demonstrate destructor in inheritance.
6. Write a program in C++to change the sign value of the inputs by using over loaded unary operator.
7. Write a program in C++ to demonstrate binary operator for the matrix class.
8. Write a program in C++ to demonstrate multiple in heritance.
9. Write a program in C++ to copy the content of file in to another.
10. Write a program in C++ to append the content of the file.
11. Write a program in C++ to create a file.
12. Write a program in C++ to demonstrate virtual function.
13. Write a program in C++ to demonstrate friend function.
14. Write a program in C++ to implement Class Matrix that adds, subtracts and initializes the matrix.
15. Write a program in C++to create a random access file, add a new record to the file modifies the details ofa record and displays the contents of the file.

Total Contact Hrs: 60

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.HARIDAS Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC2S1			Title	Batch:	2025–2028
				SEC I: Naan Mudhalvan :: Graphic Design and Multimedia	Semester:	II
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	2

Course Objective

- Provide in-depth knowledge of digital design principles and advertising techniques.
- Develop creative and technical skills for designing effective visual communication materials.
- Equip students with industry-relevant software tools for print and social media design.
- Enhance problem-solving skills through practical design projects.
- Prepare students for professional roles in digital media, branding, and advertising.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the principles of visual design and advertising.	K1
CO2	Demonstrate proficiency in designing digital and print media content.	K2
CO3	Develop creative advertisements for print and social media platforms.	K3
CO4	Utilize industry-standard tools for poster, logo, and brochure design.	K4
CO5	Create a professional portfolio showcasing their digital design skills.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M	H		M				M	L	H	M
CO2	H	H	H		H	H	M	H	H	H	H	M
CO3	H	H	M	H	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	H	H	H	H	H	H	H
CO5	H	H	M	H	H	H	H	H	H	H	H	H

25UBC2S1

1. Digital Collage Making 2. Advertisement Design (Print) 3. Advertisement Design (social media) 4. Poster Design –I 5. Poster Design – II 6. Flyer Design 7. Package Design 8. Logo Design 9. Brochure Design 10. Infographics Creation 11. Magazine Design 12. Brochure Design 13. Instagram Video Creation 14. Business card Design 15. Portfolio Presentation for print
Total Contact Hrs 30

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Ms N.AmirthaGowri Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr. Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC307			Title	Batch:	2025-2028
				CC V: RELATIONAL DATABASE MANAGEMENT SYSTEM AND ORACLE	Semester:	III
Lecture Hrs./Week	5	Tutorial Hrs./Sem	4		Credits:	4

Course Objective

This course provides a foundation in data management concepts and database systems. It includes representing information with the relational database model, manipulating data with an interactive query language (SQL). This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration. It also provides students with the practical knowledge and practical skills in the use of databases and database management systems in information technology applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts of Database and Database Management System software	K1
CO2	Understand the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.	K2
CO3	Solve Database problems using Oracle SQL and PL/SQL. This will include the use of Procedures, Functions and Triggers.	K3
CO4	Examine entity relationship and convert entity relationship diagrams in to RDBMS and formulate SQL queries on the data.	K4
CO5	Explain the usage of normalization technique and functional dependency in database design.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	H			H	H	M		M		H	H
CO2	M	H	M		H	H	M		H		H	H
CO3	H	H	M		H	H	H		M		H	H
CO4	H	M			H	M	M		M		H	H
CO5	H	H	M	M	M		M		L		H	H

Units	Content	Hrs
Unit I	Introduction - Database System - Applications - Database System Vs File Systems - View of Data- Data Models - Database Language - Database Users And Administrators –Transactions Management –Database System Structure –Application Architecture. Entity–Relationship Model-Basic Concepts – Constraints Keys – Design Issues – ER Diagram–Weak Entity Sets–*Extended ER Features*-Design of ER Database Scheme-Reduction of ER Scheme to Tables.	15
Unit II	Relationship Model - Structure of Relational Database – The Relational Algebra – Extended Relational Algebra Operation - Modification of Database – Views - The Tuple Relational Calculus - *The Domain Relational Calculus*.	15
Unit III	Integrity and Security – Domain Constraints – Referential Integrity – Assertion – Triggers –*Security and Authentication* – Authorization in SQL- Encryption and Authentication. Relational Database Design – First Normal Form – Pitfalls in Relational Database Design – Functional Dependencies – Decomposition – Desirable Properties of Decomposition–BCNF (Boyce Code Normal Form) –Third Normal Form– Fourth Normal Form–*More Normal Form*.	15
Unit IV	ORACLE: Introduction–CODD's Rule– Tools of ORACLE-Introduction to SQL– *Benefits of SQL* - Data Types – DDL – DML –DCL - TCL - Data Constraints. ORACLE SQL Functions –Single Row Functions: Date, Number, Miscellaneous, Conversions, Character Functions-Group Functions–SQL Operators: Arithmetic, Comparison and Logical Operators–Set Operators–Joins– Sub Queries– Views.	15
Unit V	PL/SQL : Introduction–Advantages of PL/SQL – Architecture of PL/SQL – Introduction to PL/SQL Block - Data Types – Control Structures - *Concepts of Error Handling* – Cursor - Procedure - Functions – Triggers - Types of Triggers. *Case Studies: Practical Applications in Real Time Environment*	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar,PowerPointPresentation,Chalkandtalk,Quiz,Assignments,GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Silberschatz, Korth,Sudarshan	Database System Concept (Unit1,2&3)	5th Edition, McGraw–Hill International Edition	2006
2	IvanBayross	SQL & PL/SQL Using ORACLE 8*i* and 9*i* (Unit 4 & 5)	BPB Publications	2003

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Bipin C.Desai	An Introduction to Data base System	Galgotia Publications	2012
2	C.J.Date	An Introduction to Database System	Eigth Edition, Pearson Education	2003

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.K.M THIYAGARAJAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC308			Title	Batch:	2025-2028
				CC VI: OPERATING SYSTEM & LINUX	Semester:	III
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

Course Objective

To learn concepts relating to structure of operating systems and its functions are including processor scheduling, memory management, and device management. This also covers OS strategies such as concurrency, deadlocks and file system organization. It helps to implement programs in Linux environment.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the concept of computer operating systems and its features.	K1
CO2	Understand types and history of operating systems and able to explain modern operating systems and its evolution over the time period.	K2
CO3	Describe how operating systems like Linux and windows will meet the future and real-life needs with respect to efficiency, storage, speed and Security.	K3
CO4	Analyze various operating system functions including memory Management, process management and dead lock prevention strategies.	K4
CO5	Evaluate security, multiprocessing features provided by the Unix operating system using Unix commands, Vi editor and Shell programming.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	H	H	M	M	L	L	M	H	H
CO2	M	H	M	L	L	L	M	M	H	M	M	H
CO3	M	H	M	H	H	H	H	L	H	H	M	H
CO4	H	M	L	L	M	M	M	L	L	L	H	M
CO5	H	H	L	M	H	H	H	L	M	H	H	H

Units	Content	Hrs
Unit I	Introduction to OS – Early History – Hardware: Interrupts and Polling, Buffering, Storage Protection, Online – Offline Operation-Cycle Stealing- Processing-Storage Hierarchy-Reduced Instruction Set Computing (RISC).Semaphores – Process Synchronization with Semaphores – Counting Semaphores. Storage Management: Real Storage – Storage Organization–Storage Management Storage Hierarchy–Swapping–Virtual Storage– Basic Concepts.	12
Unit II	PAGING: Basic Concepts – Segmentation. Dead Lock: Examples – Dead Lock Preventions – Dead Lock Avoidance – Bankers Algorithms Only – Dead Lock Detection – Dead Lock Recovery. Processor Management: Job and Processor Scheduling – Introduction– Scheduling Levels – Scheduling Objectives – Pre emptive Vs Non preemptive Scheduling – Priorities – FIFO Scheduling–Round Robin Scheduling–Quantum Size Shortest Job First Scheduling– Shortest Remaining Time Scheduling–Highest Response Ratio Next Scheduling.	12
Unit III	Auxiliary Storage Management: Disk Performance Optimization – Why Disk – Scheduling is Necessary – Desirable Characteristics of Disk Scheduling Policies – Seek Optimization – Disk Caching – RAM Disks. FILE Database System: Introduction – The File System – File System Functions – Blocking and Buffering – File Organization – Allocating and Freeing Space–File Description–Access Control Matrix–Access Control by User Classes–Backup Recovery.	12
Unit IV	Linux: Introduction–File structure of Linux–Directory hierarchy–Environmental variables –file access permissions –utility commands-files – print – login details. VI-editors -three modes-File splitting–pipes and filters–paginating files–head–tail–grep– process termination – timing process.	12
Unit V	Shell Programming: Creation and execution – command line arguments–logical operations – condition statements – System administration – Booting and shutting down – super user status–Disk management–security– user services– mount–unmount- Installing and managing printers.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	H.M.Deitel	Operating Systems (Unit 1 to 3)	Wesley Publication, Third Edition	2004 (Unit1,2&3)
2	Sumitabha Das	Unix, Concepts and applications (Unit 4, 5)	Tata McGraw Hill, Fourth Edition	2006 (Unit4&5)

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	StewartE. Madnick, JohnJ.Donovan	Operating Systems	Tata McGraw Hill, Sixth Edition	2008
2	Williams Stallings	Operating Systems-Internals and Design Principles	Prenticehall of India, Fifth Edition	2005
3	Mark.G.Sobell	Practical Guide to Red Hat Linux	Pearson Edition,Third Edition	2007
4	Andrea Arpaci Dusseau Rezi Arpaci Dusseau	Operating Systems: Three Easy Pieces	KindleEdition	2015

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC3A1			Title	Batch:	2025-2028
				GE III:Allied: Organizational Behaviour	Semester:	III
Lecture Hrs./Week	4	Tutorial Hrs./Sem			Credits:	4

Course Objective

This course aims in developing the knowledge in personality, perception, attitudes and motivation and learning about stress management, communication, leadership, organization structure and organization culture and helps to apply the obtained knowledge in their career development.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the Individual Behaviour and its effects in an organization.	K1
CO2	Acquire the knowledge about Personality, Perception, Attitudes and Values.	K2
CO3	Apply Learning and Motivation concepts in an Organization.	K3
CO4	Analyze the various types of Organizational Culture and Organizational Structure.	K4
CO5	Interpret the various types of leadership and the effects of adaptation to it.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1		H		L	M	M			M	M	M	M
CO2	M	H		M	H	H			H	L	H	H
CO3	M	H	M	H	H	H	M	M	H	M	H	H
CO4		H			H	H			M	M	H	H
CO5	L	M			H	H	M	M	H	M	H	H

Units	Content	Hrs
Unit I	Introduction: Elements of OB – Nature and Scope of OB - Contributing Disciplines to OB - Foundations of Individual Behaviour: Introduction – The Individual and Individual Differences – Human Behaviour and its Causation – Personality: Concepts – Determinants – Types.	12
Unit II	Perception: Perceptual Process – Factors affecting perception – Improving Perception – Impression management - Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes - Values: Concept of Value – Types of Values – Formation of Values – Values and Behaviour - Job Satisfaction.	12
Unit III	Learning: Meaning and Definition– Determinants of Learning - Learning Principles –Reinforcement – Punishment – Learning and Behaviour - Motivation: Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – Group Behaviour.	12
Unit IV	Organizational Conflicts: Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management - Job Frustration - Stress Management.	12
Unit V	Communication: Nature and Need for Communication – Communication Process – Communication Channel – Communication Networks –Communication Barriers – Effective Communication - Leadership – Organizational Culture: Types–Functions – Team Building.	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

25UBC3A1

Text Book

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	S.SKhanka	Organizational Behaviour (Unit 1 to 5)	S.Chand&Company Ltd	2002

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	John W New storm and Keith Davis	Organizational Behaviour	Tata McGraw Hill	2001
2	Hugh J Arnold and Daniel C Fieldman	Organizational Behaviour	Tata McGraw Hill	1996

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.Sumadhi Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC3A2			Title	Batch:	2025-2028
				GE III- Allied: Corporate Systems	Semester:	III
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

Course Objective

To develop the students' knowledge in various industries such as health care systems, banking, insurance, textiles and telecommunications.

Course Outcomes

On the successful completion of the course. Students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the usage of computers in Healthcare systems.	K1
CO2	Disseminate knowledge and can inculcate the theoretical structures about banking and insurance	K2
CO3	Apply IT in Telecommunication and over internet.	K3
CO4	Gain practical under standing of different textile materials (Fiber, yarn, fabric).	K4
CO5	Evaluate the efficiency of various energy utilities.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M		H	H	M	H		H	H	H	H
CO2	M	M	M	M	H		H		H		H	M
CO3	H	H	M	H	M	M	H		H	H	H	H
CO4	M	M		M	M			M	M		M	M
CO5	M	H	M	M	M	H	L		M	M	M	H

Units	Content	Hrs
Unit I	**Health Care Information Systems** : History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support – Security of health care information systems – Organizing information technology services – IT alignment and strategic planning – IT governance and management - Assessing and achieving value in health care information systems - Case study.	12
Unit II	**Banking and Insurance:** Account Management - Hardware Technology - Customer Accounts – Branch Banking Support – Information Systems Audit – Internet Banking - Electronic Transactions - Web-based Banking. The Uses of Computers in Insurance – Record Keeping - Providing Quotes - Assessing Risk – Underwriting - Life Insurance Applications: Life Administration Module - Policy Servicing of existing policies – New Business - Renewal notice / Billing – Loans - Statistics and MIS Claims - Archiving of historical data and imaging Systems.	12
Unit III	**Telecommunication Systems and Technologies:** Fundamental of Telecommunications - Digital Signal Processing - Wireless / Wire line Networks - PCS - GSM - working of dial up connection – ISP - ISDN - *Web enabled systems, virtual reality, and multimedia applications over Internet*. Protocol Engineering: Principles, stages, specification formalisms of telecom protocol design, protocol software development process, and computer aided protocol engineering.	12
Unit IV	**Textile Industry:** Computers in Textiles – Texture Mapping – Computer Integrated Manufacturing – Order processing, Machinery Planning, Manufacturing – Quality Integration – MIS Reporting – Online monitoring in spinning and weaving – Maintenance and Quality control.	12
Unit V	**Energy Utilities:** Multi processor system – Real Time tasks- Energy Minimization – Energy aware scheduling - Dynamic Reconfiguration - Adaptive power management – *Energy Harvesting Embedded system*. Energy Aware Applications: On chip network – Video codec Design – Surveillance camera – Low Power mobile storage.	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

1	Course Material prepared by the Department of Computer Applications based on the below web references (Unit 1 to 5).

Reference Websites

1	www.inventors.about.com, www.economywatch.com
2	www.modernhealthcare.com, www.indiantextilejournal.com
3	www.atmbanking.net, www.apparelsearch.com
4	www.banknetindia.com, www.telecoms.org

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Dr.S.SATHIYAPRIYA Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Course Code:	25UBC309			Title	Batch:	2025-2028
				CC LAB –III: Relational Database Management System and Oracle	Semester:	III
Practical Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	2

Course Objective

The major objective of this Lab is to provide a strong formal foundation in database concepts .It demonstrates the use of constraints and various types of SQL functions. It also emphasizes the importance of normalization in database and facilitates the students in Database Design.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember Structured Query Language (SQL) queries using DDL,DML, DCL and TCL commands.	K1
CO2	Understand various queries execution such as relational constraints, joins, set operations, aggregate functions, trigger and views.	K2
CO3	Apply Normalization concepts in a database.	K3
CO4	Analyze the techniques used to design and create Relational Database.	K4
CO5	Evaluate options to make informed decisions that meet data storage, processing and retrieval needs.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H	M		H	H	M	L	M		H	H
CO2	H	M	M		H	H	M		M		H	H
CO3	H	M			H	M	M				M	M
CO4	H	H			H	M	H		H		M	H
CO5	H	H		M	H	H	M	M	H	H	M	H

1. Write Oracle Queries in Data Definition Language.
2. Write Oracle Queries in Data Manipulation Language.
3. Write Oracle Queries in Transaction Control Language.
4. Write Oracle Queries in Data Control Language.
5. Write Oracle Queries using Data Constraints.
6. Manipulate Single Row Function.
7. Manipulate Function – Group function.
8. Generate Operators in SQL plus.
9. Manipulate SET Operators.
10. Generate View.
11. Manipulate the various types of Join Queries.
12. Write PL/SQL to find whether the given number is Even or Odd.
13. Write PL/SQL to find whether the given number is Armstrong or Not.
14. Write PL/SQL to Display ten numbers.
15. Write PL/SQL to reverse of given number.
16. Write PL/SQL to find whether the given number is Prime number or not.
17. Write PL/SQL queries to create Procedure.
18. Write PL/SQL queries to create Function.
19. Write PL/SQL queries to create Cursor.
20. Write PL/SQL queries to create Trigger.
21. Write PL/SQL to Access Restriction Trigger.
22. Create a real time application using Master and Transaction tables.

Total Contact Hours :75

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: MS. A.PRIYADHARSHINI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC310			Title	Batch:	2025-2028
				CC Lab- IV: Programming in Linux	Semester:	III
Practical Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To familiarize with the Linux commands, environment, fundamentals of shell scripting and programs on basic Linux administration.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply the various commands in terminal to handle UNIX system files.	K3
CO2	Analyze Linux commands using file and system security	K4
CO3	Discuss shell code in VI editors to solve various problems.	K5
CO4	Analyze and Create file systems and directories	K4
CO5	Distinguish various filter and Pipes commands	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	**H**	**M**	L	**L**	L	L	**M**	L	L	**H**	**M**	**M**
CO2	**H**	**M**	**M**	**H**	**M**	**H**	L	L	**M**	**M**	**H**	**H**
CO3	**H**	**M**	**H**	**H**	**H**	**H**	**H**	**M**	**H**	**H**	**H**	**H**
CO4	**H**	**M**	**L**	**H**	**M**	**H**	L	L	**M**	**L**	**H**	**M**
CO5	**H**	**M**	**H**	**M**	**L**	**M**	**H**	**M**	**L**	**M**	**H**	**M**

1. Work with utility commands.
2. Work with directory commands.
3. Work with handling file commands.
4. Work with file access commands.
5. Work with pipes and filters.
6. Work with VI editors.
7. Create a program to find simple interest
8. Create a program to find factorial value
9. Create a program to find Fibonacci series.
10. Create a program to find sum of N numbers.
11. Write a program with case condition.
12. Create a program to find reverse the digit.
13. Create a program to find sum of individual digit.
14. Create a program to swap any two numbers.
15. Create a program for sorting of N numbers.

Total contact hours :60 hrs

Course Designed by	**HOD**	**CDC**	**COE**
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC3N1			Title	Batch:	2025-2028
				Non Major Elective-I: Web Designing Lab	Semester:	III
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	01

Course Objective

To provide the necessary knowledge of various techniques in web development and will albe able to design a complete website.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the concepts of website Development	K1
CO2	Demonstrate knowledge and skills utilizing various HTML tags for Designing static webpage.	K2
CO3	Analyze the HTML tags, CSS and JavaScript.	K3
CO4	Recognize and apply the elements of Creating Style Sheet(CSS).	K4
CO5	Develop and incorporate dynamic capabilities in Web pages using JavaScript.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	M	M	H	M		M	H	H	M	M
CO2	M	H		H	M	M	M		M	M	M	M
CO3	M	H		H	H	M		H	M	M	H	M
CO4	M	H		H	M		M	H	H		M	H
CO5	H	H		H	M		M	H	M	M	M	M

1. Design a home page which will display your information i.e. Biodata.
2. Create Hyperlinks in home page i.e educational details, Hobbies, Achievement, My Ideals etc.
3. Design a time table and display it in tabular format.
4. Design a Registration form in HTML.
5. Design a webpage for Biodata using CSS.
6. Design web page using Frames, Framesets.
7. Embedding Java scripts in HTML pages.
8. Design a Bio data page whose content can be changed using Java Script like events.
9. Design a Signup form with all validations.

Total contact hours : 15 hrs

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC3N2			Title	Batch:	2025-2028
				Non Major Elective - I : Desktop Publishing Lab	Semester:	III
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	01

Course Objective

The course is designed to provide a deep knowledge in various image processing tools and effects**.**

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic technical and handling tools.	K1
CO2	Understands the various concepts of Photoshop.	K2
CO3	Apply various effects that is suitable to access various formats in this platform for editing.	K3
CO4	Analyze the concepts of different modes in Photoshop.	K4
CO5	Emphasis is placed on desktop concepts desktop applications, learning and working in the desktop environment.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	H			M	H		M	H		H	M
CO2	H	M	M	M	H	M	M		L	M	H	H
CO3	M	H		M	H	H	M	M	H	H	H	H
CO4	H	H		H	M	M	M	H	H	H	H	H
CO5	M	H		M	H	H	M	M	H	H	H	H

1. Design the Wedding Invitation using the associated tools in Photoshop.
2. Apply special art effects for the image using various options from the Filter Gallery.
3. Design the Banner.
4. Implement the Usage of different modes in a Single Image.
5. Design the College Profile.
6. Work with different images to implement Sharpen tool and Smudge Tool
7. Design the Calendar.
8. Edit the image using Blur tool.
9. Design the Visiting Card.
10. Edit the image using Burn and Sponge tool.
11. Edit the image using Clone tool.

Total Contact Hrs : 15

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC3VA			Title	Batch:	2025-2028
				VAC I : Digital Marketing	Semester:	III
Lecture Hrs./Week		Tutorial Hrs./Sem			Credits:	2*

Course Objective

This course aims to familiarize students with the concept of digital marketing and its current and future evolutions.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

K1	CO1	Understand the concept of digital marketing and its real-world iterations
K2	CO2	Understand how to create and run digital media based campaigns.
K3	CO3	Identify and utilize various tools such as social media etc.

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M		H	H			M	H	H	M
CO2	H			M	H	H	M		H	H	H	H
CO3	H	H	M	M	H	H		M	H	H		H
CO4	M	M	M		M	M				H	M	M
CO5	H	M		M	H	H	H		H	H	H	H

Units	Content	Hrs
Unit I	Introduction to Digital Marketing-The Fundamentals of Digital Marketing-Latest Trends in Digital Marketing-Digital Marketing for Working Professionals-Digital Marketing for Startups-Digital Marketing for SMBs (Small & Medium Businesses)-Career Opportunities in Digital Marketing Learning Word Press- Role of learning Word Press in Digital Marketing-Word Press Themes & Plugins-Using Word Press for Blogging-Building Word Press-based eCommerce sites-Using Word Press for Different Website	**10**
Unit II	Search Engine Optimization (SEO)- Introduction to SERP**s**-Different SEO Ranking Factors-White Hat vs Black Hat SEO-Understanding Google algorithm-On-Page SEO-Off-Page SEO-Technical SEO-Local SEO-Mobile-first SEO-Advanced Keyword Research-Google Search Console-SSL Certificate & Website Security-eCommerce SEO-SEO Reporting	**10**
Unit III	Social Media Optimization & Marketing- Google Analytics 4- Google Tag Manager (GTM) - Content Marketing-YouTube Marketing- App Store Optimization (ASO)- Google My Business (GMB)- Google Ads- Facebook Ads-Email Marketing- Online Reputation Management (ORM)	**10**
	Total Contact Hrs	**30**

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Ryan Deiss & Russ Henneberry	Digital Marketing for Dummies	2nd Edition, John Wiley & Sons	2020
2	Simon Kingsmorth	Digital Marketing Strategy	Kindle edition	2022
3	Eric Enge, Stephan Spencer, Jessie Stricchiola	The Art of SEO, and Social Media Marketing	3rd Edition, O' Reilly Media, Inc.	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dave Chaffey & Fiona Ellis-Chadwick	Digital Marketing	The seventh edition	2022
2	V Venkata Krishna	Digital Marketing for Beginners : A Road Map to Successful Career in Digital Marketing	Kindle Edition	2023
3	Seema Gupta	Digital Marketing	Mc Graw Hill 3rd Edition	2022

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC411			Title	Batch:	2025-2028
				CC VIII: Visual Programming	Semester:	IV
Practical Hrs./Week	3	Tutorial Hrs./Sem.			Credits:	03

Course Objective

The course gives introduction to the .Net framework, library and various applications involved in it. It enables the students to learn and develop Windows and Web applications for the .NET platform.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the concepts of the .NET framework as a whole and the technologies that constitutes the framework.	K1
CO2	Knowledge on ADO.NET with ASP.NET for creating web based data centric applications also understand web services.	K2
CO3	Understand the ASP.NET architecture, web server controls, rich webcontrols and validation controls, Analyze security management in ASP.NET.	K3
CO4	Use ADO.NET in a web application to read, insert, and update datain a database.	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	H			M	H		M	H		H	M
CO2	H	M	M	M	H	M	M		L	M	H	H
CO3	M	H		M	H	H	M	M	H	H	H	H
CO4	H	H		H	M	M	M	H	H	H	H	H
CO5	M	H		M	H	H	M	M	H	H	H	H

Units	Content	Hrs
UnitI	**Introductionto.NET:** Understand .NET Framework– .Net Architecture–CLR, base class library VB .Net : Visual Basic.Net IDE, Compiling and Debugging.	12
Unit II	**ASP.NETBASICS:** Introduction –ASP.NET architecture - ASP.NET Runtime- Internet Information Services - Visual Web Developer Web Server – ASP.NET Parser –Assembly.	12
Unit III	**WINDOW AND WEB BASEDAPPLICATIONS** Window Based Applications – Core ASP.NET – ASP.NET Web Forms – Server Controls, Data Binding – ASP.NET -Error Handling, Security, Deployment- Validation Controls - Ad rotator Controls- Security.	12
Unit IV	**ASP.NET Database Programming** Introducing ADO.NET- ADO.NET Basics- ADO.NET Object Model: Data Provider, Data Reader, at Adapter-Data Set -Managed Providers-Understanding Data Binding-Working with Data Grids-Using SQL Server With ASP.NET.	12
Unit V	**AdvancedASP.NET** ASP.NET Application Configuration-Understanding Caching-Localizing *ASP.NET Applications-Deploying ASP.NET Applications-Web Services-Web Services Infrastructure-Understanding SOAP- Building a Web Service.*	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation,Chalk and talk,Quiz, Assignments,GroupTask.

Text Book

25UBC413

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Matthew Mac Donald	The Complete Reference "ASP.NET" (Unit1,3)	Tata McGraw-Hill Edition	2009
2	Mridula Parihar	ASP.NET Bible (Unit 2, 4, 5)	John Wiley	2002
3	BillEvjen, Hanselman, Muhammad, Sivakumar& Rader	Professional ASP.NET 2.0 (Unit3)	Wiley India(p)Ltd.	2006

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Andrew Troelsen,	Pro C# 5.0 and the.NET 4.5 Framework	A press publication	2012
2	Mike Yenderloy	ADO&ADO.Net programming	BPB publications	2002
3	McDownell	ASP.NET complete reference	Sahitya Bhawan Publications	2007

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.R.MALATHI RAVINDRAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC412			Title	Batch:	2025-2028
					Semester:	IV
Lecture Hrs./Week	4	Tutorial Hrs./Sem		CC IX: Java Programming	Credits:	03

Course Objective

This course aims to create an environment to understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc. It also helps to test Java Servlets while developing Java programs which incorporate advanced graphic functions.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the structure and significance of the Java Programming Language.	K1
CO2	Acquire the knowledge about Java Programming Language for various programming technologies.	K2
CO3	Apply the concept of Inheritance and various Java Components.	K3
CO4	Analyze the usage of event handling on AWT and Swing components	K4
CO5	Evaluate the Internet Programming using Java Applets.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M	H		M				M	L	H	M
CO2	H	H	H		H	H	M	H	H	H	H	M
CO3	H	H	L			M			H	H	H	H
CO4	H	H	L			M			H	H	H	H
CO5	H	H	L	H		H	H	H	H	H	H	H

Units	Content	Hrs
Unit I	Java Evolution - Overview of Java language, Constants, Variables and Data types - Operators and Expressions. Decision Making and Branching - Decision Making and Looping - Classes, Objects and Methods - Arrays, Strings and Vectors.	12
Unit II	Inheritance-Packages: Putting Classes Together-Multithreaded Programming- *Managing Errors and Exceptions.*	12
Unit III	Applets Programming-Graphics Programming-The Graphics Class-Lines and rectangles - Circles and Ellipses - Drawing Arcs - Drawing Polygons.	12
Unit IV	A Tour of Swing: Japplet - Icons and Labels - Text Fields – Buttons - The JButton Class - Check Boxes - Radio Button - Combo Boxes - TabbedPane - Scroll Panes - Tree - JMenus.	12
Unit V	Servlet Overview and Architecture: Movement to Server Side Java - What is Java Servlet - Practical Applications for Java Servlet - *Java Servlet Alternatives - Reasons to use Java Servlets - Java Servlet Architecture.*	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Programming with Java (Unit 1 to 5)	Tata McGrawHill	2007
2	Herbert Schildt	Java: The Complete Reference (Unit 1 to 5)	Tata McGrawHill	2005
3	James Goodwill	Developing Java Servlet(Unit 5)	Techmedia	1999

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	James Keogh, Jim Keogh	J2EE:The Complete Reference	McGraw-Hill/Osborne,Seventh Edition	2002
2	Bruce W.Perry	Java Servlet and JSP Cookbook	O'Reilly	2004

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.S.Sathiyapriya Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	25UBC4A1			Title	Batch:	2025-2028
				GE IV - Allied: Mathematics III- Computer Based Optimization Techniques	Semester:	IV
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	3

Course Objective

The course provide with the basics of various optimization techniques, the key concepts of linear programming, Transportation, Assignment problem, PERT & CPM. It also offers various mathematical applications in industries and Decision making for realtime environment.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the modeling and computational tools as well as analytic skills to evaluate the problems.	K1
CO2	Understand and explain the various mathematical formulations.	K2
CO3	Apply Working with Non Linear programming Problems.	K3
CO4	Analyze Linear Programming problem and similar such problems into appropriate forms and problem solving.	K4
CO5	Estimate the problem situation for better decisions.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	P10	PSO1	PSO2
CO1	M	M		H	M			M	H	M	H	M
CO2	M	M		H	H				H	M	M	H
CO3	M	H		H	H	M		M	M		M	M
CO4	M	H		H	H	M		M		M	M	H
CO5	M	H	M	H	H	M		M	M		M	H

H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	Linear Programming Problem: Graphical Solution Method- General Linear Programming Problem (Definition alone) - Canonical and Standard forms of LPP. Simplex Method: Basic Solution and Degenerate Solutions to LinearEquation-Simplex Method-BigM Method (Only Simple Problems).	12
Unit II	Transportation Problem: North West Corner Method- Least Cost Method- Vogel's Approximation Method- Moving towards optimality UV Method.AssignmentProblem:Definition-AssignmentAlgorithm-Hungarian Assignment Method-Unbalanced AP.	12
Unit III	Inventory Control: Introduction- *Types of Inventory*- Inventory Decision- Economical Order Quantity (EOQ) - Deterministic Inventory Problems.	12
Unit IV	Sequencing Problems: Introduction- Problems with n Jobs and 2 Machines- Problems within Jobs and k Machines- Problems with 2 Jobs and k Machines (Simple Problems).	12
Unit V	Network Scheduling: Introduction- Network and Basic Components- *Rules of Network Construction*- Time calculation in Networks-CPM-PERT-PERT Calculations- Difference between CPM and Pert Network.	12
	Total Contact Hrs	**60**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar,PowerPoint Presentation,Chalk and talk,Quiz,Assignments,GroupTask.

Text Book

25UBC4A4

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Kanti Swarup, P.K.Gupta, Man Mohan	Operations Research (Unit 1 to 5)	Sultan Chand&Sons	1996

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	R.PaneerSelvam	Operations Research	Prentice Hall of India Pvt Ltd.	2004

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC4A2	Title	Batch:	2025-2028
Hrs/Week:	4	BUSINESS MATHEMATICS	Semester	IV
			Credits	03

Course Objective

The course aim is to introduce the concepts of operations on set and applications, to study the characteristic of analytical geometry, differential calculus, matrices and commercial arithmetic.

Course Outcomes (CO)

CO1	Know the basic concepts of operations on sets, relations and functions.	K1
CO2	Learn to find an equation of straight line, distance, slope and interpretations.	K2
CO3	Able to find Limit, Continuity, Average and Marginal cost using differential calculus,	K3
CO4	Know the operations on Matrices, inverse of Matrix, Solution of system of linear equations and Input and Output Analysis using matrices.	K4
CO5	Compute percentage, simple and compound interest, Arithmetic and Geometric series and solve Simultaneous Linear equations.	K5

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M
CO2	H	H	H	M	H
CO3	H	H	M	H	H
CO4	M	H	H	L	H
CO5	M	H	H	L	H

H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	SET THEORY: Basic concepts – Subsets – Operations on sets Applications – Cartesian Product – Relation – Properties of relation - functions.	12
Unit II	ANALYTICAL GEOMETRY: Distance – Slope of a straight line – Equation of Straight line-Point of Intersection of two lines – interpretation – Break even analysis – Parabolas.	12
Unit III	DIFFERENTIAL CALCULUS: Limits – Continuity –Changes in related variables-Average & Marginal concepts – Differential coefficient-Standard Forms – Simple applications to Economics.	12
Unit IV	MATRICES: Addition of matrices –Scalar multiplication-Multiplication of a matrix by a matrix- Inverse of a matrix – Solution of a system of linear equation –Input output Analysis.	12
Unit V	COMMERCIAL ARITHMETIC: Percentages – Simple and Compound interests – Arithmetic and Geometric Series – Simultaneous Linear equations.	12
	Total Contact Hrs	**60**

TEXT BOOKS:

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	V. Sundaresan, S. D. Jaya Seelan	Contents and Treatment as in "An Introduction to Business Mathematics"	S. Chand & Company Ltd	2003

REFERENCE BOOKS

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Qazi Zameeruddin, V. K. Kahanna, S. K. Bhambri	Business Mathematics	Vikas Publishing Pvt Ltd	1995
2	V. K. Kapoor	Business Mathematics	S. Chand & Company Ltd	1994
3	P.R.Vittal	Business Mathematics	Margham Publications	

Course Designed by	Verified by HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.R.MALATHI RAVINDRAN Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC413			Title	Batch:	2025-2028
				CC Lab V:Visual Programming	Semester:	IV
Practical Hrs./Week	4	Tutorial Hrs./Sem			Credits:	02

Course Objective

To develop the practical aspects of application using fundamentals of ASP.Net and C#.

To gain the knowledge of Web server controls, Form validation, Session handling, Error handling, Inheritance, File operations and ADO.Net connectivity.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the ASP.Net applications using standard .net controls	K1
CO2	Understand the decision making statements and user interfacing controls	K2
CO3	Implement and deploy database connection management using ADO.NET	K3
CO4	Analyze simple data binding applications using ADO.Net Connectivity	K4
CO5	Evaluate web-based applications by using various web controls in ASP.NET.	K5

Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		H		M	M	M	M	M	M	H	H	M
CO2	M	M			H	H	M	H	M	H	H	M
CO3		H		M	H	M	H	M		H	H	H
CO4	M	M		H	M	M	M	H	M	M	M	H
CO5	M	H		H	H	H	M	H	H	H	H	H

1. Create a windows form with the following controls Textbox, Radio button, Check box, Command Button
2. Write a program for Menu option.
3. Create a program to connect with database and manipulate the records in the database using ADO .NET
4. Create a program to implement the concepts of OOPS for creating class with inheritance.
5. Create a program to perform input validation using procedure.
6. Write a program to open a file and using I/O operations write contents into a file and read the contents from the file.
7. Create a window form using HTML controls.
8. Create a program to perform validation using validation controls.
9. Create a program inASP.NET to connect with the database using ADODB connectivity and manipulate the records.
10. Write a program to store the employee details using class and methods in C# .NET
11. Write a program to Handle Exceptions
12. Write a program to create a form with Basic controls in C#.NET.
13. Write a program in ASP to display the session properties.
14. Write a program in ASP that makes use of Ad rotator component.
15. Write a program in ASP that makes use of Browser capabilities component.

Total Contact Hours: 60

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: MR.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
CourseCode:	25UBC414			Title	Batch:	2025-2028
				CC Lab VI: Java Programming	Semester:	IV
Practical Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	02

Course Objective

To provide students with the ability to write programs in Java and Advanced Javaby applying concepts described in the Object-Oriented Programming course and develop their programming career.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall the concepts of Object-Oriented Programming.	K1
CO2	Understands the concepts of Multithreading and Method Overriding.	K2
CO3	Apply the concept ofApplets and Servlets.	K3
CO4	Analyze the concepts of JMenu, JTabbed Pane and JTree.	K4
CO5	Evaluate the usage of Generic Servlet and HTTP Servlet.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H	M		M	M					M	H
CO2	H	M	M	M	H	M	M		L	M	H	H
CO3	H	H	L		M	M		H	H	H	M	H
CO4	H	H		H	M	M	M	H	H	H	H	H
CO5	H	H		H	H	M	M		M	M	H	M

1. Write a java program for employee details using single inheritance concept.
2. Write a java program to check the given string is palindrome or not.
3. Write a java program for multithreading concept.
4. Write a java program to read and write using random access file.
5. Write a java program to draw lines and rectangles using applets.
6. Write a java program for method overriding.
7. Write a java program using the concept to interface.
8. Write a java program to add two numbers using applets.
9. Write a java program to implement the concept of swing.
10. Write a java program to implement the concept of JMenu, JMenuBar, JMenuItem.
11. Write a program to implement the concept of JTabbed Pane.
12. Write a program to implement the concept of JTree.
13. Write a program to make use of Generic Servlet.
14. Write a program to make use of HTTP Servlet.
15. Write a program to illustrate servlet chaining.

Total Contact Hours: 60

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.S.Sathiyapriya Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC4S1			Title	Batch:	2025-2028
				SEC II: Naan Mudhalvan: Advanced Excel Lab	Semester:	IV
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To manipulate data lists using advanced functions to summarize and report results from multiple worksheets.

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Knowledge
CO1	To apply statistical functions	K3
CO2	To apply concept of date functions	K4
CO3	To verify Lookup and financial functions	K5
CO4	To verify Manipulation of database and pivot functions	K5
CO5	To create advanced filtering in excel	K6

Mapping

PO/ PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PSO1	PSO2
CO1	L	M	M	L	L	M	M	L	L	H	L	M
CO2	L	M	L	L	L	L	H	L	H	H	L	M
CO3	L	M	M	L	L	M	M	M	H	H	L	M
CO4	L	M	L	L	L	L	H	L	H	H	L	M
CO5	L	M	M	L	L	M	M	L	L	H	L	M

Content	Hrs.
SAMPLE PROGRAM LIST **Test I** 1. Inserting Basic Math And Statistics Functions 2. Using date functions 3. Logical Function- IF function 4. Look up Functions 5. Financial Functions **Test II** 1. Large Datasets Freezing and Printing 2. Conditional Formatting 3. Pivot Table creation with chart 4. Advanced Filtering 5. Database functions	**30**

Pedagogy:

Direct Instruction, Digital Presentation

Assessment Methods:

Test, Assignments, Group Task(GD)

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: MS.A.PRIYADHARSHINI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC4S2			Title	Batch:	2025-2028
				SEC II: Naan Mudhalvan: Data science Foundation	Semester:	IV
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To provide in-depth coverage of Data science programming principles and techniques. Topics include arrays; data frames and Variability. To develop competent technical writing skills using Data science programming so as to enable the graduate to meet the requirement.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the structure and significance of the Data science programming Language.	K1
CO2	Acquire the knowledge about Data science Programming for various programming technologies.	K2
CO3	Demonstrate the ability to analyze, use and operators.	K3
CO4	Demonstrate the ability to understand and use Numpy arrays and Pandas data frames	K4
CO5	Demonstrate the ability to understand and use Correlation and scatter plots.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M	H		M				M	L	H	M
CO2	H	H	H		H	H	M	H	H	H	H	M
CO3	H	H	M	H	H	H	H	H	H	H	H	H
CO4	H	H	M	H	H	H	H	H	H	H	H	H
CO5	H	H	M	H	H	H	H	H	H	H	H	H

1. Working with Numpy arrays
2. Working with Pandas data frames
3. Develop python program for Basic plots using Matplotlib
4. Develop python program for Frequency distributions
5. Develop python program for Variability
6. Develop python program for Averages
7. Develop python program for Normal Curves
8. Develop python program for Correlation and scatter plots
9. Develop python program for Correlation coefficient
10. Develop python program for Simple Linear Regression

Total Contact Hrs 30

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr. Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC4N1			Title	Batch:	2025-2028
				Non Major Elective-II: Illustration Effects Lab	Semester:	IV
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	01

Course Objective

To learn the various photo editing features and animation techniques and demonstrate proficiency in developing the multimedia presentations.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the basic elements and principles of photo editing software to Achieve a great photo effect by applying effects.	K1
CO2	Understand the important aspects of Adobe Photoshop Elements.	K2
CO3	Construct simple documents utilizing selections, layers and blending modes.	K3
CO4	Analyze color management and correction techniques in Adobe Photoshop.	K4
CO5	Evaluate simple shapes using animation editing software and design Simple animation by applying shape tweens and motion tweens.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H			H			M		H	H	H
CO2	H	H	M		H	H	H	H	M	H	H	H
CO3	H	M		M	H	H		H	M	H	H	M
CO4	H	H	H			H	H			H	H	H
CO5	H	H	H			H	H			H	H	H

1. Create a Business Card. 2. Create a Monthly Calendar. 3. Change the Background Transparent and Save it in Transparent Image. 4. Create a Poster with a Fancy Font. 5. Convert Blur Image into Correct Image. 6. Changing Hair Color into Simply Fix GreyHair. 7. Convert an Image in to Blend Images using Layer Masking. 8. Create a 3D Text. 9. Create an Outline using a Brush Strokes. 10. Create a Photo Manipulation.
Total Contact Hours: 15

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
CourseCode:	25UBC4N2			Title	Batch:	2025-2028
				Non Major Elective– II: Animation Techniques Lab	Semester:	IV
Practical Hrs./Week	2	Tutorial Hrs./Sem.			Credits:	01

Course Objective

To learn the concepts Multimedia and Compression Techniques through Graphic design.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect animation software and make them to design animated applications.	K1
CO2	Understand the gradients and patterns using available tools.	K2
CO3	Apply the concept of timeline animation.	K3
CO4	Analyze innovative character and applying effects with aid of software.	K4
CO5	Evaluate import text, character, paragraph formatting and effects to text.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	H			H		M	M	H	H	H	M
CO2	M	M		M			M		M	H	M	H
CO3	L	H		H	H	M	M	M	H	H	H	H
CO4	M	H		M	H	H	M	M	H	M	M	M
CO5	M	M		M	M	M	M	M	M	M	H	M

1. Setting Motion for a Butterfly.

2. Create a Rain Effect.

3. Create a masking.

4. Create a Basket Ball.

5. Create a Text Animation.

6. Design a Cartoon Background.

7. Create a Water Effect.

8. Create a flash website.

9. Create a Lightening Effect for Text.

10. Create an Image Gallery using Buttons.

Total Contact Hours: 15

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**25UBC4VA**			**Title**	**Batch:**	**2025-2028**
					Semester:	**IV**
Lecture Hrs./Week		**Tutorial Hrs./Sem**		**VAC II- Digital Media Planning**	**Credits:**	**2***

Course Objective

The course is designed to develop campaigns that carry a big idea across several media, including traditional and digital spaces. Practice and enhance essential copywriting skills. Practice and enhance essential design principles and layout skills.

Course Outcomes (CO)

CO1	Recognize well-executed advertising and understand what makes it strategically sound.
CO2	Generate and develop work that is strategic, memorable and persuasive.
CO3	Practice writing creative briefs and following them when developing campaigns.

Mapping

PO/PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	H		M		M		L	M	H	H	H
CO2	H	H	H	H	H	M	M	L	M	M	H	H
CO3	H	H		M	H	M	M	H	H	M	H	H

Units	Content	Hrs
UnitI	Principles of Advertising- Advertising: Meaning and Definitions- Types and Classification of Advertising- Process of Advertising- Research in Advertising	10
Unit II	Preparing and Producing Advertising Materials- Concept of Advertising Copy- Concept of Advertising Layout- Stages of Preparing Advertising Materials- Advertising Campaign Planning- Developing and Executing the Advertising Plan	10
Unit III	Practical Production of Advertising Copy- Design and Illustration of copy in Advertising- Creative and production Tactics in Print Advertising- Preparation and Production of Television commercials- Guidelines for Evaluating copy outputs- Advertising Media Planning and Strategy	10
	Total Contact Hrs	**30**

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Sandra Ernst Moriarty, Nancy Mitchell, William Wells	Advertising & IMC Principles & Practice	Pearson Education	2018
2	John-Kamen, A.U	Advertising: Genesis, Evolution, Principles, Practice.	Snap Press Ltd. Nigeria, Enugu.	2006

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Ms.N.AMIRTHA GOWRI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC515			Title	Batch:	2025-2028
				CC - XI : Python Programming	Semester:	V
Lecture Hrs./Week	5	Tutorial Hrs./Sem	5		Credits:	5

Course Objective

The course is designed to covers the Basic knowledge of Python Programming. It is intended for software engineers, system analysts, and program manager's and user support personnel who wishto learn the Python programming language.

Course Outcomes

On the successful completion of the course, student's will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the fundamental concept of python programming.	K1
CO2	Understand the control flow, Operators and looping statements	K2
CO3	Applying and developing programs using Functions & modular programming.	K3
CO4	Analyze the Errors handling Mechanisms while working with Exception	K4
CO5	Evaluate object oriented features and organize files.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	M		M	M	H			M	M	H	M
CO2	M	M		M	H	M	M		H	M	H	M
CO3	H	H	M		H	H			H	H	H	H
CO4	H	H	M	M		H	M		H	H	H	H
CO5	H	H				H	H	H	H	H	H	H

Units	Content	Hrs
Unit I	Introduction To Python - Uses Of Python – Python Basics: Identifiers & Keywords – Data Types – Operators – Built In Functions & Modules– Comments & Indentation – Classes & Objects.	15
Unit II	Control Statements: Control Flow and Syntax – Decision Making Statements – Repetition Control Statements – Break & Continue – Console Input / Output Lists – Tuple – Sets – Dictionaries.	15
Unit III	Functions: Communication With Functions – Types Of Arguments – Recursion – Lambda Functions – Higher Order Functions – Namespaces - Strings – Built-In Functions.	15
Unit IV	Classes and Objects: User Defined Classes – Object Initialization – Class Variables and Methods – Dir ( ) Functions – Operator Overloading – Containership – Inheritance – Types OfInheritance – Polymorphism.	15
Unit V	Exception Handling: Types Of Errors –Try– Except Block – Else Block – Finally Block – File Input/output – I/O System – Read/Write Operations – File Opening Modes – File & Directory Operations – Command Line Arguments.	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Yashavant Kanetkar& Aditya Kanetkar	Let Us Python**:**4th Edition (Unit 1 to 5)	BPB Publications	2023
2	Martin C**.**Brown	Python**:** TheComplete Reference(Unit1to5)	Mcgraw Hill Publications	2018

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Allen Downey, Jeffrey Elkner, Chris Meyers	Learning With Python	Green TeaPress, Wellesley, Massachusetts.	2016
2	Wesley JChun	Core Python Application Programming.	Prentice Hall Press Upper Saddle River, NJ,USA	2012
3	Mark Lutz.	Learning Python	O'Reilly & Associates,Inc. Sebastopol	2003

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC516			Title	Batch:	2025-2028
				CC XII: AI-Driven Low-Code Applications using Zoho creator	Semester:	V
Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	5

Course Objective

- To provide hands-on experience in Zoho Creator for building real-world applications.
- To explore AI-powered capabilities like Zia Assistance, OCR AI models, and AI Model assistants for application development.
- To integrate applications with third-party services like Zoho CRM, Zoho Books, Zoho Flow, and external APIs.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and apply the fundamentals of Low-Code Development.	K1
CO2	Build and deploy Zoho Creator Applications with AI-powered features.	K2
CO3	Use Deluge Scripting for workflow automation.	K3
CO4	Integrate applications with Zoho CRM, external APIs, and AI-based models.	K4
CO5	Develop and present a fully functional low-code application.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H	M		M	M					M	H
CO2	H	H	M	H	M	M	M	M	H	H	M	H
CO3	H	H			M	M		H	H	H	H	H
CO4	H	H	M	M						M	M	H
CO5	H	H		H	M	M		H	H		H	H

Units	Content	Hrs
Unit I	**Fundamentals of Low-Code Development** Introduction to Low-Code Platforms: Concept, Importance, and Evolution. Benefits and Challenges of Low-Code Development in Industry. Overview of Zoho Creator: Features, Architecture, and Platform Walkthrough (Forms, Workflows, Reports, Pages). Setting Up a Zoho Creator Account and Getting Started. AI-Powered Features: AI Model Assistant to Create Apps from Files, Power of Creation with AI. Case Studies: Low-Code Applications in Business and Education. Practical: Build a basic College Management System application.	15
Unit II	**Application Design and Workflow Basics** Building Applications: Designing Forms – Field Types, Field Properties, and Validation. Setting Up Relationships: Lookups, Subforms, and Data Hierarchies. Workflow Automation Basics: Understanding Triggers and Actions. Workflow Rules for Real-Time Automation. AI in Workflows: AI Assistance in Deluge for Smart Automation. Report Creation: Types of Reports – List, Calendar, Pivot, Kanban, Summary. Custom Filters and Search Criteria. User Interface Customization: Themes, Page Layouts, and Navigation Bars. Practical: Create a Task Tracker with Forms, Workflows, and Reports.	15
Unit III	**Advanced Features and Deluge Scripting** Introduction to Deluge Scripting: Syntax, Variables, and Data Types. Writing Custom Scripts for Dynamic Behavior. Advanced Workflow Automation: Conditional Statements, Loops, and Functions. Automating Notifications and Approval Processes. AI-Powered Assistance in Deluge:Zia Assistance Using Zoho GenAI. Error Handling and Debugging Deluge Scripts. Using API Calls and Webhooks for Advanced Integrations. Practical: Automate a Student Attendance Management System using Deluge	15
Unit IV	**Integration and Data Management** Data Management: Designing Effective Data Models for Applications. Importing and Exporting Data. Ensuring Data Security and GDPR Compliance. AI in Data Processing: PDF Support for OCR AI Models. External Integrations: Connecting with Third-Party Applications via APIs. Integrating Zoho CRM, Zoho Books, and Zoho Flow. Real-Time Data Updates: Webhooks and JSON Parsing. Best Practices for Scalable Application Development. Practical: Build an Integrated Sales Dashboard with Live Data from Zoho CRM.	15
Unit V	**Application Deployment and Capstone Project** Application Deployment: Testing, Debugging, and Publishing Applications. Configuring User Roles and Permissions. Deploying Web and Mobile Applications. AI-Powered Assistance: Zia Assistant Powered by OpenAI for Smart Recommendations. Capstone Project Guidelines: Identifying a Problem Statement. Designing and Developing a Complete Application. Project Documentation and Final Presentation. Examples of Capstone Projects: Online Event Registration System, E-Commerce Product Catalog with Order Management, Library Management System. Practical: Develop a Fully Functional Capstone Project	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

References

1. Zoho Creator User Guide & Documentation – https://www.zoho.com/creator/
2. Online Tutorials and Webinars from Zoho Creator Academy: https://www.zoho.com/creator/webinars/recorded-webinars.html
3. Zoho Creator Resource Center: https://www.zoho.com/creator/help/#getting-started
4. Deluge Scripting: https://www.zoho.com/deluge/help/
5. AI-Powered Applications with Zoho Creator – Zoho Blogs & Whitepapers. https://www.zoho.com/blog/

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.Sumadhi Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**25UBC5E1**			**Title**	**Batch:**	**2025-2028**
				DSE -I: Internet Of Things(IOT)	**Semester:**	**V**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:**	**5**

Course Objective

Students will be explored to the interconnection and integration of the physical world and the cyber space

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate proficiency in using Arduino IDE for programming microcontrollers and interfacing them with sensors, actuators, and communication modules	K1
CO2	Design and implement IoT solutions by applying fundamental principles of data acquisition, processing, and transmission	K2
CO3	Develop practical skills in building IoT projects from concept to completion, including hardware setup, software development, and testing.	K3
CO4	Analyze real-world IoT scenarios and apply appropriate sensors and communication protocols to collect and transmit data effectively	K4
CO5	Evaluate and troubleshoot IoT systems to ensure functionality, reliability, and security in diverse application domains.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M		H	H	M	H		H	H	H	H
CO2	M	M	M	M	H		H		H		H	M
CO3	H	H	M	H	M	M	H		H	H	H	H
CO4	M	M		M	M			M	M		M	M
CO5	M	H	M	M	M	H	L		M	M	M	H

Units	Content	Hrs
Unit I	**Internet of Things**: An Overview**:**Internet of Things - Definition & Characteristics of IoT-Evolution of IoT -IoT Architecture - IoT Ecosystem. **Design Principles for Connecting Devices:** M2M Communications-M2M System Architecture - Difference between M2M and IoT - Software Defined Network (SDN) - Network Function Virtualization (NFV) - IoT Protocols - IoT Platform Design Methodology. **Domain Specific IoT's:** Home Automation - Environment - Agriculture - Health & Lifestyle - Industry.	18
Unit II	**Arduino: An Overview:** Introduction to Arduino - Arduino History - Arduino Family - Anatomy of Arduino Board. **Working with Arduino IDE:** Introduction to Arduino IDE - Install & Setup Arduino IDE - Adding Library from External Sources - Standard Arduino Libraries. **Programming with Arduino:** Basics of Embedded C Programming for Arduino - Arduino Basic Functions - Arduino Coding Basics.	18
Unit III	**Types of Sensors:** Introduction to Sensors - DHT11 Temperature and Humidity Sensor - Motion Detections Sensor - Soil Moisture Sensor - Distance Measurement Sensor - MQ Series Gas Monitoring Sensor. **Actuators with Arduino:** Introduction to Actuators - Working with DC Motors - Working with Servo Motor -Arduino Displays. **Communication Modules with Arduino:** RFID Reader Module - HC-05 Bluetooth Module - GSM Module - NEO-6M GPS Module	18
Unit IV	**Networking with ESP8266 Wi-Fi Module:** Introduction to ESP8266 Wi-Fi Module - Interfacing Arduino with ESP8266. **IoT with NodeMCU:** Introduction to NodeMCU - Setup NodeMCU in Arduino IDE - Anatomy of NodeMCU - Arduino vs NodeMCU. **Cloud Platform for IoT:** Virtualization Concepts & Cloud Architecture - Thing Speak and MQTT - Interfacing with Blynk Application - IFTTT Platform.	18
Unit V	**IoT & other Technologies:** IoT & Blockchain - IoT & Big Data - IoT & Artificial Intelligence - IoT & AR/VR - IoT & Edge Computing. **IoT Real Life Examples:** Self Driven Cars - IoT Retail Shops - Wearables - Smart Grids - Home Automation. **Carrer Opportunities in IoT:** IoT Security Engineer - IoT Embedded Engineer - IoT Platform Developer - IoT Architect - Chief Internet of Things Officer (CIoTO)	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

25UBC5E1

Text Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\EDITION	YEAR OF PUBLICATION
1	P. Ganesh, K. Haridas	Internet of Things: A Practical Approach using Arduino IDE	Selfypage Developers Pvt Ltd, First Edition	2025

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Rajkumar Buyya, Amir Vahid Dastjerdi, Satish Narayana Srirama	Internet of Things: Principles and Paradigms	Wiley, 1st Edition	2016

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIP KUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**25UBC5E2**			**Title**	**Batch:**	**2025-2028**
				DSE-I Networks	**Semester:**	**V**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:**	**5**

Course Objective

To provide a strong background of computer network concepts, a good foundation covering the layers of OSI and TCP/IP model to acquire knowledge and network functionalities into layers.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember computer network basics, network architecture, and TCP/IP and OSI reference models.	K1
CO2	Understand the knowledge about essential protocols and their operations.	K2
CO3	Apply aspects of network security.	K3
CO4	Familiarize the different types of protocols.	K4
CO5	Evaluate detection and correction of errors in transmission.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	M		H	H	M	H		H	H	H	H
CO2	M	M	M	M	H		H		H		H	M
CO3	H	H	M	H	M	M	H		H	H	H	H
CO4	M	M		M	M			M	M		M	M
CO5	M	H	M	M	M	H	L		M	M	M	H

Units	Content	Hrs
Unit I	Introduction: Uses of Computer Network-**Network Hardware:** LAN– WAN – MAN – Wireless – Home Networks. **Network Software:** Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. **Reference Models:** OSI Reference Model– TCP/IP reference Model	18
Unit II	**Physical Layer -** Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. **Wireless Transmission:** Electromagnetic Spectrum –Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves. **Communication Satellites:** Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites – Satellites versus Fiber. **Data-Link Layer**: Error Detection and correction–Elementary Data-link Protocols– Sliding Window Protocols.	18
Unit III	**Network Layer:** Routing algorithms – Congestion Control Algorithms – IPv4 Addresses – IPv6 Addresses. **Transport Layer:** *Elements of Transport Protocols* – Internet Transport Protocols:TCP – Quality of Service.	18
Unit IV	**Session Layer:** Session and Transport Interaction – Synchronization Points– Session Protocol Data Unit. **Presentation Layer:** Translation– Encryption/Decryption– Authentication– Data Compression.	18
Unit V	**Application Layer:** DNS –E-mail: SMTP, POP– File Transfer Protocol– HTTP – Telnet Protocols. **Case Studies:** Network Security.	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\EDITION	YEAR OF PUBLICATION
1	Andrew S. Tanenbaum	Computer Networks	4th edition(Unit-1,2,3,5)	Reprint2003, PHI.
2	Behrouz A.Fo rouzan	Data Communication AndNetworking	2nd Edition Update, Genuine Tata Mcgraw–Hill Edition. (Unit – 4)	2008

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Achyut Godbole	Data Communication And Networks	Tata McGraw Hill Edition	2007
2	Uyless Black	Computer Networks Protocols,Standards, and Interfaces	Prentice Hall India, 2nd Edition.	Jan. 1993

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIP KUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC5E3			Title	Batch:	2025-2028
				DSE -I:Data Science	Semester:	V
Lecture Hrs./Week	6	Tutorial Hrs./Sem			Credits:	5

Course Objective

To develop the student's knowledge in the basic concepts of Python, Machine Learning and Deep Learning.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the fundamentals of Python and R-Programming.	K1
CO2	Understand the basic concepts of Data Wrangling and the process of data flow.	K2
CO3	Apply the basic concepts in Natural Language Processing and Neural Networks.	K3
CO4	Analyze the concept of Machine Learning and Deep Learning.	K4
CO5	Evaluate ML algorithms and gain knowledge on Outliers.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M				H	H					H	H
CO2					H	M		M	H	H	H	H
CO3		H	M			H	H	M	H	H	H	H
CO4				H	H	H	H		H	H	H	H
CO5	M	H		H	H	H				H	H	H

Units	Content	Hrs
Unit I	Python for Data Science: Why Python – IDEs for Python Programming– Packages – Top 10 DS Packages in Python – Modules in Python – Introduction to R – Commands – Objects – Variables – Data Visualization – Basic Graphs using R.	18
Unit II	Data Wrangling – Definition -Analytic Process – Cross Industry Standard for Data Mining – Sources of Data – The Data Science Process – Process Flow – The Data Scientist Role–Data Wrangling Steps.	18
Unit III	Natural Language Processing – Statistical Language Models – Unigram Model – Bigram Model – N-gram Models – Logistic Regression – Neural Network – DNN - NTypes of Neural Network.	18
Unit IV	Machine Learning – What is Machine Learning?–Components of Machine Learning – Types – ML algorithms – Comparison of K-Means and DB Scan - Deep Learning – What is Deep Learning? – Applications of Deep Learning.	18
Unit V	Data Preprocessing – Why Data Preprocessing? – Data Transformations – Identifying and Handling the missing values - Encoding the Categorical Data – Ways to Encode - Normalization vs Standardization- - Case studies on Machine Learning Algorithms – Outliers.	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Juraf sky and Martin	Speech and Language Processing (Unit1 to5)	Prentice Hall,2nd Edition	2008

Reference Websites

S.NO	WEBSITES
1	https://towardsdatascience.com/data-preprocessing-concepts-fa946d11c825
2	https://developers.google.com/machine-learning/clustering/clustering-algorithms
3	https://towardsdatascience.com/your-guide-to-natural-language-processing-nlp-48ea2511f6e1
4	https://www.ibm.com/cloud/learn/natural-language-processing

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC517			Title	Batch:	2025-2028
					Semester:	V
Practical Hrs./Week	5	Tutorial Hrs./Sem.		CC Lab VII : Python Programming	Credits:	02

Course Objective

The course presents an overview of elementary data items, list, dictionaries and oops concepts.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the syntax of the Python language	K1
CO2	Understanding the control statements, loops and functions	K2
CO3	Identify the external modules for creating and writing data to excel files and inspect the file operations to navigate the file systems.	K3
CO4	Analyze the techniques used to design and create Python.	K4
CO5	Interpret the concepts of Object-oriented programming as used in Python using encapsulation, polymorphism and inheritance	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	H	H	M		M	M					M	H
CO2	H	H	M	H	M	M	M	M	H	H	M	H
CO3	H	H			M	M		H	H	H	H	H
CO4	H	H	M	M						M	M	H
CO5	H	H		H	M	M		H	H		H	H

1. Write a program to display the following information: Your name, Full address, Mobilenumber, College name, Course.
2. Write a program to find the largest integer using if-else and comparison operator.
3. Write a program to find the Armstrong number.
4. Write a program to display prime number.
5. Write a program to generate the Fibonacci series
6. Write a program to display the Student Mark sheet.
7. Write a program to find the factorial of a given number.
8. Write a program to generate the product of matrices.
9. Write a program to design a simple calculator.
10. Write a program to find the mean, median and mode.
11. Write a program to convert Decimal to Binary, Octal and Hexadecimal.
12. Write a program to Generate odd number from the list.
13. Write a program to handle the Exceptions.
14. Write a program to create two files and merge them.
15. Write a program to find out the uppercase and lowercase characters in the file and count the words present in the file.

Total Contact Hours:75

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC518			Title	Batch:	2025-2028
				CC Lab VIII : AI-Driven Low-Code Applications using Zoho creator	Semester:	V
Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	2

Course Objective

The course aims to provide students with hands-on experience in developing AI-driven low-code applications using **Zoho Creator**. It covers essential concepts of low-code platforms, AI integration, workflow automation, and application development with minimal coding.

Course Outcomes

On successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of **low-code platforms** and their role in AI-driven application development.	K1
CO2	Learn how to create **forms, workflows, and automation** in Zoho Creator.	K2
CO3	Apply AI features within Zoho Creator to enhance application functionality.	K3
CO4	Analyze real-world use cases and implement **AI-driven decision-making** in applications.	K4
CO5	Develop **end-to-end low-code applications** using Zoho Creator with AI capabilities.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M		M	H	H	M	H	M	H	H	H
CO2	M	H	M	H	H	M		H	M		H	M
CO3	M	M		M	H	M		H	M		M	M
CO4	H	H	M	M	H	M		M	H	H	H	H
CO5	H	M		H	M	H	M	H	M	M	M	H

1. Create a Basic College Management System App

2. Build a Task Management System

3. Develop a Leave Management System with Approval Workflow

4. Automate Student Attendance System Using Deluge

.5. Develop an Expense Reimbursement App with Auto-Approval

6. Generate Dynamic Reports with Deluge Scripting

7. Integrate Zoho Creator with Zoho CRM

8. Build an AI-Powered OCR-Based Invoice Processing App

9. Deploy an AI-Powered Online Event Registration System

10. Develop an E-Commerce Product Catalog with Order Management

11. Build a Library Management System with Role-Based Access

Total Contact Hours:75

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name:Dr.T.Sumadhi Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
CourseCode:	25UBC519			Title	Batch:	2025-2028
				PROJECT : Mini Project	Semester:	V
LectureHrs./ Week or Practical Hrs./Week		Tutorial Hrs./Sem.			Credits:	2

BACHELOR OF COMPUTER APPLICATIONS PROJECT & VIVAVOCE

GUIDELINES

INTRODUCTION

The title of the project work and the organization will be finalized at the end of fifth Semester. Each student will be assigned with a Faculty for guidance. The Project work and coding will be carried by using the facility of computer science lab as well as in the organization. Periodical review will be conducted to monitor the progress of the project work. Project report will be prepared and submitted at the end of the semester. External examiner appointed by the Controller of Examination will conduct the viva voce examination along with respective guide.

Area of Work

- Web Based Development
- Mobile app development
- Website development
- IOT Projects
- BigData and DataMining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python, R, Tableau etc..
- System Software
- WebSecurity Projects
- Image Processing

Methodology

Arrangement of Contents:

The sequence in which the project report material should be arranged and bound as follows:

1. Cover Page & Title Page
2. Bonafide Certificates from Organization (Mandatory)
3. Declaration
4. Acknowledgement
5. Synopsis
6. TableofContents.
7. Chapters
8. Appendix
9. Reference

Format of Table of Contents

`

TABLE OF CONTENTS

Chapter No.	Title	Page No.
i	**Certificates**	
ii	**Declaration**	
iii	**Acknowledgement**	
iv	**Synopsis**	
Introduction		
	Introduction	
	Objective of the Project Company	
	Profile System Specification	

Hardware Sp**e**ification

Software Specification

2 System Study

Existing System Drawbacks

Proposed System

Planning and Scheduling

3 System Design

Overview of the Project

Modules of the Project Input Design Format

Output Design

Table Design

Supporting Diagrams(ER/DFD/UseCase)

4 Implementation and Testing Coding

Methods TestingApproach

Implementation and Maintenance

5 Project Evaluation

Project Outcome

Limitation of the Project

Further Scope of the Project

6 Conclusion

7 Appendix Source Code

Screenshots and Reports

8 References

Size of the Project

The Project Report contents should be maximum of not exceeding 60 pages

Assessment Method

Internal Assessment: 50Marks

Criterion	Mode of Evaluation	Marks	Total
I	Synopsis, Company profile, System Specification, Existing system, Proposed system OR (For android Developments)Planning Stage	15	50
II	Supporting Diagrams like system flowchart, ER, DFD, Use case and Table Design OR UI and UX Design Application Architect and Prototyping	20	
III	Coding, Input forms, Output format, testing OR Development, Testing Preparation of rough draft	15	

External Assessment: 50 Marks

Mode of Evaluation	Marks	Total
Project Report		
Title Relevance of the Industry/Institute	05	40
Technology	05	
Design and development Publishing	15	
Testing, Report	15	
Viva Voce		
Project Presentation	05	10
Q & A Performance	05	

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	25UBC5S1			Title	Batch:	2025-2028
				SEC III : Mobile Application Development Lab	Semester:	V
Practical Hrs./Week	3	Tutorial Hrs./Sem.			Credits:	02

Course Objective

To design and implement various mobile applications and learn how to deploy applications to hand-held devices.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember essential Android Programming concepts.	K1
CO2	Understand various Android Applications related to layouts and rich uses Interactive interfaces.	K2
CO3	Apply native application using GUI components and Mobile application Development framework.	K3
CO4	Analyze Android applications to the app market.	K4
CO5	Evaluate mobile applications for the current scenario.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M		M	H	H	M	H	M	H	H	H
CO2	M	H	M	H	H	M		H	M		H	M
CO3	M	M		M	H	M		H	M		M	M
CO4	H	H	M	M	H	M		M	H	H	H	H
CO5	H	M		H	M	H	M	H	M	M	M	H

1. Create Application by Using Widgets, Creating the Application by using the Activity class
2. Creating the Application by using Text Edit control.
3. Creating the Application Choosing Options Check Box.
4. Creating the Application Choosing Options Radio Button.
5. Creating the Application Choosing Options Radio Group.
6. Creating the Application Choosing Options Spinner.
7. Create Application by Using Building Blocks for Android Application design by using LinearLayout
8. Create Application by Using Building Blocks for Android Application design by usingRelative Layout.
9. Create Application by Using Building Blocks for Android Application design by usingAbsolute Layout.
10. Design the application to display the Drop-Down List Action Bar.

Total Contact Hours : 45

Course Designed by	**HOD**	**CDC**	**COE**
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Mr.S.DILIPKUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC5S2			Title	Batch:	2025–2028
				SEC III : R-Programming Lab	Semester:	V
Lecture Hrs./Week	3	Tutorial Hrs./Sem.			Credits:	02

Course Objective

The objective of these R programming lab programs is to develop fundamental skills in data handling, mathematical operations, control structures, data visualization, and database connectivity. Students will learn to perform arithmetic and statistical computations, implement matrix operations, generate sequences, apply sorting and sampling techniques, create visual representations of data, and interact with databases using R.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain critical R programming concepts	K1
CO2	Demonstrate how to install and configure R-Studio	K2
CO3	Explain the use of data structure and loop functions	K3
CO4	Analyze data and generate reports based on the data	K4
CO5	Apply various concepts to write programs in R	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M		H	M		L		M	M	M
CO2	M	H	H	M	H	H	H		H	M	H	M

CO3	M	M	M	H		H	H		H	M	H	H
CO4		M	H		H	H		M	H	H	H	H
CO5	M	M	H	H	H	H	H	M	H	H	H	H

1. Check if a Number is Odd or Even in R Programming
2. Find the Sum, Mean and Product of the Vector in R Programming
3. Implement matrix addition, subtraction and multiplication
4. R Program to Sample from a Population
5. Create an R Program to Find the Minimum and Maximum
6. R Program to Sort a Vector
7. How to Find the Factorial of a Number
8. Draw Pie chart and Bar chart in R Programming
9. R Program to Print the Fibonacci Sequence
10. Create database and insert values to Database using R-Programming

Total Contact Hours : 45

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Ms.N.AMIRTHAGOWRI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC5AL			Title	Batch:	2025-2028
				ALC - I: Adhoc and Sensor Networks- Self Study	Semester:	V
Lecture Hrs./Week		Tutorial Hrs./Sem			Credits:	2*

Course Objective

To study the protocols and the functionalities of ad hoc networks, understanding the various applications developed based on ad hoc networking, addressing issues and challenges created. To know about the sensor networks and addressing the challenges in establishing infrastructure for sensor networks and managing database.

Course Outcomes

Upon completion of this course students shall be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the Fundamental Concepts and applications of adhoc and wirelesssensor networks.	K1
CO2	Demonstrate the MAC protocol issues of adhoc networks.	K2
CO3	Apply the concepts of network architecture and MAC layer protocol for WSN.	K3
CO4	Analyze the routing protocols for adhoc wireless networks with respect to TCPdesign issues.	K4
CO5	Explain the WSN routing issues by considering QoS measurements.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H		H	H	H	H	H		H	H	H
CO2				M		M		H			M	M
CO3	H	H		H	H	H	H	M	H	H	H	H
CO4				M			M	H	M	H	H	H
CO5	M			M	H	H	M				M	M

Units	Content	Hrs
Unit I	Introduction to adhoc & sensor networks: Key definitions of adhoc and sensor networks - unique constraints and challenges- advantages of ad -hoc/sensor network - driving applications - issues in adhoc wireless networks - issuesin design of sensor network -sensor network architecture -data dissemination and gathering.	15
Unit II	Issues in designing MAC protocols for adhoc wireless networks - Design Goals of MAC protocol for Ad hoc Networks - Classification of MAC protocols- MAC protocols for sensor network-Contention Based Protocols-Reservation and Scheduling Mechanisms- Other Protocols.	15
Unit III	Routing protocols for Ad hoc wireless Networks- Design Issues and Classifications of unicast and multicast Routing Protocols - Proactive- Reactive and Hybrid routing protocol –Tree based and Mesh based multicast protocols- Energy Efficient and QoS guaranteed multicast protocols.	15
Unit IV	Security in wireless Ad hoc wireless Networks-Network security requirements-challenges in security provisioning-Network security attacks- Layer wise attacks in wireless sensor networks: jamming-tampering-black hole attack-flooding attack-Secure routing in Adhoc wireless Networks.	15
Unit V	Quality of service in Adhoc wireless Networks: Introduction – challenges in providing QoS in Adhoc wireless Networks - Classification of QoS solutions - MAC layer solutions - network layer solutions.	15
	Total Contact Hrs	**75**

The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Assignment, Case Study

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	C. Siva Ram Murthy and B.S. Manoj	AdHoc Wireless Networks– Architectures and Protocols (Unit 1 to 3)	Pearson Education-2nd Edition	2005
2	Feng Zhao and LeonidasGuibas	Wireless Sensor Networks– an Information Processing Approach (Unit 4, 5)	Elsevier Publications	2004

Reference Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	C.K.Toh	Ad hoc Mobile Wireless Networks–Protocolsand Systems	Pearson Education-1st Edition	2007.
2	George Aggelou	Mobile Ad hoc Networks– FromWirelessLANsto4G Networks	Tata McGrawHill	2009
3	HolgerKarland AndreasWilling	Professional ASP .NET Protocols and Architecturesfor Wireless Sensor Networks 1.1	Wiley Publications	2005

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T. SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC620			Title	Batch:	2025-2028
				CC - XIV :	Semester:	VI
Lecture Hrs./Week	5	Tutorial Hrs./Sem		Software Engineering and Testing	Credits:	3

Course Objective

The course is to expose the students to different software testing tools and techniques, to plan and create test plan and manage test cases. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects using automation tool.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the fundamental concepts and types in software testing.	K1
CO2	Understand the process of applying tests to software and the basic components of a test case.	K2
CO3	Apply a test plan by learning its process and components.	K3
CO4	Analyze the automation techniques and use modern testing tools to support software testing projects.	K4
CO5	Evaluate the test code and automate test execution.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M		H	H			M	H	H	M
CO2	H	H		M	H	H	M		H	H	H	H
CO3	H	H	M	M	H	H	H	M	H	H	H	H
CO4	M	M	M		M	M				H	M	M
CO5	H	H		M	H	H	H		H	H	H	H

Units	Content	Hrs
Unit I	Software-Software Characteristics-Software Components - Software Applications - The Process -Software Engineering a Layered Technology-The Process, Methods, Tools-A Generic View of Software Engineering - The Software Process -Software Process Models Linear Sequential Models - Prototyping Model- RAD Model	15
Unit II	Analysis Modeling - Elements of Analysis Model - Data Modeling - Data Objects, Attributes and Relationship Diagram - Function Modeling - Data Flow Diagram - Behavioral Modeling. Design Concepts and Principles - The Design Process - Design Principles - Design Concepts - Effective Modular Design - Functional Independence – Cohesion – Coupling – Design Documentation.	15
Unit III	Software Quality Assurance (SQA), Quality Control (QC), Comparison between QA & QC. Introduction to Testing, Black Box Testing -White Box Testing- Test Case- Levels of Testing- Software Testing Life Cycle - Special Types of Testing.	15
Unit IV	Test Plan - Phases of Test Plan - Hierarchy of Test Plan - Hierarchy of Test Document - Test Plan Process - Components of a Test Plan - Verification and Validation – Audits – Reviews - Software Metrics - Process Metrics - Project Metrics - Product Metrics - Testing Metrics. Introduction to Automation Test Tools - Automation Process - Features of Automation Tools: Record and Playback – Integration - Environment Support - Database Test – Data Function - Object Mapping - Image Testing - Object Name – Map - Object Identity Tool - Test/Error Recover - Web Testing - Quality Standards.	15
Unit V	Introduction - Selenium IDE - Web Driver - Launching AUT and Inspecting properties of Elements - Automating Operations on various Elements - Automating Keyboard and Mouse Events - Handling multiple Windows - Handling Alerts - Handling Frames - Page Object Model (POM) & Page Factory in Selenium - Database Testing using Selenium.	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Roger Pressman	Software Engineering	A Practioner's Approach, SixthEdition	2005
2	Course Material prepared by the Department of Computer Science based on the above web references (Unit 1 to 4).			
3	MarkFewster& Dorothy Graham	SoftwareTest Automation(Unit5)	Addiso_Wesley	1999

Reference Books

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Srinivasan Desikan &Gopalswamy Ramesh	Software Testing Principles and Practices (unit I- IV)	Pearson Education	2006

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6E4			Title	Batch:	2025-2028
				DSE -II: Storage Management	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.			Credits:	05

Course Objective

The main objective of the course is to understand the fundamental storage system architectures and storage performance management.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remembering the storage architectures, storage subsystems and variety of storage system environments.	K1
CO2	Understanding different RAID levels and their suitability on different Application environments.	K2
CO3	Apply the file sharing operations and protocols on Network Attached Storage (NAS).	K3
CO4	Analyze the characteristics and components of SAN	K4
CO5	Evaluate the different back up and recovery topologies	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	M	L	L	M	M	H	L	M		H	M
CO2	H	M	M	H	M	H	M	M		M	H	H
CO3	M	M	M	L	H	L	L	M	M		H	M
CO4	H	M	M	M	H	M	M	H	M	H	H	H
CO5	H	M	L	M	H	H	H	L	M	H	H	H

Units	Content	Hrs
Unit I	Introduction to Information Storage and Management: Information Storage: Data – Type of Data - Information - Storage – Evolution of Storage Technology and Architecture - Data Center Infrastructure – Core Element - Key Requirement for Data Center Elements - Key Challenges in Managing Information Life cycle: Information Life Cycle Management.	18
Unit II	Storage System Environment and RA/D: Components of Storage System Environment: Host - Connectivity- Storage Disk Drive Components - Platter, Spindle, Read/Write Head, Actuator Arm Assembly, Controller, Physical Disk Structure, Zoned Bit Recording, Logical Block Addressing-Data Protection: RA/D:Implementation of RA/D Software RA/D – Hardware RA/D-RA/D.	18
Unit III	Intelligent Storage System and Storage Area Network: Components Of An Intelligent Storage System: Front End - Cache – Back End - High End Storage Systems - Midrange Storage System - Storage Area Network: Fibre Channel: Overview-The SAN and its Evolution-Components of SAN- SAN Management Software-Fibre Channel Architecture.	18
Unit IV	Network Attached Storage and Content Addressed Scheme: Network Attached Storage: General Purpose Servers Vs NAS Devices - Benefits of NAS - Content Addressed Storage: Fixed Contents and Archives – Types of Archives - Features And Benefits of CAS.	18
Unit V	Storage Virtualization, Backup and Recovery: Forms of Virtualization: Memory Virtualization - Network Virtualization – Server Virtualization - Storage Virtualization- - Backup And Recovery: Backup Process - Disaster Recovery - Operational Back Up - Backup And Restore Operations - VirtualTape Library.	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	G.Somasundaram and AlokShrivatsava,	"Information Storage Management: Storing, Managing and Protecting Digital Information", (Unit 1 to 5).	Wiley,	2009

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	UlfTroppens etal	Storage Networks Explained: Basics and Application of Fibre Channel SAN	NAS, ISCSI, INFINIB and FOCE",Wiley	2015
2	Hubbert Smith	Data Center Storage: Cost-effective strategies, implementation and management	CRCPress	2011

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Mr.S.DILIP KUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6E5			Title	Batch:	2025-2028
				DSE II :Artificial Intelligence and Expert systems	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.			Credits:	05

Course Objective

The main objective of the course is to study and apply IT applications with a wide range of concepts and technical skills in the areas to succeed in the future.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate fundamental understanding of the history of artificialintelligence (AI) and its foundations	K1
CO2	Understanding about the basic concepts of Software agents and representation of knowledge	K2
CO3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.	K3
CO4	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.	K4
CO5	Learn various applications domains of AI	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1	M	H	L	M	H	M	M	L	H	M	H	M
CO2	M	H	M	M	H	H	M	L	H	M	H	H
CO3	H	H	L	H	H	H	H	M	H	L	H	H
CO4	M	H	M	H	H	H	H	L	H	H	H	H
CO5	H	H	M	H	H	H	H	M	H	H	H	H

Units	Content	Hrs
Unit I	**Introduction to Artificial Intelligence:** Intelligent Agents - Approaches in Artificial Intelligence - Definitions of Artificial Intelligence - AI Problems - Features of AI Programs - Importance of AI - Advantages of AI - Disadvantages of AI.	18
Unit II	**Applications Of Artificial Intelligence:** Finance - Hospitals and Medicine – Robotics - Expert Systems – Diagnosis - Pattern Recognition - Natural language Processing - Game Playing - Image Processing - Data Mining - Big Data Mining.	18
Unit III	**Heuristic Search Strategies:** Generate and Test - Best First Search - Hill Climbing Search - Simulated Annealing Search – A* Algorithm - AND-OR Graphs. **Properties of the Heuristic Search Algorithm:** The MINIMAX Algorithm.	18
Unit IV	**Expert Systems:** Definitions of Expert Systems - Features of Good Expert Systems. **Roles of the Individuals Who Interact with the System**: Domain Expert - Knowledge Engineer – Programmer - Project Manager – User. *Advantages of Expert Systems – Disadvantages of Expert Systems*.	18
Unit V	**The Learning Process:** Types of Learning in a Neural Network - Supervised Learning - Unsupervised Learning - Reinforcement Learning. **Perceptron:** The Representational Power of a Perceptron. Backpropagation Networks - Advantages of Neural Networks - Limitations of Neural Networks – *Applications of Neural Networks*.	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask

25UBC6E2

TEXT BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Itisha Gupta & Garima Nagpal	Artificial Intelligence and Expert systems(Unit 1 to 5)	David Pallai	2020

REFERENCES BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dan W.Patterson	Introduction to Artificial Intelligence and Expert systems	Pearson Education	2015
2	Dr Nimish Kumar	Artificial Intelligence and Expert Systems	Genius Publication	2013

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Mr.S.DILIP KUMAR Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6E6			Title	Batch:	2025-2028
					Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.		DSE - II: Information Security	Credits:	05

Course Objective

To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks. To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets. To develop graduates that can identify, analyze, and remediate computer security breaches.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the fundamental concepts of Information Security.	K1
CO2	Understand the concepts of public key encryption, Authentication and hash functions.	K2
CO3	Examine the issues in Network Security and Intrusion Detection and Defensive Programming.	K3
CO4	Analyze the basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.	K4
CO5	Evaluate the security features and Cyber security law in real life situations.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	M	H	H	M		L		M	L	H	H
CO2	M	M	M	H	H	H	M		M	M	H	H
CO3			H		H	M	H		H	H	M	M
CO4		H	M	M	M	H	M	H	M	M	M	H
CO5	H	H	H	H	M	M	H	H		H	H	H

Units	Content	Hrs
Unit I	Attacks on Computers and Computer Security: Introduction – Need For Security – Types Of Attacks. Cryptography - Concepts and Techniques: Introduction – Plain Text and Cipher Text–Substitution Techniques-Transposition Techniques– Encryption and Decryption.	18
Unit II	Symmetric Key Algorithms: Introduction – Algorithm Types – An Overview Of Symmetric Key Cryptography – Data Encryption Standard (DES): How DES Works? Asymmetric Key Algorithms, Digital Signature and RSA: Introduction – An Overview Of Asymmetric Cryptography-The RSA Algorithm.	18
Unit III	Network Security: Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats – Counter measures – Distributed Denial of Service Attacks–Firewalls–Design Principles–Trusted Systems.	18
Unit IV	Software Security: Secure software engineering – Hackers, Crackers, and Attackers – Security Failures – Technical Trends affecting Software Security - *Defensive programming and its Techniques- Buffer overruns and other Implementation flaws.*	18
Unit V	Cyber security: Classification of Cybercrimes - Case Studies: Privacy - Mobile code– Security and the Law - The legal perspective – Indian perspective, Global perspective - *Cyber Stalking and Obscenity in Internet – Electronic Voting.*	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Books 25UBC6E6

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Atul Kahate	"Cryptography and NetworkSecurity", 2nd Edition (Unit-1 and 2)	TataMcgrawHill Publications	2013
2	DebbyRussell and Sr.G.T.Gangemi	Computer Security Basics (Unit – 1)	O'Reilly Media	2006
3	William Stallings	Cryptography and Network Security (Unit– 2,3and 4)	PrenticeHall	2008
4	NinaGodbole, SunitBelapure	Cyber Security – Understanding Cyber Crimes, Computer Forensics and Legal Perspectives (Unit-5)	WielyIndia PvtLtd	2011

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Charles P pfleeger and Shai Lawrence pfleeger	Security in Computing	Prentice Hall	2007
2	BehrouzA. Forouzan	Cryptography and Network Security	Tata Mc-GrawHill Publications	2007

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Program me Title:	Bachelor of Computer Applications	
Course Code:	25UBC6E7			Title	Batch:	2025-2028
				DSE -III: Data Mining And Warehousing	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.			Credits:	05

Course Objective

To learn the basic concepts, applications and techniques of data mining and to develop skills for applying data mining techniques and algorithms to solve practical problems in data and information management, retrieval and knowledge discovery in various disciplines.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall the concept of data mining, warehousing and knowledge discovery process.	K1
CO2	Understand data pre-processing techniques like cleaning ,integration and data transformation strategies.	K2
CO3	Describe the knowledge discovery process and its algorithms including k-nearest neighbour, decision trees, association rules and neural networks.	K3
CO4	Understand the concepts and characteristics of data warehousing, data modeling techniques and query tools.	K4
CO5	Analyze the data modeling, design and implementation of warehousing solutions for emerging internet and cloud environments.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	L	L	H	M	L	M	H	M	H	H
CO2	M	H	L	L	M	H	H	L	H	L	M	M
CO3	H	M	H	L	H	H	L	L	M	M	H	M
CO4	M	L	H	H	M	M	H	L	H	M	H	H
CO5	M	H	L	L	M	H	L	M	M	M	M	H

Units	Content	Hrs
Unit I	Introduction to Data Mining: Definition- Kinds of Data- Kinds of Patterns - Technologies used – Major Issues in Data mining – Data mining Applications & Trends – Data objects & Attribute types – Data visualization.	18
Unit II	Data Preprocessing: Data cleaning: Missing values, Noisy data, Data cleaning as a process-Data Integration: Entity Identification problem, Redundancy and correlation analysis, Tuple Duplication, Data value conflict detection & resolution – Overview of Data reduction strategies – Data transformation strategies overview.	18
Unit III	Knowledge Discovery Process: Data Selection-Cleaning-Enrichment-Coding-Data Mining-Reporting-Preliminary Analysis of Data Set Using Relational Query Tools- Visualization Techniques-Likelihood and Distance-K-Nearest Neighbor-DecisionTrees-AssociationRules-NeuralNetworks-GeneticAlgorithms- Reporting. Setting up KDD Environment: - 10 Golden Rules.	18
Unit IV	Data warehousing: An introduction - characteristic of a data warehouse - data mats - other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems - data modelling - star schema for multidimensional view - data modelling – multi fact star schema or snow flake schema - OLAP TOOLS - state of the market - OLAP TOOLS and the internet.	18
Unit V	Developing a Data warehouse: Why and how to build a data warehouse architectural strategies and organization issues-design consideration- data content, metadata, comparison data warehouse and operational data - tools for data warehousing - performance consideration-crucial decision in designing a data warehouse.	18
	Total Contact Hrs	**90**

Text Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Jiawei Han, MichelineKamber, Jianpei	Dataminingconcepts and Techniques	MorganKaufmann Publishers, 3rdedition	2011
2	PieterAdriaansDolfZantinge	DataMining	AddisonWesley Publications, SecondEdition	2000
3	Alex Berson, Stephen J. Smith,	Data warehousing, Data Mining & OLAP	Tata McGraw Hill, Publications	2004.

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	IanH.WittenEdileFrank	DataMining-Practical Machine Learning Tools & Techniques	Elsevier SecondEdition	2005
2	DanielT.Larose	DataMiningMethods and Models	JohnWeiley&Sons	2006
3	ArunK.Pujari	DataMining Techniques	UniversitiesPress Third Edition	2013

Course Designed by	HOD	CDC	COE
Name and signature	**Name and signature**	**Name and signature**	**Name and signature**
Name: MS.A.PRIYADHARSINI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6E8			Title	Batch:	2025-2028
				DSE -III: Cloud Computing	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.	-		Credits:	05

Course Objective

This course provides with the basics of Cloud Computing, the key concepts of Virtualization and different Cloud Computing services. It also offers students a sound foundation of the Cloud environment so that they are able to start using and adopting Cloud services in their real life scenarios.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and Challenges brought about by the various models and services in cloud computing.	K1
CO2	Demonstrate the fundamental concepts of cloud storage and their use in Storage systems such as Amazon S3 (Simple Storage Service) and Microsoft Azure.	K2
CO3	Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost.	K3
CO4	Analyze the performance of Cloud Computing.	K4
CO5	Explain the core issues of Cloud Computing such as security, privacy andinteroperability.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		H		H	M	H	H		H		H	H
CO2		H		H	M	H	H		H		H	H
CO3		M		H	M	H	H		H		H	H
CO4		H		H	H	H	H		H		H	H
CO5		M		H	M	M	M		H		H	H

Units	Content	Hrs
Unit I	Cloud Computing Basics: Cloud Computing Overview-Cloud Components-Infrastructure-Services-Applications-Storage-Database Services-Intranets and the cloud-Components–Hypervisor Applications. First Movers in the Cloud: Amazon-Google-Microsoft.	18
Unit II	Organization and Cloud Computing-Benefits-Limitations of Cloud Computing-Security Concerns-Privacy concerns with a third party-Security Benefits.	18
Unit III	Cloud Computing Technology: Hardware and Infrastructure - Clients-Security-Network-Services-Accessing the Cloud – Platforms – Web APIs-Web browsers-Cloud Storage – Overview – *Cloud Storage Providers* - Standards	18
Unit IV	Cloud Computing with the Titans: Google-Google App Engine-Google Web tool kit-EMC Technologies-VMware Acquisition-Microsoft-Azure Services Platform-Windows live-Exchange online-Share point Services-Microsoft Dynamics CRM-Amazon-Amazon Elastic Compute Cloud- Amazon Simple Storage Service - Amazon Simple Queue Service – Sales force.com - IBM.	18
Unit V	SecurityConcerns in Cloud Computing-Key Areas of Cloud Security-*Threats and Vulnerabilities in Cloud Computing*-How to overcome Cloud Security Challenges and Solutions. *Case Studies: Research Topics in the field of Cloud Computing*	18
	Total Contact Hrs	**90**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Anthony T.Velte, Toby J.Velte, Robert Elsenpeter	Cloud Computing-A Practical Approach (Unit 1 to 5)	Mc Graw Hill Publications	2010

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dr.Kumar Saurabh	Cloud Computing	Wiley India, Second Edition	2012

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**25UBC6E9**			**Title**	**Batch:**	**2025 -2028**
				Data Analytics Essentials : Power BI, Tableau and Pandas	**Semester:**	**VI**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:**	**5**

Course Objective

To enable the students to gain the knowledge about the Data Science

- Understand the foundational concepts of data analytics.
- Gain hands-on experience with Pandas.
- Learn the fundamentals of Power BI.
- Master Tableau's data visualization capabilities.
- Develop a comparative understanding of Power BI and Tableau

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the foundational concepts of data analytics	K2
CO2	Gain proficiency in using **Pandas** for data manipulation	K3
CO3	Develop the skills to create interactive reports and dashboards using **Power BI**	K3
CO4	Acquire the ability to connect to data sources	K3
CO5	Compare and contrast **Power BI** and **Tableau**	K4

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	**M**	**H**	**M**	**L**	**M**	**L**	**M**	**L**	**M**	**M**	M	L
CO2	**M**	**H**	**H**	**L**	**M**	**M**	**M**	**L**	**H**	**M**	M	H
CO3	**M**	**H**	**M**	**H**	**M**	**H**	**M**	**M**	**M**	**H**	H	M
CO4	**M**	**H**	**M**	**H**	**M**	**H**	**M**	**M**	**M**	**H**	H	M
CO5	**M**	**M**	**H**	**M**	**L**	**M**	**M**	**L**	**M**	**H**	M	H

Units	Content	Hrs
Unit I	**Basics of Data Analytics :** Introduction to Data Analytics - Data Science vs. Data Analytics - Data Analytics Process - Data Analytics Tools Overview.	18
Unit II	**Data Analytics Basics - Using Pandas :** Introduction to Pandas - Data Manipulation with Pandas - Data Analysis with Pandas - Basic Data Visualization in Pandas.	18
Unit III	**Basics of Power BI** : Introduction to Power BI - Data Import and Transformation in Power BI - Data Modeling in Power BI - Creating Reports and Dashboards - Publishing and Sharing Reports**.**	18
Unit IV	**Basics of Tableau :** Introduction to Tableau - Data Preparation and Transformation in Tableau - Creating Visualizations in Tableau - Building Dashboards and Stories.	18
Unit V	**Applications of Power BI and Tableau in Business Analytics :** Power BI in Business Analytics - Tableau in Business Analytics - Comparison Between Power BI and Tableau.	18
	Total Contact Hrs	**90**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Books:

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Yuxing Yan, Stephen Chen	Data Analytics and Visualization with Python	Packt Publishing **Edition**: First Edition	2020
2	Michael Heydt	Learning Pandas: A Practical Guide for Data Analysis	Packt Publishing **Edition**: First Edition	2019
3	Finn Tormod Eikenes	Power BI for the Excel Analyst	Apress **Edition**: First Edition	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Wes McKinney	Python for Data Analysis	O'Reilly Media **Edition**: 2nd Edition	2017
2	Chandraish S. Sharma	Mastering Power BI	Packt Publishing **Edition**: 1st Edition	2017
3	Joshua N. Milligan	Tableau 10 for Beginners	CreateSpace Independent Publishing Platform **Edition**: First Edition	2016
4	Ryan Sleeper	Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master	O'Reilly Media **Edition**: 1st Edition	2017

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Dr.R.Malathi Ravindran Signature	Dr. K.Haridas Signature	Mr.K. Srinivasan Signature	Mr.K. Srinivasan Signature

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC621			Title	Batch:	2025-2028
				CC Lab XIV: Software Testing	Semester:	VI
Practical Hrs./Week	4	Tutorial Hrs./Sem			Credits:	02

Course Objective

The course has been designed to provide knowledge on how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, and generate atesting report.

Course Outcomes

Up on completion of this course students shall be able to

CO Number	Co Statement	Knowledge Level
CO1	Recollect the essential characteristics of tools used for test automation.	K1
CO2	Understands the Automation testing approach and to write test suites for Software	K2
CO3	Develop analyzing techniques through automation testing tool	K3
CO4	Generate test cases from software requirements using various test processes for continuous quality improvement	K4
CO5	Evaluate the automation process in software testing.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PSO1	PSO2
CO1		H	M	M	H	H	H	H	M	H	H	H
CO2	H	M			H	M		H	H	H	M	H
CO3		H	M	M	H	H		H	H	H	H	H
CO4	H	H	M	M	M	M	M	H	M	M	H	H
CO5	M	M	M	M	H	H	H	M	H	M	M	M

25UBC621

1. Write a test case based on controls.
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3. Using Selenium write a simple test script to validate each field of the registration page
4. Conduct a test suite for any two websites.
5. Write and test a program to login a specific webpage.
6. Write and test a program to count number of items present on a desktop.
7. Write and test a program to get the number of list items in a list/combo box.
8. Write and test a program to provide total number of objects present /available on the page.
9. Test a program in MS Excel for Data Driven Wizard.
10. Test the addition of two values in C++ Program.
11. Test a HTML file.

Total Contact Hours:60

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC622			Title	Batch:	2025-2028
				CC Lab X: PHP Programming	Semester:	VI
Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	02

Course Objective

To measure the student's knowledge about the PHP script languages and to demonstrate how to store and retrieve data from the database and also helps the studentsto setup a better career.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall the fundamentals of PHP Script.	K1
CO2	Understand the concept of loops in PHP.	K2
CO3	Apply the concept of Functions and Arrays in PHP.	K3
CO4	Analyze the usage of Database in PHP.	K4
CO5	Evaluate the PHP and WAMP Server Connectivity.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	H	L		M	M	L			M	H	M
CO2	H	M	M	H	H	H			M	M	H	M
CO3	H	H	M		H	M	L	M		M	H	M
CO4	L	H	H	M	M	M	M		M	M	H	M
CO5	M	L	M	M	M	H	H		H	H	H	H

1. Write a PHP script for Arithmetic operation.
2. Write a PHP script which will display the colors.
3. Write a PHP script using nested for loop that creates a chess board.
4. Write a function to sort an array.
5. Write a PHP function that checks if a string is all lowercase.
6. Create a simple 'birthday countdown' script, the script will count the number of daysbetween current day and birthday.
7. Write a PHP script to generate simple random password.
8. Program to Store and Read an image in Database.
9. Program to Insert records to the table in Database and fetch records from the table inDatabase.
10. Create a Contact Form using PHP and WAMP server connectivity.

Total Contact Hours : 75

Course Designed by	**HOD**	**CDC**	**COE**
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Dr.T.SUMADHI Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6S3			Title	Batch:	2025-2028
				Skill Enhancement Course (SEC) IV: Naan Mudhalvan : Interview Readiness	Semester:	VI
Lecture Hrs./Week	3	Tutorial Hrs./Sem			Credits:	02

Course Objective

To develop the student broad career plans, evaluate the employment market, identify the organizations to get good placement, match the job requirements and skill sets.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the communication and inter personal skills.	K1
CO2	Understand the abilities and competencies.	K2
CO3	Apply the concept of strengthening the skills.	K3
CO4	Analyze the Technical and Case Interviews.	K4
CO5	Evaluate the interview challenges and utilize them for future purpose.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H			H					H	M	H
CO2		H		M	H	M				H		H
CO3			M		H				M	H		H
CO4	M	M			H	M	M	H	H	H	H	H
CO5		M			H			M	M	H	M	H

Units	Content	Hrs
Unit I	**Interview Process:** Introduction to different types of interviews - Importance of interview preparation - Stages of the interview process - Written test - Common interview formats and structures-Role of body language and - communication in interviews	9
Unit II	**Mastering Behavioral Interviews :** Understanding the STAR (Situation, Task, Action, Result) method - Analyzing common behavioral interview questions - Crafting impactful stories to showcase our abilities - Addressing competency-based questions with confidence - Handling challenging behavioral questions and turning them to our advantage.	9
Unit III	**Crafting our Personal Brand:** Identifying your strengths, skills, and experiences - Developing a compelling elevator pitch - Creating a strong online presence - Aligning our personal brand with the job seeking - Showcasing our achievements and projects effectively.	9
Unit IV	**Excelling in Technical and Case Interviews:** Preparing for technical assessments and coding challenges - Reviewing key technical concepts relevant to the role - Approaches to solving case interview questions - Developing structured frameworks for analyzing cases - Presenting logical and organized solutions during the interview.	9
Unit V	**Navigating Common Interview Challenges:** Handling nerves and anxiety before and during interviews - Addressing gaps in our resume or experience - Responding to tricky questions or unexpected scenarios - Negotiating salary, benefits, and other job offer components - Seeking and providing effective feedback after interviews.	9
	Total Contact Hrs	**45**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, PowerPoint Presentation, Chalk and talk, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Barun K.Mitra	Personality Development and soft skills	Oxford University Press	2011
2	Patrick Mc Namee	Success in Interviews: How to succeed in any job interview	PBMCN Publishers	2011
3	James Storey	The Art of the Interview: The perfect answers to every Interview question	Online Publication	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Nitin Bhatnagar	Effective Communication and SoftSkills	Pearson Education India	2011

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6S4			Title	Batch:	2025-2028
				Skill Enhancement Course: A 360° Interview Preparation Course	Semester:	VI
Lecture Hrs./Week	3	Tutorial Hrs./Sem			Credits:	02

Course Objective

To develop the student broad career plans, evaluate the employment strategies, identify theTricks to get good placement, match the job requirements and skill sets.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the types of interviews and companies.	K1
CO2	Understand the personal capabilities.	K2
CO3	Apply the concept of tackling situations.	K3
CO4	Analyze the Technical and Case Interviews.	K4
CO5	Evaluate the confidence and bouncing back.	K5

Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H			H					H	M	H
CO2		H		M	H	M				H		H
CO3			M		H				M	H		H
CO4	M	M			H	M	M	H	H	H	H	H
CO5		M			H			M	M	H	M	H

Units	Content	Hrs
Unit I	**Inside Interviews: What to Expect** - Different types of interviews we might encounter - Written test - Why researching the company is a big deal - What interviewers want to see in candidates - Learning about behavior, tech, and other types of interviews - Making a plan to do well in any interview.	9
Unit II	**Creating Your Professional Image:** Finding what we're good at and what we want - Making a personal pitch that stands out - Setting up our online presence - Making sure our image fits the job we want - Telling stories that show off what we've done.	9
Unit III	**Acing Questions:** How to answer with STAR: Situation, Task, Action, Result - Understanding different questions they might ask - Sharing interesting stories about our self - What to do when they ask tricky situations - Practicing different scenarios to be ready.	9
Unit IV	**Handling Tech and Tough Situations:** Getting ready for technical tests or coding questions - Remembering important technical stuff for the job - Solving tough problems and cases step by step - Explaining your solutions confidently - Doing mock interviews to stay calm under pressure.	9
Unit V	**Feeling Confident and Bouncing Back:** Tricks to calm your nerves before interviews - Doing mindfulness exercises for self-confidence - Dealing with common problems like gaps in your work history - Learning from things that didn't go well - Keeping a positive attitude and showing we're confident.	9
	Total Contact Hrs	**45**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Bari A.Williams	Diversity in the Workplace: Eye-opening Interviews to Jumpstart Conversations about Identity, Privilege and Bias	Rockridge Press	2020
2	Christopher Mulligan and Craig Taylor	Talent Keepers: How top leaders engage and retain their best performers	Wiley Publications	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Rhamy Alejeal	People Processes: How your people can be your organization's competitive advantage	Online Publication	2018
2	Simon Sinek	Start with Why: How great leaders inspire everyone to take action	Portfolio Publications	2011

Course Designed by	HOD	CDC	COE
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name:Mrs N.AmirthaGowri Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature:

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	25UBC6AL			Title	Batch:	2025-2028
				Advanced Learner Course – II: Disaster Management	Semester:	VI
Lecture Hrs./Week		Tutorial Hrs./Sem			Credits:	2*

Course Objective

This course provides with the basics of disasters, their significance and types. To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the types of disasters, causes and their impact on environment and society.	K1
CO2	Understand the knowledge about approaches of Disaster Risk Reduction (DRR)	K2
CO3	Apply emergency planning into overall community planning.	K3
CO4	Analyze the vulnerability and various methods of risk reduction measures as well as mitigation.	K4
CO5	Explain the hazard and vulnerability profile of India, scenarios in the Indian context, Disaster damage assessment and management.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M		H	H			M	H	H	M
CO2	H	H		M	H	H	M		H	H	H	H
CO3	H	H	M	M	H	H	H	M	H	H	H	H
CO4	M	M	M		M	M				H	M	M
CO5	H	M		M	H	H	H		H	H	H	H

Units	Content	Hrs
Unit I	INTRODUCTION TO DISASTERS : Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire, etc –Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change – Dos and Don'ts during various types of Disasters.	15
Unit II	APPROACHES TO DISASTER RISK REDUCTION(DRR):Disaster cycle- Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake – holders - Institutional Processes and Framework at State and Central Level –State Disaster Management Authority(SDMA) –Early Warning System – Advisories from Appropriate Agencies.	15
Unit III	INTER-RELATION SHIP BETWEEN DISASTERS AND DEVELOPMENT: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.-*Climate Change Adaptation*- IPCC Scenario and Scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.	15
Unit IV	DISASTER RISK MANAGEMENT IN INDIA: Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.	15

Unit V	DISASTER MANAGEMENT – APPLICATIONS AND CASE STUDIES AND FIELD WORKS: Land slide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment,Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: *Case Studies, Space Based Inputs for Disaster Mitigation And Management and field works related to disaster management.*	15
	Total Contact Hrs	**75**

- The topics given in **Italics** are noted as Self-Study topics.

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	SinghalJ.P	Disaster Management (Unit – 1,2,3)	Laxmi Publications	2010
2	Tushar Bhattacharya	Disaster Science and Management (Unit – 3,4)	McGraw Hill India Education Pvt.Ltd	2012
3	GuptaAnilK, SreejaS.Nair	Environmental Knowledge for Disaster Risk Management (Unit-5)	NIDM, New Delhi	2011

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	KapurAnu	Vulnerability India: A Geographical Study of Disasters	IIAS and Sage Publishers	2010

25UBC6AL

Course Designed by	HOD	CDC	COE
Name and Signature	**Name and Signature**	**Name and Signature**	**Name and Signature**
Name: Dr.S.SATHIYAPRIYA Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Mr.K.SRINIVASAN Signature: