DEPARTMENT OF COMPUTER SCIENCE

Nallamuthu Gounder Mahalingam College

(Autonomous)

(Accredited by NAAC with A++ &

ISO 9001:2015 Certified Institution)

Re-Accredited by NAAC

Pollachi-642001

SYLLABUS

B. Sc. COMPUTER SCIENCE

BATCH 2025-2028

NGMCOLLEGE

Vision

Our dream is to make the College an institution of excellence at the national level by imparting quality education of global standards to make students academically superior, socially committed, ethically strong, spiritually evolved and culturally rich citizens to contribute to the holistic development of the self and society.

Mission

Training students to become role models in academic arena by strengthening infrastructure, upgrading curriculum, developing faculty, augmenting extension services and imparting quality education through an enlightened management and committed faculty who ensure knowledge transfer, instill research aptitude and infuse ethical and cultural values to transform students into disciplined citizens in order to improve quality of life.

DEPARTMENT OF COMPUTER SCIENCE

Department Vision

Our vision is to make the department, a department of excellence at the international level by imparting need based Information Technology education of global industry standards to make students academically and technically sound, enriched with rich spiritual quotients, contribute to the overall development of the self, society and country.

Department Mission

Developing students to become role models as technocrats by imparting technical knowledge, recent curriculum in catering the needs of Information Technology industry and quality education through dedicated faculty and rejuvenate students into technically sound, in order to make globally fit and improve the standard of life.

Programme Educational Objectives(PEOs)	
The **B.Sc. Computer Science** programme describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	To enrich knowledge in core areas related to the field of computer science and Mathematics.
PEO2	To provide opportunities for acquiring in-depth knowledge in Industry 4.0/5.0tools and techniques and there by design and implement software projects to meet customer's business objectives.
PEO3	To enable graduates to pursue higher education leading to Master and Research Degrees or have a successful career in industries associated with Computer Science or as entrepreneurs
PEO4	To enhance communicative skills and inculcate team spirit through professional activities. skills in handling complex problems in data analysis and research project to make them a better team player.
PEO5	To embed human values and professional ethics in the young minds and contribute towards nation building.

Programme Outcomes(POs)	
On successful completion of the **B.Sc. Computer Science** program	
PO1	**Problem Solving:** Demonstrate the aptitude of Computer Programming and Computer based problem solving skills.
PO2	**Disciplinary Knowledge:** Display the knowledge of appropriate theory, practices and tools for the specification, design and implementation.
PO3	**Scientific reasoning/Problem analysis:** Ability to link knowledge of Computer Science with other two chosen auxiliary disciplines of study.
PO4	**Environment and sustainability:** Understand the impact of software solutions in environmental and societal context and strive for sustainable development.
PO5	**Modern tool usage:** Use contemporary techniques, skills and digital tools necessary for integrated solutions.
PO6	**Design Development Solution:** Ability to formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate
PO7	**Ethics and Team Work:** Ability to operate with Ethical Values as a member, leader and manage deploy in an organization
PO8	**Communication Skills:** An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups
PO9	**Lifelong Learning and Self-directed learning:** Ability to obtain knowledge and skills that are necessary for participating in learning activities throughout life.
PO10	**Decision Making:** Ability to apply decision making methodologies to evaluate solution for efficiency, effectiveness, and sustainability.

Programme Specific Outcomes(PSOs)	
After the successful completion of **B.Sc. Computer Science** program, the students are expected to	
PSO-01	**Software Development:** Design and develop computer programs/computer-based systems Development in the areas related to algorithms, languages, networking, web development, cloud computing, IoT and data analytics.
PSO-02	**Education and Employment:** Ability to pursue higher studies of specialization and to take up technical employment

MAPPING OF PEOs WITH POs & PSOs

PEOs / POs \ PSOs	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	H	M	M	L	L
PO2	M	M	H	L	L
PO3	M	H	M	H	L
PO4	M	H	M	L	L
PO5	M	H	H	H	M
PO6	M	H	H	H	L
PO7	H	M	H	H	M
PO8	M	H	H	H	M
PO9	H	H	M	H	L
PO10	H	H	H	M	L
PSO1	H	H	H	M	L
PSO2	H	M	H	H	M

B.Sc. – COMPUTER SCIENCE DEGREE COURSE

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

I to VI SEMESTERS

SCHEME OF EXAMINATIONS

SEMESTER - I										
Part	**Subject Code**	**Title of the Paper**	**Hrs/ Week**		**Hrs/ Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL1C1	Tamil Paper-I	5	-	-	3	25	75	100	3
	25UHN1C1	Hindi Paper-I								
	25UFR1C1	French Paper-I								
II	25UEN101	Communication Skills – I	5	-	-	3	25	75	100	3
III	25UCS101	**CC I**: C++ Programming	4	-	-	3	25	75	100	4
	25UCS102	**CC II**: Digital Computer Fundamentals and Organization	4	-	-	3	25	75	100	4
	25UCS1A1/ 25UCS1A2	**GE I – Allied I**: Mathematics:Statistical Methods & Linear Algebra / Advanced Mathematics and Applied Statistics	5	-	-	3	25	75	100	4
	25UCS103	**CC Lab I**: Programming Lab using C++	-	4	-	3	20	30	50	2
IV	25EVS101	**AECC I**: Environmental Studies	2	-	-	-	-	50	50	2
	25HEC101	Human Excellence: Personal Values & Indian Yoga Practice -I	1	-	-	2	20	30	50	1
V		Extension Activities – Annexure I	-	-	-	-	-	-	-	-
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

NOTE:

1. Include at least one Indian Knowledge System (IKS) course that is relevant to department-specific and regional language teaching in the programme.
2. Include Project/Field visit/Internship compulsory component in curriculum.
3. Include Blended mode of teaching atleast one hour for a course and also minimum of two courses in a semester.

SEMESTER - II										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL2C2	Tamil Paper-II	5	-	-	3	25	75	100	3
	25UHN2C2	Hindi Paper-II								
	25UFR2C2	French Paper-II								
II	25UEN202	Communication Skills – II	5	-	-	3	25	75	100	3
III	25UCS204	**CC III**: Java Programming	4	-	-	3	25	75	100	4
	25UCS205	**CC IV**: Data Communication and Computer Networks	4	-	-	3	25	75	100	4
	25UCS2A1 / 25UCS2A2	**GE II – Allied II**: Vedic and Discrete Mathematics / Discrete Mathematical Structures	5	-	-	3	25	75	100	4
	25UCS206	**CC Lab II**: Programming Lab using Java	-	4	-	3	20	30	50	2
IV	25UCS2S1 / 25UCS2S2	**SEC I**: Naan Mudhalvan : Business English Communications / Data Analysis using Excel Lab	-	2	-	3	-	50	50	2
	25HEC202	Human Excellence - Family Values & Indian Yoga Practice – II	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	-	-	-	-
EC	25CMM201	**IKS:**Manaiyiyal Mahathuvam - I			15 Hrs.	2	-	50	50	Grade
	25CUB201	**IKS:**UzhavuBharatham - I			15 Hrs.	2	-	50	50	Grade
	25UCS2VA	**VAC I**: Digital Content Development Lab			30 Hrs.					2*
		Online Course (Optional) (MOOC / NPTEL / SWAYAM)	-		-	-	-	-	-	Grade
Total			**30**						**650**	**23**

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course,
CC – Core Course; GE – Generic Elective; AECC - Ability Enhancement Compulsory Course;
SEC – Skill Enhancement Course; IKS – Indian Knowledge System

SEMESTER – III										
Part	**Subject Code**	**Title of the Paper**	**Hrs. / Week**		**Hrs. / Sem.**	**Exam Hrs.**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL3C3	Tamil Paper-III	3	-	-	3	25	75	100	3
	25UHN3C3	Hindi Paper-III								
	25UFR3C3	French Paper-III								
II	25UEN3C3	Communication Skills – III	3	-	-	3	25	75	100	3
III	25UCS307	**CC V**: Data Structures	4	-	-	3	25	75	100	4
	25UCS308	**CC VI**: Operating System Concepts and Linux	4	-	-	3	25	75	100	4
	25UCS3A1 / 25UCS3A2	**GE III – Allied III**: Computer Based Optimization Techniques / Resource Management Techniques	5	-	-	3	25	75	100	4
	25UCS309	**CC Lab III**: Data Structures Lab	-	4	-	3	20	30	50	2
	25UCS310	**CC Lab IV**: Linux Programming Lab	-	4	-	3	20	30	50	2
IV	25UCS3N1 / 25UCS3N2	Non-Major Elective I: Multimedia Lab/ Advanced Applications in MS Excel Lab	-	2	-	2	-	50	50	2
	25HEC303	Human Excellence - Professional Values & Indian Yoga Practice – III	1	-	-	2	20	30	50	1
V	25UHW301	Health & Wellness	2#	-	-	-	100 Reduce to 25	-	25	1
EC	25CMM302	**IKS:**Manaiyiyal Mahathuvam - II			15 Hrs.	2	-	50	50	Grade
	25CUB302	**IKS:**Uzhavu Bharatham - II			15 Hrs.	2	-	50	50	Grade
Total			**30**						**725**	**26**

NOTE:

1. Offer skill-oriented courses as non-major elective courses.
2. Health & Wellness (Single Credit) course of 30 Hrs. of activity which is outside of the Class hours. Credit of this course to be adjusted preferably in Part IV.
   # Outside class hours mandatory course with one Credits.

SEMESTER - IV										
Part	**Subject Code**	**Title of the Paper**	**Hrs/ Week**		**Hrs. / Sem.**	**Exam Hrs**	**Maximum Marks**		**Total Marks**	**Credits**
			L	**P**	**T**		**Internal**	**External**		
I	25UTL4C4	Tamil Paper-IV	3	-	-	3	25	75	100	3
	25UHN4C4	Hindi Paper-IV								
	25UFR4C4	French Paper-IV								
II	25UEN4C4	Communication Skills – IV	3	-	-	3	25	75	100	3
III	25UCS411	**CC VII**: Python Programming **(Regional Language)**	4	-	-	3	25	75	100	3
	25UCS412	**CC VIII**: Relational Database Management Systems	4	-	-	3	25	75	100	3
	25UCS4A1 / 25UCS4A2	**GE IV – Allied IV**: Accountancy for Decision Making / Financial Accounting	4	-	-	3	25	75	100	3
	25UCS413	**CC Lab V**: Programming Lab using Python	-	4	-	3	20	30	50	2
	25UCS414	**CC Lab VI**: RDBMS Lab	-	3	-	3	20	30	50	2
IV	25UCS4S1 / 25UCS4S2	**SEC II**: Naan Mudhalvan: Social and Mobile Media Lab /Aptitude for Placements	-	2	-	3	-	50	50	1
	25UCS4N1 / 25UCS4N2	Non-Major Elective Paper -II : Flash Lab/ Internet Services and Applications Lab	-	2	-	2	-	50	50	2
	25HEC404	Human Excellence : Social Values & Indian Yoga Practice –IV	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	50 Reduced to 25	-	25	1
EC	25CMM403	**IKS:** Manaiyiyal Mahathuvam-III			15 Hrs.	2	-	50	50	Grade
	25CUB403	**IKS:** Uzhavu Bharatham – III			15 Hrs.	2	-	50	50	Grade
	25UCS4VA	**VAC II**: Introduction to 3D Modeling and UI Design Lab			30 Hrs.					2*
Total			**30**						**775**	**24**

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

CC – Core Course; GE – Generic Elective; SEC – Skill Enhancement Course; VAC-Department Specific Value Added Course; IKS – Indian Knowledge System;

*Extra Credits.

NOTE:

1. Offer skill-oriented courses as non-major elective courses.

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	25UCS515	**CC IX**: Open Source Technologies	5	-	-	3	25	75	100	4
	25UCS516	**CC X**: Cyber Security	5	-	-	3	25	75	100	4
	25UCS517	**CC XI**: Artificial Intelligence and Machine Learning	5	-	-	3	12	38	50	4
	25UCS5E1/ 25UCS5E2/ 25UCS5E3	**DSE -I**: Data Mining and Warehousing / Data Engineering with Google Cloud / Block Chain Technology	5	-	-	3	25	75	100	4
	25UCS518	**CC Lab VII**: PHP & MySQL Lab	-	5	-	3	20	30	50	2
IV	25UCS5S1	**SEC III**: Programming Lab using .NET	-	4	-	3	-	50	50	2
	25HEC505	Human Excellence: National Values & Indian Yoga Practice-V	1	-	-	2	20	30	50	1
EC	25CSD501	Soft Skills Development – I	-		-	-	-	-	-	Grade
	25GKL501	General Knowledge	SS		-	2	-	50	50	Grade
	25UCS5AL	**ALC – I:** Cloud Computing	SS		-	-	-	100	100	2**
Total			**30**						**500**	**21**

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	25UCS619	**CC XII** :R Programming	4	-	-	3	25	75	100	4
	25UCS6E4/ 25UCS6E5/ 25UCS6E6	**DSE–II:** Software Engineering / Web Development Essentials with Angular, React and Node.js / Mongo DB	4	2	-	3	25	75	100	5
	25UCS6E7 25UCS6E8 25UCS6E9	**DSE–III:** Robotic Process Automation/ Java script and JQuery for Web Designing / Big Data Analytics	4	2	-	3	25	75	100	5
	25UCS620	**CC Lab VIII**: R Programming Lab	-	5	-	3	20	30	50	2
	25UCS621	**CC Lab IX**: IoT Lab	-	5	-	3	20	30	50	2
	25UCS622	Project	-	-	-	-	25	75	100	2
IV	25UCS6S1 / 25UCS6S2	**SEC IV**: Naan Mudhalvan : Data Visulization using Tableau Lab/ Generative AI Lab	-	3	-	3	-	50	50	2
	25HEC606	Human Excellence Paper: Global Values & Indian Yoga Practice-VI	1	-	-	2	20	30	50	1
EC	25CSD602	Soft Skills Development–II	-		-	-	-	-	-	Grade
	25UCS6AL	**ALC –II:** Augmented reality, Virtual reality (AR/VR)	SS		-	-	-	100	100	2**
Total			**30**						**600**	**23**
Grand Total									**3900**	**140**

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

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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	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.

HEALTH AND WELLNESS COURSE

Scheme of Evaluation

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

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:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS101			**Course Title**	**Batch:**	2025 - 2028
				CC I: C++ Programming	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

On successful completion of the course the students should understand all the features of C++ and make the students to apply the same for writing programming for solving problem

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To remember the basic OOPs concepts such as Class, Inheritance, Abstraction, Polymorphism, etc.	K1
CO2	To understand how C++ differentiates between object oriented programming and procedural programming and the use of function, operator overloading.	K2
CO3	To apply constructor & Destructors in performing and built programme using virtual functions.	K3
CO4	To implement programs using more advanced features such as composition of Objects, Operator overloads, Inheritance, Polymorphism, Dynamic memory allocation etc.	K4
CO5	To evaluate C++ programs using File I/O, Command line arguments and Exception Handling.	K2,K5

Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	H	H	H	M	H	L	H	M	M	H	M	H
CO2	H	M	H	M	M	L	M	M	M	M	M	M
CO3	H	H	H	H	H	M	H	H	H	M	H	H
CO4	H	H	M	M	H	M	M	H	M	L	M	H
CO5	H	M	H	M	M	L	M	M	M	M	M	M

H-High; M-Medium; L-Low

Syllabus

Units	Content	Hrs
Unit I	**Principles of Object Oriented Programming:** Software Evolution – Procedure-Oriented Programming – Object-Oriented Programming Paradigm – Key Concepts of Object-Oriented Programming–Benefits of OOP–Object-Oriented Languages – Applications of OOP. **Beginning with C++:** Introduction – A Simple C++ Program – Output Operator –Input Operator-Cascading of I/O Operators – Structure of C++Program. **Tokens, Expressions and Control Structures:** Introduction– Tokens–Keywords Identifiers and Constants–Basic Data Types– User-Defined Data Types–Derived Data Types – Symbolic Constants - Declaration of Variables – Dynamic Initialization of Variables–Reference Variables-Operators in C++-Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator – Expressions and Their Types –Special Assignment Expressions – Implicit Conversions– Operator Precedence –Control Structures.	12
Unit II	**Functions in C++:** Introduction – The Main Function – Function Prototyping–Call by Reference – Return by Reference – Inline Functions – Default Arguments –const Arguments – Function Overloading – Friend and Virtual Functions – Math Library Functions. **Classes and Objects:** Introduction – C Structures Revisited – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory Allocation for Objects – Static Data Members – Static Member Functions – Array of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.	12
Unit III	**Constructor and Destructor:** Introduction – Constructors – Parameterized Constructors– Multiple Constructors in a Class–Dynamic Initialization of Objects Copy Constructor–Dynamic Constructors–Constructor with Default Arguments -Destructors. **Operator Overloading and Type Conversions:** Introduction – Defining Operator Overloading – Overloading Unary Operators -- Overloading Binary Operators – Overloading Binary Operator Using Friends–Manipulation of Strings using Operators – Rules for Overloading Operators–Type Conversions.	12
Unit IV	**Inheritance: Extending Classes:** Introduction – Defining Derived Classes – Single Inheritance –Making a Private Member Inheritable–Multilevel Inheritance–Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes – Constructors in Derived Classes – Member Classes: Nesting of Classes. **Pointers, Virtual Functions and Polymorphism:** Introduction–Pointersto Objects – this Pointer – Pointers to Derived classes – Virtual Functions –Pure Virtual Functions.	12

Unit V	**Managing Console I/O Operations:** Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Managing Output with Manipulators. **Working with Files:** Introduction – Classes for File Stream Operations – Opening and Closing a File – Detecting End-of-File – More about Open(): File Modes – File Pointer and their Manipulations– Sequential Input and Output Operations–Updating a File: Random Access – Error Handling During File Operations –Command-Line Arguments. **Exception Handling :**Introduction– Basics of Exception Handling–Exception Handling Mechanism – Throwing and Catching Mechanism.	12
	Total Contact Hrs	60

Pedagogy and Assessment Methods:

Direct Instruction Digital Presentation, Digital Assignments, Seminar, Power Point Presentation, Online Quiz, Group Talk(APS).

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	ObjectOriented Programming with C++	Tata McGrawHill publication,SeventhEdition	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	AshokN.Kamthane	Programming withANSIandTurboC++	First Edition	2009

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R.Manicka chezian Dr.R.Nandhakumar Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (ComputerScience)	
Course Code:	25UCS102			**Course Title**	**Batch:**	2025–2028
				CC II: Digital Computer Fundamentals and Organization	**Semester:**	I
LectureHrs./Week Or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

On completion of this course, the students can understand the design of combinational and sequential digital logic circuits.Students will also have knowledge on Programmable Logic devices and its usage.

Course Outcomes (CO)

On the successful completionof the course, students will be able

CO Number	CO Statement	Knowledge Level
CO1	To recollect the fundamental concepts and techniques used in digital Electronics.	K1
CO2	To get the idea of basic postulates of Boolean Algebra and to apply the methods of simplifying Boolean expressions	K2
CO3	To apply knowledge about internal circuitry and logic behind any digital system and to design various synchronous and asynchronous circuits.	K3
CO4	To identify the concept of memories, and to introduce micro controller casestudy.	K4
CO5	To analyze the usage of different kinds of Memory Management and mapping techniques.	K5

Mapping

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

H-High;M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Number System and Binary Codes:**Introduction–Number System–Conversion from Binary to Decimal,Octal,Hexadecimal-Conversion from Decimal to Binary , Octal ,Hexadecimal – Conversion from Octal to Decimal,Binary , Hexadecimal – Conversion from Hexadecimal to Binary ,Decimal ,Octal-Floating Point Representation of Numbers–Arithmetic Operation–I's and 2's Complements.1's Complement Subtraction–2's Complement Subtraction.9's Complement–10's Complement–BCD	12
Unit II	**Boolean algebra, Minimization Techniques and Logic Gates:** Introduction – Boolean Logic Operations–Basic Laws of Boolean Algebra– Demorgan's Theorems – Sum of Products and Product of Sums – Karnaugh Map. Logic Gates:OR Gate–AND Gate–NOT Gate–NAND Gate–NOR Gate.	12
Unit III	**Arithmetic Circuits and Flip Flops**: Introduction – Half Adder – Full Adder,Half Subtractor – Full Subtractor – Multiplexers – Demultiplexer – Decoders. **FlipFlops:** Types of FlipFlops– SRFlip Flop– JK FlipFlop –T FlipFlop. **Registers:**Shiftregisters- PIPO–PISO–SISO–SIPO	12
Unit IV	**Input – Output Organization** – Input/output Interface – I/O Bus and Interface–I/O Bus Versus Memory Bus–Isolated Versus Memory–Mapped I/O–Example of I/O Interfaces –Asynchronous DataTransfer–Store Control and Handshaking–DMA–DMAController,DMATransfer.	12
Unit V	**Input–Output Processor:** CPU – IOP Communication. **Memory Organization:** Memory Hierarchy– Main Memory–**AssociativeMemory:** Hardware Organization–Match Logic–Cache Memory–Associative –Direct, Set, Associative Mapping.	12
	Total Contact Hrs	**60**

PedagogyandAssessment Methods:

Direct Instruction Digital Presentation, Digital Assignments, Seminar, Power Point Presentation,Online Quiz,GroupTalk(APS).

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	V.K.Puri,	DigitalElectronics Circuits and Systems	TMH.	2017
2	S.Arivazhagan, SSalivahanan	Digital Circuits and Design	Vikas PublishingHousePvt Limited	2009
3	M.Morris Mano	Computer System Architecture	PHI	2015

ReferenceBooks

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	M.Carter,Schaum's	Computer Architecture	TMH	2018
2	Albert Paul Malvino, Donald P Leach	Digital principles and applications	TMH	1996

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.M.Malathi Dr.M.MeenaKrithika Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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ProgrammeCode:	B.Sc.			**ProgrammeTitle:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS1A1			**Course Title**	**Batch:**	2025 - 2028
				GE I – Allied I: Mathematics – Statistical Methods & Linear Algebra	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

- To apply the computational aspects of basic statistical measures and applications of small and large samples in real life problems
- To introduce the computational techniques and algebraic skills essential for the study of systems of linear equations and matrix algebra.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand the statistical formula and apply them in various data analysis	K3
CO2.	Understand the concept of most powerful test and analyze the samples based on most powerful test like't' and 'F' distributions	K4
CO3	Understand the concepts of probability and apply to solve real life situations	K3
CO4	Recognize the basic concepts of vectors , matrices and linear equations and examine its application in the modern science	K4
CO5	Apply the linear algebra techniques learned from determinants, differential equations to solve simple problems	K3

Mapping

PO / **CO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	M	M	H	L	H	M	L	L	L	M	M	M
CO2	H	M	H	L	H	M	M	M	M	H	M	H
CO3	M	M	H	L	H	M	M	M	M	H	M	H
CO4	H	M	H	L	H	H	H	M	H	H	M	H
CO5	M	M	H	L	H	H	L	M	M	M	M	M

H-High;M-Medium;L-Low

Units	Content	Hrs
Unit I	**Statistics:** Measure of Central Tendency - Mean, Median, Mode - Measure of Dispersion -Range, Quartile Deviation, Standard Deviation – Correlation: Definition,Rank Correlation, Co-efficient of Correlation-Regression.	15
Unit II	**Sampling Theory and Tests of Significance:** Standard Error, Tests of Significance for Attributes: Tests for Number of Successes- Tests for Proportion of Successes-Tests for Difference between Proportions- Tests of Significance for Large Samples: The Standard error of mean-Testing the difference between means of two samples-Standard Error of the Difference between two Standard Deviations- Tests of Significance for Small Samples: Students' t-Distribution-Test of Hypothesis about the population Mean-Test of Hypothesis about the difference between two means-Test of hypothesis about the difference between two means with dependent samples.	15
Unit III	**Probability:** Permutation, combination, trail, event, samplespace, mutually exclusive cases, exhaustive events, Independent events and dependent events, simple and compound events. Measurement: Classical, relative frequency,theory of probability, Limitations, personality view of probability and Axiomatic Approach of probability, addition and multiplication theorem, odds, miscellaneous illustrations question.	15
Unit IV	**Linear Algebra:** Introduction–VectorsandMatrices–Length andDot Products –SolvingLinear Equations–LinearEquations–TheIdeaofElimination–EliminationUsingMatrices – RulesforMatrix Operations–InverseMatrices–TransposesandPermutations. **(Problems Only)**	15
Unit V	Determinants – The Properties of Determinants – Permutations and Cofactors – Cramer"s Rule, Inverse, and Volumes–Eigenvalues and Eigenvectors–Introduction to Eigenvalues–Diagonalizinga Matrix–Applications to Differential Equations–Symmetric Matrices – Positive Definite Matrices–Similar Matrices. **(Problems Only)**	15
	Total Contact Hrs	**75**

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments, Online Quiz, Group Talk (APS), Seminar, Numerical Excercises.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	RSN Pillai & Bagavathi	Statistics Theory and Practice	S.Chand& Company Ltd/17/e	2017
2	Gilbert Strang	Introduction to Linear Algebra	5th Edition. Wellesley – Cambridge Press	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	S.P.Gupta	Statistical Methods	Sultan Chand &Sons Publishers,13/e	2016
2	Gilbert Strang	Linear AlgebraandIts Applications.	FourthEdition. Cengage Learning	2006
3	David C.Lay, Steven R. Lay, and JudiJ. McDonald	Linear Algebra and its Applications	5th Edition.Pearson.	2014

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr.K.Srinivasan G. Angayarkanni Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name:Mr.K.Srinivasan Signature:

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Level II

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS1A2			**Course Title**	**Batch:**	2025 - 2028
				Allied-1: Advanced Mathematics and Applied Statistics	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

- To apply the computational aspects of basic statistical measures and to enable the students to solve linear system of equations and integration using numerical methods.
- To present the concept of theoretical probability to acquaint the knowledge of testing of small and large samples which plays an important role in real life problems

Course Outcomes

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

CO	**CO Statement**	**Knowledge Level**
CO1	Understand and analyze the statistical formula and apply the min various data analysis problems and Measure and interpret the degree of relationship between variables.	K4,K2
CO2	Apply the distributions to infer the behavior of observation in the sample space and also learn its moment generating function.	K4
CO3	Analyze the conceptof most powerful test and analyze the samples based on most powerful test like't', 'F'and chi-square.	K4
CO4	Understand the concepts of probability and apply to solve real life situations.	K3,K2
CO5	Evaluate numerical solutions of aigebraice quations andcompute the integrals by using the appropriate technique.	K5

Mapping

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	M	H	H	M	H	H	H	M	H
CO2	H	M	H	M	H	H	M	H	H	H	M	H
CO3	M	H	H	L	H	H	M	H	H	H	L	H
CO4	H	H	H	M	H	H	H	H	H	H	M	H
CO5	M	M	H	L	M	H	M	M	M	M	L	M

H-High;M-Medium;L-Low

Syllabus

Units	Content	Hrs
Unit I	**Statistics:**Measure of Central Tendency: Mean, Median, Mode, Geometric Mean,Harmonic Mean- Measure of Dispersion-Quartile Deviation,Standard Deviation,Coefficient of Variation–Correlation: Definition, KarlPearson Co-efficient of Correlation,Rank Correlation,Bivariate Correlation–Regression:Lines of Regression, Co-efficient of Regression.	15
Unit II	**Distributions:**Binomial,Poisson,Normal and Continuous Distribution- Moment- Moment Generating Functions of Binomial, Poisson and Normal Distribution- Fitting of Binomial,Poisson and Normal Distribution–Problems-Geometric Distribution,Multinomial Distribution,Power Series Distribution,Uniform Distribution,Gamma Distribution, Pearson Distribution(Definitiononly)	15
Unit III	**Large Sample test:** Standard error- Test of Significance of Large Samples -- Tests for (i)single proportion (ii) Difference of two proportions (iii) difference of two means (iv)difference of two standard deviations.Small sample test based on t, – t-test for (i) single mean(ii)Difference of two means(iii)Observed sample correlation co-efficient. F-Variance Ratio Test–chi square test of goodness of fit	15
Unit IV	**Probability:** Permutation, combination, trail, event, sample space, mutually exclusive cases, exhaustive events, Independent events, and dependent events, simple and compound events. Measurement: Classical, relative frequency, theory of probability, Limitations, personalistic view of probability and Axiomatic Approach of probability, addition and multiplication theorem,odds,miscellaneous illustrations question– Bayes theorem.	15
Unit V	**Numerical Methods:**Gauss-Jordan direct method, Gauss-Seidaliterative method for linear algebric system – Bisection , Newton's Rapshon method for polynomial system-Newton forward and backward interpoiation-Trapezoidal rule-Simpsen1/3 rule and 3/8 rule for Numerical Integration.	15
	Total Contact Hrs	75

PedagogyandAssessment Methods:

Direct Instruction,Digital Presentation, Digital Assignments, Online Quiz,Group Talk(APS), Numerical Exercises.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	S.C.Gupta, V.K.Kapoor	Fundamentals of Mathematical Statistics	Sultan Chand andSons,17/e	2017
2	RSN Pillai&Bag avathi	Statistics Theory and Practice	S.Chand & Company Ltd	2013
3	P.Kandasamy, K.Thilagavathy, K.Gunavathy	Numerical Methods	Sultan Chand & Co.Ltd.,5/e	2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	S.P.Gupta	Statistical Methods	Sultan Chand &Sons Publishers,Thirty-third Edition	2002
2	SantoshKumar	Computer Oriented Statistical and Numerical Methods	S.ChandandCo, 5/e	2013

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Mr. K. Srinivasan G. Angayarkanni Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS103			**Course Title:**	**Batch:**	2025-2028
				CC Lab I: Programming Lab using C++	**Semester:**	I
Hrs/Week:	4	**Tutorial Hrs./Sem.**	-		**Credits:**	2

Course Objective

The primary aim of C++ programming was to add object orientation to the C++ programming language and also to enhance problem solving and programming skills using OOPs concepts in various domains.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To apply the basic concepts of C++ such as function, friend functions and array of objects to solve a particular problem.	K3
CO2	To analyze programs using more advanced OOPs concepts such as Constructor/Destructor, Operator overloading, Inheritance, and Polymorphism.	K4
CO3	To validate programs using Dynamic memory allocation and Virtual functions.	K5

Mapping

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	H	H	H	M	M	L	H	M
CO2	H	H	M	H	M	M	H	M	M	L	M	H
CO3	M	M	H	H	M	M	H	M	M	L	H	H

H-High;M-Medium;L-Low

Syllabus

Contents	Hrs
• C++ program to illustrate the concept of decision making statement. • C++ program to print Floyd'striangle. • C++ program to generate Fibonacci seriesfor 'n' numbers. • C++ program to illustrate the concept of inline function. • C++ programto illustrate the conceptof friendfunction. • C++ program to illustrate the conceptof function overloading. • C++ program to illustrate the concept of class and object, with return statement. • C++ program to illustrate the concept of array of objects. • C++ program to illustrate the concept of object as function arguments and returning by objects. • C++ program to illustrate the concept of constructors. • C++ program to illustrate the conceptof single inheritance. • C++ program to illustrate working with single file. **SETB** • C++ program to illustrate the concept of condition statement. • C++ program to create a string, concatenate two strings and to compare two strings respectively. • C++ program to check whether the given string is palindrome or not using pointers. • C++ program to illustrate the concept of multiple inheritances. • C++ program to illustrate the concept of destructors. • C++ program to illustrate the concept of overloading binary operator using member function. • C++ program to illustrate the concept of overloading binary operator using friend function. • C++ program to illustrate working with Random Access File. • C++ program using the concept of Exception Handling. **INTERNALMARK(20Marks) EXTERNALMARK(30Marks)**	**60**

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Programming in ANSI C++	Tata McGraw-Hill Publishing Co&Ltd.,Sixth Edition	2016.

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	AshokN.Kamthane	Programming with ANSI and Turbo C++	First Edition	2009

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R.Manicka chezian Dr.R.Nandhakumar Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name:Mr.K.Srinivasan Signature:

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Programme code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS204			**Course Title:**	**Batch:**	2025-2028
				CC III: Java Programming	**Semester:**	II
Lecture Hrs/Week:	4	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

The objective of this course is to make the students to understand the various features of Java such as Packages, Applets, AWT controls, Stream classes and Files and make the students to apply the same for writing the programs.

CourseOutcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To remember and understand the OOPs concept ssuch as class, methods, inheritance, encapsulation and polymorphism, etc.	K1,K2
CO2	To understand the differences between application programs and applets,applet life cycle and graphics programming.	K2
CO3	To implement programs using Thread, Applet and AWT controls, Swings, Beans and Servlets	K3
CO4	To evaluate java programs using stream classes and files.	K4
CO5	To design webpage using Applets	K5

Mapping

POs / **COs**	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PSO1**	**PSO2**
CO1	H	H	H	M	H	L	H	M	M	H	M	H
CO2	M	M	M	M	M	L	M	M	M	M	M	M
CO3	M	M	H	H	H	M	H	H	H	M	H	H
CO4	H	H	M	M	H	M	M	H	M	L	M	H
CO5	H	M	H	M	M	L	M	M	M	M	M	M

H-High; M-Medium;L-Low

Syllabus

Units	Contents	Hrs
Unit I	Java Evolution-Overview of Java Language-Constants,Variables & Data types-Operators & Expressions-Decision making & branching-Decision making & looping.	11
Unit II	Classes, Objects & Methods- Arrays, Strings & Vectors-Interfaces: MultipleInheritance–Packages:Putting classes together-Multithreaded Programming.	12
Unit III	Managing Errors & Exceptions- Applet Programming: Introduction-How Applets differ from application-Preparing to Write Applets-Building applet code- Applet lifecycle-Creating an Executable Applet - Designing Web page-Applet tag-Adding Applet to HTML file-Running the Applet-Passing Parameters to Applets-Graphics Programming.	12
Unit IV	The Java Library: String Handling - Networking - Event Handling - Introducing theAWT: Working with Windows, Frames, Graphics, and Text - Using AWT Controls,Layout Managers, andMenus-JDBC.	12
Unit V	Managing Input/Output in files in Java: Introduction-Concept of Streams-StreamClasses-Byte Stream classes-Character Stream Classes-Using Streams-other useful I/O Classes- using the File Class-I/O Exceptions-Creation of Files-Reading/Writing Characters-Reading/Writing Bytes.	13
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

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

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy (Unit-I,II,IIIandV)	Programming with Java –APrimer	Tata McGrawHill PublishingCompany Limited,New Delhi,5thEdition.	2019
2	Herbert Schildt(Unit-IV)	Java: The Complete Reference	ORACLE Press, Tenth Edition	2017

Reference Books

S.No.	AUTHOR	TITLE OF THE PAPER	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	C.Xavier	Java Programming –A Practical Approach	McGraw Hill Education	2011
2	Phil Hanna	The Complete Reference JSP 2.0	TataMcGraw Hill Publishing Company Ltd	2011
3	K.Somasundram	Programming in Java2	Jaico Publishing House,Chennai	2005
4	Sagayaraj,Denis,Karthik and Gajalakshmi	Java Programming for Core and Advanced Learners	Universities Press	2018

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini Ms. G. Angayarkanni Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS205			**Course Title:**	**Batch:**	2025-2028
				CC IV: Data Communication and Computer Networks	**Semester:**	II
Lecture Hrs/Week:	4	**Tutorial Hrs./Sem.**	4		**Credits:**	4

Course Objective

To enable the students to understand the concepts and principles of datacommunication and networking including topology, protocols, and types of networks along with concepts of the OSI reference model.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts of Networks	K1
CO2	Get the idea on Connection-oriented and Connection-less networks	K2
CO3	Apply design principles andfunctionalities in OSIReference Layers	K3
CO4	Analyze ISDN network,TCP/IP,etc.,	K4
CO5	Knowledge about different computer networks, reference models and the functions of each layer in the models	K5

Mapping

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

H-High;M-Medium;L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Communications and Networking-Fundamental concepts-Data communications-Protocols-Standards-Signal Propagation-Analog and Digital Signals-Parallel and Serial Communications-Simplex, Half-duplex and Full-duplex communications-Multiplexing-Transmission errors-Detection and Correction. **Error classification**: Delay Distortion, Attenuation & Noise.Types of Errors: Single bit and Burst errsors-Error Detection:VRC,LRC,CRC-Recovery from errors:Stop-and-Wait, Go-back-n.	12
Unit II	**Transmission Media:** Guided Media-Twisted Pair-Coaxial Cable-Optical Fiber-Unguided Media–Microwave Communication-Satellite Communication–FDMA, TDMA and CDMA. **Network Topology:** Mesh Topology-Star Topology-Tree Topology-Ring Topology-Bus Topology-Hybrid Topology. **Switching and Routing:** Switching basics-Circuit switching-Packet switching-Message switching-Router and Routing.	12
Unit III	**Networking protocols and OSI Model:** Protocols in Computer Communication – OSI Reference Models –Physical Layer-Data link Layer-Network Layer-Transport Layer-Session Layer-Presentation Layer-Application Layer.	12
Unit IV	Local Area Network (LAN)-Ethernet-Ethernet properties- CSMA/CD –Metropolitan Area Network (MAN) – Distributed Queue Dual Bus (DQDB) –Switched Multimegabit Data Services(SMDS)-Wide Area Network(WAN)-WAN Architecture.	12
Unit V	Integrated Services Digital Network (ISDN)-ISDN Architecture-ISDN Interfaces-X.25 Protocol-Understanding and Working of X.25protocol. **TCP/IP:** An Introduction to TCP/IP- TCP/IP Basics- IP/LogicalAddresses- TCP/IP Example-ARP-RARP.	12
	Total Contact Hrs	**60**

Pedagogy & AssessmentMethods

Direct Instruction Digital Presentation, Digital Assignments, Seminar, Power PointPresentation,Online Quiz,GroupTalk(APS).

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Achyut S.Godbole	Data Communications and Computer Networks	TataMcGrawHill	2007

ReferenceBooks

S.No.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Prakash. C.Gupta	Data Communication and Computer Networks	PHI Publicaitons, SecondEdition	2013
2.	Brijendra Singh	DataCommunication and Computer Networks	PHIPublicaitons, Fourth Edition	2014

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Archamy Rajini Dr.R.Nandhakumar Signature:	Name:Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**ProgrammeTitle:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS2A1			**Course Title:**	**Batch:**	2025-2028
				GE II – Allied II: Vedic and Discrete Mathematics	**Semester:**	II
Hrs/Week:	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

On successful completion of the course, students will be able to understand and apply Vedic mathematics techniques for arithmetic operations and algebraic structures, grasp fundamental principles of mathematical logic and functions, analyze types and properties of relations, and effectively utilize graph theory concepts and algorithms to solve practical problems in various fields

Course Outcomes (CO)

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

CO Number	**CO Statement**	**KnowledgeLevel**
CO1	Rememberthe Fundamental Techniques and Notation of Vedic Mathematics, including Methods For Addition, Subtraction, and Squaring.	K1
CO2	Understand and Explain the Principles of Mathematical Logic, including Propositions, Connectives, and Normal Forms.	K2
CO3	Apply Vedic Methods For Complex Arithmetic Operations In Real-Life Scenarios	K3
CO4	Analyze Various Types of Functions And Relations, including their Compositions and Properties.	K4
CO5	Synthesize Knowledge of Algebraic Structures And Graph Theory to Solve Complex Problems, including those involving Semigroups, Monoids, and Graph Algorithms.	K5

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	M	L	L	M	H	L	M	L	L	H	M
CO2	M	H	L	L	L	M	L	M	L	L	H	H
CO3	H	H	M	L	M	H	M	M	M	L	H	M
CO4	M	M	H	L	M	H	M	M	M	M	H	H
CO5	M	H	H	M	H	H	M	M	H	M	H	H

H:HighM:MediumL:Low

Syllabus

Units	CONTENTS	Hours
Unit I	**Vedic Mathematics** - What is Vedic Mathematics? – Use of Vedic Mathematics – **Addition** - Vedic Method for Addition - Completion of a base number in the multiple of 10- pair of numbers doesn't form a base (multiple of 10)and one more than the previous one – **Subtraction** – Nikhilam Navatashcaramam Dashatah (All from 9 and last from 10)- Digit Separator Method for Subtraction – **Square – Cube.**	14
Unit II	**Multiplication** - Vedic Multiplication – All from 9 and last from 10–to proportionately - one less than the previous – the sum of unit and ten's digit at multiplicand and multiplier is 100 - Sum of left two digits is equal to 10 - process of vertical and cross-wise multiplication. **Division** –Introduction – Nikhilam(All from nine and last from 10) - Transpose and Apply –Division by UrdhvaTiryag and Dhwajanka(straight division) method	16
Unit III	**Mathematicallogic :** Propositions **-** Connectives–Tautology and contradiction – Equivalence of Propositions –Duality law – Algebra of Propositions – Tautological Implications –Normal forms–Disjunctive and Conjunctive Normal Forms –PDNF -PCN F–Worked examples-Predicate Calculus–Quantifiers–Freeand bound variables (Definitions only). **Functions:**Representation of function-Types of function-Composition of functions–Inverse of functions-Worked Examples	15
Unit IV	**Relations:**Types of Relations- Some Operation of Relations –Composition of Relations – Properties of Relations -Equivalence Classes-Matrix Representation of Relation-Hasse diagrams for partial ordering- Terminology related to posets-Worked Examples. **Algebric Systems:**Definitions – Properties of Algebraic Systems – Semi groups & Monoids - Homomorphism of Semigroups and Monoids– Properties of Homomorphism - - Subsemigroups and Submonoids- Groups	16
Unit V	**Graph Theory:** Graph - Basic Definitions –Degree of aVertex – Some Special Simple Graphs-Matrix Representation of Graphs-Paths, Cycles and Connectivity-EulerianGraphs - Hamiltonian graphs- Connectedness in Directed Graphs- Shortest pathalgorithm-Dijkstra'sAlgorithm-Worked Examples.	14
	Total Hours	75

Pedagogy and Assessment Methods:

Seminar,PowerPoint Presentation,ChalkandTalk,Quiz,Assignments,GroupTask

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Rajesh Kumar Thakur	The Essential of Vedic Mathematics	Rupa Publications India Pvt. Ltd	2013
2	T.Veerarajan	Discrete Mathematics	Tata McGrawHill	2007

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Rajesh Kumar Thakur	Advanced Vedic Mathematics	Rupa Publications India Pvt. Ltd	2019
2	V. Sundaresan, K.S.Ganapathi Subramanian, K.Ganesan	Discrete Mathematics	A.P.Publications, Sirkali	2006

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Mr. K. Srinivasan Ms. G. Angayarkanni Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS2A2			**Course Title:**	**Batch:**	2025-2028
				GE II – Allied II: Discrete Mathematical Structures	**Semester:**	II
Hrs/Week:	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

On successful completion of the course the students are able to understand the concepts and principles of relations, functions, set theory, partial ordering, mathematical logic, and formal languages and graph theory andtrees.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To keep in mind about the fundamental ideas and notation of discrete mathematics with examples	K1
CO2	To get the idea of relations, types of relations and functions, types of functions	K2,K5
CO3	To analyze the formal language such as formation of words and monoids with examples	K2
CO4	To apply algebraic structures	K4
CO5	To Understand some basic properties of graphs, types of graphs, trees and be able to relate these to practical examples	K2,K3

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	M	H	M	H	H	H	L	M	M	H	M
CO2	H	H	H	H	M	L	H	M	M	H	H	H
CO3	H	M	H	M	H	H	H	M	M	H	H	M
CO4	H	M	H	H	H	M	M	H	H	H	H	H
CO5	H	M	H	H	H	M	M	H	H	H	H	H

H:High, M:Medium, L:Low

Syllabus

Units	CONTENTS	Hours
Unit I	**Set Theory:-**Introduction-Set & its Elements-Set Description-Types of sets, Venn-Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-Minsets- Algebra of sets and Duality- The Inclusion and Exclusion principle	15
Unit II	**Mathematical logic**:– Introduction- Statements and Notation-Connectives-Negation- Conjunction-Disjunction-Statement formulas and Truth tables-Conditional and Biconditional-Tautologies, Equivalence of Formulas-Duality Law-Tautological Implications-Normal Forms-DNF-CNF-PDNF-PCNF-Predicate Calculus-Predicates-The statement function, variables, and Quantifiers-Predicate Formulas-Free and Found Variables-The Universe of Discourse.	15
Unit III	**Relations**: – Introduction- Cartesian Product of Sets- Binary Relations – Set operations on relations-Types of Relations – Partial order relations – Equivalence relation – Composition of relations. **Functions**: – Types of functions – Invertible functions – Composition of functions.	15
Unit IV	**Algebric Structure:** Semigroups & monoids- Homomorphism of semigroups and monoids- sub semigroups and submonoids-groups **Formallanguages:** Basic definitions-phase structure grammar- types of phase structure grammar-Workedexamples	15
Unit V	**Graph Theory**: – Basic concepts of Graph theory-Basic Definitions-Paths, Reachability and Connectedness- Matrix Representation of graphs-Trees-Storage representation and Manipulation of Graphs- Trees: Their Representation and Operations-List structures and Graphs	15
	TotalHours	**75**

PedagogyandAssessment Methods:

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

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	J.K. Sharma (Unit I & III)	Discrete mathematics	Macmillan India Ltd,Second Edition	2005
2	J P Tremplay & R Manohar (Unit II & V)	Discrete Mathematical structures with Applications to computer Science	Tata Mc Graw-Hill Companies	2008
3	T.Veerarajan (Unit IV)	Discrete Mathematics	Tata McGraw Hill	2007

Reference Books

S.No	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Dr M. K. Venketaramen, Dr N.Sridharan, N.Chandarasekaran	Discrete Mathematics	The National publishing Company Chennai.	2006
2	V. Sundaresan, K.S. Ganapathi Subramanian, K. Ganesan	Discrete Mathematics	A.P.Publications Sirkali	2006
3	RaniSironmani	Formal Languages	The Christian Literature Societry, First Edition	1984

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.M.Malathi Dr.S.Sharmila Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS206			**Course Title:**	**Batch:**	2025-2028
				CC Lab II: Programming Lab using Java	**Semester:**	II
Hrs/Week:	4	Tutorial Hrs./Sem.	-		**Credits:**	2

Course Objective

The objective of this course is to make the students to implement various features of Java programming by using Java SDK environment to create, debug and run Java programs.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To apply the basic concepts of Java such as class, methods, constructors, arrays and interfaces to solve the problems.	K3
CO2	To analyze programs using method overloading, method overriding, packages and threads.	K4
CO3	To validate programs using event handling, applets, AWT controls and files.	K5

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	M	H	H	H	L	M	M
CO2	H	H	M	M	H	H	H	M	M	L	M	H
CO3	H	H	M	M	M	M	H	H	H	H	M	M

H-High;M-Medium;L-Low

Syllabus

Units	Contents	Hrs
	SET-A • Program to sort the given names in alphabetical order. • Program to determine whether two strings are anagram or not. • Program to calculate area of different shapes using method overloading. • Program for command line Argument. • Program to illustrate the use of single inheritance. • Program to implement the concept of Multithreading. • Program to create an Exception called Pay out of bounds & throw theException. • Program to draw smiley using Applet. • Program to perform method overriding. • Program to get the parts of the URL using networking concepts. • Program for Key Events. • Program to create Thread by implementing Runnable interface. • Program to draw several shapes. **SET-B** • Program for processing Bank details using the concept of multiple inheritances using the interfaces. • Program for Employee salary details using Packages. • Program to demonstrate the multiple selections List-Box. • Program to create menu Bars and pull down menus. • Program to create a frame with four Text Fields, name, street, city and pincode with suitable Labels. Also add a Button called my details, when the Button is clicked is corresponding details to be displayed. • Program to create a frame with three text fields for name, age and qualification and a text field for multiple lines for Address. • Program to perform arithmetic operations using AWT controls. • Program to display the student information system using Swing. • Program to extract a portion of character string and print the extractedstring. • Program for Mouse Events. • Program for processing Random Access File. • Program to copy one file to another file. • Program for creating a simple JDBC application **INTERNAL MARK (20 Marks)** **EXTERNAL MARK (30 Marks)**	**60**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini Ms. G. Angayarkanni Signature:	Name:R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS2S2			**Course Title:**	**Batch:**	2025-2028
				SEC I: Naan Mudhalvan : Data Analysis using Excel Lab	**Semester:**	II
Hrs/Week:	2	**Tutorial Hrs./Sem.**	-		**Credits:**	2

Course Objective

The main objectives are to construct formulas, including the use of built-in functions and relative and absolute references; convert text and validate; consolidate data; and create pivot tables and charts.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Develop organized data format using sorting and filtering components	K3
CO2	Design advanced graphic presentations on stored data	K4
CO3	Sort, search, and extract knowledge from historical data	K5

Mapping

POs / **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	M	H	H	H	L	M	M
CO2	H	H	M	M	H	H	H	M	M	L	M	H
CO3	H	H	M	M	M	M	H	H	H	H	M	M

H-High; M-Medium;L-Low

Content	**Hours**
• **Getting Started with Excel:** Creation of spread sheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions. • **Working with Data:** Importing data, Data Entry & Manipulation, Sorting &Filtering • **Working with Data:** Data Validation, Pivot Tables & Pivot Charts. • **Data Analysis Process:** Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs • **Cleaning Data with Text Functions:** use of UPPER and LOWER, TRIM function, Concatenate. • **Cleaning Data Containing Date and Time Values:** use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE functions.	**30**

• **Conditional Formatting:** formatting, parsing, and highlighting data in spreadsheets during data analysis. • **Working with Multiple Sheets:** work with multiple sheets within a workbook is crucial for organizing and managing data, perform complex calculations and create comprehensive reports. • **Create worksheet with following fields:**Empno, Ename, Basic Pay(BP),Travelling Allowance(TA), Dearness Allowance(DA), House Rent Allowance(HRA), Income Tax(IT), Provident Fund(PF), Net Pay(NP). Use appropriate formulas to calculate the above scenario. Analyse the data using appropriate chart and report the data • **Create worksheet on Sales analysis of Merchandise Store:** data consisting of Order ID, Customer ID, Gender, age, and date of order, month, online platform, Category of product, size, quantity, amount, shipping city and other details. Use of formula to segregate different categories and perform a comparative study using pivot tables and different sort of charts. • Generation of report & presentation using Auto filter & macro.	

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Manisha Nigam	Data Analysis with ExcelData Analysis with Excel	BPB	September 2019

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS2VA			**Course Title**	**Batch:**	2025–2028
				VAC I: Digital Content Development Lab	**Semester:**	II
Lecture Hrs./Week or Practical Hrs./Week	-	**Tutorial Hrs./Sem.**	30		**Credits:**	2*

Course Objective

To reinforce human connections is even more important when people are working remotely and interactingwith their customers digitally.

Syllabus

Programs	**Hrs**
• Calendar: Create and manage events • Docs: Create and manage comments and action items, set preferencesuit your work style, and use the Google Docs Explore tool. • Drive: Organize, protect, and share files. • Gmail : Compose, send, and reply to messages. • Meet & Chat : Manage video meetings and collaborate using instantmessages • Sheets: Create and edit spreadsheets directly in your browser—no other software is required. • Sheets Advanced Topic: Apply themes and conditional formatting, anduse advanced formulas and functions • Slides: Create and collaborate on professional presentations forproposals, sales, marketing, or training Form: To create online forms and surveys with multiple question types.	30
Total Contact Hrs	30

PedagogyandAssessment Methods:

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

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:Dr.M.Malathi Dr.S.Sharmila Signature:	Name: Dr.R. Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

Dr. R. MANICKA CHEZIAN M.Sc.,M.S.,Ph.D.,
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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS307			**Course Title**	**Batch:**	2025 - 2028
				CC V: Data Structures	**Semester:**	III
Lecture or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

On successful completion of the course the students are able to understand the concepts of array, stack, queue, list, linked list, tree, graph theory, searching and sorting.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To keep in mind the basic static and dynamic data structures and relevant standard algorithms for them.	K1
CO2	To get the idea about advantages and disadvantages of specific algorithms and data structures.	K2
CO3	To implement new solutions for programming problems or improve existing code using learned algorithms and data structures.	K3
CO4	To evaluate algorithms and data structures in terms of time and memory complexity of basic operations.	K4
CO5	To analyze storage device types and indexing techniques	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Overview – Creation of Programs – Analysis of Programs – Arrays – Ordered Lists- Representation of Arrays – **Stacks and Queues**: Fundamentals – Evaluation of Expressions -Multiple stacks and queues.	12
Unit ii	**Linked List** : Singly Linked lists –- Linked Stacks and Queues – Polynomial addition – – More on Linked lists – Sparse matrices - Doubly Linked List and Dynamic Storage Management – Garbagecollection and Compaction.	12
Unit III	**Trees:** Basic Terminology – Binary Trees – Binary Trees Representation – Binary Trees Traversal – Binary tree representation of Trees –. **Graphs:** Terminology and Representations.	12
Unit IV	**InternalSorting**:Searching–Sequentialsearch-Binarysearch-Fibonaccisearch– Insertion Sort – Quick sort - 2-way Merge - Heap sort –**Symbol Tables:** Hash Tables.	12
Unit V	**Files** : **Files, Queries and Sequential Organizations** : Storage device types - Query types - Mode of Retrieval - Mode of update – **Indexing techniques** : Cylinder-Surface Indexing - Hashed Indexes – **File Organizations** : Sequential Organizations - Random Organizations –Linked-Organization – Inverted Files – Cellular Partitions.	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 PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1	Ellis Horowitz & Sartaj Sahni	Fundamentals of Data Structures	Sahni, Galgotia Book Source	1999
2	ISRD GROUP	Data Structures using C	Tata McGraw Hill,Seventh Reprint	2010

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Paul G Sorenson Jean Paul Tremblay	An Introduction to Data Structures with Applications	Tata McGraw Hill Publication, Second Edition	2008
2.	Ellis Horowitz, Sartaj Sahni, SusanAnderson-Freed	Fundamentals of Data Structures in C	Universities Press (India) Private Limited	2008
3.	R.Krishnamurthy and G.IndiraniKumaravel	Data Structures using C	TataMcGraw – Hill Publishing Company Limited,New Delhi	2008

Course Designed by	**Verifiedby HOD**	**Checked by**	**Approved by**
Name and Signature	**NamewithSignature**	**CDC**	**COE**
Dr. Aruchamy Rajini Dr.M.Meenakrithika Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS308			**Title**	**Batch:**	2025 - 2028
				CC VI: Operating System Concepts and Linux	**Semester:**	III
LectureHrs./Week	4	**Tutorial Hrs./Sem**	-		**Credits:**	4

Course Objective

Understand the fundamental concepts of operating systems, including process management, memory management, and virtual storage management and also learn about the different storage management strategies, job and processor scheduling algorithms

Understand the basics of Linux, including the GNU Project and the Free Software Foundation, shell programming, and Linux commands and Gain knowledge of processes, threads, and interprocess communication and file system permissions.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Develop a solid understanding of operating system fundamentals, including process concepts, process states and transitions, operations on processes, interrupt processing, and real storage management strategies	K1
CO2	Understands the use of different process scheduling algorithm and virtual storage techniques	K2
CO3	Apply the concept of Disk Performance Optimization to improve system performance and can be effectively navigate and utilize the Linux environment for various tasks.	K3
CO4	Design, develop, and manage processes and threads, enable to build robust and efficient software systems.	K4
CO5	Evaluate the different methods of interprocess communication and implement secure communication and access control mechanisms in software systems.	K5

Mapping

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

H-High;M-Medium;L-Low

Syllabus

Units	Content	Hrs
Unit I	**OPERATING SYSTEM:** Introduction to Operating System – **Process Concepts:**Definition of Process - Process States - Process States Transition Operations on Processes – InterruptProcessing **Storage Management: Real Storage:** Real Storage Management Strategies – Contiguous versus Non-contiguous storage allocation–Single User Contiguous Storage allocation-Fixed partition multi programming–Variable partition multi programming.	12
Unit II	**VirtualStorage:** Basic Concepts – Virtual Storage Management Strategies–Page Replacement Strategies –Working Sets–Demand Paging–Page Size. **Processor Management:**Job and Processor Scheduling: Scheduling Levels - PreemptiveVsNon-preemptive scheduling–Priorities –Deadline scheduling – FIFO - Round Robin – Shortest Job First – Shortest Remaining Time – Highest Response Ration Next Scheduling.	12
Unit III	**Disk Performance Optimization:** Operation of moving head disk storage – Need for disk scheduling – SeekOptimization. **LINUX:** What Is Linux? - The GNU Project and the Free Software Foundation - Shell Programming: What Is a Shell? - Shell as a Programming Language – **Linux Commands:** Basic Commands – File Permission Commands – Environmental Variable Commands - Vi Editing commands – User Management Commands – Network Commands – Process Commands.	12
Unit IV	**Processes:** Looking at Processes - Creating Processes – Signals - Process Termination – **Threads:** Thread Creation - Thread Cancellation - Synchronization and Critical Sections - GNU/Linux Thread Implementation - Processes Vs. Threads	12
Unit V	**Interprocess Communication:** Introduction - Shared Memory - Processes Semaphores - Mapped Memory – Pipes – Sockets – **Security:** Users and Groups - Process User IDs and Process Group IDs - File System Permissions.	12
	Total Contact Hrs	**60**

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 PUBLICATION
1	H.M.Deitel	Operating Systems	2nd Edition, Perason	2003
2	Neil Matthew Richard Stones	Beginning Linux® Programming	4th Edition, Wiley Publishing, Inc	2008
3	Mark Mitchell, Jeffrey Oldham, Alex Samuel	Advanced Linux Programming	New Riders Publishing	2001

ReferenceBooks

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Achyut S. Godbole	Operating Systems	TMH	2002
2	Petersen andRichard	LINUX:The Complete Reference	McGraw Hill,Sixthed ition	2007

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr. K.Srinivasan Ms. G.Angayarkanni Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS3A1			**Course Title:**	**Batch:**	2025-2028
				GE III – Allied III: Computer Based OptimizationTechniques	**Semester:**	III
LectureHrs/Week:	5	**Tutorial Hrs/Sem.**	-		**Credits:**	4

Course Objective

To enable the students to understand and to apply the resource management techniques available in OR including linear programming, transportation, assignment problem, inventory control, queuing theory and network problems.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Rememberandunderstandtheconceptsofrelations	K1,K2
CO2	Understand theconceptoftransportation,networking,replacement,etc.,	K2
CO3	Apply the appropriate optimization techniquesto solve the computerbasedbusinessproblems	K3,K5
CO4	Becomefamiliarwith. LPP, Hungarianmethod, Gametheory, Replacementproblem.	K4,K5
CO5	Analyzetheabilityofcriticalthinking,tofindshortesttimeduration	K5

Mapping

POs / **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	H	H	M	M	M	M	H
CO2	H	M	H	H	H	M	M	M	M	H	H	M
CO3	M	H	H	M	M	M	M	M	M	H	M	M
CO4	H	H	H	H	M	H	M	M	M	M	M	H
CO5	H	H	H	H	M	M	M	H	M	M	M	M

H-High;M-Medium;L-Low

Syllabus

Units	**Contents**	**Hrs**
Unit I	Origin and development of OR–*Applications of OR*–Linear programming problem–Mathematical formulation of the problem–Graphical Method–Simplex Method.	15
Unit II	**Transportation Problem:** Balanced Transportation problem and Un-Balanced Transportation problem- Row Minimum-Column Minimum-North-West Corner-Matrix Minima Method-Vogel's Approximation Methods-U-V Method for OBFS.	15

	Assignment Problem: Balanced Assignment Problem and Un-Balanced Assignment Problem–Hungarian Method.	
UnitIII	**Network Scheduling:**Network and Basic components–*Logical sequencing*: Formation of a Loop,Dangling,Redundancy-Network Construction-Rules of Network construction–Time calculation in Network-Numbering the events–Critical Path Method (CPM)–PERT Calculations.	15
UnitIV	**Replacement Problem and System Reliability:** Model1: Value of Money doesnot change withtime. Model2: Value of Money change with time. **Game and Strategies:** Introduction-Two-Person Zero-Sum games-Pure Strategies: Maximin-Minimax Principles-Saddle Point and Value of the Game-Rule for Determining a Saddle Point- Mixed Strategies: Games without Saddle Points- 2x2 Rectangular Games.	15
UnitV	**Sequencing Problem:** Problems with ' n' jobs and 2 machines–Problems with 'n' jobs and 'k'machines. **Inventorycontrol**–Types of inventory – Economic Order Quantity: Model 1:EOQ problem with no shortages Model 2:EOQ problem with no shortages and several production runs of unequal length Model 3: EOQ problem with shortages.	15
	Total Contact Hrs	75

PedagogyandAssessmentMethods

Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, GroupTask.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Kanti Swarup, PK Gupta,Man Mohan	Operations Research	Sultan Chand and Sons	2020

References Books

S.No	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	S.Dharani Venkatakrishnan	Operations Research	KeerthiPublishing P.Ltd	2015
2	PK Gupta,Man Mohan	Problemsin Operations Research	3rd Edition	2018
3	G.Srinivasan	Operations Research:principles and Applications	2nd Edition	2017

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr. M.Malathi Dr.R.Nandhakumar Signature:	Name:Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS3A2			**Course Title:**	**Batch:**	2025-2028
				GE III – Allied III: Resource Management Techniques	**Semester:**	III
Lecture Hrs/Week:	5	**Tutorial Hrs/Sem.**	-		**Credits:**	4

Course Objective

To enhance the students' knowledge in decision analysis, sequencing of the jobs to be carried out based on cost optimization, replacement policies and analyze the cases according to their categories.

Course Outcomes (CO)

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

CO Number	**COStatement**	**Knowledge Level**
CO1	Know the principles and applications of information theory	K1,K2
CO2	To understand sequencing, replacement problems.	K2
CO3	Demonstrate skills to achieve their objective using sequencing models.	K3,K5
CO4	Apply decision making under different business environments.	K4,K5
CO5	Determine a solution to a rectangular game using simplex method	K5

Mapping

POs / **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	H	H	M	M	M	M	H
CO2	H	M	H	H	H	M	M	M	M	H	H	M
CO3	M	H	H	M	M	M	M	M	M	H	M	M
CO4	H	H	H	H	M	H	M	M	M	M	M	H
CO5	H	H	H	H	M	M	M	H	M	M	M	M

H-High;M-Medium;L-Low

Syllabus

Units	**Contents**	**Hrs**
Unit I	**Decision Analysis:** Decision Making environment – Decisions under uncertainty – Decision under risk – Decision –Tree Analysis.	15
Unit II	**Sequencing Problems:** Introduction-problem of sequencing - basic terms used in sequencing- processing n-jobs through 2 machines - processing n –jobs through k machines - processing 2 jobs through k machines (Problems only).	15
Unit III	**Replacement Problems:** Introduction - Replacement of equipment / assets that deteriorates gradually - replacement of equipment that fails suddenly and problems.	15
Unit IV	**Information Theory:** Introduction- A measure of Information-Axiomatic Approach to Information- Entropy-The expected information- Some properties of entropy function-Joint and conditional entropies.	15

Unit V	**Applications**: General solution of (mxn) rectangular games using simplex method - Reliability and system failure rates using replacement problems.	15
	Total Contact Hrs	75

Pedagogy and Assessment Methods:

Direct Instruction, Flipped Class, Digital Presentation,Seminar,Quiz,Assignments,GroupTask.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Kanti Swarup, PK Gupta, Man Mohan	Operations Research	S.Chand & sons education publications ; New Delhi	2014

References Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	S.DharaniVenkatakrishnan	OperationsResearch	KeerthiPublishing P.Ltd	2015
2	PK Gupta,Man Mohan	ProblemsinOperations Research	3rdEdition	2018
3	G.Srinivasan	Operations Research: principles and Applications	2nd Edition	2017

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme Code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS309	**Course Title:**	**Batch:**	2025-2028
		CC Lab III: Data Structures Lab	**Semester:**	III
Hrs/Week:	4		**Credits:**	2

Course Objective

The objective of this course is to make the students to write and execute programs using data structures such as arrays, linked lists, stacks, queues, trees and binary search trees, and also to implement various sorting and searching algorithms.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To apply the data structures such as stacks, queues and trees to solve various computing problems	K3
CO2	To analyze various tree traversals in a binary search tree	K4
CO3	To validate various kinds of searching and sorting techniques	K5

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	M	H	H	H	L	M	M
CO2	H	H	M	M	H	H	H	M	M	L	M	H
CO3	H	H	M	M	M	M	H	H	H	H	M	M

H-High;M-Medium;L-Low

Contents	Hrs
SET-A • Write a program to implement Stack (its operations) using Arrays • Write a program to implement Queue (its operations) using Arrays • Write a program to implement linked list using stack . • Write a program to implement linked list using Queue . • Write a program to implement Singly linked list. • Write a program to implement Doubly linked list. • Write a program to add given two polynomials • Write a program to implement binary search trees • Write a program to implement linear search trees • Write a program to implement the representation of graphs. **SET-B** • Write a program to implement the tree traversal methods. • Write a program to implement Depth First Search (DFS) graph traversal methods • Write a program to implement Breadth First Search (BFS) graph traversal methods. • Write a program to implement Merge sort for the given list of integer values • Write a program to implement Quick sort for the given list of integer values. • Write a program to implement Insertion Sort Method to sort a given list of integers in ascending order. • Write a program that implements Bubble Sort Method to sort a given list of integers in ascending order • Write a program to implement Heap sort • Write a program to implement Fibbonaci search • Write a program to implement 2-way merge sorting **INTERNALMARK(20Marks)** **EXTERNALMARK(30Marks)**	**60**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr. Aruchamy Rajini Dr.M.Meenakrithika Signature:	Name:R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS310			**Course Title**	**Batch:**	2025 - 2028
				CC Lab IV: Linux Programming Lab	**Semester:**	III
Practical Hrs./Week	4	**Tutorial Hrs./ Sem.**	-		**Credits:**	2

Course Objective

The objective of this course is to make effective use of Linux utilities and shell scripting language to solve problems.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To Develop shell scripts for simple applications	K3,K4,K5
CO2	To Develop programs to create and manage processes	K3,K4,K5
CO3	To Develop programs for system administration	K3,K4,K5

Mapping

POs, PSOs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	H	L	L	H	H	M	L	M	H	H	H
CO2	H	H	L	L	H	H	H	L	M	H	H	H
CO3	H	H	L	L	H	H	H	L	M	H	H	H

H-High; M-Medium; L-Low

Syllabus

Content	Hrs
SET A • Write shell script to demonstrate the usage of the following commands such as cat, tail, head, sort, grep, cut, paste, join, etc., • Write shell scripts to perform file- related operations using commands. • Write shell scripts to perform directory- related operations using commands. • Write shell scripts to create user, group and assign various permissions to access a directory • Write a shell script to display list of users currently logged in & process. • Write a shell script to develop a scientific calculator. • Write a shell script to compute GCD & LCM of two numbers • Write a shell script to display telephone tariff of a customer. • Write a shell script to search whether element is present is in the list or not. • Write a Shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it. **SET B** • Write a shell-script that takes a command line argument and reports on whether it is a directory, a file or something else. • Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions • Write a shell script to change the access mode of all the files and directories within the specified directory. • Write a shell script to count number of lines in a file that does not contain vowels • Write a shell script to find the no of characters ,words and lines in a file • Write a shell script to copy contents of one file to another using command line. • Write a shell script to display the process attributes. • Write a shell script to change the priority of process and terminate. • Write a shell script to allow only user1, user2, user3 to use crontab • Write a shell script to create an archive by bundling files and directories together, and extract them into a specific directory. **INTERNAL MARK (20 Marks)** **EXTERNAL MARK (30 Marks)**	60
Total Contact Hrs	**60**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr.K.Srinivasan G.Angayarkanni Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS3N1	**Course Title:**	**Batch:**	2025 - 2028
		Non-Major Elective I: Multimedia Lab	**Semester:**	III
Practical Hrs/Week:	2		**Credits:**	2

Course Objective

The objective of this course is to make the students to gain a working knowledge of Photoshop and develop their skills in editing and altering photographs for through a basic understanding of the toolbar, layers and the adjustments panel.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To apply the different type of tools available in Photoshop to create simple applications.	K3
CO2	To interpret programs using various filters in Photoshop	K4
CO3	To Identify the basic tools and components of multimedia	K5

Syllabus

Units	Contents	Hrs
	SET A • Image Menu using Photoshop • Reduce Picture Size using Photoshop • Replace color in an image using Photoshop • Make a simple book cover by using basic functionalities using Photoshop • Transfer an object from one image to another and erase background using Photoshop • Add a pattern as background using Photoshop **SET B** • Create India Map using Photoshop • Retouching photos using Photoshop • Take a logo and modify it using Photoshop • Alter an image using filters using Photoshop • Special Effects-Color in black and white image using Photoshop	**30**

	• Special Effects-Feathered Portraits (Softfade) using Photoshop **EXTERNAL MARK (50 Marks)**	

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.M. Malathi Dr.S.Sharmila Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

Dr. R. MANICKA CHEZIAN M.Sc.,M.S.,Ph.D.,
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Programme Code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS3N2	**Course Title:**	**Batch:**	2025 - 2028
		Non-Major Elective I: Advanced Applications in MS Excel Lab	**Semester:**	III
Practical Hrs/Week:	2		**Credits:**	2

Course Objective

This course was designed for the intermediate student who has already mastered the basic skills and wants to gain more advanced excel skills to put to work in a business environment or for personal use.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand and apply formulas and functions	K3
CO2	Develop professional –looking worksheets using formatting tools.	K4
CO5	Work with multiple worksheets and workbooks.	K5

Syllabus

Contents	Hrs
SET A • In a new worksheet, create a table and insert information of student details. Use features of Format Menu. • Create employee table and calculate the salary.Use mathematical functions for the worksheet. • Create own templates in Excel. • Create and use data validation rules. • Create, manage, and format pivot tables and pivot charts. • Create a data and use sum if and count if formulas **SET B** • Create and write complex formulas. • Create and use IF statements. • Apply custom and prebuilt conditional formatting. • Work withfunctions to manipulate strings of text and data. • Create charts in excel • Create a data and using that data perform Match and index • Create a data and using that data per form Vlookup concept **EXTERNAL MARK (50Marks)**	**30**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.M.Malathi Dr.R.Nandhakumar Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS411			**Course Title:**	**Batch:**	2025 - 2028
				CC VII: Python Programming	**Semester:**	IV
Lecture Hrs./Week	4	**Tutorial Hrs./ Sem.**	-		**Credits:**	3

Course Objective

On successful completion of this course the students should understand the core principles of the Python Language and use the tools to produce well designed programs in python and create effective GUI applications.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Remember the principles of structured programming and to understand basics of python.	K1
CO2	Understand the common programming idioms: variables, loop, branch, subroutine and input/output	K2
CO3	Deploy the concepts of functions, standard libraries, modular programming and the design of user interfaces	K3
CO4	Figure out ability to analyze and solve the problems using advanced facilities o fthe Python Language	K4
CO5	Evaluate the object oriented features in python using functions and standard libraries.	K5

Mapping

POs/PSOs / **CO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	H	H	M	L	H	H	M	H	H
CO2	H	M	H	H	H	L	L	H	L	H	M	H
CO3	H	H	H	H	M	M	M	M	M	H	H	H
CO4	M	H	M	M	H	L	L	L	L	M	H	M
CO5	H	H	M	H	M	M	M	M	M	H	H	M

H-High; M-Medium; L-Low

Syllabus

Units	Content	Hrs
Unit I	**BASICS :** Python - Variables - Executing Python from the Command Line – Editing Python Files - Python Reserved Words – Basic Syntax-Comments - Standard Data Types – Relational Operators - Logical Operators - Bit Wise Operators - Simple Input and Output.	12
Unit II	**CONTROL STATEMENTS:** Control Flow and Syntax - Indenting - if statement–else Statement–elif statement–conditional expression–while statement–for statement – break statement – continue statement – pass statement – Iterators and the iter( ) function - break and continue – for Loop - Lists–Tuples – Sets – Dictionaries.	12
Unit III	**FUNCTIONS:** Definition–callingfunctions–creating functions–passing functions–Mapping Functions in a Dictionary – Built – in Functions: apply( ), filter(), map( ) and reduce() – Lambda – Modules and Files – module - Build-in Functions.	12
UnitIV	**ERROR HANDLING:** Run Time Errors - Exception Model - Exception Hierarchy -Handling Multiple Exceptions - Data Streams - Access Modes Writing - Data to a File Reading - Data From a File - Additional File Methods - Using Pipes as Data Streams – Handling IOExceptions –Working with Directories.	12
UnitV	**OBJECT ORIENTED FEATURES**: Classes Principles of Object Orientation-Creating Classes - Instance Methods - File Organization - Special Methods – Class Variables–Inheritance - Polymorphism-Type Identification –Simple Character Matches - Special Characters - Character Classes – Quantifiers - Dot Character – Greedy Matches – Grouping - Matching at Beginning or End - Match Objects – Substituting –Splitting a String-Compiling Regular Expressions.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, APS

TextBooks

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Mark Summer field	Programming in Python 3: A Complete introduction to the Python Language	Addison-Wesley Professional	2009
2	Martin C.Brown	Python: The Complete Reference	McGraw-Hill	2001

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBLICATION
1	Allen B.Downey	Think Python: How to Think Like a Computer Scientist	Shroff/ O'Reilly Publishers	2016
2	Guido van Rossum and Fred L. DrakeJr	An Introduction to Python	Network Theory Ltd	2011
3	WesleyJChun	Core Python Applications Programming	Prentice Hall	2012

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr.K.Srinivasan Dr.S.Sharmila Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS412			**Course Title:**	**Batch:**	2025 - 2028
				CC VIII: Relational Database Management Systems	**Semester:**	IV
Lecture Hrs/Week:	4	**Tutorial Hrs./ Sem.**	-		**Credits:**	3

Course Objective

The objective of this course is to make the students to understand and apply the principles of data modeling using Entity Relationship and normalization techniques and understand the use of Structured Query Language (SQL) and its syntax.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts and applications of database systems and SQL.	K1
CO2	Understand the relational database theory, and be able to write relational algebra expressions for queries	K2
CO3	Apply design principles using the E-R method and normalization approach	K3
CO4	Interpret SQL interface of a relational DBMS package to create, secure, populate, maintain, and query a database and PL/SQL programming using Triggers and Cursors.	K4
CO5	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	K5

Mapping

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

H-High; M-Medium; L-Low

Units	Content	Hrs
UnitI	**Database Concepts: ARelational Approach:** An Introduction- Relationships-Database Management System-The Relational Database Model–Integrity Rules–Theoretical Relational Languages – Relational Algebra, Applications of Relational Algebra, Relational Calculus. **Database Design:** Data Modeling – Dependency – Database Design – Entity –Relationship Model–DFD Diagrams–Codd's Rules for RDBMS.	12
UnitII	**Normalization:** Normal Forms (1NF,2NF,3NF,BCNF,4NF) – Dependency Diagrams *–Denormalization.* **OracleSQL:** Personal Databases- Client/Serve rDatabases –Structured Query Language (SQL) - SQL*Plus Commands. **Oracle Table: Data Definition Language (DDL):** Naming rules and conventions-Data Types-Constraints – Creating an Oracle Table – Displaying Table Information - Altering, Dropping, Renaming a Table – Truncating a Table.	12
Unit III	**Working with Table: Data Management and Retrieval:** DML - Adding a new Row/ Record – Customized Prompts – Updating and Deleting an existing Rows/ Records – Retrieving data from table – Arithmetic Operations – restricting data with WHERE Clause – Sorting – Revisiting substitution variables – DEFINE Command – CASE structure. Functions and Grouping: Built-infunctions – Grouping Data.	12
UnitIV	**Multiple Tables: Joins and Set Operations:** Join – Set Operations. **PL/SQL:** Introduction – Block Structure – Comments – *Data types* – Other data types – Declaration –Assignment Operators. **Control Structures and Embedded SQL:** Control Structures–Nested Blocks–SQL in PL/SQL – Data Manipulation – Transaction Control Statements.	12
UnitV	**PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes –Cursor FOR Loops – SELECT…FOR UPDATE – WHERE CRRENT OF Clause – Cursorwith parameters – Cursor Variables – Exceptions– Types of Exceptions. **PL/SQL Composite Data Types:** Records – Tables – Arrays. **Named Blocks:** Procedures – Functions – Packages – Triggers–Data Dictionary Views.	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	Nilesh Shah	Database Systems using Oracle	PHI, 2nd edition	2004
2	Diana Lorentz	Oracle® Database SQL Reference	ORACLE	2005
3	Bill Pribyl, Steven Feuerstein	Oracle PL/SQL Programming	O'Reilly Media, Inc.,6th Edition,	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBLICATION
1	Ivan Bayross	SQL, PL/SQL- The programming language of Oracle	BPB Publication, 3rd edition	2010
2	Ivan Bayross	Commercial Application Development using Oracle.	BPB Publication	2000
3	George Koch	The Complete Reference - Oracle8i	Tata McGraw Hill publication.	2000

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Ms.Latha Dr.M.Meena krithika Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.SC (CS)			Programme Title:	Computer Science Aided / Self Financing	
Course Code:	25UCS4A1			Title	Batch:	2025– 2028
				GE IV – Allied IV ACCOUNTANCY FOR DECISION MAKING	Semester:	IV
Lecture Hrs./Week or Practical Hrs./Week	04	Tutorial Hrs./Sem.	-		Credits:	3

Course Objective

To enlighten the students on the basics of Accountancy

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Provide the knowledge of accounting theory based on conceptual framework of accounting.	*K1
CO2	Enable students to understand the concept of accounting.	*K2
CO3	Impart knowledge accounting in decision making.	*K3
CO4	Analyze and interpret accounting related transactions in accordance with accounting theory.	*K4
CO5	Summarise ratio analysis and fund flow statement	*K5

Mapping

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

H- High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	**Financial Accounting** Accounting- Meaning - Definition– Concepts – Conventions – Journal – Ledger –Trial Balance.	12
Unit II	**Subsidiary Books and Final Accounts** Subsidiary Books – Purchase Book and Sales Book – Purchase Returns and SalesReturns Book – Cash Book – Single Column- Double Column- - Preparation of Final Accounts with Simple Adjustment.	12
Unit III	**Cost Accounting** Meaning – Definition- Objectives - Elements of Cost – Cost Sheet –Meaning – Definition - Methods of Stock Valuation – FIFO - LIFO – Simple Average Method.	12
Unit IV	**Management Accounting** Meaning -Definition- Objectives of Management Accounting – Budgetary Control – Cash Budget –Flexible Budget– Material Budget (Simple problems)	12
Unit V	**Cash Flow Statement** Cash Flow Analysis – Meaning- Classification of Cash Flows – Cash Flows from Operating activities – Cash Flow from investing activities – Cash flow from Financing activities – Procedure for preparing Cash Flow Statement. (Simple problems only)	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Direct Instruction, Quiz, Assignments, Group Task.

Distribution of Marks: 20 % Theory & 80 % Problems **25UCS4A1**

Text Book

1. Sharma. K, Shashi.K.Gupta. (2023), Management Accounting, Kalyani Publishers, New Delhi.

Reference Books

1. Jain. S.P and Narang. K.L. (2023) Cost Accounting, Kalyan Publishers, New Delhi.
2. Gupta K.L. (2023), Accountancy for Managerial Decisions, Sahitya Bhawan, Publications, New Delhi.
3. Shukla. M.C and Grewal. T.S and Gupta. S.L.(2023), Advanced Accountancy, S.Chand and Co, New Delhi.

Course Designed by	Head of the Department	Curriculum Development Cell and Controller of the Examination
Name and Signature	Name and Signature	Name and Signature
Dr.P.Bruntha Dr.S.Kaleeswari	Dr.P.Bruntha	Mr.K.Srinivasan

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Programme Code:	B.SC (CS)			Programme Title:	Computer Science Aided / Self Financing	
Course Code:	25UCS4A2			Title	Batch:	2025– 2028
				GE IV – Allied IV FINANCIAL ACCOUNTING	Semester:	IV
Lecture Hrs./Week or Practical Hrs./Week	04	Tutorial Hrs./Sem.	-		Credits:	3

Course Objective

To introduce the students to the basics of Financial Accounting.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recollect the basic concepts, conventions, methods and techniquesunderlying the accounting practices.	*K1
CO2	Interpret the idea for preparing and presenting financial statements in accordance with generally accepted accounting principles.	*K2
CO3	Describe the accounting Principles and Regulations in accordance with appropriate standard.	*K3
CO4	Evaluate conceptual knowledge of the financial accounting and to impart skills for recording various kinds of business transactions.	*K4
CO5	Assess students' demonstrate skills in critical-thinking and problem-solving	*K5

Mapping

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

H- High; M-Medium; L-Low

Units	Content	Hrs
Unit I	**Introduction** Accounting-Definition-Concepts-Conventions-Journal –Ledger- Preparation of Trial Balance –Subsidiary Books- Cash book, Purchase book, Sales book, Purchase return book, Sales return book.	12
Unit II	**Final Accounts** Final Accounts of Sole Trader with Simple Adjustments- Depreciation, prepaid expenses, outstanding expenses, Interest on Capital, Bad debts Provision.	12
Unit III	**Single Entry** Single Entry- Meaning and Salient features- Statement of Affairs Method- Conversion Method.(Simple problems only)	12
Unit IV	**Branch Accounts** Branch Accounts-Meaning-Definition-Types of Branch Accounting- Dependent Branch-Stock and Debtors system.	12
Unit V	**Depreciation** Depreciation Accounting-Meaning-Definition - Straight Line and Diminishing Balance Method.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods

Seminar, Power Point Presentation, Direct Instruction, Quiz, Assignments, Group Task.

Distribution of Marks: 20 % Theory & 80 % Problems **25UCS4A2**

Text Book

1. Reddy. T.S and Moorthy, (2023), Financial Accounting, Margham Publications, Chennai.

Reference Books

1. Gupta. R.L and Radha. M. (2023), Advanced Accountancy, Sultan Chand and Sons, New Delhi.
2. Raman. B.S., (2021), Financial Accounting, United Publisher, Mangalore.
3. Narayanswamy.K , (2020) Financial Accounting, PHI Learning, New Delhi.

Course Designed by	Head of the Department	Curriculum Development Cell and Controller of the Examination
Name and Signature	Name and Signature	Name and Signature
Dr.P.Bruntha Dr.S.Kaleeswari	Dr.P.Bruntha	Mr.K.Srinivasan

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS413			**Course Title**	**Batch:**	2025 - 2028
				CC Lab V: Programming Lab using Python	**Semester:**	IV
Practical Hrs./ Week	4	**Pratical Hrs./ Sem.**	-		**Credits:**	2

Course Objective

On successful completion of the course the students should write well –documented programs in the Python language, including use of the logical constructs of that language.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To implement, Interpret, Contrast of various operators.	K3
CO2	To review and analyze database with variables, loop, branch, subroutine, and input/ output.	K4
CO3	To validate how databases are integrated with components, modular programming and the design of user interfaces.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Contents	Hrs
SETA • Write a Python Program to solve quadratice quation. • Write a Python Program to generate a random number. • Write a Python Program by implementing tuples. • Write a Python Program for Insertion sort. • Write a Python Program to make a Simple Calculator. • Write a Python Program to print the elements of an array inreverse order. • Write a Python Program using strings and their built-in functions. • Write a Python Program to find the product of two matrices. • Write a Python Program that writes a series of random numbers to a file from1 to n and display. • Write aPython Program using apply(). filter(), map() and reduce( ) functions. **SET B** • Write a Python Program to convert list to dictionary, sort a dictionary, and Merge two Dictionaries. • Write a program for linear search and Binary Search. • Write a program to create file, write the content and display the contents of File. • Write a function in Python to count the words "this" and "these" present in a text file • Write a function in Python to coun tnumber ofwords, number of characters in a File. • Write a GUI program that converts Celsius temperatures to Fahrenheit temperatures. • Write a GUI program that displays your details when a button is clicked. • Write a program to delete or remove elements from a list. • Write a program to slice lists in Python • Write a Program tolllustrate Different Set Operations. **INTERNAL MARK (20 Marks) EXTERNAL MARK (30 Marks)**	**60**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr. K.Srinivasan Dr.S.Sharmila Signature:	Name: Dr.R.Manicka chezian Signature:	Name: Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS414			**Course Title**	**Batch:**	2025-2028
				CC LabVI: RDBMS Lab	**Semester:**	IV
Practical Hrs./Week	3	**Tutorial Hrs./Sem.**	-		**Credits:**	2

Course Objective

The objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom the min to well-informed database application developers.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To apply the normalization techniques for development of application Software to realistic problems and ability to formulate queries using SQL DML/DDL/DCL commands	K3
CO2	To interpret SQL interface of a relational DBMS package to create, secure, populate, maintain, and query a database and PL/SQL programming using Triggers and Cursors.	K4
CO3	To access data stored in an Oracle Relational DBMS using Oracle SQL,PL/SQL	K5

Mapping

PO/ CO	**PO1**	**PO2**	**PS3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	M	M	H	H	H	M	M	H	H	M	H
CO2	H	H	M	M	M	H	H	M	M	M	M	M
CO3	M	H	M	H	M	H	H	M	H	M	M	H

H-High; M-Medium; L-Low

Syllabus

Contents	Hrs

SET A

- Write the SQL Commands for DDL
- Write the SQL Commands for DML
- Write the SQL Commands for TCL
- Write the SQL Commands to perform SQL Operations
- Write the SQL Commands for Views
- Write the SQL Commands for Joins
- Write the SQL Commands to perform Set Operations
- Write the SQL Commands for SubQueries
- Write a PL/SQL program to Reverse a given number
- Write a PL/SQL program to find given number is Odd Or Even
- Write a PL/SQL program to display Fibonacci Series
- Write a PL/SQL program to find given number is Prime Or Not

45

SET B

- Apply Normalizations (1st,2nd& 3rd) to the following table:

TableName: Users

Name	Company	Company_Address	Url1	Url2
Joe	ABC	WorkLane	abc.com	xyz.com
Jill	XYZ	1JobStreet	abc.com	xyz.com

- Salary Calculation using Cursor
- Write a PL/SQL program to generate all prime numbers below 100
- Write a program to demonstrate %type and%rowtype attributes
- Create a trigger before/after update on employee table for each row/statement
- Create a trigger before/after delete on employee table for each row/statement
- Create a trigger before/after insert on employee table for each row/statement
- Create a cursor,which displays all employee numbers and names from the EMP table
- Create a cursor,which update the salaries of all employees as per thegivendata
- Create a cursor,which displays names of employees having salary>50000
- Cursor For Loop
- **Database Schema for a Employee-pay scenario**
- Tables:Employee, department, paydetails, payroll For the above schema,perform the following—

• Create the tables with the appropriate integrity constraints • Insert around 10 records in each of the tables • List the employee details department wise • List all the employee names who joined after particular date • List thedetails of employees whose basic salary is between 10,000 and 20,000 • Give a count of how many employees are working in each department • Give a names of the employees whose net salary>10,000 • List the details for an employee_id=5 • Create a view which lists out the emp_name, department, basic, deductions, netsalary • Create a view which lists the emp_name and net salary **INTERNAL MARK(20Marks)** **EXTERNAL MARK (30Marks)**	

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Ms.Latha Dr.M.Meenakrithika Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name:Mr.K.Srinivasan Signature:

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Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS4S1			**Title :**	**Batch :**	2025-2028
				SEC II: Naan Mudhalvan: Social and Mobile Media Lab	**Semester:**	IV
Hrs/Week:	2	**Tutorial Hrs./Sem**	-		**Credits:**	1

Course Objective

On successful completion of the course students should understand the principles, applications, and impact of social and mobile media in communication, marketing, and technology-driven interactions.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Apply social and mobile media tools for effective communication, marketing, and user engagement.	K3
CO2	Analyze the impact of social and mobile media on consumer behavior, digital marketing strategies, and online communities.	K4
CO3	Evaluate the effectiveness of various social and mobile media platforms in achieving business and communication objectives.	K5

Mapping

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

H – High; M-Medium; L-Low

Syllabus

Social Media • Social Media Analytics & Insights using **Google Analytics or Facebook Insights** • Digital Marketing Campaigns & Ad Management (Meta Ads Manager, Google Ads) • Podcast or Video Blogging (Vlogging) • Design an engaging post for Instagram or Facebook using **Canva** • Use **Google Dialogflow** to make a basic chatbot that answers 3-5 common questions **Mobile App** • Create an Android app using MIT App Inventor that allows the user to draw a basic shapes • Create an Android app using MIT App Inventor that allows the user to select a date and a menu item using Spinner • Create an Android app using MIT App Inventor that allows the user to select an event from a List View and display the event details on the screen • Create a simple app that **stores and retrieve data** using **Tiny DB** • Create an app where an object (e.g., a ball or an image) moves across the screen using animation **EXTERNAL MARK (50 Marks)**	**Total Hours** **30**

Course Designed by	VerifiedbyHOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Ms.Latha Ms.M.Dhavapriya Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS4S2	**Course Title:**	**Batch:**	2025-2028
		SEC II: Naan Mudhalvan: Aptitude for Placements	**Semester:**	IV
Hrs/Week:	2		**Credits:**	1

Course Objective

The objective of the course is to develop a wide variety of soft skills starting from communication, to working in different environments, learning creative and critical decision making, developing awareness of how to work with people and to resolve stress.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic mathematics and its functions.	K1
CO2	To understand the various problems in the real world related to shapes, purchase, sales, interest.	K2
CO3	To apply the skills required for various problems.	K3
CO4	To analyze the illustration and steps involved in problem solving approach.	K4
CO5	To build the quantitative aptitude skills for solving various mathematical and application.	K5

Mapping

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

H - High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	Numeral- Place Value or Local Value of a Digit in a Numeral- Face Value- Types of Numbers- Tests of - Multiplication by Short Cut Methods Divisibility- Basic Formulae-Progression.	6
Unit II	Time – Speed – Distance – Heights And Distances -Races - Problems On Trains – Boats & Streams- Time And Work - Ratio Proportion- Partnership - - Pipes and Cisterns -Chain Rule- Mixtures & Solutions- Clocks – Calendar.	6
Unit III	LCM and GCD - Unit digit, Number of zeroes, Factorial notation - Sets- Functions Square root, Cube roots, Remainder concepts—Identities- Fractions and Decimals, Surds.	6
Unit IV	Problems on ages- Percentage- Profit and Loss- Discount- . Simple Interest- Compound Interest-Installments- Stocks and Shares- True Discount.	6
Unit V	Logarithms- Linear Equations - Quadratic Equations And In-Equations Volume And Surface Area- Permutations And Combinations - Probability – Bar Graphs-Pie Charts-LineGraphs.	6
	Total Contact Hrs	30

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments, Online Quiz, Group Talk (APS)

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	R.S Agarwal	Quantitative Aptitude	S.Chand Publications.	2015

Reference Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Abhijit Guha	Quantitative Aptitude for Competitive Exams	McGrawhill Education, 6th edition	2016
2.	Dilip Kumar Yugnirmal	Quantitative Aptitude for Competitive Exams	Trail Blazer Winning Edge Series Publications.	2017

Course Designed by	VerifiedbyHOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.M.Malathi Dr.R. Nandhakumar Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS4N1	**Course Title:**	**Batch:**	2025-2028
		Non-Major Elective Paper-II: Flash Lab	**Semester:**	IV
Hrs/Week:	2		**Credits:**	2

Course Objective

The objective of this course is to make the students to learn about Macromedia Flash and develop their skills in creating animations and special effects by using the tools.

Course Outcomes (CO)

Onthe successful completion of the course, students will be able

CO Number	COStatement	Knowledge Level
CO1	To Remember the concepts of animation with flash Software.	K1
CO2	To under stand various applications and view its presentations.	K2
CO3	To apply the various tools available in Flash for creating animations.	K3
CO4	To get the idea about timeline, frames and motion tweens.	K4
CO5	To validate the animations by running the test movies.	K5

Syllabus

Contents	Hrs
SET A • Wind mill effect using flash • Drawing and creating text with effects using Flash • Logo using Flash • Moving car using Flash • Eye ball rotation using Flash • Growing moon using Flash. **SETB** • Rotating globe using Flash • Fog Effect using Flash • Lightning Effect using Flash • Animated Effect using Flash • Raining Effect using Flash • Bouncing ball using Flash. **EXTERNALMARK (50Marks)**	30

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.M.Malathi Dr.S.Sharmila Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS4N2	**Course Title:**	**Batch:**	2025-2028
		Non-Major Elective Paper-II: Internet Services and Applications Lab	**Semester:**	IV
Hrs/Week:	2		**Credits:**	2

Course Objective

To enable the students to know how to work with internet, the usage of internet and its applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To know about basic of internet	K3
CO2	To analyze the concept through online.	K4
CO3	To get idea about online applications.	K5

Syllabus

Contents	Hrs
SET A • Download a information about "Power of Indian president" from a website by using a search engine. • Select two electronics items by e-shopping. • Select mobile phone items by e-shopping. • Book Online train Tickets from Coimbatore to Chennai. • Using Search Engine download information on "Benefits of Yoga". • Open an email account in your names in gmail/yahoomail/hotmail. • Write e-mail to Pradeep by marking a blind copy to Priya. • Download information about "greatness of Himalayas for tourism interest" in PowerPoint presentation. • Create an electronic greeting card with personal remarks and pictures. • Create an album edited by using online photo editor tools. • Create a questions and post it to any online evaluation tool to conduct a test • Download information about greatness of Himalayas for tourism interest. **SET B** • Write a congratulating letter to your friend on his promotion using mail. • Download research articles on "Information technology Applications" and save as doc. Files. • Download M.Phil application form in Bharathiar university • Search the information about " PowerPoint creation" in youtube • Download pdf about the concept of "Environmental studies". • Convert word to pdf and pdf to word using online convertor.	**30**

• Pay EB-Bill through online • Create a new video using online video editing tools **EXTERNAL MARK (50Marks)**	

Course Designed by	Verified by HOD	Checked by	Approved by
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Dr.M.Malathi Dr.R.Shiddharthy Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc	**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS4VA	**Course Title:**	**Batch:**	2025-2028
		VAC II: Introduction to 3D Modeling and UI Design Lab	**Semester:**	IV
Hrs/semester:	30		**Credits:**	2*

Course Objective

To introduce the concepts of 3D Modeling and UI Design

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Apply the concept of 3D modeling	K3
CO2	Analyze the concepts of UI	K4
CO3	Evaluatea program in corporating all the User Interface.	K5

Syllabus

Contents	Hrs
SET A **3D Modeling (Tinkercad)** • Create a simple scene using basic shapes • Create a **sphere** and duplicate it to make different-sized balls. Change their **colors** and experiment with placements. • Create a **cylinder-shaped pencil holder.** Make it **hollow** by using the **hole tool** with a smaller cylinder inside. • Design a **coffee mug** with a **hollowed-out interior** and a **handle.** • Create a **pyramid** using **wedge shapes**. Rotate and align them to form a **4-sided pyramid structure.** **SET B** **UI Design (Figma)** • Design a **call-to-action button** for a mobile or web application • Create a user login form for a mobile or web application • Build a Navigation Bar for a mobile application • Design a **landing page header section** for a modern website • Create a **to-do list UI** that allows users to add and check off tasks.	30

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Name: Dr.M.Malathi Mrs. M.Dhavapriya Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature

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Programme code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS515			**Course Title:**	**Batch:**	2025-2028
					Semester:	V
Lecture Hrs/Week:	5	**Tutorial Hrs./ Sem.**	-	**CC IX**:Open Source Technologies	**Credits:**	4

Course Objective

On successful completion of the course the students should understand features and applications of HTML, DHTML, Apache, MySQL & PHP

Course Outcomes (CO)

CO Number	CO Statement	Knowledge Level
CO1	Understand HTML tags for designing static pages and separate design from content using Cascading Style sheet	K1
CO2	Gain knowledge on basic MySQL commands	K2
CO3	Apply MYSQL commands to create and connect PHP application	K3
CO4	Examine basic PHP syntax for variables types, operators and flow controls	K4
CO5	Evaluate application accessing restrictions, logging and monitoring Apache web server activity, optimizing and tuning MySQL	K5

Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	H	H	H	M	H	L	H	M	M	H	M	H
CO2	H	M	H	M	M	L	M	M	M	M	M	M
CO3	H	H	H	H	H	M	H	H	H	M	H	H
CO4	H	H	M	M	H	M	M	H	M	L	M	H
CO5	H	M	H	M	M	L	M	M	M	M	M	M

H-High; M-Medium; L-Low.

Syllabus

Units	Contents	Hrs
Unit I	***HTML*:** Introduction-SGML-DTD-DTD Elements-Attributes-Outlines of and HTML document- HEADSECTION-Prologue-Link-Basis-Meta-Script-Style-BODY SECTION-Headers-paragraphs- Text Formatting-Linking-Embedding Images-Lists-Tables-Frames-Other Special Tags and Characters-HTML Forms. ***Dynamic HTML (DHTML):*** Introduction-Cascading Style Sheet (CSS)-Coding CSS. Properties of Tags-Property Values-Other Style Properties-Inline Style Sheets- Embedded Style Sheets-External Style Sheets-Grouping-Inheritance.	15
Unit II	***MySQL:*** Introduction to MYSQL - The Show Databases and Table - The USE command - Create Database and Tables - Describe Table - Select, Insert, Update, and Delete statement – Some Administrative detail - Table Joins - Loading and Dumping a Database. **Using Transactions and Stored Procedures in MySQL:** What Are Transactions?-What are Stored Procedures?-Interacting with MySQL Using PHP – MySQL or MySQLite Functions? Connecting to MySQL with PHP – Working with MySQL Data.	15
Unit III	***PHP:*** Introduction-PHP Syntax-Variables-Data Types- String Functions-Constants-PHP Operators-Arithmetic Operators, Assignment Operators, String Operators, Increment/Decrement Operator- Comparison Operator- Logical Operator – Array Operators- if-else-elseif- Switch- While loop-for loop.	15
Unit IV	PHP Arrays-Sorting Arrays-PHP Global Variables-PHP Forms-Form handling-Form Validation- Form required field- PHP Functions-PHP Files: Opening and Closing files-Reading and Writing a file.	15
Unit V	***APACHE:*** Introduction - Apache Explained - Starting, Stopping, and Restarting Apache - Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Don't Allow public_html Web sites - Apache control with .htaccess	15
	Total Contact Hrs	75

Pedagogy and **AssessmentMethods**

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

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	N.P. Gopalan, J. Akilandeswari	Web-Technology–A Developer's Perspective	2nd Edition, PHI Publications	2014
2	Julie C. Meloni	PHP, MySQL and Apache	5th Edition, Pearson Education, Inc.	2012

Reference Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Rick Siva	MySQL Crash Course: A Hands-on Introduction to Database Development	No Starch Press	2023
2	Steven Holzner	PHP Complete Reference	Indian Edition	2017

Course Designed by	Verified by HOD	Checked by	Approved by
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Dr.M.Malathi M.Dhavapriya Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS516			**Course Title**	**Batch:**	2025 - 2028
				CC X:Cyber Security	**Semester:**	V
Lecture Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

This course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques. Upon the completion of this course, students should be able to understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Evaluate the computer network and information security needs of an organization.	K5
CO2	Assess cyber security risk management policies in order toadequately protect an organization's critical information and assets.	K2
CO3	Troubleshoot, maintain and update an enterprise-level information security system.	K3
CO4	Implement continuous network monitoring and provide real-time security solutions.	K4
CO5	Formulate, update and communicate short- and long-term organizational cyber security strategies and policies.	K5

Mapping

POs,PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	H	H	H	M	M	H	H	H	M
CO2	M	M	H	H	H	M	M	H	H	H	M	M
CO3	H	H	H	H	H	H	H	H	H	H	H	H
CO4	H	M	H	H	H	H	M	H	H	H	H	M
CO5	M	H	M	H	M	M	H	M	H	M	M	H

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Why Network Security is needed – Management principles – Security principles - Network management - Security attacks – Qualitiesof a Good Network. Organizational Policy and Security: Security policies, Standards and Guidelines – Information Policy – Security Policy - Physical Security – Social Engineering – Security Procedures – Building a Security Plan. Security Infrastructure: Infrastructure Components – Goals of Security Infrastructure – Design Guidelines – Security Models	15
Unit II	Cryptography: Terminology and background – Data Encryption Methods – Cryptographic Algorithms- Secret Key Cryptography - Public key cryptography – Message Digest – Security Mechanisms. Database Security: Introduction to Database – Characteristics of a Database Approach – Database Security Issues - Database Security – Vendor- Specific Security – Data Warehouse Control and Security	15
Unit III	Intrusion Detection Systems: What is not ad IDS – Infrastructure of IDS – Classification of Intrusion Detection Systems – Host-Based IDS – Network-Based IDS - Anomaly Vs Signature Detection – Manage an IDS – Intrusion Detection Tools – IDS Products and Vendors. Network Security: Fundamental Concepts – Identification and Authentication – Access Control – A Model for Network Security – Malicious Software – Firewalls	15
Unit IV	Network Management: Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management - Simple Network Management Protocol (SNMP). Security Management: Security Plan - Security Analysis - Change Management - Systems Security Management - Protecting Storage Media- Exchanges of Information and Software – Security Requirements of Systems.	15
Unit V	Electronic Mail Policy: Electronic Mail – What are the E-mail threats that organization's face - Why do you need an E-mail Policy - How do you create an E-mail Policy - Publishing the E-mail Policy - University E-mail Policy. Security of Internet Banking Systems: Introduction Banking System – Security Problem – Methodology for Security Problem – Schematic flow of Internet Banking – A layered approach to security.	15
TotalContactHrs		**75**

Pedagogy and Assessment Methods:

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

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	BrijendraSingh	Network SecurityandManagement	PHI	2007

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	RickHoward	Cyber Security Essentials	Auerbach Publications	2011.

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Ms.Latha Dr.M.Meenakrithika Signature:	Name:Dr.R.Manickachezian Signature:	Name:Mr.KSrinivasan Signature:	Name: Mr.KSrinivasan Signature:

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Programme code:	B.Sc			**ProgrammeTitle:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS517			**Course Title:**	**Batch:**	2025-2028
					Semester:	V
Lecture Hrs./Week & Practical Hrs./Week	5	**Tutorial Hrs./ Sem.**	-	**CC XI**: Artificial Intelligence and Machine Learning	**Credits:**	4

Course Objective

On successful completion of the course the students are able to understand the concepts of problemsolving logics, reasoning knowledge, Decision making, Learning with searches and algorithms.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To recall the basic logical searches, learning algorithms and improve decision makingsystems.	K1
CO2	To Summarize the idea about knowledge representation and reasoning	K2
CO3	To illustrate new knowledge with probabilistic reasoning solutions	K3
CO4	To Analyze Decision making system and its different process	K4
CO5	To evaluate the learning skills with many observations and machine learning algorithms	K5

Mapping

POs, PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	H	H	M	H	H	M	H	M	H
CO3	H	H	H	H	H	H	H	H	H	H	H	H
CO4	M	H	M	M	M	H	M	M	H	H	H	M
CO5	H	H	M	H	H	H	M	H	H	M	H	M

H – High; M: Medium L: Low

Syllabus

Units	Contents	Hrs
Unit I	**INTRODUCTION:** The Introduction of AI - The History of AI - Intelligent agents – Agent based system. PROBLEM SOLVING: State Space models - Searching for solution - Uninformed/Blind search - Informed/ Heuristic search- A* search - Hill- climbing search - Meta Heuristic: Genetic Algorithm - Adversary based search : Minimax - Expectimax – Alpha Beta pruning – Constraint satisfaction problem - Backtracking search	15
Unit II	**KNOWLEDGE REPRESENTATION AND REASONING**: Knowledge representation - Logics - bivalent logic - inference - Fuzzy logic: membership - Fuzzy rulesand reasoning - Fuzzy inference	15
Unit III	**UNCERTAIN KNOWLEDGE AND PROBABILISTIC REASONING**: Uncertainty - Probabilistic reasoning - Semantics of Bayesian network - Exact inference in Bayesian network- Approximate inference in Bayesian network - Probabilistic reasoning over time – Inference in temporal models - Hidden Markov Models – Dynamic Bayesian Networks	15
Unit IV	**DECISION-MAKING**: Basics of utility theory, Utility functions - Sequential decision problems - Markov decision process - Value iteration - Policy iteration- Decisions in Multi agent system: Multi agent decision theory - Group decisionmaking	15
Unit V	**MACHINE LEARNING:** Introduction- Probability distributions: Binary variables, Multinomial variables. Neural networks –feed forward network function-Error propagation. Kernel methods- radial bias function networks .Graphical models- Bayesian networks-Discrete variables, linear Gaussian model. Mixture models and EM-K means clustering-.Combining models-Boosting Algorithm.	15
	Total Contact Hrs	75

Pedagogy and Assessment Methods:

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

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1	Stuart Russell and Peter Norvig	Artificial Intelligence: AModern Approach	Pearson Education	2014
2	David Pool and Alan Mackworth,	Artificial Intelligence: Foundations of Computational agents	Cambridge University Press,	2017
3	Christopher M.Bishop	Pattern Recognition and Machine Learning	Springer	2013.

Reference Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	C. S. Krishnamoorthy, S.Rajeev	Artificial Intelligence and Expert Systemsfor Engineers	CRC Press	1996
2.	Nils J. Nilsson	The Quest for Artificial Intelligence: A History of Ideas and achievements	Cambridge University press	2010
3.	Alpaydin Ethem	Introduction to Machine Learning	Massachusetts Institute of Technology Press,	2009

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.Aruchamy Rajini M.Dhavapriya Signature:	Name: Dr.R.Manicka chezian Signature:	Name: Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS5E1			**Course Title**	**Batch:**	2025 - 2028
				DSE I: Data Mining and Warehousing	**Semester:**	V
Lecture Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

This course will introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Be familiar with the basics of data mining and data warehousing	K1
CO2	Develop skill in selecting the appropriate data mining algorithm for solving practical problems	K2
CO3	Characterize the kinds of patterns that can be discovered by classification, decision tree and neural network	K3
CO4	Identify the master data mining techniques in clustering	K4
CO5	Understand and implement classical models and algorithms in data warehouses and data mining	K5

Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	H	H	H	M	M	H	M	M	M	H	M	H
CO2	H	M	H	M	H	H	H	M	H	H	M	H
CO3	H	H	H	H	M	H	H	M	H	H	H	H
CO4	H	H	H	H	H	H	M	H	H	H	H	H
CO5	M	H	H	M	H	M	M	H	H	H	H	M

H-High;M-Medium;L-Low

Syllabus

Units	**Content**	**Hrs**
Unit I	**Introduction :**Basic Data Mining Tasks - Data Mining Versus Knowledge Discovery In Databases - Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective. **Data Mining Techniques:** Introduction – A Statistical Perspective on Data Mining –Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.	15

Unit II	**Classification:** Introduction – Issues in Classification- Statistical – Based Algorithms - Distance – Based Algorithms- Decision Tree-Based Algorithms – ID3, C4.5, CART, Scalable DT Techniques - Neural Network Based Algorithms – Propagation-NN Supervised Learning – Radial Basis Function – Perceptrons – Rule Based Algorithms – Combining Techniques.	15
Unit III	**Clustering**: Introduction – Similarity And Distance Measures – Outliers – Hierarchical Algorithms. **Association Rules**: Introduction - Large Item Sets - Basic Algorithms – Apriori Algorithm –Partitioning-Parallel and Distributed Algorithms – Comparing Approaches – Incremental Rules.	15
Unit IV	**Data Warehousing**: Introduction - Characteristics of a Data Warehouse – Data Marts – Other Aspects of Data Mart. Online Analytical Processing: Introduction - OLTP & OLAP Systems – Data Modeling –Star Schema For Multidimensional View –Data Modeling – Multi Fact Star Schema or Snow Flake Schema –OLAP Tools.	15
Unit V	**Advanced Topics**: Web Mining-Introduction – Web Content Mining-Web Structured Mining(Page Ranking Only)-Web Usage Mining-Spatial Mining-Introduction-Spatial Data Overview-Temporal Mining-Introductions-Time Series	15
	Total Contact Hrs	**75**

Pedagogy and Assessment Methods:

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

Text Books

S.NO	AUTHOR	TITLE OFTHEBOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Margaret H. Dunham	Data mining introductory and advanced topics	Pearson education	2003
2	C.S.R. Prabhu	Data warehousing concepts, techniques, products and a applications	PHI, Second Edition.	2015
3	Arun K. Pujari	Data Mining Techniques	Universities Press (India) Private Limited, Hyderabad	2008

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS / EDITION	YEAR OF PUBLICATION
1	Alex Berson, Stephen J. Smith	Data warehousing, Data mining, & OLAP	TMCH	2001
2	Jiawei Han & Micheline Kamber	Data mining Concepts & Techniques	Academic press	2001

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Programmecode:	B.Sc			**Programme Titie:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS5E2			**Course Title:**	**Batch:**	2025-2028
				DSE I: Data Engineering with Google Cloud	**Semester:**	V
LectureHrs/Week :	5	**Tutorial Hrs./ Sem.**	-		**Credits:**	4

Course Objective

On successful completion of the course the students are enabling to data-driven decision making by collecting, transforming, and publishing data.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the concepts of Data and storage.	K1
CO2	To understand the idea of designing data models	K2
CO3	To Apply Data Engineering Concepts in building Data Processing Systems	K3
CO4	To Analyze the Operational zing of Data Processing Systems.	K4
CO5	To evaluate the Data Processing System.	K5

Mapping

POs,PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	M	H	H	H	H	H
CO2	M	H	H	M	M	M	M	H	M	M	M	M
CO3	H	M	H	H	M	H	H	H	M	H	M	H
CO4	H	H	H	M	H	H	H	M	H	H	H	H
CO5	H	H	H	H	H	H	M	H	H	H	H	H

H-High;M-Medium;L-Low.

Syllabus

Units	Contents	Hrs
Unit I	**Selecting the appropriate storage technologies:** Mapping storage systems to business requirements-Data modeling-Tradeoffs involving latency-throughput, transactions-Distributed systems-Schema design. **Designing data pipelines:** Data publishing and visualization-Batch and streaming data-Online vs. batch predictions Job automation and orchestration. **Designing a data processing solution:** Choice of infrastructure System availability and fault tolerance-Use of distributed systems-Capacity planning, Hybrid cloud and edge computing- Architecture options-event processing. **Migrating data warehousing and data processing:** Awareness of current	15

	state and how to migrate a design to a future state migrating from on-premises to cloud validating a migration.	
Unit II	**Building and operationalizing storage systems:** Effective use of managed services (Cloud Bigtable, Cloud Spanner, Cloud SQL, BigQuery, Cloud Storage, Cloud Datastore, Cloud Memorystore)-Storage costs and performance-Lifecycle management of data. **Building and operationalizing pipelines:** Data cleansing Batch and streaming-Transformation Data acquisition and import integrating withnew data sources. **Building and operationalizing processing infrastructure:** Provisioning resources Monitoring pipelines Adjusting pipelines testing and qualitycontrol.	15
Unit III	**Operationalizing machine learning models:** Leveraging pre-built ML models as a service ML APIs (e.g., Vision API, Speech API)-Customizing ML APIs (e.g.,AutoML Vision, Auto ML text) Conversational experiences (e.g., Dialogflow).Deploying an ML pipeline ingesting appropriate data retraining of machine learning- models (Cloud Machine Learning Engine, BigQuery ML, Kubeflow, and Spark ML) Continuous evaluation. **Choosing the appropriate training and serving infrastructure:** Distributed vs. single machine Use of edge compute Hardware accelerators (e.g., GPU, TPU).	15
Unit IV	**Measuring, monitoring, and troubleshooting machine learning models:** Machine learning terminology (e.g., features, labels, models, regression, classification, recommendation, supervised and unsupervised learning, evaluation metrics)-Impact of dependencies of machine learning models Common sources of error (e.g., assumptions about data) **Designing for security and compliance:** Identityand accessmanagement (e.g., Cloud IAM)-Data security (encryption, key management)- Ensuring privacy (e.g., Data Loss Prevention API)Legal compliance (e.g., Health - Insurance Portability and Accountability Act (HIPAA)-Children's Online Privacy Protection Act (COPPA)-FedRAMP-General Data Protection Regulation (GDPR))	15
Unit V	**Ensuring scalability and efficiency:** Building and running test suites Pipeline monitoring (e.g., Stackdriver)-Assessing-troubleshooting and improving data representations and data processing infrastructure-Resizing and autoscaling resources **Ensuring reliability and fidelity:** Performing data preparation and qualitycontrol (e.g., Cloud Dataprep)-Verification and monitoring Planning, executing, and stress testing data recovery (fault tolerance, rerunning failed jobs, performing retrospective re-analysis)-Choosing between ACID, idempotent, eventually consistent requirements **Ensuring flexibility and portability:** Mapping to current and future business requirements-Designing for data and application portability (e.g., multi-cloud, data residency requirements) -Data staging-cataloging and discovery.	15
	TotalContactHrs	**75**

Pedagogy and AssessmentMethods

Seminar, PowerPointPresentation, Chalk and talk,Quiz,Assignments,Group Task.

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Dan Sullivan	Professional Data Engineer Study Guide	SYBEX Imprint,First Edition	2020

Reference Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Alasdair Gilchrist	Google CloudPlatform for DataEngineering: LearnFundamental toadvanceddataEngineeringconcepts andtechniquesusing 30+real-worldusecases	Kindle Edition	2019
2	Laura Lemay, Rafe Colburn,Jennifer Kyrnin	Data Analyticswith Google CloudPlatform: BuildReal time dataAnalyticson Google CloudPlatform.	BPB Publication Kindle Edition	2019

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS5E3			**Course Title**	**Batch:**	2025 - 2028
LectureHrs./Week	5	**Tutorial Hrs./Sem.**	-	**DSE I:** Block Chain technology	**Semester:**	V
					Credits:	4

Course Objective

To impart knowledge on Block chain and Cryptocurrency and make the students to design, build and deploy distributed applications by integrating the ideas from Block chain technology.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Remember the basics of Cryptography.	K1
CO2	Understand emerging abstract models for Block chain technology	K2
CO3	Design, build, and deploy a distributed application.	K3
CO4	Analyze the differences between proof-cf-work and proof-of-stake consensus.	K4
CO5	Evaluate security, privacy, and efficiency of a Block chain system.	K5

Mapping

POs, PSOs / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	H	H	M	M	H	H	H	M	H	M	M	M
CO2	M	H	M	L	H	H	H	M	H	L	H	H
CO3	M	H	L	L	M	H	M	M	M	M	H	H
CO4	H	H	L	H	H	H	H	M	H	L	H	H
CO5	H	H	L	H	H	H	M	L	H	L	H	H

H-High;M-Medium;L-Low

Units	Contents	Hrs
Unit I	**Introducing Blockchain**: Beginning at the Beginning: What Blockchains Are - What blockchains do - Why blockchains matter - The Structure of Blockchains - Blockchain Applications - The Blockchain Life Cycle. **Picking a Blockchain** - Where Blockchains Add Substance - Determining your needs - Defining your goal - Choosing a Solution - Drawing a blockchain decision tree - Making a plan.	15
Unit II	**Cryptography:** Types of Cryptography - Use of Cryptography in Blockchain - Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.	15
Unit III	**Basic Distributed Computing & Crypto primitives:** Atomic Broadcast, Consensus, Byzantine Models of fault tolerance, Hash functions, Puzzle friendly Hash, Collison resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge systems.	15
Unit IV	**Getting Your Hands on Blockchain** - Diving into the Bitcoin Blockchain - Creating your first Bitcoin wallet - Creating a second Bitcoin wallet - Generating a Bitcoin vanity address - Transferring your vanity address - Making an entry into the Bitcoin blockchain - Reading a blockchain entry in Bitcoin - Using Smart Contracts with Bitcoin - Checking the status of your contract.	15
Unit V	**Encountering the Ethereum Blockchain** - Exploring the Brief History of Ethereum - Ethereum: The Open-Source World Wide Computer - Decentralized applications: Welcome to the future - The power of decentralized autonomous organizations - Hacking a Blockchain - Understanding smart contracts - Discovering the crypto currency Ether - Getting Up and Running on Ethereum - Mining for ether - Setting up your Ethereum wallet.	15
	Total Contact Hrs	**75**

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Tiana laurence	Blockchain for dummies	1st Efotion, John Wiley & Sons, Inc	2017
2	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction	Illustrated Edition	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Daniel Drescher	Blockchain Basics: A Non-Technical Introduction in 25 Steps	Apress, 2nd Edition	2017

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (ComputerScience)	
Course Code:	25UCS518			**Course Title**	**Batch:**	2025 - 2028
				CC Lab VII: PHP & MySQL Lab	**Semester:**	V
Practical Hrs./Week	5	**Practical Hrs./Sem.**	-		**Credits:**	2

Course Objective

To learn about creating dynamic webpages using different open source technology like HTML, PHP, MySQL and Apache.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand HTML tags for designing static pages and separate design from content using Cascading Style sheet	K1
CO2	Gain knowledge on basic MySQL commands	K2
CO3	Apply MYSQL commands to create and connect PHP application	K4
CO4	Examine basic PHP syntax for variables types, operators and flow controls	K3
CO5	Evaluate application accessing restrictions, logging and monitoring Apache web server activity, optimizing and tuning MySQL	K5

Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	M	H	L	L	M	M	H	L	M	L	M	L
CO2	H	M	L	L	M	H	L	L	M	M	H	L
CO3	H	H	H	M	M	M	M	M	L	M	H	M
CO4	H	H	H	M	H	H	M	H	M	L	M	M
CO5	M	M	H	H	H	M	M	M	M	H	M	M

H-High;M-Medium; L-Low

Contents	Hours
Set A • Write a HTML program for Creation of web site with forms, frames, links, tables etc • Write a web application that functions as a simple hand calculator, but also keeps a paper trail of all your previous work • Create a web page with appropriate content and insert an image towards the left hand side of the page when user clicks on the image. It should open another web page. • Write a PHP program to check student grade based on the marks using if-else statement. • Write a PHP program to reverse the string. • Write a PHP program to count the words in the string. • Write a PHP program using nested for loop that creates a chess board. • Write a PHP program to find factorial of a number using recursive function. • Write a PHP program for shopping cart. • Write a query to get the first 3 characters of first name from employees table • Write a query to get unique departmentID from employee table. • Write a query to get the first name, last name who joined in the month of June. **Set B** • Write a PHP program for students mark list preparation using database Connection. • Write a PHP program to check if a person is eligible to vote or not. • Write a program in PHP to remove specific element by value from an array using PHP program. • Write a simple calculate or program in PHP using switch case • Create a table and implement all DDL Commands and all DML Commands. • Write a SQL statement to create a table named jobs including columns job_id, job_title, min_salary, max_salary and check whether the max_salary amount exceeding the upper limit 25000.	75

- Write a SQL statement to create a table named countries including columns country_id, country_name and region_id and make sure that the country_id column will be a key field which will not contain any duplicate data at the time of insertion.
- Write a SQL statement to increase the minimum and maximum salary of PU_CLERK by 2000 as well as the salary for those employees by 20% and commission percent by 10.
- Create salesman table with fields like salesman_id, name, city, commission and create customer table with column names like customer_id, cust_name, city, grade, salesman_id. Write a SQL statement to prepare a list with salesman name, customer name and their cities for the salesmen and customer who belongs to the same city.
- Create salesman table with fields like salesman_id, name, city, commission and create customer table with column names like customer_id, cust_name, city, grade, salesman_id. Write a SQL statement to know which sales man are working for which customer.
- Create a MySQL database for electricity bill processing.
- Create salesman table with fields like salesman_id, name, city, commission and create customer table with column names like customer_id, cust_name, city, grade, salesman_id. Write a query to display all salesmen and customer located in London.

INTERNAL MARK(20 Marks) EXTERNAL MARK(30 Marks)

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Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS5S1			**Course Title :**	**Batch :**	2025-2028
				SEC III: Programming Lab using .NET	**Semester:**	V
Hrs/Week:	4	**Tutorial Hrs./Sem**	-		**Credits:**	2

Course Objective

This Lab course will help students to achieve the following objectives:

- Introduce to .Net IDE Component Framework.
- Programming concepts in .Net Framework.
- Creating website using ASP.Net Controls.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To Create user interactive web pages using ASP.Net. K3 CO2 K4 CO3 K5	K3
CO2	To Create simple data binding applications using ADO.Net connectivity	K4
CO3	Performing Database operations for Windows Form and web applications.	K5

Mapping

POs, PSOs / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	M	M	H	H	H	M	H	M	M	M
CO2	M	H	M	L	H	H	H	M	H	L	H	H
CO3	M	H	L	L	M	H	M	M	M	M	H	H

H-High; M-Medium; L-Low

SET A	**Total Hours**
• Develop a project for performing arithmetic, relational and logical operators. • Develop a project for demonstrating polymorphism abstraction • Develop a project for demonstrating switch statements. • Create a form that is the main window of a program using window class. • Develop an application which is similar to notepad using menus • Develop an application for facilitating purchasing order . • Develop an application which is similar to login form. • Develop an application using tree view control • Develop an application using font dialog control • Develop an application using color dialog control. • Develop an application to display the file selected by the user in a web browser control	
SET B	
• Create a form which is displays the given inputs in the form of a tree view Structure. • Develop a project for implementing exception handling in c#. • Develop an application for billing system in coffee shop • Develop an application for fruits billing • Develop an application using the data reader to read from a database. • Develop a project which displays the student information in the relevant fields from the database which already exists. • Design an application with simple bulleted list control. • Design an application for selecting a single day in the calendar control.. • Design an application by using the new scroll bar feature with the panel server control.	60
EXTERNAL MARK (50 Marks)	

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS5AL			**Title**	**Batch:**	2025 -2028
				ALC-I: Cloud Computing	**Semester:**	V
Lecture Hrs./Week & Practical Hrs./Week	-	**Tutorial Hrs./Sem**	-		**Credits:**	2**

Course Objective

This course gives students an insight into the basics of cloud computing along with virtualization, cloud computing is one of the fastest growing domain from a while now. It will provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand basics of cloud computing along with virtualization	K3
CO2	Knowledge on cloud computing for community	K4
CO3	Understand and apply various collaboration on project management	K3
CO4	Evaluating web mail services and web conference tools	K4,K5
CO5	Exploring on line photo editing applications, exploring photo sharing communities	K4, K6

Mapping

PO /PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	L	M	M	M	M	H	M	H	H
CO2	H	M	H	L	H	M	M	H	H	M	H	H
CO3	H	M	H	L	H	H	M	H	H	L	H	H
CO4	H	M	H	L	H	H	M	H	H	H	H	H
CO5	H	M	H	L	H	M	H	M	H	H	H	H

H-High; M-Medium; L-Low

Units	Content
Unit I	Introduction: Cloud Computing Introduction, From, Collaboration to cloud, working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.
Unit II	Cloud Computing For Everyone: Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping, schedules, managing projects, presenting on road.
Unit III	Using Cloud Services: Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.
Unit IV	Outside The Cloud: Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis.
Unit V	Storing and Sharing: Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.
	Self Study Paper

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Michael Miller	Cloud Computing"	Pearson Education, New Delhi	2009
2	Ian Foster and Dennis B Gannon	Cloud Computing for Science and Engineering	MIT Press, Massachusetts	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBLICATION
1	RajkumarBuyya, James Broberg and AndrzejGoscinski	Cloud Computing: Principles and Paradigms	Wiley India Pvt Ltd, New Delhi	2017
2	Mathew Portnoy	Virtualization Essentials	Wiley India Pvt Ltd, New Delhi	2017

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS619			**Course Title**	**Batch:**	2025 - 2028
				Core XII : R Programming	**Semester:**	VI
LectureHrs./ Week	4	**Tutorial Hrs./Sem.**	-		**Credits:**	4

Course Objective

This course is laid to master techniques like data exploration, data visualization, and predictive analytics and descriptive analytics with the help of R language.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the core to provide a conceptual understanding of the basics of R programming	K1
CO2	To understand the common programming Variable classes, Data frames and lists	K2
CO3	To deploy the concepts of Reading, creating and storing R -CSV file	K3
CO4	To figure out appropriate statistical tests using R	K4
CO5	To describe the various data visualization methods.	K5

Mapping

POs,PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	H	H	M	H	H	M	H	M	H
CO3	H	H	H	H	H	H	H	H	H	H	H	H
CO4	M	H	M	M	M	H	M	M	H	H	H	M
CO5	H	H	M	H	H	H	M	H	H	M	H	M

H– High;M:MediumL:Low

Syllabus

Units	Contents	Hrs
Unit I	**OVERVIEW OF THE R LANGUAGE:** Defining the R project, Obtaining R, Generating R codes, Scripts, Comments, Text editors for R, Graphical User Interfaces (GUIs) for R, Packages.	12
Unit II	**R OBJECTS AND DATA STRUCTURES**: Variable classes, Vectors and matrices, Data frames and lists, Array and Factors.	12
Unit III	**MANIPULATING OBJECTS IN R:** Mathematical operations, Decision making, loops, functions and Strings.	12
Unit IV	**EXPLORATORY DATA ANALYSIS:** Reading, creating and storing R -CSV	12

	file, Excel File, Binary file, XML File - R -Mean, Median, Mode- Regression.	
Unit V	**GRAPHICAL REPRESENTATION:** R-PIE chart – Bar chart – Box plots- Histograms – line graphs - Scatter plots.	12
	Total Contact Hrs	**60**

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 PUBLICATION
1	Jared Lander	R for everyone	Pearson Education	2017
2	Norman Matloff	The Art of R Programming	No Starch Press	2011

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \EDITION	YEAR OF PUBLICATION
1	Garrett Grolemund	Hands on Programming with R	O'Reilly Media	2014
2	Nina Zumel &John Mount	Practical data science with R	Manning Publications	2014

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Aruchamy Rajini Dr.R.Nandhakumar Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E4			**Course Title**	**Batch:**	2025 - 2028
Lecture Hrs./Week	4&2	**Tutorial Hrs./Sem.**	-	**DSE-II:** Software Engineering	**Semester:**	VI
					Credits:	5

Course Objective

The objective of this course is to make the students to learn the development phases of a software lifecycle and to have the depth knowledge about a software project.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To recollect basic software quality assurance practices to ensure that software designs, development, and maintenance meet or exceed applicable standards.	K1
CO2	To understand concepts of software process models, management activities, requirement gathering.	K2
CO3	To implement proficiency of quality in software development process.	K3
CO4	To manage software projects indesigning, coding and documentation	K4
CO5	To evaluate different methods of verification, validation, testing and software maintenance	K5

Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PS02
CO1	H	H	L	L	M	H	L	H	M	L	H	H
CO2	H	H	L	M	M	M	L	H	M	M	H	H
CO3	H	H	M	M	H	H	H	H	H	M	H	H
CO4	H	H	M	M	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H	H	H

H-High;M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	Introduction to Software Engineering: Definitions – Size Factors – Quality and Productivity Factors. Planning a Software Project: Planning the Development Process – Planning an Organizational Structure.	18
Unit II	Software Cost Estimation: Software cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs.	18
Unit III	Software Requirements Definition: The Software Requirements specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.	18
Unit IV	Design Notations – Design Techniques. Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.	18
Unit V	Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance – Configuration Management.	18
Total Contact Hrs		90

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	Richard Fairley	Software Engineering Concepts	TMH	1997

Reference Books

S.No.	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1	Eve Anderson, Philip Greenspun, Andrew Grumet	Software Engineering for Internet Applications	PHI	2006
2	Rajib Mall	Fundamentals Of Software Engineering	PHI, 5th edition	2018
3	Stephen Schach	Software Engineering	TMH, 7th edition	2006

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Ms.Latha Dr.R.Shiddharthy Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E5			**Course Title:**	**Batch:**	2025-2028
Hrs/Week:	4&2	**Tutorial Hrs./Sem.**	-	**DSE II:** Web Development Essentials with Angular, React and Node.js	**Semester:**	VI
					Credits:	5

Course Objective

Upon successful completion of this course, students will be able to develop real-world applications using Angular, Node.js, and React. They will understand the theoretical and practical aspects of full-stack web development, create dynamic single-page applications with AngularJS, manage server-side development with Node.js, and build component-based interfaces with React.js. This course equips students with the essential skills to build robust and scalable web applications.

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand the foundational concepts of AngularJS, including its MVC architecture and the creation of Single Page Applications (SPA)	K2
CO2	Apply and manipulate AngularJS core features such as ng attributes, data binding, directives, and modules to develop dynamic web applications	K3, K4
CO3	Construct and implement advanced AngularJS functionalities, including custom filters, form handling, and Ajax calls using the $http service	K3, K5
CO4	Demonstrate proficiency in Node.js by setting up the development environment, utilizing core modules, and creating web servers to handle HTTP requests	K1, K3
CO5	Develop and manage React applications, including setting up projects, creating and optimizing components, and understanding advanced features such as Next.js and Concurrent Mode	K3, K5

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	H	L	L	H	L	L	L	H	L	H	L
CO2	H	H	L	L	H	H	L	L	H	L	H	L
CO3	H	H	H	L	H	H	L	L	H	L	H	L
CO4	H	H	H	L	H	H	L	L	H	H	H	L
CO5	H	H	L	L	H	H	H	H	H	H	H	H

H:High, M:Medium, L:Low

Syllabus

Units	CONTENTS	Hours
Unit I	**Introduction to AngularJS:**Overview of AngularJS - Advantages of AngularJS - Understanding the AngularJS MVC Architecture - Introduction to Single Page Applications (SPA) - **Setting Up the Environment:**Installing AngularJS -Creating the first AngularJS application using MVC architecture - **Core AngularJS Concepts:**Understanding ng attributes - Expressions and Data Binding - Working with Directives - Angular Modules, Controllers, Scope, and View - Creating Controllers and Modules - Understanding $scope hierarchy.	18
Unit II	**Filters and Forms:**Built-in filters: uppercase, lowercase, date, currency, number formatting, orderBy, filter - Creating custom filters - **AngularJS Forms:**Working with AngularJS forms - Model binding and form controller - Using CSS classes and form events - Custom model update triggers - Custom validation - **Ajax with AngularJS:**$http service - Ajax implementation using $http.	18
Unit III	**Introduction to Node.js:**Overview and features of Node.js - Setting up the development environment: Installing Node.js - Working with REPL and Node.js Console - **Node.js Core Concepts:**Understanding Node.js Modules - Node Package Manager (NPM) - Node.js Basics - File System operations - HTTP and HTTPS modules - Creating a web server - Handling HTTP requests - Node.js Callbacks and Events.	18
Unit IV	**Introduction to React.js:**Overview and features of React - Understanding the component-based architecture of React - Declarative nature of React - Quick JavaScript version overview: Classes and Closures - **Setting Up React:**Structure and objectives of a React project - Choosing a text editor - Setting up Node.js and NPM for React development - Setting up React projects - Introduction to JSX - Moving to TypeScript.	18
Unit V	**React Components:** Structure and objectives of React components - Class vs Functional components - Lifecycle management in React - **Introduction to Next.js:** Overview of Next.js and its features - Installation and setup of Next.js - Next.js default pages and routing - Working with Next.js components - Importance of CSS files in Next.js - **Bleeding Edge React:**How React works - Introduction to Concurrent Mode - Opting into Concurrent Mode - Suspense for code fetching and data fetching.	18
	Total Hours (60 Lecture + 30 Lab)	**90**

Pedagogy and Assessment Methods:

Seminar,PowerPoint Presentation,Chalk andTalk,Quiz, Assignments,GroupTask

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Brad Dayley	Node.js, MongoDB and AngularJS Web Development	Addison-Wesley 2nd Edition	2018
2	Mehul Mohan	Advanced Web Development with React: SSR and PWA with Next.js using Reactwith advanced concepts	First Edition	2020

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Adam Freeman	Pro Angular JS	Apress 1ST Edition	2014
2	Robin Wieruch	The Road To Learn React: Your Journey To Master Plain Yet Pragmatic React.Js	BPB Publication s, FirstEdition	2018

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Mr. K. Srinivasan Ms. G. Angayarkanni Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name:Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E6			**Title**	**Batch:**	2025 -2028
				DSE II: Mongo DB	**Semester:**	VI
Lecture Hrs./Week & Practical Hrs./Week	4&2	**Tutorial Hrs./Sem**	-		**Credits:**	5

Course Objective

To understand fundamentals of NoSQL and apply MongoDB (NoSQL) for Data Analysis using CURDand User Management.

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand NoSQL database Design multiple tables, and using group queries.	K3
CO2	Design a database based on a data model normalization to a specified level	K4
CO3	Understand and apply various operators and queries in Mongo DB	K3
CO4	Develop a text processing skill set and able to apply in creation of	K4,K5
CO5	Design a secure database and analyze with security protocols	K4, K6

Mapping

PO /PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	L	M	M	M	M	H	M	H	H
CO2	H	M	H	L	H	M	M	H	H	M	H	H
CO3	H	M	H	L	H	H	M	H	H	L	H	H
CO4	H	M	H	L	H	H	M	H	H	H	H	H
CO5	H	M	H	L	H	M	H	M	H	H	H	H

H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	**NoSQL :** Indexing and Hashing – Query Processing – Transaction Processing – Concurrency Control and Recovery - Advanced Database Concepts and Emerging Applications: Distributed Databases – Object Oriented Databases - Object Relational Databases- Data mining and Data Warehousing – Big Data - Big Databases- SQL–NoSQL Tradeoffs–CAP Theorem–Eventual Consistency - NoSQL–database types – Document Oriented – Columnar – Graph – KeyValue Pair - NoSQL database, design for performance / quality parameters, documents and information retrieval .	18
Unit II	**MongoDB Introduction** : MongoDB- Introduction - MongoDb – Need – MongoDBVs RDBMS – MongoDB- Driver Installation – Configuration – Import and Export – MongoDB Server Configuration - Data Extraction Fundamentals - Intro to Tabular Formats - Parsing CSV -Parsing XLS with XLRD- Parsing XML - Intro to JSON -Getting Data into MongoDB - MongoDB-CURD – Database Creation – Update – Read – Delete	18
Unit III	**MongoDB Operators** : Using mongoimport -Operators like $gt, $lt, $exists, $regex -Querying Arrays and using $in and $all Operators -Changing entries: $update, $set, $unset - Data Analysis - Field Queries - Projection Queries- Limiting – Sorting -Aggregation - Examples of Aggregation Framework - The Aggregation Pipeline - Aggregation Operators: $match, $project, $unwind, $group	18
Unit IV	**Indexes and Advanced MongoDB:** Indexes – Create – Find – Drop – Backup – MongoDB – Relationships – Analyzing Queries – MongoDB Objectid MapReduce – MongoDB - Text Processing - Regular Expression – Case Studies – Text processing of large datasets, Map Reduce using MongoDB - Data Security – Performance – Data Safety – Resource Utility – High – Advanced MongoDB: Map Reduce – MongoDB - Text Processing	18
Unit V	**Contemporary Issues:** Availability User Management – MongoDb Data Replication in Servers – Data Sharding – MongoDB Data Security – Performance – Data Safety – Resource Utility – High Availability Expert lectures, online seminars - webinars	18
	Total Contact Hrs (60 Lecture + 30 Lab)	90

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments, Online Quiz, Group Talk(APS)

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Kristina Chodorow	The Definitive Guide-Mongo DB	'O'Reilly Media, Reilly Media/ 3rd	2013
2	Guy Harrison	Next Generation Databases: NoSQL, New SQL and Big Data	Apress /2nd	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Shamkant B. Navathe, Ramez Elamsri	Fundamentals of Database Systems ",	Pearson Education Limited, 7th	2017
2	David Hows , Peter Membrey , EelcoPlugge , Timm Hawkins ,	The Definitive Guide to MongoDB, 3	Apress/ 2nd	2015

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Mr. K. Srinivasan Ms. G. Angayarkanni Signature:	Name: Dr.R.Manicka chezian Signature:	Name: Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E7			**Course Title:**	**Batch :**	2025-2028
				DSE-III: – Robotic Process Automation	**Semester:**	VI
Lecture Hrs/Week:	4&2	**Tutorial Hrs./ Sem.**	-		**Credits:**	5

Course Objective

On successful completion of the course the students are able to understand the concepts of RPA represent a transformative approach to streamline and automate business processes. By employing software robots or "bots," RPA technology can mimic human actions to execute repetitive and mundane tasks, significantly enhancing operational efficiency, accuracy, and productivity.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Describe RPA, where it can be applied and how it's implemented	K1
CO2	Describe the different types of variables, Control Flow and data manipulation techniques	K2
CO3	Identify and understand Image, Text and Data Tables Automation	K3
CO4	Describe how to handle the User Events and various types of Exceptions and strategies.	K4
CO5	Understand the Deployment of the Robot and to maintain the connection	K5

Mapping

POs,PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PSO1	PSO2
CO1	H	H	H	L	M	M	M	M	H	M	H	H
CO2	H	M	H	L	H	M	M	H	H	M	H	H
CO3	H	M	H	L	H	H	M	H	H	L	H	H
CO4	H	M	H	L	H	H	M	H	H	H	H	H
CO5	H	M	H	L	H	M	H	M	H	H	H	H

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Introduction to Robotic Process Automation:** Scope and techniques of automation, Robotic process automation - What can RPA do?, Benefits of RPA, Components of RPA, RPA platforms, The future of automation. RPA BASICS: History of Automation - What is RPA - RPA vs Automation - Processes & Flowcharts - Programming Constructs in RPA - What Processes can be Automated - Types of Bots - Workloads which can be automated - RPA Advanced Concepts - Standardization of processes - RPA Development methodologies - Difference from SDLC - Robotic control flow architecture - RPA business	18

	case - RPA Team - Process Design Document/Solution Design Document - Industries best suited for RPA - Risks & Challenges with RPA - RPA and emerging ecosystem.	
Unit II	**RPA Tool Introduction and Basics**: Introduction to RPA Tool - The User Interface - Variables - Managing Variables - Naming Best Practices - The Variables Panel - Generic Value Variables - Text Variables - True or False Variables - Number Variables - Array Variables - Date and Time Variables - Data Table Variables - Managing Arguments - Naming Best Practices - The Arguments Panel - Using Arguments - About Imported Namespaces - Importing New Namespaces- Control Flow - Control Flow Introduction - If Else Statements - Loops - Advanced Control Flow - Sequences - Flowcharts - About Control Flow - Control Flow Activities - The Assign Activity - The Delay Activity - The Do While Activity - The If Activity - The Switch Activity - The While Activity - The For Each Activity - The Break Activity - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data.	18
Unit III	**Advanced Automation Concepts & Techniques:**Recording Introduction - Basic and Desktop Recording - Web Recording - Input/Output Methods - Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval - Advanced Citrix Automation challenges - Best Practices - Using tab for Images - Starting Apps - Excel Data Tables & PDF - Data Tables in RPA - Excel and Data Table basics - Data Manipulation in excel -- Extracting.	18
Unit IV	**Handling User Events & Assistant Bots, Exception Handling:** Introduction to assistant bots - Monitoring system event triggers - Hotkey trigger - Mouse trigger - System trigger - Monitoring image and element triggers - An example of monitoring email - Example of monitoring a copying event and blocking it - Launching an assistant bot on a keyboard event. Exception Handling: Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors.	18
Unit V	**Deploying and Maintaining the BOT:** Publishing using publish utility - Creation of Server - Using Server to control the bots - Creating a provision Robot from the Server - Connecting a Robot to Server - Deploy the Robot to Server - Publishing and managing updates - Managing packages - Uploading packages - Deleting packages.	18
	Total Contact Hrs (60 Lecture + 30 Lab)	90

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments, Online Quiz, Group Talk(APS)

Text Book

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Alok Mani Tripathi	Learning Robotic Process Automation	Packt Publishing	2018

Reference Books

S.NO.	AUTHOR	TITLE OF THEBOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Richard Murdoch	Robotic Process Automation: Guide to Building Software Robots	Independently Published, 1st Edition	2018
2	Srikanth Merianda	Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation	Consulting Opportunity Holdings LLC, 1st Edition	2018

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Ms.Latha Dr.R.Nandhakumar Signature:	Name: Dr.R.Manickachezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E8			**Course Title:**	**Batch :**	2025 - 2028
				DSE-III : JavaScript and JQuery for Web Designing	**Semester:**	VI
Lecture Hrs./Week & Practical Hrs./Week	4&2	**Tutorial Hrs./ Sem.**	-		**Credits:**	5

Course Objective

On successful completion of the course the students are able to understand the concepts of problem solving logics, reasoning knowledge, Decision making, Learning with searches and algorithms.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Remember the concepts of basic web designing languages.	K1
CO2	Understand the idea of designing and scripting web pages	K2
CO3	Apply Queries using categorization and clustering	K3
CO4	Analyze the validation and querying techniques using Javascript and jQuery.	K4
CO5	Evaluate the web forms for different applications.	K5

Mapping

PO /PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PSO1**	**PSO2**
CO1	H	H	H	L	M	M	M	M	H	M	H	H
CO2	H	M	H	L	H	M	M	H	H	M	H	H
CO3	H	M	H	L	H	H	M	H	H	L	H	H
CO4	H	M	H	L	H	H	M	H	H	H	H	H
CO5	H	M	H	L	H	M	H	M	H	H	H	H

H-High; M-Medium; L-Low

Syllabus

Units	**Contents**	**Hrs**
Unit I	**Javascript:** Introduction-History of Javascript-Hello World Webpage-Buttons-Funtions –DOMs-Forms and Event Handlers-window object-if Statement-Strings-Numbers and Input Validation. Loops-Additional Controls-Manipulating CSS with Javascript.	18

Unit II	**JavaScript Operators:** Understanding the Operator Types - Understanding Arithmetic Operators - Understanding Assignment Operators - Understanding Comparison Operators - Understanding Order of Operations Defining Conditional Statements - What Is a Conditional Statement? Why Conditional Statements are Useful - Using Conditional Statements - Using if/else Statements - Using the switch Statement -Using the Conditional Operator - User Input from a Prompt.	18
Unit III	JS Arrays-JS Array Methods-JS Array Sort-JS Date-JS Switch-JS Type Conversion-Java Script Arrays-Math,Number,Date objects- Strings-Form Validation.	18
Unit IV	Objects: Defining Objects - Creating Objects – Naming - Single Objects - Object Structures - Constructor Functions - Using Prototypes - The class Keyword - Helpful Statements for Objects - The for-in Loop - The with Statement - Understanding Predefined JavaScript Objects - The Navigator Object - The History Object	18
Unit V	jQuery Overview-Basics-Selectors-Attributes-jQuery Traversing-Events-jQuery Ajax-jQuery UI: Interactions-Widgets-Theming	18
	Total Contact Hrs (60 Lecture + 30 Lab)	**90**

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments, Online Quiz, Group Talk (APS)

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	John Pullock	Java Script-A Beginners Guide	Tata McgrawHill, Fifth Edition	2020
2	Jonathan Chaffer, KarlSwedberg	jQuery	Packt, Fourth Edition	2010

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Jon Duckett	Web Design with HTML, CSS, JavaScript and jQuery Set	Wiley Publications	2014
2	Laura Lemay, Rafe Colburn,Jennifer Kyrnin	Mastering HTML, CSS, and Java ScriptWeb Publishing	BPB Publications	2016
3	Mary Delamater, ZukRuvalcaba	Java Script and jQuery	Mike Murach and Asscociates Inc.	2020

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.M.Malathi Dr. M.Meenakrithika Signature:	Name: Dr.R.Manickachezian Signature:	Name: Mr. K.Srinivasan Signature:	Name: Mr. K.Srinivasan Signature:

Dr. R. MANICKA CHEZIAN M.Sc.,M.S.,Ph.D.,
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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6E9			**Course Title:**	**Batch:**	2025 -2028
				DSE-III : Big data Analytics	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	4&2	Tutorial Hrs./Sem.	-		**Credits:**	5

Course Objective

On successful completion of course students will possess the skills necessary for utilizing tools (including deploying them on Hadoop/MapReduce) to handle a variety of big data analytics, and to be able to apply the analytics techniques on a variety of applications.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Remember how to collect, manage, store, query, and analyze various forms of big data	K1
CO2	Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data	K2
CO3	Deploy use of Big Data to deliver business value	K3
CO4	Analyze un-modeled, multi-structured data using Hadoop, MapReduce	K4
CO5	Validate the novel architectures and platforms introduced for Big data, in particular Hadoop and MapReduce.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Big Data Road Map:** Digital Data – an Imprint, Evolution of Big Data – What is Big Data – Sources of Big Data – Characteristics of Big Data – Data Discovery – Traditional Approach – Applications of Big Data. **Hadoop:** Why Hadoop – Hadoop Milestones – Hadoop Architecture – An Overview – Why Hadoop Distributed File System (HDFS) –HDFS Architecture - Why MapReduce – MapReduce Applications – Real time – Hadoop Ecosystem - Limitations of Hadoop 1.X Architecture – Hadoop YARN: Beyond	18
Unit II	**HADOOP ECOSYTEM:** Components of Hadoop Ecosystem – Hadoop Installation – PIG Installation – HIVE Installation. **SPARK and SCALA:** Why SPARK? Spark Ecosystem – Apache Spark Use Cases – SCALA Programming – SCALA REPL – SCALA vs Java.	18
Unit III	**NoSQL Database – HBASE –** Why NoSQL – Types of NoSQL Database – Advantages of NoSQL –HBASE – HBASE Architecture – HBASE vs RDBMS. **PIG:** Why PIG? PIG user Interactive Modes – PIG Latin – Dataset – PIG Commands and Functions – Relational Operators – Evaluation Functions – Batch Mode – Embedded Mode – PIG vs SQL.	18
Unit IV	**HIVE:** Why HIVE - HIVE Architecture – Data Units in Hive – Hive Query Languages – HIVE Startup – Database Operations – Tables – Joins – A Comparative View. **Data Analytics Big Data Tools:** R- Programming – Why R + Hadoop – Rhadoop Architecture – R Big Data Intergration Packages – SAS – SAS program Components – SAS Support for -Hadoop – SAS Functions – KNIME – KNIME Components – KNIME Big Data Analytics.	18
Unit V	**Big Data Solutions in the Real World:** The Importance of Big Data to Business – Big Data as a Business Planning Tool – Adding New Dimensions to the Planning Cycle – Keeping Data Analytics in Perspective – Getting Started with Right Foundation – Planning for Big Data – Transforming Business Processes with Big Data. **Ten Big Data Best Practices – Ten Big Data Do's and Don'ts.**	18
	Total Contact Hrs (60 Lecture + 30 Lab)	**90**

PedagogyandAssessmentMethods:

Direct Instruction, Flipped Class, Digital Presentation, Seminar, Online Quiz, Digital Assignments, Group talk: APS

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBLICATION
1	Judith Hurwitz,Alan Nurgent, Dr. Fern Halper, Marcia Kaufman	Big Data for Dummies (Unit 5)	First Edition, A Wiley Publication	2013
2	V. Bhuvaneswari, T. Devi	Big Data Analytics-A Practitioner Approach (Unit 1,2,3 & 4)	Independently Published, 1st Edition	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Michael Minelli, Michele Chambers, Ambiga Dhiraj	Big Data, Big Analytics – Emerging Business Intelligence and Analytic Trends For Todays Businesses	First Edition, A Wiley Publication	2013
2	Strata Conference, Making Data Work	Big Data Now	First Edition, Shroff Publication	2013

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Ms.Latha Dr. P. Jayapriya Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS620			**Course Title:**	**Batch:**	2025 - 2028
				CC Lab VIII: R Programming Lab	**Semester:**	VI
Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	2

Course Objective

On successful completion of the course the students learn the practical aspects of the R programming language

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	To implement Vector Roperations	K3
CO2	To review and analyze data frames and objects	K4
CO3	To validate how Barcharts and Piecharts are implemented	K5

Mapping

POs,PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	H	H	H	M	H	M	H	H	M
CO2	H	M	M	H	H	M	M	H	M	H	M	M
CO3	M	H	H	M	M	H	H	M	H	M	H	H

H-High; M-Medium; L-Low

Syllabus

Contents	Hrs
• R Program for Vector operations. • Create a R-list. • Implement matrices addition, subtraction and Multiplication. • Create a Dataframe. • Create a factor object. • Import data, copy data from CSV file to R. • Create a R program for Mean median and mode. • Draw Bar charts and Piecharts in R. • Make visual representations of data for plotting functions in R. • Create a R program for Regression Model. **.INTERNAL MARK (20 Marks) EXTERNAL MARK (30 Marks)**	75

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme Code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	25UCS621			**Course Title:**	**Batch:**	2025 - 2028
				CC Lab IX: IoT Lab	**Semester:**	VI
Practical Hrs/Week:	5	**Tutorial Hrs./Sem**	-		**Credits:**	2

Course Objective

On successful completion of the course the students should understand the IoT concepts and will be able to design IoT based prototypes.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Gain the knowledge of Internet connectivity principles	K3
CO2	Understand and apply various protocols for design of IoT systems	K4
CO3	Analyzing and evaluate the data received through sensors in IOT	K5

Mapping

POs, PSOs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	H	H	M	H	L	H	H	M	H	M	H
CO2	H	H	M	H	H	H	H	M	M	M	H	H
CO3	M	H	H	H	H	H	H	H	H	M	H	H

H-High; M-Medium; L-Low

Syllabus

Contents	Hrs
SET A • Make an LED blink at regular intervals • Turn LED ON/OFF using a push button • Make a buzzer beep when a button is pressed • Simulate a traffic light sequence • Measure and display temperature using Temperature Sensor **SET B** • Detect movement using a PIR sensor and turn on a buzzer when motion is detected • Measure soil moisture and turn ON LED when the soil is dry • LED Brightness Control Using Potentiometer • Measure the distance of an object using an Ultrasonic Sensor • Program to read the bending value of a Flex Sensor and display it on the Serial Monitor **INTERNAL MARK (20Marks)** **EXTERNAL MARK (30 Marks)**	75

Reference Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1	M.Dhavapriya, R.Nandhakumar	Internet of Things: A Beginners Approach	Independent Publisher	2024
2	Bahga, Arshdeep, and Vijay Madisetti	Internet of Things: A hands-on approach	Vpt	2014

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.M.Malathi Ms. M.Dhavapriya Signature:	Name: Dr.R.Manicka chezian Signature:	Name:Mr.K.Srinivasan Signature:	Name: Mr.K.Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS622			**Course Title**	**Batch:**	2025–2028
				Project	**Semester:**	VI
Lecture Hrs./ Week or Practical Hrs./ Week	-	**Tutorial Hrs./Sem.**	-		**Credits:**	2

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

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

COMPUTER SCIENCE PROJECT AND VIVA VOCE
Guidelines

Introduction

The title of the project work and the organization will be finalized at the end of fifthSemester. Each student will be assigned with a Faculty for guidance. The Project work andcoding will be carriedby using thefacility of computersciencelab as well asin theorganization. Periodical review will be conducted to monitor the progress of the projectwork. Project report will be prepared and submitted at the end of the semester. External examiner appointed by the Controller of Examination wil lconduct the viva voce examination along with respective guide.

Area of Work

- WebBased Development
- Mobileapp development
- Website development
- IoT Projects
- BigData and DataMining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python,R,Tableau,etc..
- WebSecurity Projects
- Image Processing

Methodology Arrangement of Contents:

Thesequenceinwhichtheprojectreportmaterialshouldbearrangedandboundasfollows:

1. Cover Page&TitlePage
2. BonafideCertificates
3. Declaration
4. Acknowledgement
5. Synopsis
6. Table ofContents
7. Chapters
8. Appendix
9. References

Format of Table of Contents

TABLE OF CONTENTS

Size of the Project

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

Programme code:		B.Sc		**Programme Title:**	Bachelor of Science (ComputerScience)	
Course Code:		25UCS6S1		**Course Title:**	**Batch:**	2025-2028
Practical Hrs./Week	3	**Tutorial Hrs./Sem**	-	**SEC IV**: Naan Mudhalvan: Data Visualization using Tableau Lab	**Semester:**	VI
					Credits:	2

Course Objective

The main objectives of this Lab are

- To understand the concept of Tableau
- To become familiar with the Work Sheets and Time Series
- To provide hands on experience with Tableau.
- To familiarize students with Various BI Dashboards

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Connect data source using Tableau.	K3
CO2	Implement Maps and Scatter plots.	K4
CO3	Apply appropriate data sets for visualization	K5

Mapping

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

H - High; M-Medium; L-Low

Content	Hours
• Connecting to a data source and joining related data sources in Tableau • Visualization concept using Show Me. • Adding, duplicating, and renaming, reordering, clearing, and deleting on worksheets. • Time series, Aggregation and Filters for Unemployment Data Statistics. • Maps and Scatter plots for a sample Dataset. • Table calculations, Dashboard and Storytelling using Customer Data Set. • Import the legacy data from different sources such as (Excel, SQL Server, Oracle etc.) and load in the target system. • Reporting/Dash boarding using powerBI. • Publishing Power BI Dashboards. • Data relationships and queries in PowerBI	45
Total Contact Hrs	**45**

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1.	Praveen Kumar	Data Visualization with Tablea	Kindle Edition	2020

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.M.Malathi Mr. N. Suresh babu Signature:	Name:Dr.R.Manicka chezian Signature:	Name:Mr.K. Srinivasan Signature:	Name: Mr.K. Srinivasan Signature:

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	25UCS6S2			**Course Title**	**Batch:**	2025 - 2028
				SEC IV: Naan Mudhalvan: Generative AI Lab	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	3	**Tutorial Hrs./Sem.**	-		**Credits:**	2

Course Objective

On successful completion of the course aims to provide students with a comprehensive understanding of AI models that generate text, images.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Apply fundamental concepts of Generative AI to develop AI-driven content generation models	K3
CO2	Analyze different Generative AI models and compare their performance in text, image, and video generation	K4
CO3	Evaluate the effectiveness of AI-generated outputs based on quality, realism, and human perception metrics	K5

Mapping

POs, PSOs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	M	H	L	H	H	M	H	M	H
CO2	H	H	M	H	H	H	H	M	M	M	H	H
CO3	M	H	H	H	H	H	H	H	H	M	H	H

H - High; M-Medium; L-Low

Syllabus

Contents	Hrs
SET A • Generate a short story or poem based on a given prompt using ChatGPT • Generate a Python program that sorts a list of numbers using AI assistance • Generate an AI-created image from a text prompt using DALL-E • Generate a Python program that sorts a list of numbers using AI assistance using GitHub Copilot	45

• Train a simple chatbot that answers questions on a specific topic **SET B** • Generate an AI-composed music track based on a genre • Train an AI model to detect fake news based on text input • Generate an AI-powered personalized email response • Use AI to create realistic character dialogues for a game • Use AI to draft a professional email **EXTERNAL MARK (50 Marks)**	
Total Contact Hrs	**45**

Pedagogy and Assessment Methods:

Direct Instruction, Digital Presentation, Digital Assignments

Text Books

S.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1.	Altaf Rehmani	Generative AI for everyone: Understanding the essentials and applications of this breakthrough technology	Kindle Edition	2024
2	Numa Dhamani	Introduction to Generative AI"	Kindle Edition	2024

Course Designed by	VerifiedbyHOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme Code:	B.Sc			**ProgrammeTitle:**	Bachelor of Science (Computer Science)	
CourseCode:	25UCS6AL			**Title:**	**Batch:**	2025-2028
Hrs/Week:		**Tutorial Hrs./Sem.**	-	**ALC-II:** Augmented Reality, Virtual Reality (AR/VR)	**Semester:**	VI
					Credits:	2**

Course Objective

This course provides a fundamental understanding of Augmented Reality (AR) and Virtual Reality (VR), covering their concepts, tools, sensor devices, modeling techniques, and application development. Students will gain hands-on experience in designing and developing AR/VR applications for various domains.

Course Outcomes:

CO Number	**CO Statement**	**Knowledge Level**
CO1	Remember the core concepts of Virtual Reality and Augmented Reality, their differences, and their key components.	K1
CO2	Understandthe VR and AR modeling techniques, including geometric, kinematics, and behavior modeling.	K2
CO3	Implement basic VR and AR applications using appropriate software tools and frameworks.	K3
CO4	Evaluate interaction techniques in VR and AR environments for better user experience.	K4
CO5	Develop AR/VR applications in different domains	K5

Mapping

POs / COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P1O**	**PSO1**	**PSO2**
CO1	H	M	M	L	L	L	L	L	M	L	M	M
CO2	M	H	M	L	M	M	L	L	M	L	H	M
CO3	H	H	M	M	H	M	M	M	H	M	H	H
CO4	M	M	H	M	H	H	M	M	H	H	H	M
CO5	H	H	H	M	H	H	H	M	H	H	H	H

H: High, M: Medium, L: Low

UNITS	CONTENTS
Unit I	**INTRODUCTION TO VR & AR - Virtual Reality (VR):** Definition, Three I's of VR, VR vs 3D Computer Graphics, Components of a VR System - **Augmented Reality (AR):** Definition, AR Technologies, AR vs VR, Introduction to Trajectories & Hybrid Space - **Input Devices:** 3D Position Trackers, Types of Trackers, Gesture-Based Interfaces, Navigation Interfaces. - **Output Devices:** Graphics Displays, Human Visual System, Personal & Large Volume Displays, Sound Displays.
Unit II	**MODELING IN VR & AR - Geometric Modeling:** Object Shape, Appearance, and Transformations- Kinematics Modeling: Object Position, Motion, Transformation Matrices - **Physical Modeling:** Collision Detection, Surface Deformation, Force Computation - **BehaviorModeling:** Object Interaction & Response to Environment - **Model Management:** Handling Multiple Objects & Scenes.
Unit III	**VR & AR PROGRAMMING FUNDAMENTALS - VR Programming Basics:** Toolkits & Scene Graphs - **Basic VR Software Frameworks:** World ToolKit, Java 3D (Overview) - **AR Software Development:** Camera Parameters, Camera Calibration, Marker-Based AR - **Developing Simple VR & AR Applications:** Using Basic Tools.
Unit IV	**INTERACTION IN VR & AR ENVIRONMENTS** - Motor Programs & Remapping in VR - Locomotion & Manipulation in VR & AR - Social Interaction in Virtual Spaces - Visualization Techniques for AR - Enhancing Interactivity in AR Environments.
Unit V	**APPLICATIONS OF AR & VR** - Education, Training & Simulation - Medical & Healthcare –Applications - Entertainment & Gaming - Business & Industrial Applications - Emerging Trends in AR & VR.
	Total Hours (Self Study Paper)

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 PUBLICATION
1	Gregory C. Burdea& Philippe Coiffet, John	Virtual Reality Technology	Second Edition, Wiley & Sons, Inc,	2017
2	Steven M. LaValle	Virtual Reality	Cambridge University Press	2016
3	Charles Palmer, John Williamson	Virtual Reality Blueprints: Create compelling VR experiences for mobile	Packt Publisher	2018
4	Dieter Schmalstieg, Tobias Hollerer,	Augmented Reality: Principles & Practice	Addison Wesley	2016

ReferenceBooks

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS /EDITION	YEAROF PUBLICATION
1.	John Vince	Introduction to Virtual Reality	Springer-Verlag	2004
2.	William R. Sherman, Alan B. Craig	Understanding Virtual Reality – Interface, Application, Design	Morgan Kaufmann	2003

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