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 2026–2029 Batch and onwards)

CDC / 26 R 1.4

UG DEPARTMENT OF COMPUTER APPLICATIONS

SYLLABUS

BATCH: 2026 – 2029

FACULTY MEMBERS

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

Dr.R.Malathi Ravindran,M.C.A.,M.Phil.,B.Ed., 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).,

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 / 26 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:

PO Number	Description
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 tools for specification, design and implementation.
PO3	**Problem Solving** – Ability to link knowledge of Computer Science with other chosen auxiliary disciplines of study.
PO4	**Information / Digital Literacy** – Display ethical code of conduct in usage of Internet and cyber systems.
PO5	**Lifelong Learning** – Ability to pursue higher studies of specialization and to take up technical employment.
PO6	**Analytical Reasoning** – Ability to formulate, model, design solutions, procedures and use software tools to solve real-world problems and evaluate.
PO7	**Scientific Reasoning** – Ability to operate, manage, deploy and configure computer networks, hardware and software in an organization.
PO8	**Reflective Thinking** – Ability to present results using different presentation tools.
PO9	**Multicultural Competence** – Ability to appreciate emerging technologies and tools.
PO10	**Co-operation / Teamwork** – Ability to work independently on a substantial software project and as an effective team member.
PO11	**Communication Skills** – Ability to communicate effectively in oral and written form and present technical information clearly.
PO12	**Project Management** – Ability to plan, organize and manage software projects using appropriate tools and techniques.
PO13	**Ethics and Professional Responsibility** – Understand professional, ethical, legal and social responsibilities in computing practices.
PO14	**Innovation and Entrepreneurship** – Ability to develop innovative ideas and transform them into entrepreneurial ventures in the IT domain.
PO15	**Environmental and Social Responsibility** – Ability to understand the impact of computing solutions on society and environment and adopt sustainable practices.

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

POs \ PSOs	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	3	3	3	3	3
PO2	3	3	3	3	3
PO3	2	2	3	2	2
PO4	2	2	3	3	3
PO5	2	3	2	2	2
PO6	3	3	3	3	3
PO7	2	2	3	3	3
PO8	3	3	3	3	3
PO9	3	3	3	2	2
PO10	3	3	3	3	3
PO11	2	3	3	2	2
PO12	3	2	3	3	3
PO13	2	2	3	3	3
PO14	3	3	2	3	3
PO15	2	3	3	2	3
PSO1	3	2	3	3	3
PSO2	3	3	3	3	2

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

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2026 - 2027 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	26UTL1C1	Tamil Paper-I	5	-	-	3	25	75	100	3
	26UHN1C1	Hindi Paper-I								
	26UFR1C1	French Paper-I								
II	26UEN101	Communication Skills – I	5	-	-	3	25	75	100	3
III	26UBC101	**CC I :** Programming In C	5			3	25	75	100	4
	26UBC102	**CC II :** Data Structures and Algorithms	4			3	25	75	100	4
	26UBC1A1/ 26UBC1A2	**GE I – Allied:** Mathematics I- Computer Oriented Numerical And Statistical Methods / Discrete Mathematics - I	4			3	25	75	100	4
	26UBC103	**CC Lab -I:** Programming In C		4		3	20	30	50	2
IV	26EVS101	**AECC I:** Environmental Studies	2			2	-	50	50	2
	26HEC101	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	26UTL2C2	TamilPaper-II	5	-	-	3	25	75	100	3
	26UHN2C2	Hindi Paper-II								
	26UFR2C2	French Paper-II								
II	26UEN202	Communication Skills – II	5	-	-	3	25	75	100	3
III	26UBC204	**CC III :**Object Oriented Programming With C++	5			3	25	75	100	4
	26UBC205	**CC IV :**Core-IV: Digital Computer Fundamentals	4			3	25	75	100	4
	26UBC2A1 / 26UBC2A2	**GE II - Allied :**Mathematics II– Mathematical Foundations Of Computer Applications / Discrete Mathematics - II	4			3	25	75	100	4
	26UBC206	**CC Lab - II :** Programming In C++		4		3	20	30	50	2
IV	26UBC2S1/ 26UEL2S2	**SEC** I: Naan Mudhalvan : Graphic Design and Multimedia / Profession Skills		2		3	20	30	50	2
	26HEC202	Human Excellence - Family Values & Indian Yoga Practice - II	1			2	20	30	50	1
EC	26CMM201	**IKS:**Manaiyiyal Mahathuvam - I			15 Hrs.	2	-	50	50	Grade
	26CUB201	**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	26UTL3C3	TamilPaper-III	4	-	-	3	25	75	100	3
	26UHN3C3	Hindi Paper-III								
	26UFR3C3	French Paper-III								
II	26UEN3C3	Communication Skills – III	4	-	-	3	25	75	100	3
III	26UBC307	**CC V:**Relational Database management System and Oracle	4			3	25	75	100	4
	26UBC308	**CC VI:** Operating System & Linux	4			3	25	75	100	4
	26UBC3A1/ 26UBC3A2	**GE III- Allied:** Organizational Behaviour / Corporate Systems	4			3	25	75	100	4
	26UBC309	**CC Lab - III:** Relational Database ManagementSystem and Oracle		4		3	20	30	50	2
	26UBC310	**CC Lab- IV:** Programming in Linux		4		3	20	30	50	2
IV	26UBC3N1 / 26UBC3N2	Non Major Elective-I: Web Designing Lab Non Major Elective-I: Desktop Publishing Lab	-	1	-	2	-	50	50	1
	26HEC303	Human Excellence - Professional Values &Ethics - Indian Yoga Practice - III	1	-	-	2	20	30	50	1
V	26UHW301	Health and Wellness	2#	-	-	-	100 Reduce To 25	-	25	1
EC	26CMM302	**IKS:**ManaiyiyalMahathuvam - II			15 Hrs.	2	-	50	50	Grade
	26CUB302	**IKS:**Uzhavu Bharatham - II			15 Hrs.	2	-	50	50	Grade
	26UBC3VA	**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	26UTL4C4	TamilPaper-IV	4	-	-	3	25	75	100	3
	26UHN4C4	Hindi Paper-IV								
	26UFR4C4	French Paper-IV								
II	26UEN4C4	Communication Skills – IV	4	-	-	3	25	75	100	3
III	26UBC411	**CC VIII** Visual Programming	3			3	25	75	100	3
	26UBC412	**CC IX:** Advanced Java Programming	3			3	25	75	100	4
	26UBC4A1/ 26UBC4A2	**GE IV-Allied:** Mathematics III- Computer Based Optimization Techniques/ BusinessMathematics	4			3	25	75	100	3
	26UBC413	**CC Lab V** Visual Programming		4		3	20	30	50	2
	26UBC414	**CC Lab VI:** Advanced Java Programming		4		3	20	30	50	2
IV	26UBC4S1/ 26UBC4S2	**SEC II**: Naan Mudhalvan: Advanced Excel/ Data Science Foundation		2		2	20	30	50	2
	26UBC4N1 / 26UBC4N2	Non Major Elective-II: Illustration Effects Lab/Non Major Elective –II: Animation Techniques Lab	-	1	-	2	-	50	50	1
	26HEC404	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	26CMM403	**IKS:** Manaiyiyal Mahathuvam - III			15	2	-	50	50	Grade
	26CUB403	**IKS:** UzhavuBharatham - III			15	2	-	50	50	Grade
	26UBC4VA	**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; SEDSC – Skill Enhancement Department Specific 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	26UBC515	**CC XI:** Machine Learning using Python	5			3	25	75	100	5
	26UBC516	**CC XII:** Mobile Application Development	5			3	25	75	100	5
	26UBC5E1 / 26UBC5E2 / 26UBC5E3	**DSE -I:**	6			3	25	75	100	5
	26UBC517	**CC Lab VII :** Machine Learning using Python		5		3	20	30	50	2
	26UBC518	**CC Lab VIII :** Mobile Application Development		5		3	20	30	50	2
	26UBC519	**Project:** Mini Project					25	75	100	2
	26UBC5S1 / 26UBC5S2/ 26UBC5S3	**SEC III**: IT Service Support Management / Business Intelligence/ Software Engineering and Software Testing	3			2	-	50	50	2
IV	26HEC505	Human Excellence - National Values & Indian Yoga Practice -V	1	-	-	2	20	30	50	1
EC	26CSD501	Soft Skills Development - I								Grade
	26GKL501	General Awareness - Self Study	SS		-	2	-	50	50	Grade
	26UBC5AL	**ALC - I**: Adhoc and Sensor Networks- Self Study	SS					100	100	2*
Total			**30**						**600**	**24**

DSE -I:
26UBC5E1 – Cryptography and Network Security
26UBC5E2 – Cloud Security
26UBC5E3 – Cyber Security

SEC III
26UBC5S1–IT Service Support Management
26UBC5S2 – Business Intelligence
26UBC5S3- Software Engineering and Software Testing

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	26UBC620	**CC XIV:** Artificial Intelligence for Internet of Things	5			3	25	75	100	3
	26UBC6E4 / 26UBC6E5 / 26UBC6E6	**DSE -II:**	6			3	25	75	100	5
	26UBC6E7/ 26UBC6E8 / 26UBC6E9	**DSE -III:**	6			3	25	75	100	5
	26UBC621	**CC Lab IX:** IoT IoT Applications Development Lab		4		3	20	30	50	2
	26UBC622	**CC Lab X:** Artificial Intelligence and Data Analytics Lab Tools		5		3	20	30	50	2
	26UBC6S3/ 26UBC6S4/	Skill Enhancement Course **(SEC)** IV: **NaanMudhalvan :** Disaster Management / Fundamentals of Web Development	3			2	25	25	50	2
IV	26HEC606	Human Excellence - Global Values & Indian Yoga Practice - VI	1	-	-	2	20	30	50	1
EC	26CSD602	Soft Skills Development - II								Grade
	26UBC6AL	Advanced Learner Course **ALC - II**:	SS					100	100	2*
Total			**30**						**500**	**20**
Grand Total									**3900**	**140**

Discipline Specific Elective (DSE) – II	**Discipline Specific Elective (DSE) – III**	**SEC-IV** –25UBC6S4 –
26UBC6E4 – Data Visualization and Business Intelligence 26UBC6E5 –Big Data Analytics 26UBC6E6 – Data mining Techniques and Visual Analytics	26UBC6E7-Data Center Infrastructure and Management 26UBC6E8-Data Storage Technologies 26UBC6E9- DSE -III: Cloud Infrastructure Professionals	Disaster Management 26UBC6S5-Fundamentals of Web Development

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	

Components for CEE: 75 Marks

Components for CEE	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

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ii	**Declaration**	
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iv	**Synopsis**	
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	1.1 Introduction	
	1.2 Objective of the Project	
	1.3 Company Profile	
	1.4 System Specification	
	1.4.1 Hardware Specification	
	1.4.2 Software Specification	
2	**System Study**	
	2.1 Existing System	
	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
3	**System Design**	
	3.1 Overview of the Project	
	3.2 Modules of the Project	

3.3 Input Design Format
3.4 Output Design
3.5 Table Design
3.6 Supporting Diagrams (ER/DFD/Use Case)

4 Implementation and Testing

4.1 Coding Methods
4.2 Testing Approach
4.3 Implementation and Maintenance

5 Project Evaluation

5.1 Project Outcome
5.2 Limitations of the Project
5.3 Further Scope of the Project

6 Conclusion

7 Appendix

7.1 Source Code

7.2 Screenshots and Reports

8 References

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			ProgrammeTitle:	BachelorofComputer Applications	
CourseCode:	26UBC101			Title	Batch:	2026-2029
				CCI: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 dayto dayIT demands.

Course Outcomes

Onthe successfulcompletionofthecourse,studentswillbe able to

CO Number	CO Statement	
CO1	Tellthebasicterminologyusedincomputerprogramming	PO1
CO2	Understandanddebugprogramsin Clanguage.	PO1,PO2, PO3,PO6
CO3	Inferenceprogrammingconceptssuchas Arrays, Functionsand Structures	PO1,PO2, PO3,PO6
CO4	Analyzethedynamic somemorybytheuseofpointersandStructures.	PO1,PO2, PO3,PO6
CO5	Designdifferentdatastructuresand create/ updatebasic datafiles.	PO3, PO5, PO10,PO11, PO12

Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	2	1	1	1	1	2	1	2	1	1
CO2	3	3	2	2	2	3	2	1	1	2	2	1	2	1	1
CO3	3	3	3	2	2	3	2	2	1	2	2	2	2	1	1
CO4	3	3	3	2	2	3	2	2	1	2	2	2	2	1	1
CO5	3	3	3	2	3	3	2	3	2	3	3	3	2	2	2

26UBC101

Units	Content	Hrs
UnitI	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-EvaluationofExpressions-Precedence ofArithmetic Operators-Type Conversions in Expressions-Operator Precedence and Associativity - Mathematical Functions.	15
UnitII	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
UnitIII	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 Andtheir Types-CallingaFunction-CategoryofFunctions-NoArgumentsandNo	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.*	
UnitIV	Structures and Unions-Structure Definition-Giving Values to members - Structure 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
UnitV	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
	TotalContactHrs.	**75**

PedagogyandAssessmentMethods:

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

TextBook

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Programming in ANSI C(Unit1to5)	TataMcGraw-Hill publications,Fourth Edition	2007

ReferenceBooks

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	YashavantKanetkar	LetUsC	BPBPublications, 8th Edition	2004
2	Yashavant Kanetkar	TestYourCSkills	BPBPublications, Second Edition	2009

CourseDesignedby	Dr.K.Haridas		
VerifiedbyHoD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R.Manickachezian		

ProgrammeCode:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC102			Title	Batch:	2026-2029
				CCII:Data Structures and Algorithms	Semester:	I
Lecture Hrs./Week	4	Tutorial Hrs./Sem.	5		Credits:	04

CourseObjective

Thecourseisdesigned forunderstandingthebasic concepts,terminologies indatastructures.To enthuse students knowledge on computer algorithms and able to develop efficient program.

CourseOutcomes

Onthesuccessfulcompletionofthe course,students willbeableto

CO Number	COStatement	
CO1	Rememberingtheconceptstouselinear andnon-lineardata structures Likestacks,queues,linkedlist etc.	PO1
CO2	Understandandanalyzetohandleoperationslikesearching,insertion, deletion,traversingmechanismetc.onvariousdatastructures	PO1,PO2,PO6
CO3	Enhancetheknowledgetosolveproblemslikesorting,searching, InsertionanddeletionofdataOperations.	PO1,PO2,PO3,PO6
CO4	Analyzetheconceptsoftrees,graphsandits applications.	PO1,PO2,PO3,PO6
CO5	Evaluatetolearnanumberofalgorithmdesigntechniquesandto Analyze the efficiencyandthe accuracyofalgorithms.	PO1,PO2,PO3,PO5, PO6

Mapping

CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	2	1	1	1	1	1	1	1	1	1
CO2	3	3	2	1	2	3	1	1	1	2	1	1	1	1	1
CO3	3	3	3	1	2	3	1	1	1	2	2	1	1	1	1
CO4	3	3	3	1	2	3	2	2	1	2	2	1	1	1	1
CO5	3	3	3	1	3	3	2	2	2	2	2	2	1	2	1

Units	Content	Hrs
UnitI	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
UnitII	Trees - Definitions and Concepts- BinaryTrees – Representations-Operations-Traversals: In order -Preorder-Post order- Threaded Binary Trees – Binary Search Trees.	12
UnitIII	GRAPHS-Terminology–Representations:AdjacencyMatrix-AdjacencyLists - Adjacency Multi lists -Depth First Search-Breadth First Search-Shortest paths Dijkstra algorithm- *Minimum spanning Tree*- Kruskal's Algorithm & Prim's Algorithm.	12
UnitIV	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
UnitV	SortingTechniques:Insertionsort–Mergesort–Quicksort–Heapsort. Searching-Searching Techniques: Linear search –Binary Search.	12
	TotalContactHrs	60

- Thetopicsgiven in**Italics**arenotedasSelf-Studytopics.

TextBook

S.NO	AUTHOR	TITLEOF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	EllizHorowitz, SartajSahani	Fundamentalsof Data Structures, (Unit 1, 2&3).	GalgotiaPublishers	1984
2	EllizHorowitz,Sartaj Sahani, Sanguthevar Rajasekaran,	Fundamentalsof Computer Algorithms, (Unit4&5).	Galgotia Publishers,	2008

Reference Book

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

CourseDesignedby	Mr.S.Dilipkumar		
VerifiedbyHoD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC1A1			Title	Batch:	2026-2029
				GE I – Allied : Mathematics I- ComputerOriented Numerical and StatisticalMethods	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

Onthesuccessfulcompletionofthecourse,students willbe ableto

CO Number	COStatement	
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.	PO1,PO6
CO2	UnderstandthepropertiesofCorrelation,RegressionandcomputeKarl-Pearson's coefficient of correlation.	PO1,PO2,PO6
CO3	Apply numerical differentiation and Integration whenever and wherever routine methods are not applicable and understand the importance of Interpolationand its applicationto solve problems for equalintervals and Unequalintervals.	PO1,PO2,PO3, PO6
CO4	Analyze the system of linear equations by applying different methodologies.	PO1,PO2,PO6
CO5	ComputeandinterprettheresultsoRegressionandCorrelationAnalysis.	PO1,PO2,PO3, PO5, PO6

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	3	3	2	1	2	3	1	1	1	1	1	1	1	1	1
CO3	3	3	3	1	2	3	1	1	1	1	2	1	1	1	1
CO4	3	3	2	1	2	3	1	1	1	1	2	2	1	1	1
CO5	3	3	3	1	3	3	2	2	2	2	2	2	1	2	1

Units	Content	Hrs
UnitI	Introduction – Bisection Method –Method ofSuccessive Approximations or theIterationMethod- MethodofFalsePosition- NewtonRaphsonMethod–Horner's Method	12
UnitII	System of Linear Algebraic Equations- Gauss Elimination- Inverse of Matrix using Gauss Elimination-Gauss Jordan–Triangularization-Gauss Jacobi and Gauss Seidal Method.	12
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*.	12
UnitIV	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.	12
UnitV	Regression Analysis-Meaning- *Types of Regression* –Regression Equations-Regression Equations from Mean-Regression Coefficients-Properties of Regression Coefficients-Correlation and Regression, a Comparison.	12
	TotalContactHrs	**60**

- Thetopicsgiven in**Italic** arenoted asSelf-Studytopics.

PedagogyandAssessmentMethods:

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

Text Books

S.NO	AUTHOR	TITLE OFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	P.Kandasamy, K.Thilagavathy, K.Gunavathi	Numerical Methods(Unit 1,2,3)	S.Chand&CompanyLtd,First Edition	1999
2	S.P.Gupta	StatisticalMethods (Unit 4, 5).	Sultana Chand &Sons,Thirty-Fourth Edition	2004

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	MarkL. Crossley	The Desk Reference ofStatisticalQuality Methods	AmericanSocietyfor Quality, Quality Press,SecondEdition	2008
2	RaoV.Dukkipati	NumericalMethods	New Age International,First Edition	2010

CourseDesignedby	Dr.R.MalathiRavindran		
VerifiedbyHoD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R.Manickachezian		

Programme Code:	**BCA**			**ProgrammeTitle:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC1A2**			**Title**	**Batch:**	**2026-2029**
				GEI–Allied:	**Semester:**	**I**
Lecture Hrs./Week	**4**	**Tutorial Hrs./Sem**	**5**	**DISCRETE MATHEMATICS-I**	**Credits:**	**04**

Course Objective

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

Course Outcomes

Onthe successfulcompletionofthecourse,students willbeableto

CO Number	COStatement	
CO1	Abilitytoapplymathematicallogictosolve Problems.	PO1,PO6
CO2	Understandsets,relations,functionsanddiscretestructures	PO1,PO2,PO6
CO3	Abletouselogical notationstodefineandreasonabout fundamental Mathematicalconceptssuchassetsrelationsandfunctions	PO1,PO2,PO3, PO6
CO4	Abletoformulateproblems and solverecurrencerelations	PO1,PO2, PO3,PO6
CO5	Ableto modeland solve realworld problemsusinggraphsandtrees	PO1, PO2, PO3,PO5,PO6

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	3	3	2	1	2	3	1	1	1	1	1	1	1	1	1
CO3	3	3	3	1	2	3	1	1	1	1	2	1	1	1	1
CO4	3	3	3	1	2	3	1	1	1	1	2	2	1	1	1
CO5	3	3	3	1	3	3	2	2	2	2	2	2	1	2	1

Units	Content	Hrs.
UnitI	Fundamental and Mathematics Logic Fundamental- Sets and Subsets- Operationson Sets-Sequences- Properties of Integers- Matrices. Logic- Proposition andLogical Operations- Conditional Statements- Methods of Proof- Mathematical Induction. Mathematical Logic- Statements and Notation, Connectives, Normal Forms.	12
UnitII	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, RecurrencesRelations.	12
UnitIII	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, PermutationFunctions.	12
UnitIV	GraphTheory- Booleanand Tree -GraphTheory- Basic Concept ofGraphTheory- Euler Paths and Circuits- Hamiltonian Paths and Circuits- Other Relations and Structure-PartiallyOrderedSets-Lattices-FiniteBooleanAlgebras-Functionsof BooleanAlgebras- BooleanFunctionsAsBoolean Polynomials.	12
UnitV	Semi Group and Groups Semi Group and Groups- Binary Operations Revisited Semi Groups- Products and Quotients of Semi Groups- Groups- Products and Quotients ofGroups. Introduction to Computability Theory-Languages-Finite-State Machines, SemiGroups-Machinesand Languages.	12
	TotalContactHrs.	**60**

Thetopicsgivenin **Italics**are notedasSelf-Studytopics.

PedagogyandAssessment Methods:

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

Text Books **26UBC1A2**

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	J.P.Tremblayand R.Manohar,	"Discrete Mathematical StructurewithApplicationsto computerScience",Unit1,2,3).	Tata McGraw-Hill,FirstEdition	2005
2	BernardKolman, Robert C. Busby and SharonRoss,	"DiscreteMathematical Structure", (Unit 4, 5).	Tata McGraw-Hill,FirstEdition	2005

ReferenceBooks

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	KennethH.Rosen	DiscreteMathematics and its Applications	McGraw Hill education(India) Private Limited. 7thEdition	2008
2	C.L. LiuandD. P.Mohapatra	ElementsofDiscrete Mathematics	4th edition,McGraw Hilleducation(India) Private Limited.	2010

CourseDesignedby	Ms.A.Priyadharsini		
VerifiedbyHoD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	BachelorofComputer Applications	
CourseCode:	26UBC103			Title	Batch:	2026-2029
				CCLab-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 laboratoryexperiences. To code, document,test,andimplement awell-structured, robust computer program using the C programming language. To prepare students to face the challenges and opportunities in the IT industry by building strong foundations in C programming language.

Course Outcomes

Onthe successfulcompletionofthe course,students willbeableto

CO Number	COStatement	
CO1	RememberthestructureandsignificanceoftheCProgramming Language.	PO1
CO2	AcquiretheknowledgeaboutCProgrammingforvarious programming technologies.	PO1,PO2,PO6
CO3	Roleofconstants,variables,identifiers,operators,type conversion and Other building blocks of C Language.	PO1,PO2,PO3, PO6
CO4	Useofconditionalexpressionsand loopingstatementstosolve problems associated with conditions and repetitions.	PO1,PO2,PO3, PO6
CO5	RoleofFunctionsinvolvingtheideaofmodularity.	PO1, PO2, PO3, PO5,PO6,P10,P11

Mapping

CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	2	1	1	1	1	1	1	2	1	1
CO2	3	3	2	2	2	3	1	1	1	2	2	1	2	1	1
CO3	3	3	3	2	2	3	1	1	1	2	2	1	2	1	1
CO4	3	3	3	2	2	3	1	1	1	2	2	1	2	1	1
CO5	3	3	3	2	3	3	2	2	1	3	3	2	2	2	2

1. WriteaCprogramtocheck towhetherthegivennumberisArmstrong number ornot.
2. WriteaCprogramto findwhetherthegiven numberisprimeornot.
3. WriteaCprogramtocheckthegreatestamong threenumbersusing theconditionaloperator.
4. WriteaCprogramto generatetheFibonacciseriesforthegivennumber.
5. Writea C programtofind theadditionofmatrix.
6. WriteaCprogramto find thematrixmultiplicationofthegivennumber.
7. Writea Cprogramtodisplaythe transpose ofaMatrix.
8. WriteaCprogramto findthegivenstringispalindromeornot.
9. WriteaCprogramto countthenumberofwords,charactersandlinesinagiventext.
10. WriteaCprogramusingtypesoffunctionsforthearithmetic operations.
11. WriteaCprogramtocalculatethefactorialvalueforthegivennumberusingrecursion.
12. WriteaC programto process astudentdetailusingstructures.
13. Write aC programtoaddthe arraysusingpointers.
14. WriteaCprogramtocreate astudentfilewithreg.no,name,mark1,mark2.
15. WriteaCprogramto create and processanemployeefile.

TotalContactHrs 60

PedagogyandAssessment Methods:

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

CourseDesignedby	Dr.K.Haridas		
VerifiedbyHoD	Dr.K.Haridas		
Approved by ChairmanAcademic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC204			Title	Batch:	2026-2029
				CC III: Object OrientedProgramming with C++	Semester:	II
Lecture Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	4

CourseObjective

To develop an in-depth understandingof functional, logic and object-oriented programming paradigms. To implementseveral programs in languagesother than the one emphasizedinthe 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.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	CO Statement	Knowledge Level
CO1	Gainthebasicknowledge onObject Orientedconcepts.	PO1
CO2	Abilitytodemonstrateapplications usingObject Oriented Programming Concepts	PO1,PO2,PO6
CO3	Developthedifferencesbetween traditionalimperativedesignand object-orientedDesign	PO1,PO2, PO3,PO6
CO4	Examineclassstructures asfundamental,modularbuildingblocks	PO1,PO2, PO3,PO6
CO5	Explaintheroleofinheritance,polymorphism,dynamicbindingand Generic structures inbuilding reusable code.	PO1,PO2, PO3,PO5, PO6,PO10, PO11

26UBC204

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	1	1	2	1	1	1	1	1	1	2	1	1
CO2	3	3	2	1	2	3	1	1	1	2	2	1	2	1	1
CO3	3	3	3	1	2	3	1	1	1	2	2	1	2	1	1
CO4	3	3	3	1	2	3	2	2	1	2	2	2	2	1	1
CO5	3	3	3	1	3	3	2	2	2	3	3	2	2	2	2

Units	Content	Hrs.
UnitI	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 OrientedDesign.	15
UnitII	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 TheirTypes-ControlStructures.	15
UnitIII	Functions: Function Prototype-Call by Reference-Return by Reference-InlineFunctions–DefaultandConstantArguments-FunctionOverloadingFriend andVirtualFunctions–*ClassesandObjects*–ConstructorsandDestructors.	15
UnitIV	OperatorOverloading–Inheritance–Pointers-VirtualFunctionsandPolymorphism.	15
UnitV	ManagingConsoleInput/Outputoperations:C++Streams-C++StreamClasses-Formatted and Unformatted I/O Operations - Managing Output Manipulations-*WorkingFiles*.	15
	TotalContactHrs.	**75**

PedagogyandAssessment Methods:

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

Text Book

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Object Oriented Programmingwith C++ (Unit 1 to 5)	TataMcGraw-Hill Education, Fourth Edition	2008

ReferenceBooks

S.NO	AUTHOR	TITLE OF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	C.Ravichandran	ProgramminginC++	TataMcGrawHill Publications, Fourteenth Edition	2001
2	K.R.Venugopal, RajkumarBuyya	MasteringC++	TataMcGraw-Hill Education	2017

CourseDesignedby	Dr.K.Haridas		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

ProgrammeCode:	BCA			Programme Title:	Bachelor of Computer Applications	
CourseCode:	26UBC205			Title	Batch:	2026-2029
				CCIV:Digital Computer Fundamentals	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem			Credits:	04

CourseObjective

To provide a comprehensive introduction to digital logic design leading to the ability to understandtheprinciples,methodsandapplicationsofdigitalcomputerorganizationanddesign.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	COStatement	
CO1	Rememberhowtorepresentnumbersincomputers anduse problem solvingtechniquessuchasflowcharts.	PO1
CO2	Acquireknowledge aboutBooleanalgebraandanalyzeIC digital logic Families.	PO1,PO2,PO6
CO3	Comparevarious combinationallogiccircuits.	PO1,PO2,PO3, PO6
CO4	Analyzevariousequentialcircuitssuchasflip–flops,countersand registers.	PO1,PO2,PO3, PO5, PO6
CO5	Evaluatevarious componentsindesigningthedigitallogiccircuits.	PO1,PO2,PO3, PO5,PO6,PO7

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	2	1	2	1	1	1	1	1	1	1	1	1
CO2	3	3	2	2	2	3	2	1	1	1	2	1	1	1	1
CO3	3	3	3	2	2	3	2	1	1	2	2	1	1	1	1
CO4	3	3	3	2	2	3	3	2	1	2	2	2	1	1	1
CO5	3	3	3	2	3	3	3	2	2	2	2	2	1	2	2

26UBC205

Units	Content	Hrs.
UnitI	FlowchartandNumberSystems:LogicandFlowcharting-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
UnitII	Boolean Algebra: Boolean Algebra and Logic Gates-Basic Definition – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Other LogicOperations – Digital Logic Gates – IC Digital Logic Families – Semiconductor Memory– Bipolar MDS – ROM – RAM – PROM – EPROM - Simplification using theMapmethod- Product of Sums.	12
UnitIII	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
UnitIV	Introduction – Flip Flops – Triggers of Flip Flops – Flip Flops Excitation Table – Design Procedure – Design Counters – Registers, Counters and Memory Unit. Registers–ShiftRegisters–RippleCounters–SynchronousCounters–Timing Sequence.	12
UnitV	Input-Output Devices**:** Punched Tape, Tape Readers – Punched Cards – Card Readers –AlphanumericCodes–CharacterRecognition–MICR–OCR–OutputEquipment - Printers – CRT Output Devices – Output Offline Operation – Error Detecting and Error Correcting Codes – Keyboards – Terminals – Floppy Disks – Magnetic tape – *Tape Cassettes & Cartridges.*	12
	TotalContactHrs.	**60**

- ThetopicsgiveninItalicsare notedasSelf-Studytopics.

PedagogyandAssessmentMethods:

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

Text Book

S.NO	AUTHOR	TITLEOF THEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	M.MorrisMano	DigitalLogicand ComputerDesign	Prentice Hall of India, Third Edition(UnitItoIV)	January2004
2	J.Maynard	Computer Programming	International Edition(UnitV)	2014

ReferenceBooks

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	DonaldPLeach, Albert Paul Malvino, GoutamSaha	DigitalPrinciples andApplications	TataMcGraw-Hill, SixthEdition	2006

CourseDesignedby	MS.A.Priyadharshini		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

ProgrammeCode:	BCA			ProgrammeTitle:	BachelorofComputer Applications	
CourseCode:	26UBC2A1			Title	Batch:	2026-2029
				GEII-Allied:MathematicsII–Mathematical Foundations of ComputerApplications	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

CourseObjective

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 counterexamplesand to apply logical reasoning to solve a variety of problems.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	COStatement	
CO1	Abilitytodefinemathematicallogictosolveproblems.	PO1,PO6
CO2	Understandsets,relations,functionsanddiscretestructures.	PO1,PO2,PO6
CO3	Abletouselogicalnotationstodiscoverandreasonaboutfundamental mathematical concepts such as sets relations and functions.	PO1,PO2,PO3, PO6
CO4	Abletoexamineproblemsandsolvematrix.	PO1,PO2,PO3, PO6
CO5	Abletoevaluateandsolverealworldproblemsusinggraphsand probability.	PO1,PO2,PO3, PO5, PO6

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	3	3	2	1	2	3	1	1	1	1	1	1	1	1	1
CO3	3	3	3	1	2	3	1	1	1	1	2	1	1	1	1
CO4	3	3	3	1	2	3	1	1	1	1	2	2	1	1	1
CO5	3	3	3	1	3	3	2	2	2	2	2	2	1	2	1

Units	Content	Hrs.
UnitI	**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-OrderedPair–CartesianProducts–PartitionofSet–MinSets- MaxSet.	12
UnitII	**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 Intersectionof two relations – Symmetric Relation-Anti-Symmetric Relation-Reflexive Relation-Transitive Relation-Equivalence Relation (Simple Problems only).	12
UnitIII	**GraphTheory:**Graph:UndirectedGraph-DirectedGraph-MultiGraph-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
UnitIV	**Matrices:** Introduction - Definition - Rank of a Matrix - Elementary Transformations–SolutionofaSystemoflinearequations(SimpleProblemsOnly). Eigen values and Eigen Vectors – Singular and Non Singular Matrix – Inverse (or reciprocal)ofaSquare Matrix–Adjointof aSquare Matrix(SimpleProblemsOnly).	12
UnitV	**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 – MultiplicationlawofProbabilityforindependentevents-*Extensionofmultiplication Lawofprobability*-TotalProbability-Bayes'theorem(SimpleProblemsonly).	12
	TotalContactHrs.	**60**

PedagogyandAssessment Methods:

Text Book

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

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	P.Geetha	DiscreteMathematics (Unit 1 to 4)	SciTechPublications (India) Pvt. Ltd., Chennai	2011
2	Dr.M.K.Venkata Raman, Dr.N.Sridharan	DiscreteMathematics (Unit 5)	NationalPublishing Company, FirstEdition	2000

Reference Book

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

CourseDesignedby	Dr.R.MalathiRavindran		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

Programme Code:	BCA			Programme Title:	BachelorofComputer Applications	
CourseCode:	26UBC2A2			Title	Batch:	2026-2029
				GEII-Allied: MathematicsII– Discrete Mathematics-II	Semester:	II
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

CourseObjective

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 counterexamplesand to apply logical reasoning to solve a variety of problems.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	COStatement	
CO1	Abilitytodefine mathematical logictosolve problems.	PO1,PO6
CO2	Understandsets,relations,functionsand discretestructures.	PO1,PO2,PO6
CO3	Able to use logical notations to discover and reason about fundamentalmathematicalconceptssuchassetsrelationsand functions.	PO1,PO2,PO3,PO6
CO4	Abletoexamineproblemsandsolvematrix.	PO1,PO2,PO3,PO6
CO5	Abletoevaluateandsolverealworldproblemsusinggraphsand probability.	PO1,PO2,PO3,PO5, PO6

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PO13	PO 14	PO 15
CO1	3	2	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	3	3	2	1	2	3	1	1	1	1	1	1	1	1	1
CO3	3	3	3	1	2	3	1	1	1	1	2	1	1	1	1
CO4	3	3	3	1	2	3	1	1	1	1	2	2	1	1	1
CO5	3	3	3	1	3	3	2	2	2	2	2	2	1	2	1

26UBC2A2

Units	Content	Hrs.
UnitI	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
UnitII	Mathematicallogic–Introduction-prepositionalcalculus–Basiclogicaloperations-Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.	12
UnitIII	Relations – Binary Relations – Set operation on relations-Types of Relations – Partial order relation–Equivalencerelation –Compositionofrelations–Functions–Typesof functions – Invertible functions – Composition of functions.	12
Unit IV	Graph Theory– Basic terminology – paths, cycle & Connectivity – Sub Graphs – Typesofgraphs–Representationofgraphsincomputememory-Trees–Propertiesof trees–Binarytrees–traversingBinarytrees–ComputerRepresentationofgeneral trees.	12
UnitV	Event - Exhaustiveevent- Favorable event- Mutuallyexclusiveevents –Equallylikely events – Independent events – Probability -Axioms of probability - Extension of general law of addition of probabilities - Conditional Probability.	12
	TotalContactHrs.	**60**

PedagogyandAssessment Methods:

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

Text Book

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	J.PTremblay R Manohar	Discrete Mathematics StructureswithApplications to Computer Science- (Unit1to 4)	McGrawHill International Edition	2011
2	Dr.M.K.Venkata Raman, Dr.N.Sridharan,	DiscreteMathematics (Unit-5)	National Publishing Company, FirstEdition	2000

ReferenceBooks

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	DrM. K. Venkatraman, Dr N.Sridharan, N.ChandraSekaran	DiscreteMathematics	Fifth Edition, The Nationalpublishing Company,Chennai.	2006
2	Tremblay J.PandManoharR,	Discrete Mathematical StructureswithApplications to Computer Science	TataMcGrawHill	2001

CourseDesignedby	Dr.R.MalathiRavindran		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

Programme Code:	BCA			Programme Title:	Bachelorof Computer Applications	
CourseCode:	26UBC206			Title	Batch:	2026–2029
				CCLab-II: Programmingin C++	Semester:	II
Practical Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	2

CourseObjective

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.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	COStatement	Knowledge Level
CO1	Rememberthestructureand significanceoftheC++ Programming Language.	K1
CO2	AcquiretheknowledgeaboutC++Programmingforvariousprogramming technologies.	K2
CO3	Demonstratetheabilitytoanalyze,useandcreatefunctions,classes,to overload operators.	K3
CO4	Demonstratetheabilitytounderstandanduseinheritanceand Pointers when creating or using classes and create templates.	K4
CO5	DemonstratetheabilitytounderstandanduseExceptionhandlingandfile handling mechanism.	K5

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	2	1	1	1	1	1	1	2	1	1
CO2	3	3	2	2	2	3	1	1	1	2	2	1	2	1	1
CO3	3	3	3	2	2	3	1	1	1	2	2	2	2	1	1
CO4	3	3	3	2	2	3	2	2	1	2	2	2	2	1	1
CO5	3	3	3	2	3	3	2	2	2	3	3	2	2	2	2

1. WriteaprograminC++ toexchange thecontentof twovariablesusingcallbyreference.
2. WriteaprograminC++tocreatetheclassshapeandoverloadthefunctiontoreturnthe perimeters of the different shapes.
3. WriteaprograminC++ tosortthe integer array.
4. WriteaprograminC++todemonstrateconstructor withdefaultargument.
5. WriteaprograminC++ todemonstratedestructor ininheritance.
6. WriteaprograminC++tochangethesignvalueoftheinputsbyusingoverloadedunary operator.
7. Writeaprogram inC++todemonstrate binary operator forthematrixclass.
8. Writeaprogram inC++ todemonstrate multiple inheritance.
9. WriteaprograminC++ tocopythecontentof fileintoanother.
10. WriteaprograminC++ toappendthecontentof thefile.
11. WriteaprograminC++ tocreate file.
12. Writeaprogram inC++ todemonstrate virtualfunction.
13. Writeaprogram inC++todemonstratefriendfunction.
14. WriteaprograminC++toimplementClassMatrixthatadds,subtractsandinitializesthematrix.
15. WriteaprograminC++tocreatearandom-accessfile,addanewrecordtothefilemodifiesthe details of a record and displays the contents of the file.

TotalContactHrs. 60

PedagogyandAssessment Methods:

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

CourseDesignedby	Dr.K.Haridas		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

Programme Code:	**BCA**			**ProgrammeTitle:**	**BachelorofComputer Applications**	
CourseCode:	**26UBC2S1**			**Title**	**Batch:**	**2026–2029**
				SECI:Naan Mudhalvan: GraphicDesign andMultimedia	**Semester:**	**II**
Practical Hrs./Week	**2**	**Tutorial Hrs./Sem.**			**Credits:**	**2**

CourseObjective

- Providein-depthknowledgeofdigital designprinciplesand advertisingtechniques.
- Developcreativeandtechnicalskillsfor designingeffectivevisualcommunicationmaterials.
- Equipstudentswithindustry-relevantsof software toolsfor printandsocialmedia design.
- Enhanceproblem-solvingskillsthroughpractical designprojects.
- Preparestudentsforprofessionalrolesindigital media,branding, and advertising.

CourseOutcomes

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO Number	COStatement	
CO1	Understandtheprinciplesofvisualdesignandadvertising.	PO1
CO2	Demonstrateproficiency indesigningdigital andprintmedia content.	PO1,PO2,PO3,PO4
CO3	Developcreativeadvertisementsforprintandsocialmedia platforms.	PO1,PO2,PO3,PO4, PO9
CO4	Utilizeindustry-standardtoolsforposter,logo, andbrochuredesign.	PO1,PO2,PO3,PO4, PO9
CO5	Createaprofessionalportfolioshowcasingtheirdigital design skills.	PO1–PO12

Mapping(RatingScale:1:Low|2:Medium|3:High)

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	2	1	2	1	2	2	1	2	1	2	2	1
CO2	3	3	2	3	2	3	1	2	2	2	2	2	2	2	1
CO3	3	3	3	3	2	3	1	2	3	2	3	2	2	3	1
CO4	3	3	3	3	2	3	2	2	3	2	2	2	2	3	1
CO5	3	3	3	3	3	3	2	3	3	3	3	3	2	3	2

1. DigitalCollageMaking 2. AdvertisementDesign(Print) 3. AdvertisementDesign(socialmedia) 4. PosterDesign–I 5. PosterDesign–II 6. FlyerDesign 7. PackageDesign 8. LogoDesign 9. BrochureDesign 10. InfographicsCreation 11. MagazineDesign 12. BrochureDesign 13. InstagramVideoCreation 14. BusinesscardDesign 15. PortfolioPresentationforprint
TotalContact Hrs.–30

PedagogyandAssessment Methods:

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

CourseDesignedby	Ms.N.AmirthaGowri		
VerifiedbyHOD	Dr.K.Haridas		
ApprovedbyChairman Academic Council	Dr.R. Manickachezikan		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC307			Title	Batch:	2026-2029
				CC V: Relational Database Management System and Oracle	Semester:	III
Lecture Hrs./Week	4	Tutorial Hrs./Sem			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	
CO1	Remember the basic concepts of Database and Database Management System software	PO1 (3)
CO2	Understand the basic concepts ofrelational data model, entity-relationship model, relational database design, relational algebra and SQL.	PO1 (3), PO2 (3)
CO3	Solve Database problems using Oracle SQL and PL/SQL.This will include the use of Procedures, Functions and Triggers.	PO1 (3),PO2 (3), PO3 (3), PO6(3)
CO4	Examine entity relationshipand convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.	PO1 (3),PO2 (3), PO3 (3), PO6(3)
CO5	Explain the usage of normalization technique and functional dependency in database design.	PO1 (3),PO2 (3), PO6(3)

Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	–	1	1	–	–	–	–	–	–	–	–	–	–
CO2	3	3	2	1	1	2	–	–	–	–	–	–	–	–	–
CO3	3	3	3	2	2	3	1	–	–	1	1	1	–	1	–
CO4	3	3	3	1	2	3	–	2	–	1	1	1	–	–	–
CO5	3	3	2	1	2	3	–	–	–	–	1	–	–	–	–

3 Point Scale – 1, 2, 3

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 toTables.	12
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*.	12
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 inRelational Database Design – Functional Dependencies – Decomposition – Desirable Properties of Decomposition–BCNF (Boyce Code Normal Form) –Third Normal Form–Fourth Normal Form–*More Normal Form.*	12
Unit IV	ORACLE:Introduction – CODD'sRule–ToolsofORACLE-IntroductiontoSQL– *Benefits of SQL* - Data Types – DDL – DML –DCL - TCL - Data Constraints. ORACLESQLFunctions–Single Row Functions: Date, Number, Miscellaneous, Conversions, Character Functions-Group Functions–SQL Operators:Arithmetic, Comparison and Logical Operators–Set Operators–Joins– Sub Queries– Views.	12
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:PracticalApplications in Real Time Environment*	12
	TotalContactHrs	**60**

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

Pedagogy and Assessment Methods:

Text Books

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	Ivan Bayross	SQL&PL/SQL Using ORACLE8*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	Dr. R. Malathi Ravindran		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC308			Title	Batch:	2026-2029
				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, memorymanagement, and device management. This also covers OS strategies such as concurrency, deadlocks and file system organization. It helps to implementprograms in Linux environment.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember the concept of computer operating systems and its features.	PO1 (3)
CO2	Understand types and history of operating systemsand able to explain Modern operating systems and its evolution over the time period.	PO1 (3), PO2 (3)
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.	PO1 (3)
CO4	Analyze various operating system functions including memory Management, process management and dead lock prevention strategies.	PO1 (3), PO2 (3), PO6 (3)
CO5	Evaluate security, multiprocessing features provided by the Unix operating System using Unix commands, VI Editor and Shell programming.	PO1 (3), PO7 (3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	–	–	1	–	1	–	–	–	–	–	–	–	–
CO2	3	3	2	–	2	–	1	–	–	–	1	–	–	–	–
CO3	3	2	2	1	2	2	2	–	1	–	1	–	1	–	1
CO4	3	3	2	–	2	3	2	–	–	–	–	1	–	–	–
CO5	3	2	2	2	2	2	3	–	1	–	1	1	2	–	1

3 Point Scale – 1, 2, 3

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– BasicConcepts.	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–Diskmanagement–security–userservices–mount–unmount-Installing and managing printers.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

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

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	H.M.Deitel	Operating Systems(Unit 1to3)	Wesley Publication, Third Edition	2004 (Unit1,2&3)
2	Sumitabha Das	Unix, Concepts and applications(Unit4,5)	Tata McGraw Hill, Fourth Edition	2006 (Unit4&5)

REFERENCE BOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	StewartE.Madnick, JohnJ.Donovan	OperatingSystems	Tata McGraw Hill, Sixth Edition	2008
2	WilliamsStallings	Operating Systems-Internals and Design Principles	Prentice hall of India, Fifth Edition	2005
3	Mark.G.Sobell	Practical Guide To RedHat Linux	Pearson Edition,Third Edition	2007
4	Andrea ArpaciDusseauRezi ArpaciDusseau	Operating Systems: ThreeEasyPieces	Kindle Edition	2015

Course Designed by	Dr. T. Sumadhi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC3A1			Title	Batch:	2026-2029
				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	
CO1	Recollect the Individual Behaviour and its effects in an organization.	PO1(3)
CO2	Acquire the knowledge about Personality, Perception, Attitudes and Values.	PO2(3)
CO3	Apply Learning and Motivation concepts in an Organization.	PO2(3)
CO4	Analyze the various types of Organizational Culture and Organizational Structure.	PO2(3) ,PO6(3)
CO5	Interpret the various types of leader ship and the effects of adaptation to it.	PO2(3), PO8(3), PO10(3), PO11(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	–	1	–	–	2	1	1	1	–	1	–	1
CO2	2	3	1	–	2	–	–	2	1	1	1	–	1	–	1
CO3	2	3	2	–	2	2	–	2	1	2	1	–	1	–	1
CO4	2	3	2	–	2	3	–	2	1	2	1	1	1	–	1
CO5	2	3	2	–	2	2	–	3	2	3	3	1	2	1	2

3 Point Scale – 1, 2, 3

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 – EffectiveCommunication-Leadership–Organizational Culture:Types–Functions–Team Building.	12
	Total Contact Hrs	**60**

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

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	S.S Khanka	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 Newstorm and Keith Davis	Organizational Behaviour	Tata Mc GrawHill	2001
2	Hugh J Arnold and Daniel C Fieldman	Organizational Behaviour	Tata Mc GrawHill	1996

Course Designed by	Dr. T. Sumadhi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC3A2			Title	Batch:	2026-2029
				GE III- Allied: Corporate Systems	Semester:	III
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	4

Course Objective

To develop the student's 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	
CO1	Recollect the usage of computers in Healthcare systems.	PO1(3)
CO2	Disseminate knowledge and can inculcate the theoretical structures about banking and insurance	PO2(3)
CO3	Apply IT in Telecommunication and over internet.	PO1(3), PO2(3), PO9(3)
CO4	Gain practical under standing of different textile materials (Fiber, yarn, fabric).	PO9(3)
CO5	Evaluate the efficiencyof various energy utilities.	PO2(3), PO6(3), PO15(3)

Mapping

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO 14	PO 15
CO1	3	2	1	2	1	–	1	1	2	–	–	–	2	–	2
CO2	2	3	2	2	2	–	1	1	2	–	1	–	2	1	2
CO3	3	3	2	2	2	2	2	1	3	–	1	1	2	1	2
CO4	2	2	2	–	1	2	1	1	3	–	–	1	1	1	2
CO5	2	3	2	1	2	3	2	1	2	–	1	2	2	1	3

3 Point Scale – 1, 2, 3

Units	Content	Hrs
Unit I	**Health Care Information Systems** : History and evolution of healthcare 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 BankingSupport – InformationSystems Audit– InternetBanking - 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- EnergyMinimization – Energyaware 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	Dr.S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor ofComputer Applications	
Course Code:	26UBC309			Title	Batch:	2026-2029
				CC LAB–III: Relational Database Management System and Oracle	Semester:	III
Practical Hrs./Week	4	Tutorial Hrs./Sem.	-		Credits:	2

Course Objective

The major objective of this Lab is toprovide 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	
CO1	Remember Structured Query Language (SQL) queries using DDL, DML, DCL and TCL commands.	PO1(3)
CO2	Understand various queries execution such as relational constraints, joins, set operations, aggregate functions, trigger and views.	PO1(3) , PO2(3)
CO3	Apply Normalization concepts in a database.	PO1(3), PO2(3)
CO4	Analyze the techniques used to design and create Relational Database.	PO1(3), PO2(3), PO6(3)
CO5	Evaluate options to make informed decisions that meet data storage, processing and retrieval needs.	PO1(3), PO2(3), PO5(3) PO6(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	–	1	–	–	–	–	–	1	–	–
CO2	3	3	2	2	2	1	1	–	1	–	1	–	1	–	–
CO3	3	3	2	–	2	2	1	–	1	–	–	1	–	–	–
CO4	3	3	2	–	2	3	2	–	1	1	–	2	1	–	–
CO5	3	3	2	1	3	3	2	1	2	1	1	2	2	1	1

3 Point Scale – 1, 2, 3

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 – Groupfunction. 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 givennumber. 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:60

Course Designed by	MS.A.Priyadharshini		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC310			Title	Batch:	2026-2029
				CCLab-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	
CO1	Apply the various commands in terminal to handle UNIX system files.	PO1(3), PO4(3)
CO2	Analyze Linux commands using file and system security	PO1(3), PO2(3), PO4(3), PO7(3)
CO3	Discuss shell code in VIeditorsto solve various problems.	PO1(3), PO2(3)
CO4	Analyze and Create file systems and directories	PO1(3), PO2(3), PO6(3), PO7(3)
CO5	Distinguish various filter and Pipes commands	PO1(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO 14	PO 15
CO1	3	2	2	3	1	–	2	–	–	–	–	–	1	–	–
CO2	3	3	2	3	2	2	3	–	–	–	–	–	2	–	1
CO3	3	3	2	2	2	2	2	1	1	–	1	1	1	–	–
CO4	3	3	2	2	2	3	3	–	1	1	–	2	1	–	–
CO5	3	2	2	2	2	2	2	–	1	–	–	–	1	–	–

3 Point Scale – 1, 2, 3

1. Work with utility commands.
2. Workwith 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	Mr.S.Dilipkumar		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC3N1			Title	Batch:	2026-2029
				Non Major Elective-I: Web Designing Lab	Semester:	III
Practical Hrs./Week	1	Tutorial Hrs./Sem.			Credits:	01

Course Objective

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

Course Outcomes

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

CO Number	CO Statement	
CO1	Recollect the concepts of website Development	PO1(3)
CO2	Demonstrate knowledge and skills utilizing various HTMLtags for Designing static web page.	PO1(3), PO4(3)
CO3	Analyze the HTML tags, CSS and JavaScript.	PO1(3), PO2(3)
CO4	Recognize and apply the elements of Creating Style Sheet (CSS).	PO1(3), PO2(3)
CO5	Develop and incorporate dynamic capabilities in Web pages using Java Script.	PO1(3), PO2(3), PO6(3) PO9(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PO 13	PO 14	PO 15
CO1	3	1	–	2	1	–	–	1	1	–	–	–	–	–	–
CO2	3	2	1	3	1	–	–	1	2	–	1	–	–	1	–
CO3	3	3	2	2	2	2	–	1	2	1	1	1	–	1	–
CO4	3	3	2	2	2	2	–	1	2	1	1	1	–	1	–
CO5	3	3	2	2	2	3	–	2	3	2	2	2	1	2	1

3 Point Scale – 1, 2, 3

1. Design a home page which will display your information i.e .Biodata.
2. Create Hyper links in home page i.e educational details, Hobbies, Achievement, MyIdeals etc.
3. Design a time table and display it in tabular format.
4. Design a Registration form in HTML.
5. Design a web page for Biodata using CSS.
6. Design web page using Frames, Frame sets.
7. Embedding Java scripts in HTML pages.
8. Design a Biodata page whose content can be changed using Java Script like events.
9. Design a Sign up form with all validations.

Total Contact Hours : 15 hrs

Course Designed by	Mr.S.Dilipkumar		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC3N2			Title	Batch:	2026-2029
				Non Major	Semester:	III
Practical Hrs./Week	1	Tutorial Hrs./Sem.		Elective-I : Desktop Publishing Lab	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	
CO1	Remember the basic technical and handling tools.	PO1(3)
CO2	Understands the various concepts of Photoshop.	PO4(3)
CO3	Apply various effects that is suitable to access various formats in This platform for editing.	PO1(3), PO4(3)
CO4	Analyze the concepts of different modes in Photoshop.	PO1(3), PO2(3)
CO5	Emphasis is placed on desktop concepts desktop applications, Learning and working in the desktop environment.	PO2(3), PO9(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	1	–	2	1	–	–	1	1	–	–	–	–	–	–
CO2	2	2	1	3	1	–	–	1	2	–	1	–	–	1	–
CO3	3	2	2	3	2	1	–	1	2	1	1	1	–	2	–
CO4	3	3	2	2	2	2	–	1	2	1	1	1	–	2	–
CO5	2	3	2	2	2	2	–	2	3	2	2	2	1	2	1

3 Point Scale – 1, 2, 3

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	Dr.T.Sumadhi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC411			Title	Batch:	2026-2029
				CC VIII: Visual Programming	Semester:	IV
Lecture 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 student's to learn and developWindows andWeb applications for the .NET platform.

Course Outcomes

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

CO Number	CO Statement	
CO1	To understand theconcepts of the .NET framework as a whole and the technologies that constitutes the frame work.	PO1(3)
CO2	Knowledge onVB.Net with C#. .NET for creating windows based data centric applications and under stand Console application.	PO1(3), PO2(3)
CO3	Understand the ASP.NET architecture, web server controls, rich web controls and validation controls, analyze securitymanagement In ASP.NET.	PO1(3),PO2(3), PO9(3)
CO4	Use ADO.NET in a web application to read, insert, and updated database.	PO1(3), PO2(3), PO6(3)
CO5	Develop and evaluate complete .NET-based applications integrating C#, ASP.NET, and ADO.NET for real-world solutions.	PO1(3),PO2(3), PO3(3), PO5(3),PO6(3), PO9(3), PO12(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	1	1	–	–	–	2	–	–	–	–	–	–
CO2	3	3	2	2	2	2	1	–	2	–	1	–	–	1	–
CO3	3	3	2	2	2	2	1	1	3	1	1	1	2	1	–
CO4	3	3	2	2	2	3	2	1	2	1	1	2	2	1	1
CO5	3	3	3	2	3	3	2	2	3	2	2	3	2	2	1

3 Point Scale – 1, 2, 3

Units	Content	Hrs
Unit I	**Introduction to .NET:** Overview of .NET - Need for .NET -Features of .NET Framework - Advantages of .NET -.NET Architecture - Common Language Runtime (CLR) -Framework Class Library (FCL) –Common Type System (CTS) -Common Language Specification (CLS) -Managed vs Unmanaged Code -Visual Studio.Net IDE, Compiling and Debugging.	9
Unit II	**C# Programming** C# Programming - Introduction - Features of C# - Structure of C# Program- Data types - Variables and Constants – Operators - Control Statements - Object-Oriented Programming in C# - Classes and Objects - Inheritance – Polymorphism –Encapsulation – Interfaces -Exception Handling - Built-in exceptions - User-defined exceptions - Arrays and Strings - One-dimensional and multi-dimensional arrays - String and String Builder.	9
Unit III	**VB.NET Programming** Introduction to VB.NET - Features of VB.NET - VB.NET Program Structure – VB.NET Basics - Forms and Controls - Windows Forms - Common Controls - Event Handling - . Procedures - Sub procedures -Function procedures -Passing parameters - Object-Oriented Programming in VB.NET - Exception Handling - Error handling techniques.	9
Unit IV	**ASP.NET** Introduction - Need for Web Applications - Features of ASP.NET -Architecture - ASP.NET Web Forms - Web Form structure - Server Controls - Page Life Cycle - Controls in ASP.NET - HTML Controls - Web Server Controls - Validation Controls - AdrotatorControls State Management - View State – Session Cookies - Application State - ASP.NET Navigation.	9
Unit V	**ADO.NET Database Connectivity** Introduction - ADO vs ADO.NET - Architecture of ADO.NET - Connected and Disconnected Architecture- ADO.NET Components -Database Connectivity - CRUD Operations – Data Binding – Exception Handling in Database. Applications - Connection handling techniques.	9
	Total Contact Hrs	**45**

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Matthew MacDonald	The CompleteReference "ASP.NET"(Unit1,4)	TataMcGraw -HillEdition	2009
2	MridulaParihar	ASP.NET Bible(Unit2,4, 5)	JohnWiley	2002
3	BillEvjen, Scott Hanselman, MuhammadJ. Sivakumar, Devin Rader	ProfessionalASP.NET 2.0(Unit 3,4)	WileyIndia (p)Ltd.	2006

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Andrew Troelsen,	ProC#5.0 and the .NET 4.5 Framework	A press publication	2012
2	Mike Yenderloy	ADO&ADO.Net programming	BPB publications	2002
3	Mc Dowell	ASP.NET Complete reference	Sahitya BhawanPublications	2007
4	Evangelos Petroutsos	*Mastering VB.NET*	Sybex / Wiley	2002

Course Designed by	Ms.A.PRIYADHARSINI		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC412			Title	Batch:	2026-2029
				CC IX: Advanced Java Programming	Semester:	IV
Lecture Hrs./Week	3	Tutorial Hrs./Sem			Credits:	04

Course Objective

The objective of this course is to provide knowledge of advanced Java programming concepts and GUI development using Swing and Applets. It aims to develop skills in designing interactive applications using advanced components and Java Beans. The course also introduces distributed computing concepts such as RMI and server-side programming using Servlets. Further, it enables students to build dynamic web applications using Java Server Pages (JSP).

Course Outcomes

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

CO Number	CO Statement	
CO1	Develop GUI applications using Swing components and Applets	PO1(3)
CO2	Implement advanced GUI components for interactive applications	PO1(3) ,PO2(3), PO5(3)
CO3	Apply Java Beans, session tracking techniques, and RMI	PO1(3) ,PO2(3), PO3(3)
CO4	Develop server-side applications using Servlets and database connectivity	PO1(3) ,PO2(3), PO5(3)
CO5	Design dynamic web applications using JSP and scripting techniques	PO1(3) , PO5(3)

Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO 14	PO 15
CO1	3	2	–	–	2	–	–	–	–	–	–	2	–	–	–
CO2	3	3	2	–	3	–	–	–	–	–	–	2	–	–	–
CO3	3	3	3	2	2	–	–	–	–	–	–	2	–	–	–
CO4	3	3	2	2	3	–	–	–	2	–	–	2	–	–	–
CO5	3	2	2	–	3	–	–	–	2	2	–	2	–	–	2

3 Point Scale – 1, 2, 3

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.	9
Unit II	Inheritance- Packages: Putting Classes Together-Multithreaded Programming- *Managing Errors and Exceptions.*	9
Unit III	Applets Programming - Graphics Programming-The Graphics Class-Lines and rectangles - Circles and Ellipses - Drawing Arcs - Drawing Polygons.	9
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.	9
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.*	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, GroupTask.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS /EDITION	YEAR OF PUBICATION
1	Herbert Schildt	Java-2, The Complete Reference	11th Edition, Tata McGraw Hill	2019
2	Jim Keogh	The Complete Reference J2EE	Tata McGraw Hill	2017
3	SamsSeries, James GoodWill	Developing Java Servlet	1 st Edition, SAMS Techmedia	2017
4	Sam Series	Java RMI	Tata McGraw Hill	2016

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Brian Cole, Robert Eckstein, James Elliott, Marc Loy, David Wood	Java Swing	2 nd Edition, O‟Reilly Publishers	2012
2	Stephen Potts, Mike Kopac	Web Services	Kindle Edition, Pearson Education	2015

Course Designed by	Mrs. N. Amirthagowri		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC4A1**			**Title**	**Batch:**	**2026-2029**
				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	
CO1	Recollect the modeling and computational tools as well as analytic skills to evaluate the problems.	PO1(3)
CO2	Understand and explain the various mathematical formulations.	PO2(3)
CO3	Apply Working with Non Linear programming Problems.	PO1(3), PO2(3), PO6(3)
CO4	Analyze Linear Programming problem and similar such problems Into appropriate forms and problem solving.	PO1(3), PO2(3), PO3(3), PO6(3)
CO5	Estimate the problem situation for better decisions.	PO1(3), PO2(3), PO3(3), PO5(3),PO6(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	–	1	2	–	1	–	–	–	–	–	–	–
CO2	2	3	1	–	2	2	–	1	–	–	1	–	–	–	–
CO3	3	3	2	–	2	3	–	1	1	–	1	1	–	1	–
CO4	3	3	3	–	2	3	–	1	1	–	1	2	–	1	–
CO5	3	3	3	–	3	3	–	2	1	1	1	2	1	2	2

3 Point Scale – 1, 2, 3

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'sApproximationMethod-Moving towards optimality UV Method. Assignment Problem: Definition –Assignment Algorithm-Hungarian Assignment Method-Unbalanced AP.	12
Unit III	Inventory Control: Introduction- *Types of Inventory*- Inventory Decision-Economical OrderQuantity (EOQ)-DeterministicInventory Problems.	12
Unit IV	Sequencing Problems: Introduction- Problems with n Jobs and 2 Machines-Problems with n 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, 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	KantiSwarup, P.K.Gupta,Man Mohan	Operations Research (Unit1to5)	Sultan Chand & Sons	1996

REFERENCE BOOK

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

Course Designed by	Dr.T.Sumadhi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC4A2			Title	Batch:	2026-2029
				GE IV - Allied: Mathematics IV- BUSINESS MATHEMATICS	Semester:	IV
Lecture Hrs./Week	4	Tutorial Hrs./Sem.			Credits:	3

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 Number	CO Statement	
CO1	Know the basic concepts of operations on sets, relations and functions.	PO1(3)
CO2	Learn to find an equation of straight line, distance, slope and interpretations.	PO2(3)
CO3	Able to find Limit, Continuity, Average and Marginal cost using differential calculus	PO1(3), PO2(3), PO6(3)
CO4	Know the operations on Matrices, inverse of Matrix, Solution of system of linear equations and Input and Output Analysis using matrices.	PO1(3), PO2(3), PO3(3),PO6(3)
CO5	Compute percentage, simple and compound interest, Arithmetic and Geometric series and solve Simultaneous Linear equations.	PO1(3), PO2(3), PO5(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	–	1	2	–	1	–	–	–	–	–	–	–
CO2	2	3	2	–	2	2	–	1	–	–	1	–	–	–	–
CO3	3	3	2	–	2	3	–	1	1	–	1	1	–	1	–
CO4	3	3	3	–	2	3	–	1	1	–	1	2	–	1	–
CO5	3	3	2	–	3	2	–	1	–	–	1	1	–	1	1

3 Point Scale – 1, 2, 3

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– Changesinrelatedvariables-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 BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	V.Sundaresan,S. D.JayaSeelan	Contents and Treatmentasin“AnI ntroduction to Business Mathematics”	S. Chand &CompanyLtd	2003

REFERENCE BOOKS

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	QaziZameeruddin,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	Dr.R. Malathi Ravindran		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC413			Title	Batch:	2026-2029
				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	
CO1	Recollect the ASP.Net applications using standard .net controls	PO1(3)
CO2	Understand the decision making statements and user interfacing controls	PO1(3), PO2(3)
CO3	Implement and deploy database connection management u	PO1(3), PO2(3), PO3(3), PO6(3)
CO4	Analyze simple data binding applications using ADO.Net Connectivity	PO1(3), PO2(3), PO6(3)
CO5	Evaluate web-based applications by using various web controls in ASP.NET.	PO1(3), PO2(3), PO3(3), PO5(3), PO6(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	–	1	–	2	–	–	–	–	–	–
CO2	3	3	2	2	2	2	1	–	2	–	1	–	–	1	–
CO3	3	3	3	2	2	3	2	1	2	1	1	2	2	1	–
CO4	3	3	2	2	2	3	2	1	2	1	1	2	2	1	–
CO5	3	3	3	2	3	3	2	2	3	2	2	3	2	2	1

3 Point Scale – 1, 2, 3

1. Create a windows form with the following controls Text box,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 in ASP.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 th session properties.
14. Write a program in ASP that makes use of Adrotator component.
15. Write a program in ASP that makes use of Browser capabilities component.

Total Contact Hours:60

Course Designed by	MR.S. DILIPKUMAR		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC414			Title	Batch:	2026-2029
				CC Lab VI: Advanced 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 Java by 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	
CO1	Develop GUI-based applications using Swing components and Applets	PO1(3), PO5(3)
CO2	Implement event-driven programming using advanced Java components	PO1(3), PO2(3), PO5(3)
CO3	Develop distributed applications using Java Beans and RMI	PO1(3), PO2(3), PO3(3)
CO4	Perform database operations using JDBC and implement server-side logic using Servlets	PO1(3), PO2(3), PO5(3)
CO5	Design and develop dynamic web applications using JSP and session tracking techniques.	PO1(3), PO5(3)

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	–	–	3	–	–	–	–	–	–	2	–	–	–
CO2	3	3	2	–	3	–	–	–	–	–	–	2	–	–	–
CO3	3	3	3	2	2	–	–	–	–	–	–	2	–	–	–
CO4	3	3	2	2	3	–	–	–	2	–	–	2	–	–	–
CO5	3	2	2	–	3	–	–	–	2	2	–	2	–	–	2

3 Point Scale – 1, 2, 3

1.	Write a Java program tocreate a GUI using Swing components (JFrame, JLabel, JTextField, JButton)**.**
2.	Write a Java program tohandle events using ActionListener**.**
3.	Write a Java program todemonstrate JCheckBox, JRadioButton, JComboBox, and JList**.**
4.	Write a Java program touse layout managers and JSplitPane / JTabbedPane**.**
5.	Write a Java program tocreate a menu-driven application using JMenu**.**
6.	Write a Java program todisplay data using JTable**.**
7.	Write a Java program todemonstrate JTree and JProgressBar**.**
8.	Develop a simpleJava Bean and use it in an application**.**
9.	Write a Java program todemonstrate bound properties in Java Beans**.**
10.	Write a Java program toimplement RMI for client-server communication**.**
11.	Write a Java program toestablish database connection using JDBC**.**
12.	Write a Java program to insert and retrieve records using JDBC**.**
13.	Develop aServlet program to display a message**.**
14.	Develop a Servlet program tohandle form data using GET and POST methods**.**
15.	Develop aJSP program to display dynamic content and session tracking**.**
	Total Contact Hours : 60

Course Designed by	Mrs. N. Amirthagowri		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC4S1			Title	Batch:	2026-2029
				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	
CO1	To apply statistical functions	PO1, PO4
CO2	To apply concept of date functions	PO1, PO4
CO3	To verify Lookup and financial functions	PO1, PO2
CO4	To verify Manipulation of database and pivot functions	PO1, PO2, PO3, PO6
CO5	To create advanced filtering in excel	PO1, PO2,PO3,PO4, PO6, PO9

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO1 2	PO 13	PO 14	PO 15
CO1	3	2	2	3	1	2	–	–	2	–	–	–	–	–	–
CO2	3	2	2	3	1	2	–	–	2	–	–	–	–	–	–
CO3	3	3	2	2	2	2	–	–	2	–	1	–	1	1	–
CO4	3	3	3	2	2	3	–	1	2	1	1	2	1	1	–
CO5	3	3	3	3	2	3	–	1	3	2	2	2	1	2	1

3 Point Scale – 1, 2, 3

Content	Hrs.
SAMPLE PROGRAM LIST **Test** 1. Inserting Basic Math And Statistics Functions 2. Using date functions 3. Logical Function-IF function 4. Lookup 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, GroupTask(GD)

Course Designed by	Dr.S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

ProgrammeCode:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
CourseCode:	26UBC4S2			Title	Batch:	2026-2029
				SEC II: NaanMudhalvan: 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 andtechniques. Topics include arrays; data frames and Variability. To develop competent technical writing skills using Data science programming so as to enable the graduateto meet the requirement.

CourseOutcomes

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

CO Number	CO Statement	
CO1	Remember the structure and significance of the Data science programming Language.	PO1
CO2	Acquire the knowledge about Datascience Programming for various programming technologies.	PO1, PO2
CO3	Demonstrate the ability to analyze, use and operators.	PO1, PO2, PO9
CO4	Demonstrate the ability to understand and use Numpy arrays and Pandas data frames	PO1, PO2, PO6, PO9
CO5	Demonstrate the ability to understand and use Correlation and scatterplots.	PO1, PO2, PO3, PO6, PO9

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	–	–	–	2	–	–	–	–	–	–
CO2	3	3	2	2	2	1	–	–	3	–	1	–	–	1	–
CO3	3	3	2	2	2	2	–	–	3	1	1	1	–	1	–
CO4	3	3	2	2	2	3	–	1	3	1	1	1	–	1	–
CO5	3	3	3	2	2	3	–	1	3	1	2	2	–	2	1

3 Point Scale – 1, 2, 3

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 Frequencydistributions
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 Hours:30

Pedagogy and Assessment Methods:

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

Course Designed by	Dr.S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC4N1			Title	Batch:	2026-2029
				NonMajorElective-II: Illustration Effects Lab	Semester:	IV
Practical Hrs./Week	1	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	
CO1	Recollect the basic elements and principles of photo editing software to Achieve a great photo effect by applying effects.	PO1(3)
CO2	Understand the important aspects of Adobe Photoshop Elements.	PO4(3)
CO3	Construct simple documents utilizing selections, layers and blending modes.	PO1(3) ,PO4(3)
CO4	Analyze color management and correction techniques in Adobe Photoshop.	PO1(3) ,PO2(3)
CO5	Evaluate simple shapes using animation editing software and design Simple animation by applying shape tweens and motion tweens.	PO2(3) ,PO9(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	1	–	2	1	–	–	1	1	–	–	–	–	–	–
CO2	2	2	1	3	1	–	–	1	2	–	1	–	–	1	–
CO3	3	2	2	3	2	1	–	1	2	1	1	1	–	2	–
CO4	3	3	2	2	2	2	–	1	2	1	1	1	–	2	–
CO5	2	3	2	2	2	2	–	2	3	2	2	2	1	3	1

3 Point Scale – 1, 2, 3

1. Create a Business Card.
2. Create a Monthly Calendar.
3. Change the Background Transparent and Save it inTransparent Image.
4. Create a Poster with a Fancy Font.
5. Convert Blur Image into Correct Image.
6. Changing Hair Color into Simply Fix Grey Hair.
7. Convert an Image into Blend Images using Layer Masking.
8. Create a 3DText.
9. Create an Outline using a Brush Strokes.
10. Create a Photo Manipulation.

Total Contact Hours:15

Course Designed by	Mr. S. Dilip Kumar		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC4N2			Title	Batch:	2026-2029
				Non Major Elective– II: AnimationTechniques Lab	Semester:	IV
Practical Hrs./Week	1	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	
CO1	Recollect animation software and make them to design animated applications.	PO1(3)
CO2	Understand the gradients and patterns using available tools.	PO3(3)
CO3	Apply the concept of timeline animation.	PO1(3)
CO4	Analyze innovative character and applying effects with aid of software.	PO1(3), PO2(3)
CO5	Evaluate import text, character, paragraph formatting and effects to text.	PO2(3), PO9(3)

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	1	–	2	1	–	–	1	1	–	–	–	–	–	–
CO2	2	2	1	3	1	–	–	1	2	–	1	–	–	1	–
CO3	3	2	2	2	2	1	–	1	2	1	1	1	–	2	–
CO4	3	3	2	2	2	2	–	1	2	1	1	1	–	3	–
CO5	2	3	2	2	2	2	–	2	3	2	2	2	1	3	1

3 Point Scale – 1, 2, 3

1. Setting Motion for a Butterfly.

2. Create a Rain Effect.

3. Create a masking.

4. Create a Basket Ball.

5. Create aText Animation.

6. Design a Cartoon Background.

7. Create aWater 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	Mr. S. Dilip Kumar		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic Council	Dr.R.Manickachezian		

Programme Code:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC515			Title	Batch:	2026-2029
				CC-XI : Machine Learning using Python Programming	Semester:	V
Lecture Hrs./Week	5	Tutorial Hrs./Sem	5		Credits:	5

Course Objective

The course is designed to provide basic knowledge of Machine Learning using Python. It introduces programming fundamentals, data handling, and simple machine learning techniques for beginners.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember basic concepts of Python programming and data handling.	PO5(3),PO8(3)
CO2	Understand control structures and data processing techniques.	PO4(3),PO7(3),PO9(3)
CO3	Apply basic machine learning models using Python libraries.	PO1(3), PO2(3), PO4(3), PO5(3), PO8(3), PO13
CO4	Analyze model performance and simple datasets.	PO1(3), PO2(3), PO5(3), PO7(3),PO10(3),
CO5	Evaluate and implement basic ML applications.	PO2(3), PO3(3), PO6(3), PO9(3), PO14

Mapping

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	2	2	3	2	2	3	2	2	2	2	2	-	-
CO2	2	2	2	3	2	2	3	2	3	2	2	2	2	2	-
CO3	3	3	2	3	3	2	2	3	2	2	2	2	3	2	2
CO4	3	3	2	2	3	2	3	2	2	3	2	2	2	2	2
CO5	2	3	3	2	2	3	2	2	3	2	2	2	2	3	2

3 Point Scale – 1,2,3

Units	Content	Hrs
Unit I	Introduction to Python – Features and Applications – Python Environment Setup – Basic Syntax – Variables and Data Types – Operators – Input and Output Operations – Writing Simple Programs.	15
Unit II	Control Statements: Decision Making (if, if-else, nested if) – Looping Statements (for, while) – Break, Continue, Pass – Introduction to Lists – List Operations – Simple Programs using Lists and Control Statements.	15
Unit III	Introduction to Data Handling – Types of Data – Working with CSV Files – Basics of NumPy (concept) – Introduction to Pandas – Data Frame Creation – Reading and Filtering Data – Basic Data Visualization using Matplotlib (Bar and Line Charts).	15
Unit IV	Introduction to Machine Learning – Types of Machine Learning – Applications of ML – Introduction to Supervised Learning – Linear Regression (basic concept only) – Steps in Machine Learning – Simple Prediction using Python Libraries.	15
Unit V	Introduction to Scikit-learn – Building Simple ML Models – Training and Testing Data – Model Evaluation (Accuracy concept) – Overfitting and Underfitting (basic idea) – Real-life Applications of Machine Learning.	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	Andreas C. Müller & Sarah Guido	Introduction to Machine Learning with Python	O'Reilly	2016
2	Aurélien Géron	Hands-On Machine Learning with Scikit-Learn	O'Reilly	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Jake VanderPlas	Python Data Science Handbook	O'Reilly	2016
2	EthemAlpaydin	Introduction to Machine Learning	MIT Press	2020
3	Tom Mitchell	Machine Learning	McGraw Hill	2003

Course Designed by	Dr.S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC516			Title	Batch:	2026-2029
				CC-XII: :Mobile Application Development	Semester:	V
Lecture Hrs./Week	5	Tutorial Hrs./Sem			Credits:	5

Course Objective

This course aims to provide a practical approach for Android Mobile Application Development and theoretical knowledge about windows application.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember the history of Android development and what is Required to build Android apps.	PO1(3)
CO2	Understanding Android application architecture, including the roles of the task stack, activities and services.	PO1(3), PO2(3)
CO3	Utilize rapid prototyping techniques to design and develop Sophisticated mobile interfaces.	PO1(3), PO2(3), PO3(3), PO6(3), PO7(3
CO4	Analyze the implementation of messaging and location-based services.	PO1(3), PO2(3), PO5(3), PO6(3), PO7(3), PO9(3),
CO5	Evaluate developed app and publish in market.	PO1(3), PO2(3), PO5(3), PO6(3), PO7(3), PO9(3)

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO 1	3	1	1	–	1	–	–	–	1	–	–	–	–	–	–
CO 2	3	3	2	1	2	2	2	1	1	1	1	–	–	–	–
CO 3	3	3	3	1	2	3	3	2	2	2	2	1	1	1	–
CO 4	3	3	3	1	3	3	3	2	3	2	2	1	1	2	–
CO 5	3	3	3	2	3	3	3	2	3	2	2	2	2	3	1

3 Point Scale – 1,2,3

Units	Content	Hrs
Unit I	Android and its Tools: Introduction to Android-open Handset Alliance-Android Ecosystem-Need of Android - Features of Android-Tools and Software Required for development of Android Application-Android Architecture Installation and Configuration of Android: Operating System-Java SDK, Android SDK-Android Development Tools (ADT)-Android Virtual Devices (AVDs)-Emulators Steps to Install and Configure Android studio and SDK	15
Unit II	Designing User-Interface with View: Text View - Edit Text – Button - Image Button Toggle Button - Radio button and Radio Group – Checkbox. List View - Grid View-Image View-Scroll View-Custom Toast Alert Time and Date Picker	15
Unit III	UI Components and Layout: Control flow - Components of a screen- Fundamental UI Design. Linear Layout-Absolute Layout-Frame Layout-Table Layout- Relative Layout. Activity: Intent – Filter – Active Lifecycle - Broadcast Life Cycle- Content Provider- Fragments.	15
Unit IV	Flutter: Introduction to Flutter - Features of Flutter- Advantages of Flutter-Disadvantages of Flutter - Architecture of Flutter Applications. React JS: Introduction to ReactJs – Components – Expression & Attributes – Key Events – Event Pooling.	15
Unit V	Databases: SQLite Database-Necessity of SQLite-Creation and Connection of the data base-extracting value from Cursors-Transactions. Publishing Apps-Building APK-Google Play store	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 Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Year
1	Dixit,Prasanna Kumar	Android (Unit 1)	Vikas Publications, NewDelhi,	2014
2	Maclean David, KomatineniSatya, Allen Grant	ProAndroid5 (Unit2, 3)	Apress Publications, ISBN: 978-1-4302- 4680-0	2015
3	Hortan,John	Android Programming for Beginners(Unit 4,5)	Packet Publication, ISBN:978-1-78588- 326-2	2015

Reference Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Year
1	Wei-MengLee	Beginning ANDROID 4 Application Development	Wiley Publications	2015

Course Designed by Dr.	Dr. T. SUMADHI		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Computer Applications	
Course Code:	26UBC5E1			Title	Batch:	2026 - 2029
				DSE. I: Cryptography and Network Security	Semester:	V
Lecture Hrs./Week	6	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To endow with better knowledge on various concepts of Security, Symmetric and Asymmetric algorithms, Digital certificates, E-mail, WWW, 2G, 3G etc.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To Recollect basic concepts of network security	PO1(3)
CO2	To Understand basic knowledge of cryptography	PO1(3), PO2(3)
CO3	To Apply diverse security mechanisms	PO1(3), PO2(3), PO3(3), PO5(3) PO6(3) PSO1(3)
CO4	To Evaluate various Malwares and its types.	PO1(3), PO2(3), PO3(3), PO4(3),PO5(3) PO6(3) PO11(3), PSO1(3), PSO2(3)
CO5	To Interpret different types of security tips.	PO1(3), PO2(3), PO4(3),PO5(3) PO6(3) PO11(3), PSO1(3), PSO2(3)

Mapping

PO/ CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	1	1	1	1	-	2	-	2	1	-	1	-	1
CO2	3	3	2	2	2	2	-	2	-	2	1	-	1	-	1
CO3	3	3	3	2	3	3	1	2	1	2	2	-	1	1	2
CO4	3	3	3	3	3	3	1	2	1	2	2	-	2	1	2
CO5	3	3	2	3	3	3	2	2	1	2	2	1	2	1	2

Units	Content	Hrs.
Unit I	**Introduction to cybercrime:** classification – reasons. **Security:** Introduction – Need – Approaches – Principles – Types of attacks. **Malware and its types:** Adware – Spyware – Browser hijacking software – Virus – Worms – Trojan Horse – Scareware. Kinds of cybercrime – Authentication – Encryption. Digital Signature – Anti-virus – Firewall – Steganography – Computer Forensics.	17
Unit II	Reporting Cybercrime – Recent Cybercrime incidents – Cyber security initiatives in India. Generating secure password – Using password manager – Enabling two-step verification – Free Antivirus – Safe browsing – Safe browsing guidelines for social networking sites. Email security tips – Smartphone security guidelines.	17
Unit III	**Cryptography:** Introduction – Plain text and Cipher text – Substitution & Transposition techniques – Encryption and Decryption – Symmetric and Asymmetric key Cryptography – Steganography – Key range and Key size - Possible types of attacks.	18
Unit IV	**Symmetric Key Algorithms**: Introduction - Algorithm Types and modes – Overview – DES– IDEA– RC4 & 5 – Blowfish – AES.	19
Unit V	**Asymmetric Key Algorithms**: Introduction – History – Overview - RSA algorithm – Symmetric and asymmetric cryptography. **Digital Signatures**: Introduction – Message Digests - MD5 – Secure Hash Algorithm. Knapsack algorithm – Other algorithms.	19
	Total Contact Hrs.	**90**

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	Dr. JeetendraPande	Introduction to Cyber Security((UNIT I -III)	Uttarakhand Open University, Haldwani	2017
2	ATUL KAHATE	CRYPTOGRAPHY and NETWORK SECURITY(UNIT IV-V)	3rd Edition, McGraw-Hill Education Pvt Ltd	2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHES\ EDITION	YEAR OF PUBLICATION
1	William Stallings	Cryptography and Network Security Principles and Practices	PHI Education Asia ,4th Edition	2006
2	Behrouz A. Forouzan	CRYPTOGRAPHY and NETWORK SECURITY	Tata McGraw Hill Pub	2007

Course Designed by Dr.	Ms. V. Prabavathi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	Computer Applications	
Course Code:	**26UBC5E2**			**Title**	**Batch:**	2026 - 2029
				DSE - I : Cloud Security	**Semester:**	V
Lecture Hrs./Week	6	**Tutorial Hrs./Sem.**	-		**Credits:**	5

Course Objective

To understand various concepts of cloud computing and learn types of cloud services, usage of cloud etc.

Course Outcomes

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

CO Number	CO Statement	
CO1	To recollect cloud networking concepts	PO1(3)
CO2	To understand and familiar with the basic concepts of cloud computing and python	PO1(3), PO10(3),
CO3	To apply the terminologies in designing cloud based applications	PO1(3), PO3(3), PO4(3),PO5(3) PO6(3) PO8(3),PO10(3), PSO1(3), PSO2(3)
CO4	To figure out security issues in cloud computing	PO1(3), PO3(3), PO4(3),PO5(3) PO6(3) PO8(3),PO10(3), PO13(3),PSO1(3), PSO2(3)
CO5	To judge the pros and cons of various types of cloud providers	PO1(3), PO2(3),PO3(3), PO4(3),PO5(3) PO6(3) PO8(3),PO10(3), PO13(3),PO15(3),PSO1(3), PSO2(3)

Mapping

PO/ PSO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	1	1	1	1	-	-	1	-	2	1	-	1	-	1
CO2	3	2	2	2	2	1	-	2	-	3	2	-	1	-	2
CO3	3	2	3	3	3	3	2	3	1	3	2	-	2	2	2
CO4	3	2	3	3	3	3	2	3	2	3	2	-	3	2	2
CO5	3	3	3	3	3	2	2	3	2	3	2	1	3	2	3

26UBC5E2

Units	Content	Hrs.
Unit I	**Introduction to Cloud Computing:** Characteristics – Models – Services Examples – Services and Applications. **Cloud concepts and technologies:** Virtualization – Load balancing – scalability and elasticity – Deployment – Replication – Monitoring – Software defined Networking – Network function virtualization – MapReduce – Identity and access management - Service level agreements – Billing.	18
Unit II	**Cloud services and Platforms:** Compute – Storage – Database – Application – Content Delivery – analytics – Deployment and Management – Identity and access Management – Open source Private Cloud Software	18
Unit III	. **Hadoop and MapReduce:** Apache Hadoop – MapReduce Job execution – Schedulers – Cluster setup. **Cloud Application Design:** Introduction **–** Design considerations – Reference Architectures – Design methodologies – Data storage approaches.	18
Unit IV	**Cloud Application Benchmarking and Tuning**: Introduction – Workload Characteristics – Application Performance Metrics – Design Considerations – Benchmarking Tools – Deployment prototyping – Load Testing and Bottleneck Deduction – Hadoop Benchmarking.	18
Unit V	**Cloud Security:** Introduction – CSA Cloud Security Architecture – Authentication – Authorization – Identity and Access Management – Data Security – Key Management – Auditing. **Cloud For Industry, Health Care and Education:** Health Care – Energy systems – Transportation systems – Manufacturing Industry – Education.	18
	Total Contact Hrs.	**90**

Pedagogy and Assessment Methods:

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

26UBC5E2

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	ArshdeepBahga, Vijay Madisetti	Cloud Computing – A Hands-on Approach	Universities Press Pvt. Ltd.	2016

Reference Books

S.NO	AUTHOR	TITLEOFTHE BOOK	PUBLISHES\ EDITION	YEAR OF PUBLICATION
1	Anthony T.Velte, Toby J.Velte, Robert Elsenpeter	Cloud Computing - A Practical Approach	McGraw Hill Publications. Fourteenth reprint.	2013
2	Michael Miller	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online	Que Publishing.	2009

Course Designed by	Ms. V. Prabavathi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC5E3**			**Title**	**Batch:**	**2026-2029**
				DSE-II: Cyber Security	**Semester:**	**V**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:**	**5**

Course Objective

This course provides students with a foundational understanding of blockchain technology and core concepts of cybersecurity. It equips learners to identify various cyber threats, apply network and data security measures, and understand legal and ethical issues in digital environments. Overall, the course promotes awareness and best practices for the safe and secure use of computer systems and networks.

Course Outcomes

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

CO Number	CO Statement	
CO1	Explain the basic concepts of cyber security and cyber threats	PO1(3), PO2(3), PO3(3), PO4(3), PO15(3)
CO2	Identify different types of malware and cyber attacks	PO1(3), PO2(3), PO3(3), PO4(3), PO5(3), PO9(3), PO15(3)
CO3	Explain network security mechanisms and protection tools	PO4(3)
CO4	Apply data protection and encryption techniques	PO2(3), PO4(3), PO7(3)
CO5	Analyse cyber laws and ethical issues related to cyber crimes	PO3(3), PO4(3), PO10(3), PO15(3)

Mappings

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	3	3	2	2	2	1	2	2	1	2	1	2	3
CO2	3	3	3	3	3	1	2	1	3	1	1	2	2	2	3
CO3	2	2	2	3	2	1	2	2	2	1	1	2	2	2	2
CO4	2	3	2	3	2	1	3	1	2	2	1	2	2	2	2
CO5	2	2	3	3	2	1	2	1	2	3	1	2	2	2	3

Units	Content	Hrs
Unit I	**Introduction to Cyber Security:** Basics of cyber security – Cyber space – Importance of cyber security – CIA triad (Confidentiality, Integrity, Availability) – Types of cyber threats – Cyber security challenges in the digital world.	18
Unit II	**Cyber Threats and Malware:** Types of malware – Virus, Worm, Trojan Horse – Ransomware – Spyware – Adware – Phishing attacks – Social engineering – Password attacks – Case studies of cyber attacks.	18
Unit III	**Network Security:** Network security fundamentals – Firewalls – Intrusion Detection System (IDS) – Intrusion Prevention System (IPS) – Secure communication protocols – Virtual Private Network (VPN) – Wireless network security.	18
Unit IV	**Data Security and Cryptography:** Data protection techniques – Encryption and decryption – Symmetric and asymmetric cryptography – Digital signatures – Data privacy – Secure data storage and backup.	18
Unit V	**Cyber Laws and Ethical Issues:** Introduction to cyber laws – Cybercrimes and their types – IT Act in India – Cybercrime investigation – Ethical hacking – Cyber security best practices and safety guidelines.	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, Group Task.

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OFPUBLICATION
1	Charles P. Pfleeger& Shari Lawrence Pfleeger	Security in Computing	Pearson Education	2015
2	William Stallings	Cryptography and Network Security	Pearson Education	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Nina Godbole&SunitBelapure	Cyber Security: Understanding Cyber Crimes	Wiley India	2011
2	Michael E. Whitman & Herbert J. Mattord	Principles of Information Security	Cengage Learning	2018

Course Designed by Dr.	Dr.S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	Computer Applications	
Course Code:	**26UBC517**			**Title**	**Batch:**	2026 - 2029
				CC Lab VII:	**Semester:**	V
Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	-	**Machine Learning with Python Programming**	**Credits:**	2

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	
CO1	Remember basic Python syntax and programming concepts.	PO1(3),
CO2	Understand control structures and data handling using Python.	PO4(3), PO7(3),
CO3	Apply Python programming to solve problems.	PO1(3), PO2(3), PO4(3), PO5(3), PO7(3), PO13(3), PO15(3),
CO4	Analyze data and implement basic machine learning models.	PO14(3)
CO5	Evaluate results and interpret outputs of ML models.	PO1(3), PO2(3), PO4(3), PO7(3), PO8(3)

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	2	2	3	2	2	2	2	2	2	2	2		
CO2	2	2	2	3	2	2	3	2	2	2	2	2	2	2	
CO3	3	3	2	3	3	3	3	3	3	2	2	2	3	3	2
CO4	3	3	2	3	3	2	3	2	2	2	2	2	3	2	3
CO5	3	3	2	3	2	2	3	3	2	2	2	2	3	2	2

1. Write a Python program to read student details and calculate total and average marks.
2. Write a Python program to perform arithmetic operations using operators.
3. Write a Python program to check whether a number is even or odd.
4. Write a Python program to find the sum of first N natural numbers using loops.
5. Write a Python program to print simple star patterns.
6. Write a Python program to perform basic operations on lists (max, min, sum).
7. Write a Python program to perform string operations (reverse and count vowels).
8. Write a Python program to read a dataset using Pandas and display basic information.
9. Write a Python program to visualize data using bar chart and line chart.
10. Write a Python program to implement simple Linear Regression using a library.
11. Write a Python program to split dataset into training and testing and evaluate model accuracy.

Total Contact Hours:75

Course Designed by	Dr. S.Sathiyapriya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC518			Title	Batch:	2026-2029
				CC Lab IX: Mobile Application Development	Semester:	V
Practical Hrs./Week	5	Tutorial Hrs./Sem			Credits:	2

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	
CO1	Remember essential Android Programming concepts	PO1(3)
CO2	Understand various Android Applications related to layouts and rich uses Interactive interfaces.	PO1(3)
CO3	Apply native application using GUI components and Mobile application Development framework	PO1(3), PO2(3), PO3(3), PO6(3), PO7(3),
CO4	Analyze Android applications to the app market	PO1(3), PO2(3), PO3(3), PO6(3), PO7(3),
CO5	Evaluate mobile applications for the current scenario.	PO1(3), PO2(3), PO3(3), PO5(3), PO6(3), PO7(3), PO9(3),

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12	PO 13	PO 14	PO 15
CO1	3	1	1	–	1	–	–	–	1	–	–	–	–	–	–
CO2	3	2	2	1	2	1	2	1	2	1	1	–	–	–	–
CO3	3	3	3	1	2	3	3	1	2	2	2	1	1	1	–
CO4	3	3	3	2	2	3	3	2	2	2	2	1	1	1	–
CO5	3	3	3	2	3	3	3	2	3	2	2	2	2	2	1

3 – High correlation, 2 – Moderate correlation, 1 – Low correlation, – No correlation

Content
1. Create "Hello World" Application. 2. Create Application by Using Widgets, Creating the Application by using the Activity class 3. Creating the Application by using Text Edit control. 4. Creating the Application Choosing Options Check Box. 5. Creating the Application Choosing Options Radio Button. 6. Creating the Application Choosing Options Radio Group. 7. Creating the Application Choosing Options Spinner. 8. Create Application by Using Building Blocks for Android Application design by using Linear Layout 9. Create Application by Using Building Blocks for Android Application design by using Relative Layout. 10. Create Application by Using Building Blocks for Android Application design by using Absolute Layout. 11. Design the Application for Menus and Action Bar. 12. Design the application to display the Drop-Down List Action Bar.
Total Contact Hrs:60

Course Designed by	DR. T. SUMADHI		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC519**			**Title**	**Batch:**	**2026-2029**
				Project: Mini Project	**Semester:**	**V**
Lecture Hrs./Week	-	**Tutorial Hrs./Sem**			**Credits:**	**2**

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

Chapter No.	Title	Page No.
i	**Certificates**	
ii	**Declaration**	
iii	**Acknowledgement**	
iv	**Synopsis**	
1.	**Introduction**	
	1.1 Introduction	
	1.2 Objective of the Project	
	1.3 Company Profile	
	1.4 System Specification	
	1.4.1 Hardware Specification	
	1.4.2 Software Specification	
2	**System Study**	
	2.1 Existing System	
	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
3	**System Design**	
	3.1 Overview of the Project	
	3.2 Modules of the Project	
	3.3 Input Design Format	
	3.4 Output Design	
	3.5 Table Design	
	3.6 Supporting Diagrams (ER/DFD/Use Case)	
4	**Implementation and Testing**	
	4.1 Coding Methods	
	4.2 Testing Approach	
	4.3 Implementation and Maintenance	

5 **Project Evaluation**
5.1 Project Outcome
5.2 Limitations of the Project
5.3 Further Scope of the Project
6 **Conclusion**
7 **Appendix**
7.1 Source Code
7.2 Screenshots and Reports
8 **References**

Size of the Project

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

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC5S1			Title	Batch:	2026-2029
				SEC III: IT Service Support Management	Semester:	V
Lecture Hrs./Week	3	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To understand and apply IT service management principles, ITIL practices, and support processes for efficient delivery and maintenance of IT services.

Course Outcomes

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

CO Number	CO Statement	
CO1	Recall the basic concepts of IT Service Management and ITIL framework.	PO1(3)
CO2	Explain service design principles and their role in aligning IT services with business needs.	PO2(3), PO12(3),
CO3	Apply incident and problem management techniques to improve service performance.	PO1(3), PO3(3), PO6(3), PO7(3),
CO4	Analyze change and release management processes to ensure smooth service transition.	PO2(3), PO6(3), PO12(3)
CO5	Evaluate and design continuous service improvement strategies using performance metrics and feedback.	PO2(3), PO5(3), PO6(3), PO8(3), PO9(3)

Mapping (Rating Scale: 1: Low | 2: Medium | 3: High)

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO13	PO14	PO 15
CO 1	3	1	1	2	1	1	2	1	1	1	1	1	2	1	1
CO 2	2	3	2	1	2	2	2	2	2	2	2	3	2	2	2

CO 3	3	2	3	1	2	3	3	2	2	2	1	2	2	2	1
CO 4	2	3	2	2	2	3	2	2	2	2	2	3	2	2	2
CO 5	2	3	2	2	3	3	2	3	3	2	2	2	2	2	2

Units	Content	Hrs.
Unit I	Introduction to IT Service Management- Overview of ITSM concepts- Components of the ITIL framework- Business benefits of ITSM	9
Unit II	Service Design and Strategy- Principles of service design- Managing SLAs- Cost optimization and risk management in strategy	9
Unit III	Service Transition and Operations- Managing service transitions- Incident and problem management- Testing and validation strategies	9
Unit IV	Continual Service Improvement- Identifying metrics for improvement - Feedback loops in service management - Performance evaluation techniques	9
Unit V	Governance, Compliance, and Risk Management- IT governance frameworks- *Regulatory compliance requirements* - Mitigating service risks	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, Group Task

26UBC5S1

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dr. Phalguni Gupta Dr. Surya Prakash Dr. UmaraniJayaraman	**IT Infrastructure & Its Management**(Unit 3 & 5)	Tata McGraw Hill (First Edition)	2009
2	Dr. S. A. Kelkar	**IT Service Management: A Concise Study * Author:**(Unit 1,2 & 4)	PHI Learning Private Limited (First Edition)	2011

Reference Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Prof. Sanjiva Shankar Dubey	IT Services Business Management: Concepts, Processes and Practices	PHI Learning Private Limited	2012
2	Dr. Anita Sengar	IT Infrastructure Management	S.K. Kataria& Sons	2011

Course Designed by Dr.	Mrs. S. LAVANYA		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC5S2			Title	Batch:	2026-2029
				SEC III: Business Intelligence	Semester:	V
Lecture Hrs./Week	3	Tutorial Hrs./Sem.			Credits:	2

Course Objective

To enable the students to learn business intelligence concepts, data warehouses, data mining techniques, web mining and its applications.

Course Outcomes

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

CO Number	CO Statement	
CO1	Understand the basics of business intelligence, business decisions, data warehouses and its architecture, KDD process.	PO1(3)
CO2	Understand the applications of data mining in business, data mining techniques for CRM, text mining and web mining.	PO2(3), PO6(3), PO9(3),
CO3	Knowledge in business intelligence, application in various domains and best practices.	PO3(3), PO6(3), PO8(3), PO12(3), PO14(3),
CO4	Understand the knowledge management, its architecture, approaches and tools.	PO5(3)
CO5	Knowledge in Web analytics and business intelligence, e CRM and case studies in web analytics.	PO2(3), PO4(3), PO6(3), PO8(3), PO9(3),

Mapping (Rating Scale: 1: Low | 2: Medium | 3: High)

CO / PSO /PO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	3	2	2	1	2	2	1	1	2	1	1	1	1	1	1
CO2	2	3	2	2	2	3	1	2	3	1	1	1	2	2	2
CO3	2	2	3	2	2	3	2	3	2	2	2	3	1	3	1
CO4	2	2	2	1	3	2	1	2	2	2	2	2	1	2	1
CO5	1	3	2	3	2	3	1	3	3	2	3	2	2	2	2

Units	Content	Hrs.
Unit I	Introduction to business intelligence and business decisions – Data warehouses and its role in Business Intelligence – Creating a corporate data warehouse – Data Warehousing architecture – OLAP vs. OLTP - ETL process – Tools for Data Warehousing – Data Mining – KDD Process	9
Unit II	Applications of Data Mining in Business – Data Mining Techniques for CRM – Text Mining in BI - Web Mining – Mining e-commerce data – Enterprise Information Management - Executive Information Systems	9
Unit III	Business Intelligence – Function, Process, Services & Tools - Application in different domains – Operational BI - Customizing BI – Managing BI projects vs. Traditional IS projects – Managing BI projects – Best Practices in BI Strategy	9
Unit IV	Knowledge Management – Definition – Data Vs. Information Vs. Knowledge – The ten key principle of KM – Knowledge Management Architecture – Knowledge Management Vs. Knowledge Processing – KM approaches – KM Tools – KM Infrastructure – KM models - KM Strategies	9
Unit V	Web Analytics and Business Intelligence – e CRM - *Case Study: Web Trends – Boeing – EverBank – China Eastern*	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, Group Task

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Dr. Efraim Turban Dr. Ramesh Sharda Dr. DursunDelen	Decision Support and Business Intelligence Systems (Unit-1 to 5)	Pearson Education / Prentice Hall-9th Edition	2016

Reference Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Ms. Mita Devi.	Business Intelligence	ICFAI University Press	2004
2	Elias M. Awad Hassan M. Ghaziri	Knowledge Management	Pearson Education	2010

Course Designed by Dr.	Mrs. S. LAVANYA		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC5S3			Title	Batch:	2026-2029
				CC-XII: Software Engineering and Software Testing	Semester:	V
Lecture Hrs./Week	3	Tutorial Hrs./Sem			Credits:	2

Course Objective

This course introduces the fundamental concepts of software engineering, including software development processes, design principles, software quality, and project management. It provides an understanding of software testing principles, objectives, and the testing life cycle. Additionally, students will learn and apply various testing techniques such as black box and white box testing, along with gaining exposure to modern software testing tools and automation frameworks.

Course Outcomes

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

CO Number	CO Statement	
CO1	Understand the basic concepts of software engineering and software development models.	PO1(3),
CO2	Explain software design principles, quality assurance, and project management concepts.	PO1(3), PO2(3),
CO3	Describe the fundamentals of software testing and testing life cycle.	PO1(3), PO2(3),
CO4	Apply software testing techniques such as black box and white box testing.	PO1(3), PO2(3), PO2(3), PO5(3), PO6(3), PO7(3
CO5	Use modern software testing tools and automation frameworks for testing applications.	PO1(3), PO2(3), PO2(3),

		PO5(3), PO6(3), PO7(3), PO12(3)

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO15
CO1	3	2	1	–	2	1	1	–	1	–	–	–	–	–	–
CO2	3	3	2	1	2	2	2	1	1	1	1	2	1	–	–
CO3	3	3	2	1	2	2	2	1	1	1	1	1	1	–	–
CO4	3	3	3	1	3	3	3	2	2	1	1	2	1	1	–
CO5	3	3	3	2	3	3	3	2	3	2	2	3	2	2	1

3 – High correlation, 2 – Moderate correlation, 1 – Low correlation, – No correlation

Units	Content	Hrs
Unit I	**Fundamentals of Software Engineering:**Introduction to Software Engineering-Software characteristics and challenges-Software Development Life Cycle (SDLC)-Software process models: Waterfall, Prototype, Spiral, Agile-Requirements engineering: Functional and non-functional requirements-Feasibility study and requirement analysis	9
Unit II	**Software Design and Development:**Software design principles and concepts-Architectural design and modular design-Cohesion and coupling-Software project management basics-Software quality assurance (SQA)-Documentation and configuration management	9
Unit III	**Fundamentals of Software Testing:**Introduction to software testing-Testing objectives and principles-Verification vs Validation-Levels of testing: Unit testing, Integration testing, System testing, Acceptance testing-Software Testing Life Cycle (STLC)-Test planning and test case design	9
Unit IV	**Software Testing Techniques:**Black box testing techniques-Equivalence partitioning,Boundary value analysis,Errorguessing.White box testing techniques:Statementcoverage,Decisioncoverage,Path coverage-Regression testing-Performance testing and security testing- Test automation concepts	9
Unit V	**Modern Software Testing Tools and Practices**Introduction to automated testing tools-Selenium for web application testing-JUnit and TestNG frameworks-Postman for API testing-JMeter for performance testing-Continuous Integration and testing using Jenkins- Overview of AI-based testing tools and modern DevOps testing practices	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 Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	Roger S. Pressman, Bruce R. Maxim	Software Engineering: A Practitioner's Approach	McGraw Hill	9th Edition	2020
2	K. K. Aggarwal, Yogesh Singh	Software Engineering	New Age International Publishers	3rd Edition	2019
3	Srinivasan Desikan, Gopalaswamy Ramesh	Software Testing: Principles and Practices	Pearson Education	1st Edition	2006

Reference Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	Roger S. Pressman, Bruce R. Maxim	Software Engineering: A Practitioner's Approach	McGraw Hill	8th Edition	2015
2	CemKaner, James Bach, Bret Pettichord	Lessons Learned in Software Testing	Wiley India	1st Edition	2002
3	Lisa Crispin, Janet Gregory	Agile Testing: A Practical Guide for Testers and Agile Teams	Addison-Wesley	Addison-Wesley	2009
4	Mauricio Aniche	Effective Software Testing: A Developer's Guide	Manning Publications	1st Edition	2022
5	EranKinsbruner	Continuous Testing for DevOps Professionals	Packt Publishing	1st Edition	2018

Course Designed by	Dr.T.Sumadhi		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

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	
CO1	Understand the Fundamental Concepts and applications of adhoc and wirelesssensor networks.	PO1(3), PO2(3)
CO2	Demonstrate the MAC protocol issues of adhoc networks.	PO2(3), PO3(3)
CO3	Apply the concepts of network architecture and MAC layer protocol for WSN.	PO3(3), PO5(3)
CO4	Analyze the routing protocols for adhoc wireless networks with respect to TCPdesign issues.	PO3(3),PO 4(3)
CO5	Explain the WSN routing issues by considering QoS measurements.	PO4(3), PO5(3)

Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PO1 3	PO1 4	PO1 5
CO 1	3	3	2	2	2	2	2	–	2	–	2	2	–	–	–
CO 2	–	3	3	2	–	2	–	2	–	–	2	2	–	–	–
CO	2	2	3	2	3	2	2	2	2	2	2	2	–	–	–

3															
CO 4	–	–	3	3	–	–	2	2	2	2	2	2	–	–	–
CO 5	2	–	–	3	3	3	2	–	–	–	2	2	–	–	–

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

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC620			Title	Batch:	2026-2029
				Artificial Intelligence for Internet of Things	Semester:	VI
Lecture Hrs./Week	5	Tutorial Hrs./Sem			Credits:	03

Course Objective

The course is designed to provide fundamental knowledge of Artificial Intelligence and Internet of Things and their integration. It enables students to understand intelligent data processing, smart devices, and real-time applications using AIoT concepts.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember the basic concepts of IoT architecture and Artificial Intelligence.	PO5(3),
CO2	Understand IoT devices, communication protocols, and data acquisition methods.	PO1(3), PO2(3), PO5(3), PO10(3), PO11(3)
CO3	Apply common learning techniques combining Machine Learning and Deep Learning concepts for IoTdata.	PO1(3), PO2(3), PO5(3), PO10(3), PO11(3), PO13(3), PO15(3)
CO4	Analyze edge computing, cloud integration, and AI model deployment in IoT systems.	PO1(3), PO2(3), PO3(3), PO4(3), PO5(3), PO6(3), PO10(3)
CO5	Evaluate AIoT applications, security challenges, and future trends.	PO1(3), PO2(3), PO5(3), PO6(3), PO10(3), PO11(3),

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	2	3	1	1	1	2	2	1	1	2	1	2
CO2	3	3	2	2	3	2	1	1	2	3	3	2	2	1	2
CO3	3	3	3	2	3	2	2	1	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	2	2	2	3	2	2	2	2	2
CO5	3	3	2	2	3	3	2	2	2	3	3	2	2	2	2

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.	15
Unit II	**IoT & Other Technologies:** IoT & Block Chain - IoT & Big Data - IoT & Artificial Intelligence - IoT & AR/VR - IoT & Edge Computing. **IoT in Real Life:** 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.	15
Unit III	**Introduction to Artificial Intelligence:** Machine Learning & Deep Learning basics - Types of Learning: Supervised - Unsupervised - Reinforcement Learning. Common Algorithms: Regression - Classification -Clustering - Neural Network Fundamentals - Deep Learning Concepts (ANN, CNN basics)	15
Unit IV	**AIoT Systems & Data Processing:** Data Preprocessing & Model Evaluation - Edge Computing Concepts -AI on IoT Devices - Cloud IoT Platforms - Real-Time Data Processing - Model Deployment in IoT Systems.	15
Unit V	**AIoT Applications, Security & Trends:** AIoT Applications: Smart Industry - Smart Agriculture - Smart Healthcare - Predictive Analytics - Computer Vision in IoT - IoT Security & Privacy - Challenges & Future Trends	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	Publisher/Edition	Year
1	Mr. P. Ganesh Dr. K. Haridas	Internet of Things: A Practical Approach using Arduino IDE (Unit I & II)	Selfypage Developers Pvt Ltd	2024
2	Arshdeep Bahga and Vijay Madisetti	Internet of Things: A Hands-On Approach (Unit III, IV & V)	Universities Press (India) Pvt. Ltd.	2015

Reference Books

S.No	Author	Title of the Book	Publisher/Edition	Year
1	Arshdeep Bahga, Vijay Madisetti	Internet of Things: A Hands-On Approach	Universities Press	2015
2	Aurélien Géron	Hands-On Machine Learning with Scikit-Learn & TensorFlow	O'Reilly	2019
3	Yuxi Liu	Artificial Intelligence for IoT Cookbook	Packt	2021
4	Stuart Russell, Peter Norvig	Artificial Intelligence: A Modern Approach	Pearson	2010

Course Designed by Dr.	Mr.S.Dilipkumar	

Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC6E4**			**Title**	**Batch:**	**2026-2029**
				DSE:II :Data Visualization And Business Intelligence	**Semester:**	**VI**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:**	**5**

Course Objective

The course gives introduction to the fundamental concepts and importance of data visualization, different types of data and visualization techniques, Develop skills in designing effective visual representations of data.

Course Outcomes(CO)

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

CO Number	CO Statement	CO–PO Mapping
CO1	Define and recall the basic concepts of data mining, business analytics, types of data, and data preprocessing techniques.	PO2 (3), PO6 (3), PO9 (3), PO11 (3)
CO2	Explain various data mining techniques such as classification, regression and clustering and interpret their applications in real world scenarios.	PO1 (3), PO6 (3), PO10 (3), PO11 (3)
CO3	Apply appropriate data mining algorithms such as decision trees, K-means clustering and association rule mining to solve business-related problems.	PO1 (3), PO2 (3), PO3 (3), PO5 (3), PO11 (3)
CO4	Analyze business data using suitable analytical tools and techniques to derive meaningful insights for decision making.	PO2 (3), PO3 (3), PO4 (3), PO5 (3), PO10 (3)
CO5	Evaluate and interpret the results of data mining models and apply them for effective decision making in real-world applications.	PO3 (3), PO4 (3), PO5 (3), PO10 (3), PO11 (3)

Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO15
CO1	2	3	-	-	2	3	-	2	3	-	3	2	-	-	-
CO2	3	2	2	2	3	2	2	-	1	2	3	3	-	-	-
CO3	2	3	-	2	3	3	2	2	3	3	3	3	-	-	-
CO4	3	3	-	3	2	2	2	3	3	3	3	3	-	-	-
CO5	2	3	-	2	3	3	2	2	3	3	3	3	-	-	-

Units	Content	Hrs
Unit I	**Introduction to Data Visualization** History and evolution of data visualization-Importance of data visualization in data analysis-Relationship between visualization and other fields (statistics, computer science, information design)-Visualization process and workflow-Principles of effective visualization-Pseudo code conventions in visualization design-Basic charts and graphs Scatter plot and its applications-Role of the user in visualization systems.	18
Unit II	**Data Foundations** Types of data: categorical, numerical, temporal, spatial-Data structures and data organization-Structure within records and between records-Data preprocessing for visualization-Visualization techniques for different types of data-One–Dimensional Data Two–Dimensional Data-Three–Dimensional Data-Dynamic Data-Combining multiple visualization techniques.	18
Unit III	**Visualization Techniques** Visualizing spatial data-Visualization of point data-Visualization of line data-Visualization of area data-Graph and network visualization-Multivariate data visualization-Geospatial data visualization-Issues and challenges in geospatial visualization-Interactive visualization techniques.	18

Unit IV	**Data Visualization using Tableau** Introduction to Tableau-Tableau architecture and components-Tableau Desktop interface-Connecting to data sources-Preparing data for visualization-Creating basic charts and dashboards-Building the first visualization-Creating calculated fields-Data filtering and sorting-Designing interactive dashboards.	18
Unit V	**Data Visualization using Power BI** Introduction to Power BI-Power BI components and architecture-Power BI Desktop interface-Data connectivity and data import-Data transformation using Power Query Creating visualizations in Power BI-Building reports and dashboards-Sharing dashboards and reports-Understanding data refresh-Getting data from services and content packs	18
		90

Text Book **26UBC6E4**

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\EDITION	YEAR OFPUBLICATION
1	Matthew Ward, Georges Grinstein, Daniel Keim	Interactive Data Visualization: Foundations, Techniques, and Applications	A K Peters Ltd	2010

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\EDITION	YEAR OFPUBLICATION
1	Noah Iliinsky& Julie Steele	Designing Data Visualizations	O'Reilly Media	2011
2	Kieran Healy	Data Visualization: A	Princeton University Press	2019

		Practical Introduction		

Course Designed by	Mrs.A.Priyadharsini		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**
Course Code:	**26UBC6E5**			**Title**	**Batch:** **2026-2029**
				DSE II: Big Data Analytics	**Semester:** **VI**
Practical Hrs./Week	**6**	**Tutorial Hrs./Sem.**			**Credits:** **5**

Course Objective

The course gives introduction to the concepts and challenges of Big Data, understand the architecture and components of Hadoop ecosystem, Learn data processing techniques using MapReduce., explore NoSQL databases and data warehousing tools like Hive and Pig, develop analytical skills for handling large-scale data.

Course Outcomes(CO)

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

CO Number	CO Statement	CO–PO Mapping
CO1	Recall Big Data concepts and architecture	PO2 (3), PO6 (3), PO9 (3), PO11 (3)
CO2	Explain Hadoop and distributed processing	PO1 (3), PO5 (3), PO11 (3), PO12 (3)
CO3	Apply MapReduce and NoSQL techniques	PO1 (2), PO2 (3), PO4 (2), PO5 (3), PO6 (3), PO7 (2), PO8 (2), PO9 (3), PO10 (3), PO11 (3), PO12 (3)
CO4	Analyze large datasets using Big Data tools	PO1 (3), PO2 (3), PO4 (3), PO5 (2), PO6 (2), PO7 (2), PO8 (3), PO9 (3), PO10 (3), PO11 (3), PO12 (3)
CO5	Evaluate Big Data solutions in real-world applications	PO2 (3), PO5 (3), PO6 (3), PO9 (3), PO10 (3), PO11 (3), PO12 (3)

Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO1	2	3	-	-	2	3	-	2	3	-	3	2	-	-	-
CO2	3	2	2	2	3	2	2	-	1	2	3	3	-	-	-
CO3	2	3	-	2	3	3	2	2	3	3	3	3	-	-	-
CO4	3	3	-	3	2	2	2	3	3	3	3	3	-	-	-
CO5	2	3	-	2	3	3	2	2	3	3	3	3	-	-	-

Units	Content	Hrs
Unit I	**Introduction to Big Data** -Introduction to Data and Big Data-Characteristics of Big Data (5 V's)-Types of Data: Structured, Semi-Structured, Unstructured-Evolution of Big Data	18

	Challenges in Big Data Management-Traditional Data Processing vs Big Data Processing Introduction to Data Analytics-Types of Analytics: Descriptive, Predictive, Prescriptive Big Data Applications and Use Cases.	
Unit II	**Hadoop and Distributed Computing :**Introduction to Distributed Systems-Hadoopverview-Hadoop Architecture-Hadoop Distributed File System (HDFS)-HDFS Architecture and Components-Data Storage and Retrieval in HDFS-Hadoop YARN (Resource Management)-Advantages and Limitations of Hadoop.	18
Unit III	**MapReduce Programming** -Introduction to MapReduce-MapReduce Architecture Working of Map and Reduce Phases-Mapper, Reducer, Combiner, Partitioner Data Flow in MapReduce-Writing Simple MapReduce Programs-Applications of MapReduce-Limitations of MapReduce	18
Unit IV	**NoSQL Databases and Hive** :Introduction to NoSQL Databases-Types of NoSQL Databases-Comparison of SQL and NoSQL-Introduction to MongoDB-Basic Operations in MongoDB-Introduction to Hive-Hive Architecture-Hive Query Language (HQL) Data Warehousing Concepts in Hive.	18
Unit V	**Pig and Big Data Analytics Applications** :Introduction to Apache Pig-Pig Architecture and Components-Pig Latin Language-Data Types and Operators in Pig-Running Pig Programs-Pig vs Hive-Real-Time Big Data Analytics-Applications in Business, Healthcare, Finance, and Social Media.	18
	Total Contact Hrs	90

Text Book :

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\EDITION	YEAR OFPUBLICATION
1	Seema Acharya, SubhashiniChellappan	Big Data and Analytics	Wiley Publications	First Edition, 2015

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\EDITION	YEAR OF PUBLICATION
1	Judith Hurwitz et al	Big Data for Dummies	John Wiley & Sons	2013
2	Tom White	Hadoop: The Definitive Guide	O'Reilly Publications, Fourth Edition	2015.
3	Dirk Deroos et al	Dirk Deroos et al	Wiley Publications	2014

Course Designed by	Mrs.A.Priyadharsini		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC6E6			Title	Batch:	2026-2029
				DSE II: Data mining Techniques & Business Analytics	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem.			Credits:	5

Course Objective

The course gives introduction to the basic concepts of data mining and business analytics, understand techniques used for discovering patterns from data, learn classification, clustering, and association analysis, understand how data mining supports business decision making, provide knowledge about analytical tools used in business environments.

Course Outcomes(CO)

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

CO Number	CO Statement	
CO1	Recall fundamental concepts such as definitions of data mining, business analytics, classification, clustering, association rules, and analytical tools.	PO2(3), PO6(3), PO9(3), PO11(3)
CO2	Explain data mining processes, algorithms (Decision Trees, KNN, Apriori), types of analytics, and the role of data in business decision-making.	PO1(3), PO5(3**),** PO11(3), PO12(3)
CO3	Apply data mining techniques, perform preprocessing, use Excel/BI tools for analysis, and implement basic classification and clustering methods.	PO2(3), PO5(3**),** PO6(3), PO9(3), PO10(3),
CO4	Analyze business problems, compare algorithms, interpret analytical results, and evaluate data-driven decision-making through case studies.	PO1(3), PO2(3), PO4(3), PO8(3), PO9(3), PO10(3),
CO5	Evaluate and design data mining models and business analytics solutions for real-world applications using appropriate **t**ools and techniques.	PO2(3), PO5(3**),** PO6(3), PO9(3), PO10(3), PO11(3), PO12(3)

Mapping

CO \ PO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO1	PSO2
CO1	2	3	-	-	2	3	-	2	3	-	3	2	-	-	-	-	-
CO2	3	2	2	2	3	2	2	-	1	2	3	3	-	-	-	-	-
CO3	2	3	-	2	3	3	2	2	3	3	2	2	-	-	-	-	-
CO4	3	3	-	3	2	2	2	3	3	3	2	2	-	-	-	-	-
CO5	2	3	-	2	3	3	2	2	3	3	3	3	-	-	-	-	-

Units	Content	Hrs
Unit I	**Introduction to Data Mining and Business Analytics**: Introduction to Data-Mining-Definition and Importance of Data Mining-Data Mining vs Data Warehousing Data Mining Process-Types of Data-Data Preprocessing-Introduction to Business Analytics-Types of Business Analytics: Descriptive, Predictive, Prescriptive-Role of Data in Business Decision Making-Applications of Data Mining in Business.	18
Unit II	**Data Mining Techniques:** Data Mining Tasks-Data ClassificationRegression Analysis-Decision Trees-Naïve Bayes Classification-K-Nearest Neighbor Method-Model Evaluation Techniques-Accuracy and Error Measures.	18
Unit III	**Association and Clustering Techniques:** Association Rule Mining-Market Basket Analysis-Apriori Algorithm-Support and Confidence-Clustering Concepts-Types of Clustering Methods-K-Means Clustering-Hierarchical Clustering-Cluster Evaluation.	18
Unit IV	**Business Analytics Tools and Techniques**:Introduction to Business Intelligence-Data Visualization in Business Analytics-Dashboards and Reports-Excel for Business Analytics-Pivot Tables and Charts-Data Analysis using Excel Tools-Introduction to Power BI / Tableau-Creating Simple Business Reports.	18
Unit V	**Applications of Data Mining in Business**:Customer Relationship Management-Sales and Marketing Analysis-Fraud Detection-Risk Analysis-Financial Analytics-Retail Data Analysis-Healthcare Data Analytics-Case Studies in Business Analytics.	18

	Total Contact Hrs	**90**

26UBC6E6

TextBook

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\EDITION	YEAR OFPUBLICATION
1	Pang-Ning Tan, Michael Steinbach, Vipin Kumar	,Introduction to Data Mining	Pearson Education	2019
2	Galit Shmueli, Nitin R. Patel, Peter C. Bruce	Data Mining for Business Intelligence:	Wiley Publications	2010

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\EDITION	YEAR OFPUBLICATION
1	Jiawei Han, Micheline Kamber, Jian Pei	Data Mining: Concepts and Techniques	Morgan Kaufmann (Elsevier)	2011
2	S. Sumathi, S. N. Sivanandam	Introduction to Data Mining and its Applications	Springer	**2006**
3	David Loshin	Business Intelligence: The Savvy Manager's Guide	Morgan Kaufmann (Elsevier)	**2003**

Course Designed by Dr.	Mrs.A.Priyadharsini		
Verified by HoD	Dr.K.Haridas		

Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC6E7**			**Title**	**Batch:**	**2026-2029**
				CC-XII: Data Center Infrastructure and Management	**Semester:**	**VI**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem**			**Credits:**	**5**

Course Objective

To expose the students to the fundamental concepts of data center architecture and components and to study data center security, management, and monitoring techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts and architecture of data centers.	PO1(3),
CO2	Explain data center infrastructure components and power systems.	PO1(3), PO2(3),
CO3	Analyze data center networking and storage technologies.	PO1(3), PO2(3) PO3(3), PO6(3), PO7(3),
CO4	Understand virtualization and cloud integration in data centers.	PO1(3), PO2(3) PO5(3), PO7(3),
CO5	Apply data center security, monitoring, and management techniques.	PO1(3), PO2(3) PO3(3),

		PO4(3), PO5(3), PO6(3), PO7(3), PO13(3),

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO15
CO 1	3	2	1	–	2	1	1	–	1	–	–	–	–	–	–
CO 2	3	3	2	1	2	2	2	1	1	–	–	1	1	–	–
CO 3	3	3	3	1	2	3	3	1	2	1	1	1	1	–	–
CO 4	3	3	2	1	3	2	3	1	2	1	1	1	1	1	–
CO 5	3	3	3	3	3	3	3	2	2	2	2	2	3	1	2

3 – High correlation, 2 – Moderate correlation, 1 – Low correlation, – No correlation

Units	Content	Hrs
Unit I	Introduction to Data Centers: Concept and evolution of data centers-Types of data centers: Enterprise, Cloud, Edge, and Colocation-Components of a data center-Role of data centers in modern computing	18
Unit II	Data Center Infrastructure: Physical infrastructure of data centers-Servers, storage systems, and networking devices-Racks, cabling, and data center layout design-Power supply systems: UPS, generators	18
Unit III	Data Center Networking and Virtualization: Network architecture in data centers-Switches, routers, and load balancers-Network virtualization-Software Defined Networking (SDN) basics-Concept of virtualization-Virtual machines and hypervisors-Containerization basics-Relationship between data centers and cloud computing	18
Unit IV	Data Center Storage and Security: Storage technologies: SAN, NAS, DAS-Data backup and recovery techniques-Storage management techniques-Data redundancy and reliability-Physical security measures-Network and data security-Access control and monitoring-Disaster recovery and business continuity	18

Unit V	Data Center Management and Emerging Technologies: Data Center Infrastructure Management (DCIM)-Monitoring tools and performance management-Capacity planning-Maintenance and operational management-Green data centers and energy efficiency-Cooling technologies and sustainable practices-Automation in data centers-AI and machine learning in data center management-Emerging trends: Edge computing, Hyper scale data centers, AI-powered data centers	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, Group Task.

Text Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	MaurícioArregoces, Maurizio Portolani	Data Center Fundamentals	Cisco Press	1st Edition	2003
2	Thomas A. Limoncelli, Christina J. Hogan, Strata R. Chalup	The Practice of Cloud System Administration: Designing and Operating Large Distributed Systems	Addison-Wesley	1st Edition	2014
3	GerardusBlokdyk	Data Center Infrastructure Management (DCIM): A Complete Guide	5STARCooks	1st Edition	2018

Reference Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	Greg Schulz	Data Infrastructure Management: Insights and Strategies	CRC Press / Routledge	1st Edition	2019
2	Dinesh G. Dutt	Cloud Native Data Center Networking: Architecture, Protocols, and Tools	O'Reilly Media	1st Edition	2019
3	Michael E. Whitman, Herbert J. Mattord	Principles of Information Security	Cengage Learning	7th Edition	2021

4	B. A. Ayomaya	Data Center for Beginners: A Beginner's Guide to Data Center Design	Independently Published	1st Edition	2020

Course Designed by Dr.	Dr.T. SUMADHI		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**
Course Code:	**26UBC6E8**			**Title**	**Batch:** **2026-2029**
				CC-XII: Data Storage Technologies	**Semester:** **VI**
Lecture Hrs./Week	**6**	**Tutorial Hrs./Sem**			**Credits:** **5**

Course Objective

The objective of this course is to introduce the fundamentals of data storage systems and storage architecture, and to provide an understanding of storage networking technologies such as DAS, NAS, and SAN. It also aims to develop knowledge of backup, recovery, and data protection techniques, along with storage management, security, and virtualization concepts. Further, the course enables students to gain insight into modern storage technologies, including cloud and distributed storage systems.

Course Outcomes

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

CO Number	CO Statement	
CO1	Explain the fundamental concepts of data storage systems and storage architecture**.**	PO1(3)
CO2	Describe storage networking technologies such as DAS, NAS, SAN and Fibre Channel**.**	PO1(3), PO2(3)
CO3	Apply backup and recovery techniques for data protection and disaster recovery**.**	PO1(3), PO2(3) PO3(3)
CO4	Analyze storage management, security and virtualization methods**.**	PO1(3), PO2(3)

CO5	Understand modern storage technologies including cloud storage and distributed storage system	PO1(3), PO5(3)

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO 1	3	2	–	–	–	–	–	–	–	–	–	2	–	–	–
CO 2	3	3	2	–	–	–	–	–	–	–	–	2	–	–	–
CO 3	3	3	3	2	–	–	–	–	–	–	–	2	–	–	–
CO 4	3	3	2	2	2	–	–	–	–	–	–	2	–	–	–
CO 5	3	2	2	–	3	–	–	–	–	2	–	2	–	–	2

3 – High correlation, 2 – Moderate correlation, 1 – Low correlation, – No correlation

Units	Content	Hrs
Unit I	**Introduction to Data Storage** Overview of Data Storage – Storage Architecture – Types of Data Storage – Direct Attached Storage (DAS) – Network Attached Storage (NAS) – Storage Area Network (SAN) – Components of Storage Systems – Storage Devices and Interfaces – Storage Networking Concepts – Storage Virtualization – RAID (Redundant Array of Independent Disks).	18
Unit II	**Storage Networking Technologies** Storage Networking Fundamentals – Fibre Channel Technology – iSCSI Protocol – Network Storage Architecture – SAN Components and Topology – NAS Architecture and Implementation – IP SAN – Storage Network Design Considerations – Storage Networking Protocols.	18
Unit III	**Backup and Recovery** Introduction to Backup – Types of Backup (Full, Incremental, Differential) – Backup Technologies – Data Protection Methods – Snapshot Technology – Replication – Data Recovery Methods – Business Continuity – Disaster Recovery Planning – Recovery Point Objective (RPO) – Recovery Time Objective (RTO).	18
Unit IV	Storage Monitoring and Management – Storage Provisioning – Storage Security – Data Encryption – Authentication and Authorization – Storage Performance Optimization – Storage Tiering – Storage Consolidation – Storage Virtualization Techniques.	18
Unit V	**Cloud and Modern Storage Technologies** *Cloud Storage Concepts – Storage as a Service (STaaS) – Public, Private and Hybrid Cloud Storage – Big Data Storage – Distributed Storage Systems – Object Storage – Storage in Virtualized Environments – Emerging Storage Technologies and Trends*.	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, Group Task.

Text Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	EMC Education Services	Information Storage and Management	Wiley India Pvt. Ltd.	2nd Edition	2012

Reference Books

S. No	Author(s)	Title	Publisher	Edition	Year
1	Ulf Troppens, Rainer Erkens, Wolfgang Muller-Friedt	Storage Networks Explained	Wiley Publication	2nd Edition	2009
2	Meeta Gupta	Storage Area Network Fundamentals	Cisco Press	1st Edition	2002
3	Darren Quick, Ben Martini, Raymond Choo	Cloud Storage Forensics	Elsevier	1st Edition	2014

Course Designed by Dr.	Mrs.N.Amirtha Gowri		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	BCA			Programme Title:	Bachelor of Computer Applications	
Course Code:	26UBC6E9			Title	Batch:	2026-2029
				CC-XII: Distributed Storage System	Semester:	VI
Lecture Hrs./Week	6	Tutorial Hrs./Sem			Credits:	5

Course Objective

The objective of this course is to introduce the fundamentals of data storage systems and storage architecture, and to provide an understanding of storage networking technologies such as DAS, NAS, and SAN. It also aims to develop knowledge of backup, recovery, and data protection techniques, along with storage management, security, and virtualization concepts. Further, the course enables students to gain insight into modern storage technologies, including cloud and distributed storage systems.

Course Outcomes

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

CO Number	CO Statement	
CO1	Explain the basic concepts and architecture of distributed storage **systems**.	PO1(3)
CO2	Understand data partitioning, replication and consistency models in distributed storage.	PO1(3), PO2(3)
CO3	Analyze distributed file systems such as HDFS and GFS**.**	PO1(3), PO2(3) PO3(3)
CO4	Evaluate fault tolerance and security mechanisms in distributed storage systems**.**	PO1(3), PO2(3)
CO5	Understand cloud-based and big data storage technologies.	PO1(3), PO5(3)

Mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO 1	3	2	–	–	–	–	–	–	–	–	–	2	–	–	–
CO 2	3	3	2	–	–	–	–	–	–	–	–	2	–	–	–
CO	3	3	3	2	–	–	–	–	–	–	–	2	–	–	–

3															
CO 4	3	3	2	2	2	–	–	–	–	–	–	2	–	–	–
CO 5	3	2	2	–	3	–	–	–	–	2	–	2	–	–	2

3 – High correlation, 2 – Moderate correlation, 1 – Low correlation, – No correlation

Units	Content	Hrs
Unit I	**Introduction to Distributed Storage Systems** Introduction to Distributed Systems – Characteristics of Distributed Storage – Architecture of Distributed Storage Systems – Storage Nodes and Clusters – Data Distribution Concepts – Scalability and Performance – Distributed File Systems Overview – Challenges in Distributed Storage.	18
Unit II	**Data Distribution and Replication** Data Partitioning Techniques – Data Replication Strategies – Consistency Models – CAP Theorem – Data Availability – Data Synchronization – Replication Management – Distributed Data Access Methods.	18
Unit III	**Distributed File Systems** Introduction to Distributed File Systems – Architecture of Distributed File Systems – Google File System (GFS) – Hadoop Distributed File System (HDFS) – File System Operations – Metadata Management – Data Blocks and Storage Nodes.	18
Unit IV	**Fault Tolerance and Security** Fault Tolerance in Distributed Storage – Data Reliability – Failure Detection – Recovery Mechanisms – Storage Security – Authentication and Authorization – Data Encryption – Secure Data Access – Storage Monitoring and Management.	18
Unit V	**Cloud and Big Data Storage** Cloud Storage Concepts – Storage in Cloud Computing – Object Storage Systems – Distributed Databases – *Big Data Storage Systems – Storage Virtualization – Emerging Trends in Distributed Storage Systems.*	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, Group Task.

Text Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS	Edition	Year
1	Kai Hwang, Geoffrey C. Fox, Jack Dongarra	Distributed and Cloud Computing	Morgan Kaufmann Publications..	1st Edition	2012

Reference Books

S. No	Author(s)	Title	Publisher	Edition	Year
1	Martin Kleppmann	Designing Data-Intensive Applications	O'Reilly Publications	1st Edition	2017
2	Andrew S. Tanenbaum, Maarten Van Steen	Distributed Systems: Principles and Paradigms	Pearson Education	2nd Edition	2007
3	Tom White	Hadoop: The Definitive Guide	O'Reilly Publications	4th Edition	2015

Course Designed by Dr.	Mrs.N.Amirtha Gowri		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC621**			**Title**	**Batch:**	**2026-2029**
				CC Lab - IX: IoT Application Development Lab	**Semester:**	**VI**
Practical Hrs./Week	**4**	**Tutorial Hrs./Sem.**			**Credits:**	**2**

Course Objective

To provide practical knowledge of IoT concepts using microcontrollers, sensors, and actuators. The lab covers interfacing with hardware, reading sensor data, controlling devices, and sending data to cloud platforms. Students will develop skills in programming IoT devices, implementing automation, and visualizing data in real-time dashboards.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember basic IoT concepts, sensors, actuators, and microcontroller programming.	PO(1),PO3(3), PO7(3),
CO2	Understand how to interface sensors and actuators with Arduino / Raspberry Pi.	PO1(3), PO2(3), PO3(3), PO4(3), PO5(3), PO7(3), PO8(3), PO9(3), PO10(3), PO11(3),
CO3	Apply learning techniques (Machine Learning / Deep Learning basics) in IoT data processing.	PO1(3), PO2(3)
CO4	Analyze and implement IoT systems with cloud integration and edge computing.	PO1(3), PO2(3) PO3(3)
CO5	Evaluate IoT applications in smart home, agriculture, healthcare, and implement security measures.	PO1(3), PO2(3)

Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PO1 3	PO1 4	PO1 5
CO 1	3	2	3	2	2	1	3	2	1	2	2	2	1	2	3
CO 2	3	3	3	3	3	2	3	3	3	3	3	2	2	2	2
CO 3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO 4	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO 5	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3

1. Control an LED using Arduino / Raspberry Pi
2. Temperature Monitoring using LM35 Sensor
3. Light Intensity Monitoring using LDR
4. Remote LED Control via Wi-Fi
5. Smart Fan Control using DHT11 Sensor
6. Humidity & Temperature Data Logging to Cloud
7. Motion Detection using PIR Sensor
8. Soil Moisture Monitoring for Smart Agriculture
9. Simple IoT Door Lock
10. IoT Dashboard using Cloud Platform

Total Contact Hrs 60

Pedagogy and Assessment Methods:

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

26UBC621

Course Designed by Dr.	Mrs.N.Amirtha Gowri		
Verified by HoD	Dr.K.Haridas		

Approved by Chairman Academic	Dr.R.Manickachezian		

Programme Code:	**BCA**			**Programme Title:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC622**			**Title**	**Batch:**	**2026-2029**
				CC Lab -I: Artificial Intelligence and Data Analytics Lab	**Semester:**	**VI**
Practical Hrs./Week	**5**	**Tutorial Hrs./Sem.**			**Credits:**	**2**

Course Objective

To provide practical knowledge of Artificial Intelligence concepts using **Google Colab.** The course enables students to implement basic machine learning and deep learning algorithms, analyze datasets, and evaluate models using Python libraries. It also helps students develop skills in building intelligent systems and applying AI techniques to real-world problems.

Course Outcomes

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

CO Number	CO Statement	
CO1	Remember the basic concepts of Artificial Intelligence and tools used in Google Colab.	
CO2	Understand and implement basic machine learning algorithms using Python libraries.	
CO3	Apply AI techniques such as classification, regression, and clustering on datasets.	
CO4	Analyze and evaluate AI models using performance metrics and visualization techniques.	
CO5	Evaluate and develop simple AI-based solutions for real-world applications.	

Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PO1 3	PO1 4	PO1 5
CO 1	3	2	2	2	2	1	2	2	1	2	2	2	1	2	3
CO 2	3	3	3	2	3	2	2	2	2	3	3	3	2	3	3
CO 3	3	3	3	2	3	3	2	2	2	3	3	3	2	3	3
CO 4	3	3	2	3	3	3	2	3	2	3	3	3	2	3	3
CO 5	3	3	2	3	3	3	2	3	2	3	3	3	3	3	3

1. Write a program in Google Colab to implement Linear Regression for predicting a numeric value using a sample dataset.
2. Write a program in Google Colab to implement Logistic Regression for binary classification (e.g., pass/fail) using a small dataset.
3. Write a program in Google Colab to implement a Perceptron for AND / OR logic gates.
4. Write a program in Google Colab to implement K-Nearest Neighbors (KNN) classification on a small dataset.
5. Write a program in Google Colab **to** implement a Decision Tree Classifier for categorical data.
6. Write a program in Google Colab to implement a Naive Bayes Classifier for text or categorical data.
7. Write a program in Google Colab to implement a Simple Feedforward Neural Network (1 hidden layer) for XOR or basic dataset using TensorFlow / Keras**.**
8. Write a program in Google Colab to implement and visualize Activation Functions (Sigmoid, ReLU, Tanh) using NumPy / Matplotlib**.**
9. Write a program in Google Colab to implement K-Means Clustering on a small dataset using scikit-learn.
10. Write a program in Google Colab to calculate Confusion Matrix, Accuracy, Precision, and Recall for a classification model using scikit-learn**.**

Total Contact Hrs 75

26UBC622

Pedagogy and Assessment Methods:

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

Course Designed by Dr.	Mr.S.Dilipkumar		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

ProgrammeCode:	**BCA**			**ProgrammeTitle:**	**Bachelor of Computer Applications**	
Course Code:	**26UBC6S4**			**Title**	**Batch:**	**2026-2029**
				Skill Enhancement Course (SEC) IV: Naan Mudhalvan : Disaster Management	**Semester:**	**VI**
Lecture Hrs./Week	**3**	**Tutorial Hrs./Sem**			**Credits:**	**02**

Course Objective

This course provides with the basics of disasters, their significance and types. Toensure 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	
CO1	Remember the types of disasters, causes and their impaction environment and society.	PO6(3)
CO2	Understand the knowledge about approaches of Disaster Risk Reduction (DRR)	PO8(3), PO11(3),
CO3	Apply emergency planning into over all community planning.	PO3(3), PO6(3), PO7(3), PO9(3), PO10(3), PO12(3),
CO4	Analyze the vulnerability and various methods o frisk reduction measures as well as mitigation.	PO2(3**),** PO4(3), PO5(3), PO14(3),
CO5	Explain the hazard and vulnerability profile of India, scenarios in the Indian context, Disaster damage assessment and management.	PO2(3**),** PO4(3), PO5(3), PO9(3), PO10(3), PO12(3),

Mapping (Rating Scale: 1: Low | 2: Medium | 3: High)

CO / PSO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO 1	3	1	1	1	1	3	2	2	1	1	1	2	1	1	1
CO 2	2	2	1	1	1	3	2	3	2	2	3	2	2	1	1
CO 3	1	2	3	2	2	3	3	2	3	3	2	3	1	2	2
CO 4	2	3	2	3	3	2	2	2	2	2	2	2	2	3	3
CO 5	1	3	2	3	3	2	2	2	3	3	3	3	3	3	3

Units	Content	Hrs.
Unit I	Definitions and Core Concepts - Resilience and Risk - Natural Disasters I: Earthquakes and Landslides - Floods, Droughts, and Fire - Social, Economic, and Political impacts and consequences. - Impact Analysis - Differential Impacts - Global Trends - Climate Change & Safety.	9
Unit II	The Disaster Cycle: Overview of all phases - Culture of Safety: Prevention and Mitigation strategies. - Community-based DRR and individual readiness - Mitigation Measures - Stakeholder Roles - Institutional Framework: State and Central Level processes- Early Warning Systems Technology and dissemination - Advisories	9
Unit III	Disasters, Development, and Climate Change -Factors Affecting Vulnerability - Deployment Impact Large projects - Land-use changes and urban sprawl- Climate Change Adaptation- Understanding global climate projections - Role of traditional wisdom in disaster resilience - Using cost-effective and local resources	9
Unit IV	Disaster Risk Management in India - Hazard Profile of India: Mapping high-risk zones - Assessing socio-economic hotspots in India - Disaster Relief Components Water, Food, and Sanitation protocols - Shelter, Health, and Waste Management - Institutional Arrangements - Disaster Management Act (2005) - Related Legislation - Role of IT & GIS for risk assessment - Damage Assessment	9

Unit V	Landslide Case Studies - Vulnerability Assessment of buildings/infrastructure - Assessment techniques and relief measures - Storm Surge assessment and coastal zone management - Riverine Flooding - Forest Fire & Man-Made Disasters - Space-Based Inputs: Use of satellites for disaster mitigation - Methodology for local risk surveys -Field Work/Project Presentation	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, Group Task.

26UBC6S3

TextBook

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Mr. J.P. Singhal	DisasterManagement (Unit –1,2,3)	LaxmiPublications	2010
2	Mr. TusharBhattacharya	Disaster Science and Management(Unit–3,4)	McGrawHillIndia Education Pvt. Ltd	2012
3	Dr. Gupta Anil Dr. Sreeja S Nair	EnvironmentalKnowledge for Disaster Risk Management (Unit-5)	NIDM,NewDelhi	2011

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Prof. AnuKapur	Vulnerability India: A GeographicalStudy of Disasters	IIASandSage Publishers	2010

Course Designed by Dr.	Mrs.S.Lavanya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		

ProgrammeCode:	BCA			ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	26UBC6S5			Title	Batch:	2026-2029
				Skill Enhancement Course (SEC) IV: Naan Mudhalvan : Fundamentals of Web Development	Semester:	VI
Lecture Hrs./Week	3	Tutorial Hrs./Sem			Credits:	02

Course Objective

To develop fundamental skills in web development using HTML, CSS, JavaScript and deploy applications using cloud tools.

Course Outcomes

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

CO Number	CO Statement	
CO1	Recall the basics of web technologies and development tools.	PO1(3)
CO2	Explain HTML structure, elements, and web application components.	PO1(3), PO6(3)
CO3	Apply CSS techniques to design responsive web pages.	PO3(3), PO5(3), PO6(3), PO14(3),
CO4	Analyze and use JavaScript for dynamic web applications.	PO2(3), PO3(3), PO4(3), PO5(3),PO6(3),PO14(3),PO15(3)
CO5	Develop and deploy web applications using cloud platforms like Git Hub.	PO3(3), PO5(3), PO9(3), PO10(3),

Mapping (Rating Scale: 1: Low | 2: Medium | 3: High)

CO /PSO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15
CO 1	3	1	1	1	2	2	1	1	1	1	1	1	1	1	1
CO 2	3	2	2	1	2	3	1	1	1	1	1	1	2	1	2
CO 3	2	2	3	2	3	3	1	2	2	1	2	2	2	3	2

CO 4	2	3	3	3	3	3	1	2	2	1	2	2	2	3	3
CO 5	1	2	3	2	3	2	2	2	3	3	2	2	2	2	2

26UBC6S4

Units	Content	Hrs.
Unit I	Program Introduction- Introduction to Skills Build Program (Orientation and Registration in Portal) - Introduction to Coding and Cloud Computing Introduction to HTML- Understanding of WEB. - Introduction to HTML- Fundamentals of Required tools and technologies like Visual Studio Code, notepad++, Eclipse for frontend web application development.	9
Unit II	HTML- Elements, Tags, Components and Structures, Formatting HTML Web Applications - Web Application: List, Table, Form, Media, graphics, Semantic tags - Link HTML - APIs: Geolocation, Web Storage	9
Unit III	Introduction to CSS- CSS syntax and embedding, CSS selector CSS properties: Color, Background, Text, Font, Position, List style, table - CSS Properties: pseudo-element, Transformations, Animation, and Media Queries, grid, flex	9
Unit IV	Introduction of JS - Java Script: Types of JS, JS console, Dialog box, Operators and Functions - Java Script: Control Structures, Document Object Model (DOM) Applications of JS - Objects and Nodes, Handling DOM using JavaScript - JavaScript Events	9
Unit V	Animation, Cookies & session Introduction of Cloud Computing-(Git&GitHub) - Deploying the Web page in GIT &GitHub	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, Group Task.

Text Book

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Mr. Thomas A Powell	HTML & CSS: The Complete Reference	McGraw Hill Professional—5th Edition	2010
2	Mr. Thomas A. Powell Mr. Fritz Schneider.	JavaScript: The Complete Reference	McGraw-Hill Education	2012

Reference Books

S.NO	AUTHOR	TITLEOFTHEBOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Mr. AchyutGodbole Mr. AtulKahate	Web Technologies	McGraw Hill Education- 2nd Edition	2012
2	Mr. C. Xavier	Web Technology & Design	New Age International Publishers- 2nd Edition	2022

Course Designed by Dr.	Mrs.S.Lavanya		
Verified by HoD	Dr.K.Haridas		
Approved by Chairman Academic	Dr.R.Manickachezian		