DEPARTMENT OF COMPUTER SCIENCE

Nallamuthu Gounder Mahalingam College
(Autonomous)
(An ISO 9001:2008 Certified Institution)
Re-Accredited with 'B' Grade by NAAC
Pollachi-642001

SYLLABUS

B. Sc. COMPUTER SCIENCE
BATCH 2021-2024

NGM COLLEGE

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

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.

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.

Program Educational Objectives (PEOs)	
The **B. Sc. Computer Science** program 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 4.0/5.0 tools 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.
PEO6	To develop project

Program Specific Outcomes (PSOs)	
After the successful completion of **B.Sc. Computer Science** program, the students areexpected to	
PSO1	**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.
PSO2	**Education and Employment :** Ability to pursue higher studies of specialization and to take up technical employment

Program 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, 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	**Team Work :**Ability to operate as a member, leader and manage, deploy, configure computer network, hardware, software operation of 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	**Emerging Technology Usage**: Ability to appreciate emerging technologies and tools.
PO10	**Decision Making** : Ability to apply decision making methodologies to evaluate solution for efficiency, effectiveness, and sustainability

B.Sc. – COMPUTER SCIENCE DEGREE COURSE
(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2021 ONWARDS)
I to VI SEMESTERS: SCHEME OF EXAMINATIONS

Part	Course Code	Title of the Paper	Hrs/ Week		Exam Hrs	MAX.MARKS			Credits
			T	P		CIA	ESE	Total	
I SEMESTER									
I	21UTL101/ 21UHN101/ 21UFR101	Tamil Paper-I/ Hindi Paper-I/ French Paper-I	6		3	50	50	100	3
II	21UEN101	Communication Skill-I (Level I)	5		3	50	50	100	3
	21UEN102	Communication Skill-I (Level II)							
III	21UCS101	Core I: Programming in C and C++	4		3	50	50	100	4
	21UCS102	Core II: Digital Computer fundamentals and organization	4		3	50	50	100	4
	21UCS1A1/ 21UCS1A2	Allied-1: Mathematics (statistical and Numerical Methods) Allied-1: Advanced Mathematics and Applied statistical	4		3	50	50	100	4
	21UCS103	Core Lab I: Programming Lab in C and C++		5	3	25	25	50	2
IV	21HEC101	Human Excellence: Personal Values& SKY Yoga Practice-1	1		2	25	25	50	1
	21UHR101	Human Rights in India	1		2		50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)							
CC	21CFE101	Fluency in English– I	-	-	--	-	-	-	-
		Online Course (Optional) (MOOC / NPTEL / SWAYAM)		-	-	-	-	-	-
Total								**650**	**23**

II SEMESTER									
Part	**Course Code**	**Title of the Paper**	**Hrs/ Week**		**Exam Hrs**	**MAX.MARKS**			**Credits**
			T	P		**CIA**	**ESE**	**Total**	
I	21UTL202/ 21UHN202/ 21UFR202	Tamil Paper-II/ Hindi Paper-II/ French Paper-II	6		3	50	50	100	3
II	21UEN202	English Paper – II	5		3	50	50	100	3
III	21UCS204	Core III: Java Programming	4		3	50	50	100	4
	21UCS205	Core IV: Data and File Structure	4		3	50	50	100	4
	21UCS2A1/ 21UCS2A2	Allied -2:Discrete Mathematics Level-I Allied-2:Discrete Mathematical Structure Level-II	4		3	50	50	100	4
	21UCS206	Core Lab II: Programming Lab in Java		4	3	25	35	50	2

IV	21HEC202	Human Excellence: Family Values& SKY Yoga Practice-2		1	2	25	25	50	1
	21EVS201	Environmental Studies	2		2		50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)							
CC	21CFE202	Communicative English (Fluency) – II	-	-	-	-	-	-	-
	21CMM201	Manaiyiyal Mahathuvam - I	-	1	-	-	50	50	-
	21CUB201	Uzhavu Bharatham – I	-	1	-	-	50	50	-
		Online Course (Optional) (MOOC / NPTEL / SWAYAM)							
Total								**650**	**23**

SEMESTER III AND IV

Part	Course Code	Title of the Paper	Hrs/ Week		Exam Hrs	MAX.MARKS			Credits
			T	P		CIA	ESE	Total	
III SEMESTER									
III	21UCS307	Core V:.NET Technologies	4		3	50	50	100	4
	21UCS308	Core VI: Relational Database Management System	5		3	50	50	100	4
	21UCS309	Core VII: System Software and Operating System	4		3	50	50	100	4
	21UCS3A3	Allied -3 : Computer Based Optimization Techniques	5		3	50	50	100	4
	21UCS310	Core Lab III: Programming Lab in .NET Technologies		5	3	25	25	50	2
	21UCS311	Core Lab IV: Programming Lab in RDBMS		5	3	25	25	50	2
IV	21HEC303	Human Excellence Paper: Professional Values& SKY Yoga Practice-3		1	2	25	25	50	1
	21UCS3N1 / 21UCS3N2	Non-Major Elective Paper-I Photoshop Lab/ Advanced Applications in MS Excel Lab		1	2		50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)							
CC	21CFE303	Communicative English (Fluency) – III	-	-	-	-	-	-	-
	21CMM302	Manaiyiyal Mahathuvam - II	-	1	-	-	50	50	-
	21CUB302	Uzhavu Bharatham – II	-	1	-	-	50	50	-
	21UCS3VA	Department Specific Value Added Course (Mandatory)	30 HRS						2
Total								**600**	**23**

Part	Course Code	Title of the Paper	Hrs/ Week		Exam hrs	MAX.MARKS			Credits
			T	P		CIA	ESE	Total	
IV SEMESTER									
III	21UCS412	Core VIII: Python Programming	4		3	50	50	100	4
	21UCS413	Core IX: Open Source Technologies	4		3	50	50	100	4
	21UCS414	Core X: Data Communication and Computer Networks	4		3	50	50	100	4
	21UCS4A4	Allied -4 : Accountancy for Decision Making	6		3	50	50	100	4
	21UCS415	Core Lab V: Programming Lab using Python		5	3	25	25	50	2
	21UCS416	Core Lab VI:Web Programming using Open Source Technologies		5	3	25	25	50	2
IV	21HEC404	Human Excellence Paper : Social Values & SKY Yoga Practice-4		1	2	25	25	50	1

	21UCS4N1 / 21UCS4N2	Non-Major Elective Paper-II Flash Lab/ Internet Services and Applications Lab		1	2	25	25	50	2
V		Extension Activities (NSS, NCC, Sports & Games)							
CC	21CFE404	Communicative English (Fluency) – III							
	21CMM404	Manaiyiyal Mahathuvam - III		1			50	50	
	21CUB403	Uzhavu Bharatham – III		1			50	50	
	21UCS4VA	Department Specific Value Added Course (Mandatory)	30 HRS						2
Total								**600**	**23**

SEMESTER V AND VI

SEMESTER V									
Part	**Course Code**	**Course Title**	**Hrs/ Week**		**Exam Hrs**	**MAX.MARKS**			**Credits**
						Int	**Ext**	**Total**	
III	21UCS517	Core XI: Linux and Shell Programming	4		3	50	50	100	3
	21UCS518	Core XII: Kotlin Programming	4		3	50	50	100	3
	21UCS519	Core XIII: Cyber Security	4		3	50	50	100	2
	21UCS5E1/ 21UCS5E2/ 21UCS5E3	Core Elective-I:	6		3	50	50	100	4
	21UCS520	Core Lab VII: Linux: shell and Socket Programming Lab		5	3	50	50	100	3
	21UCS521	Core Lab VIII: Programming Lab using Kotlin		5	3	50	50	100	3
	21UCS5AL1	Advanced Learner Course – I (Optional) - Self Study				50	50	100	3*
IV	21UCS5S1/ 21UCS5S2 / 21UCS5S3	Skill Based Elective-I		3	2	25	25	50	3
	21HEC505	Human Excellence Paper: National Values& SKY Yoga Practice-5		1	2	25	25	50	1
	21GKL501	General Knowledge	SS		2	-	50	50	2
V		Extension Activities - Annexure I							
CC	21CEF505	Communicative English (Fluency) – V							
	21CSD501	Soft Skills Development – I							
Total								**750**	**25**

List of Electives-I
21UCS5E1 Data mining and Warehousing
21UCS5E2 Data Engineering with Google Cloud
21UCS5E3 Mobile Application Development

Skill Based Elective I
21UCS5S1 Word Press
21UCS5S2 Dream Weaver
21UCS5S3 Quantitative Aptitude Skills

VI SEMESTER									
Part	**Course code**	**Course Title**	**Hrs/ Week**		**Exam/ Hrs**	**MAX.MARKS**			**Credits**
			T	P		**Int**	**Ext**	**Total**	
III	21UCS622	Core XIV: R Programming(SEP)	4		3	50	50	100	3
	21UCS6E4 21UCS6E5 21UCS6E6	Core Elective – II (4hrs theory and 2hrs lab)	6		3	50	50	100	5
	21UCS6E7 21UCS6E8 21UCS6E9	Core Elective – III (4hrs theory and 2hrs lab)	6		3	50	50	100	5
	21UCS623	Core Lab IX: R Programming Lab		5	3	50	50	100	3
	21UCS624	Core Lab X: Advanced Applications in MS Excel Lab		4	3	25	25	50	2

	21UCS625	Project		4	-	50	50	100	3
	21UCS6AL2	Advanced Learner Course - II (Optional) - Self Study				50	50	100	3*
IV	21UCS6S4/ 21UCS6S5/ 21UCS6S6	Skill based Elective-II		2	2	25	25	50	3
	21HEC606	Human Excellence Paper: Global Values & SKY Yoga Practice-6		2	2	25	25	50	1
V		Extension Activities - Annexure I							
CC	21CEF606	Communicative English (Fluency) – VI							
	21CSD602	Soft Skills Development – II							
Total								**650**	**24**
Grand Total								**3900**	**140**

List Of Electives-II	**List of Electives-III**	**Skill Based Elective-II**
21UCS6E4 Artificial Intelligence and Machine Learning 21UCS6E5 Front End Development with React 21UCS6E6 MongoDB	21UCS6E7 Information Retrieval 21UCS6E8 HTML,Javascript and JQuery for Web Designing 21UCS6E9 Angular NodeJS	21UCS6S4 Joomla 21UCS6S5Macromedia Director 21UCS6S6 Soft Skills

* Extra Credits

Question Paper Pattern

(Based on Bloom's Taxonomy)

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

1. Theory Examinations: 70 Marks (Part I, II, & III)

(i) Test- I & II, ESE:

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q 1 -10)	A (Q 1 – 5 MCQ) (Q 6–10 Define/Short Answer)	10 x 1 = 10	MCQ Define	70 **(Reduced to 50 for ESE)**
K3 (Q 11-15)	B (Either or pattern)	5 x 4 = 20	Short Answers	
K4 & K5 (Q 16 – 21)	C (Q -16 is Compulsory and Q 17 – 21 answer any 3)	4 x 10 = 40	Descriptive/ Detailed	

2. Theory Examinations: 50 Marks (Part IV)

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q 1 -10)	A (Q 1 – 5 MCQ) (Q 6–10 Define / Short Answer)	10 x 1 = 10	MCQ Define	50 **(Reduced to 25 for ESE)**
K3, K4 & K5 (Q 11-18)	B (Answer 5 out of 8)	5 x 8 = 40	Short Answers	

3. Practical Examinations: 100/50 Marks

Knowledge Level	Criterion	External/Internal Marks	Total
K3	Record work & Practical	50/50	100
K4			
K5		25/25	50

***** In Theory ESE, Students will write Examination Maximum Marks as 70 and it will be reduced to 50 for Total Mark calculation.

Components of Continuous Assessment

Components		Calculation	CIA Total
Test 1	(70/4.67)	15+15+10+5+5	50
Test 2 (Model)	(70/4.67)		
Seminar	10		
Assignment / Digital Assignment	05		
Group Task : GD, Role Play, APS	05		

Maximum Marks: 50; CIA Mark: 25

Components		Calculation	CIA Total
Test / Model	10	10+5+5+5	25
Assignment / Digital Assignment	5		
Seminar / Socratic Seminar	5		
Group Task : GD, Role Play, APS	5		

PRACTICAL

Maximum Marks: 50; CIA Mark: 25

Components		Calculation	CIA Total
Test / Model	15	15+5+5	25
Observation Note	5		
Record	5		

Maximum Marks: 100; CIA Mark: 50

Components		Calculation	CIA Total
Test / Model	30	30+5+15	50
Observation Note	5		
Record	15		

Maximum Marks: 200; CIA Mark: 100

Components		Calculation	CIA Total
Test / Model	60	60+10+30	100
Observation Note	10		
Record	30		

STUDENT SEMINAR EVALUATION RUBRIC

Grading Scale:

A	B	C	D
5	4	2 - 3	0 - 1

CRITERIA	A - Excellent	B - Good	C - Average	D - Inadequate	Score
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow; sequence of information jumpy	
Knowledge of 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 grasp of information; answered only rudimentary Questions **&** Material not clearly related to topic **OR** background dominated seminar	
Presentation Skills using ICT Tools	Uses graphics that explain and reinforce text and presentation	Uses graphics that explain 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 audience	Refers to slides to make points; eye contact majority of 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 Voice is clear and steady; audience can hear well at all times	Incorrectly pronounces few terms Voice is clear with few fluctuations; 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
09 - 10	**07- 08**	**05 - 06**	**03 - 04**	**01 - 02**

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 writing is interesting	Hits in basic content and writing is 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 topic * Words convey intended message	* Word choice is basic * Most writing language is appropriate to topic * Informal language	* Word choice is vague * Writing language is not appropriate to 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 move than 10 days late

Guidelines for Project / Internship – Commerce, Management & Social Work

The final year Commerce, Management & social work students should undergo a project work during V / VI semester

1. The period of study is for 4 weeks.
2. Project/Internship work has to be done in an industrial organization (or) work on any industrial problem outside the organization is allowed.
3. Students are divided into groups and each group is guided by a mentor.
4. The group should not exceed four students, also interested student can undergo individually.
5. A problem is chosen, objectives are framed, and data is collected, analyzed and documented in the form of a report / Project.
6. Viva – Voce is conducted at the end of this semester, by an external examiner and concerned mentor (Internal Examiner).
7. Project work constitutes 100 marks, out of which 50 is internal and 50 is external marks.

PROJECT

Maximum Marks: 100; CIA Mark: 50

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

Maximum Marks: 200; CIA Mark: 100

Components		Calculation	CIA Total
Review I	20	20+20+20+40	100
Review II	20		
Review III	20		
Report Submission	40		

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS101			**Title**	**Batch:**	2021 - 2024
				Core I: Programming in 'C' and 'C++'	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	4

Course Objective

On successful completion of this course the students should understand the core concepts and techniques in C programming and to understand the object oriented programming concepts such as classes, objects, inheritance, overloading and file handling. It provides the technical skills to the students to design and develop the applications and to solve the real world problems using C/C++.

Course Outcomes (CO)

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand the basic concepts of C programming and select appropriate data types, looping and functions for solving a given problem.	K2, K5
CO2	Remember the concept of structures, memory allocation and file handling and develop C programming using pointer and file management	K2, K3
CO3	Define the different programming paradigm and conceptualize elements of OO methodology and apply encapsulation concepts in developing the programs with classes and objects.	K1, K3
CO4	Identify the concepts of functions, constructor and its types and create applications using overloading features.	K3, K5
CO5	Analyze the usage of different kinds of inheritance and its types in real world scenario and Explain the importance of exception handling	K4, K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Content	Hrs
Unit I	**Introduction of Programming Languages:** Types of Languages - Evolution of 'C' Language - Structure of a 'C' Program - 'C' Program development life cycle - Executing and Debugging a 'C' Program; **'C' Tokens:** Keywords and Identifiers – Operators – Constants – Variables - Data Types - Precedence of Operators - Scope and Lifetime of Variables; **Control Statement and Expressions:** Decision Making using if statement - Types of if …else block - Switch case Block - Arithmetic Expressions - Evaluation of Expressions - GOTO statement; **Looping:** Concept of Loop - For loop - While loop - Do while loop - Jumping in Loop - break and continue statement; **Arrays and String:** Introduction of Array - One D Array - Two D Array – Multidimensional Array - Dynamic Arrays - Implementing String Variables - String handling Functions; **Functions:** Concept of Function - User defined Function - System Defined Function - Types of parameter passing in function	10
Unit II	**Structure and Unions:** Need of Structure - Implementing Structure Variable - Arrays of Structure - Structure within Structure - Introduction of Unions - Difference between Structure and Unions; **File Handling using 'C':** Opening and Closing File - Input / Output operations on File - Random Access to Files - Command Line Arguments; **Dynamic Memory Allocation:** Concept of Dynamic Allocation - Implementing Malloc and Calloc Functions - Releasing the free space; **Storage Classes and Pre-processor:** Introduction of Storage Class - Types of Storage Classes - Introduction of Pre-processor - Macro Substitution - File Inclusion	11
Unit III	**Introduction to Object Oriented Programming:** Concept of OOP - Features of OOP Introduction of 'C++' - Structure of 'C++' program - Executing and Debugging a 'C++' Program; **'C++' Tokens and Type Casting:** Keywords and Identifiers – Operators – Constants – Variables - Data Types - Precedence of Operators - Scope and Lifetime of Variables; **Classes & Objects:** Classes & Object Specifier - Defining data members and member functions - Array of objects - Managing console I/O - 'C++' stream classes - Formatted and unformatted console I/O - Usage of manipulators	10
Unit IV	**Function in 'C++':** Call by reference, Return by reference - Function overloading and default arguments - Inline function - Static class members - Friend functions - Virtual Functions; **Constructors and Destructor:** Concept of Constructor - Types of Constructors - Memory allocation (new and delete) - Usage of destructor; **Operator Overloading:** Overloading Unary and Binary operators - Overloading using friend function	11
Unit V	**Inheritance:** Types of inheritance - Virtual base classes and abstract base classes - Constructor and destructor in derived class; **Working with files:** File operations - File pointer and their	10

	manipulation - File Updation with random access; **Exception Handling:** Various Exception Handling classes - Implementing try and catch block - Use of throw keyword	
	Total Contact Hrs	52

Pedagogy and Assessment Methods:

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

Text Book

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.
2	E. Balagurusamy	Object Oriented Programming with C++	Tata McGraw Hill publication, Fifth edition	2012.

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Yaswanth Kanishkar	LET US C	BPB Publications, Fourteenth Edition	2016
2	Ashok N. Kamthane	Programming with ANSI and Turbo C	First Edition	2009
3	D.Ravichandran.J	Programming with C++	Tata McGraw Hill publication, fourteenth edition	2001

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini Dr. M. Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS102			**Title**	**Batch:**	2021 - 2024
				Core II: Digital Computer Fundamentals and Organization	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	04

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 completion of the course, students will be able to

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 microcontroller case study.	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 – Demultiplexers – Decoders. Flip Flops: Types of Flip Flops – SR Flip Flop – JK Flip Flop – T Flip Flop. **Registers:** Shift registers- 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 Data Transfer – Store Control and Handshaking – DMA –DMA Controller, DMA Transfer.	12
Unit V	**Input – Output Processor:** CPU – IOP Communication – **Memory Organization:** Memory Hierarchy – *Main Memory* – **Associative Memory:** Hardware Organization – Match Logic – Cache Memory – Associative – Direct, set, Associative Mapping.	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	V.K. Puri,.	Digital Electronics Circuits and Systems	TMH.	2017
2	S.Arivazhagan, S Salivahanan	Digital Circuits And Design	Vikas Publishing House Pvt Limited	2009,
3	M. Morris Mano	Computer System Architecture	PHI	2015

Reference Books

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**
M.Malathi N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS1A1			**Title**	**Batch:**	2021 - 2024
				Allied-1: Mathematics(Statistical and Numerical Methods)	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**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 to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand the definition of matrix and determinants and apply various operations on it	K3
CO2	Understand the statistical formula and apply them in various data analysis	K3
CO3	Understand the concept of most powerful test and analyze the samples based onmost powerful test like‘t’ and ‘F’ distributions	K4
CO4	Understand the concepts of probability and apply to solve real life situations	K3
CO5	Obtain numerical solutions of algebraic equations and compute the integrals by using the appropriate technique	K4

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	H	M
CO2	H	M	H	L	H	M	M	M	M	H	H	M
CO3	M	M	H	L	H	M	M	M	M	H	H	M
CO4	H	M	H	L	H	H	H	M	H	H	H	H
CO5	M	M	H	L	H	H	L	M	M	M	H	H

H-High; M-Medium; L-Low

Syllabus

Units	Content	Hrs
Unit I	**Matrices**: Introduction –Determination –Inverse of a Matrix –Rank of a Matrix– Solving a Simultaneous Linear Equation using Matrix – Cayley Hamiltonian theorem - Eigen Value and Eigen Vectors- Problems.	12
Unit II	**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.	12
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	12
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	12
Unit V	**Numerical Methods:** Gauss-Seidal method for linear algebric system - Newton's Rapshon method for polynomial system-Newton forward and backward interpolation-Trapezoidal rule, Simpson 1/3 rule and 3/8 rule for Numerical Integration.	12
	Total Contact Hrs	60

Pedagogy and Assessment Methods:

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

Text Book

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	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, 13/e	2016
2	Santosh KumarSengar	Computer Oriented Statistical and Numerical Methods	S.Chand and Co, 4/e	2017

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
K. Srinivasan G. Angayarkanni	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Level II

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS1A2			**Title**	**Batch:**	2021 - 2024
				Allied-1: Advanced Mathematics and applied Statistics	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**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 to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Understand and analyze the statistical formula and apply them in 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 spaceandalso learn its moment generating function	K4
CO3	Analyze the concept of most powerful test and analyze the samples based onmost 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 algebraic equations and compute 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, Karl Pearson Co-efficient of Correlation, Rank Correlation, Bivariate Correlation – Regression: Lines of Regression, Co-efficient of Regression.	12
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 (Definition only)	12
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	12
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.	12
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 interpolation-Trapezoidal rule-Simpson 1/3 rule and 3/8 rule for Numerical Integration.	12
	Total Contact Hrs	60

Pedagogy and Assessment 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 and Sons, 17/e	2017
2	RSN Pillai &Bagavathi	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	Santosh Kumar	Computer Oriented Statistical and Numerical Methods	S.Chand and Co , 5/e	2013

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
K. Srinivasan G. Angayarkanni	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS103			**Title :**	**Batch :**	2021-2024
				Core Lab I: Programming Lab in C & C++	**Semester:**	I
Hrs/Week:	5	**Tutorial Hrs./Sem.**	75		**Credits:**	02

Course Objective

The purpose of this course is to enrich knowledge in the field of programming using C and C++ language. The students will be able to analyze and improve their problem solving skills in C and also to enhance problem solving and programming skills using OOPs concepts in various domains.

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Course Outcomes (CO)

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

CO1	To implement different operations on arrays and use functions in C to solve any problems and to apply the basic concepts of C++ such as function, friend functions and array of Objects to solve a particular problem.	K3
CO2	To evaluate the C program that uses pointers, structures and files and to analyze programs Using more advanced OOPs concepts such as Constructor/Destructor, Operator overloading, Inheritance, and Polymorphism.	K4
CO3	To validate programs with pointers and arrays, perform pointer arithmetic, and pre Processor in C and also to validate programs using Dynamic memory allocation and Virtual functions in C++.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
	SET A • C Program to find the greatest number among 'n' numbers. • C Program to find Prime numbers between a given ranges. • C Program for finding Sum of individual digits. • C Program to display a set of numbers in Ascending order. • C Program to find whether a given string is a palindrome or not • C Program to find the transpose of a matrix. • C Program to illustrate the concept of structures. • C++ Program to generate Fibonacci series for 'n' numbers. • C++ Program to illustrate the concept of class and object. • C++ Program to illustrate the concept of function with return statement. • C++ Program to illustrate the concept of Inline and Friend function. • C++ Program to illustrate the concept of function overloading. • C++ Program to illustrate the concept Array of Object. • C++ Program to illustrate the concept of objects as Function argument and returning by objects. • C++ Program to illustrate the concept of Constructors and Destructors. **SET B** • C Program for Binary search. • C Program to find a Mean, median & mode for given values. • C Program to calculate Matrix multiplication. • C Program to count vowels, consonants, white spaces in a given sentence. • C Program to illustrate the concept of Pointers. • C Program to create and processing a random access file. • C Program for command line arguments • C++ Program to illustrate the concept copy constructor. • C++ Program to illustrate the concept overloading binary operators. • C++ Program to illustrate the concept of single inheritance. • C++ Program to illustrate the concept of multiple inheritances. • C++ Program to illustrate the concept pointers to objects and to derived objects. • C++ Program to illustrate the concept virtual function. • C++ Program to illustrate working with single file. • C++ Program to illustrate working with multiple files **INTERNAL MARK (50 Marks)** **EXTERNAL MARK (50 Marks)**	**75**

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.
2	E. Balagurusamy	Object Oriented Programming with C++	Tata McGraw Hill publication, Fifth edition	2012.

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Yaswanth Kanishkar	LET US C	BPB Publications, Fourteenth Edition	2016
2	Ashok N. Kamthane	Programming with ANSI and Turbo C	First Edition	2009
3	D.Ravichandran.J	Programming with C++	Tata McGraw Hill publication, fourteenth edition	2001
4	Rabort Lafore	Object Oriented Programming with C++	Galgotia Publication Pvt. Ltd, second edition	2003

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini Dr. M. Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS207			**Title :**	**Batch :**	2021-2024
				Core II : Java Programming	**Semester:**	II
Lecture Hrs/Week:	4	**Tutorial Hrs./Sem.**	60		**Credits:**	04

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.

Course Outcomes (CO)

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

CO1	To remember the OOPs concepts such as class, methods, inheritance, encapsulation and polymorphism etc.	K1
CO2	To understand the differences between application programs and applets, applet lifecycle 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 analyze byte stream classes input files and I/O functions	K5

Mapping

POs / **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**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 & Datatypes-Operators & Expressions-Decision making & branching-Decision making & looping.	10
Unit II	Classes, Objects & methods- Arrays, Strings & Vectors-Interfaces: Multiple Inheritance – Packages: Putting classes together - Multithreaded Programming.	10
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 - Runningthe Applet-Passing Parameters to Applets -	11

	Graphics Programming.	
Unit IV	The Java Library :String Handling - Networking - Event Handling - Introducing the AWT: Working with Windows, Frames,Graphics, and Text - Using AWT Controls, Layout Managers, and Menus - Introducing GUI Programming with Swing- Applying Java : Java Beans-Introducing Servlets.	10
Unit V	Managing Input/Output in files in Java: Introduction-Concept of Streams-Stream Classes-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.	11
	Total Contact Hrs	**52**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task, Test

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	E.Balaguusamy (Units-I ,I,III and V)	Programming with Java – A Primer	Tata McGraw HillPublishing Company Limited, New Delhi, 5th Edition,	2014
2.	Herbert Schildt (Unit- IV)	Java: The Complete Reference	Tenth Edition,ORACLE Press	2017

REFERENCE BOOKS

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

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. R. Manicka Chezian S.S.Shanthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS205			Title:	Batch :	2021-2024
				Core IV: Data and File Structure	Semester:	II
Lecture Hrs/Week:	4	Tutorial Hrs./Sem.	60		Credits:	04

Course Objective

On successful completion of the course the students are able to understandthe 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 to

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 – Garbage collection 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	**Internal Sorting** : Searching – Sequential search - Binary search - Fibonacci search – Insertion sort – Quick sort - 2-way Merge - Heap sort –**Symbol Tables** : Hash Tables.	10
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..	14
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, 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, Susan Anderson-Freed	Fundamentals of Data Structures in C	Universities Press (India) Private Limited	2008
3.	R.Krishnamurthy and G.IndiraniKumaravel	Data Structures using C	Tata McGraw – Hill Publishing Company Limited, New Delhi	2008

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R . Manicka Chezian S.S.Shanthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS2A1	**Title:**	**Batch :**	2021-2024
		Allied-2: Discrete	**Semester**	II
Hrs/Week:	4	Mathematics Level-I	**Credits:**	4

Course Objective

On successful completion of the course the students are able to understand the concepts and principles of relations, functions, fuzzy sets, partial ordering, algebraic structures, mathematical logic, and formal languages and graph theory

Course Outcomes (CO)

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

CO1	To keep in mind about the fundamental ideas and notation of discrete mathematics with examples	K1
CO2	To get the idea of relations and its types and fuzzy sets and its operations	K2
CO3	To analyze the formal language such as formation of words with examples ,groups and monoids	K3
CO4	To Understand some basic properties of graphs and types of graphs, and be able to relate these to practical examples	K4

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**

H: High M: Medium L: Low

Units	CONTENTS	Hours
UNIT I	**Mathematical logic:** Connectives – Tautology and contradiction-Equivalence of Propositions- Duality law- Normal forms – Disjunctive and conjunctive normal Forms-PDNF-PCNF– Worked examples-Predicate calculus – Quantifiers – Free and bound variables(Definitions only).	**11**
UNIT II	**Relations:** Types of relations-some operation of relation- Composition of Relations – Properties of relation-Equivalence Classes-matrix representation of relation-Worked Examples. ***Fuzzy Sets:*** Fuzzy sets – Crisp Sets –Overview of operations on fuzzy sets – Fuzzy complement – Fuzzy union – Fuzzy intersection – Aggregation operations	**12**

UNIT III	**Functions:** Representation of function-*Types of function*- Composition of functions – Inverse of functions-Worked Examples. **Partial ordering:** Hasse diagrams for partial ordering-terminology related to posets-Lattice- Properties of Lattices Worked Examples	**13**
UNIT IV	**Algebric Structure:** Semigroups & monoids- Homomorphism of semigroups and monoids- sub semigroups and submonoids-groups **Formal languages:** Basic definitions-phase structure grammar- types of phase structure grammar-Worked examples	**11**
UNIT V	**Graph Theory:** Graph –Degree of the vertex – some special simple graphs-*Matrix representation of graphs*-Paths, Cycles and connectivity- Eulerian Graphs - Hamiltonian graphs- Connectedness in directed graphs- Shortest path algorithm-Dijkstra's Algorithm-Worked Examples	**13**
	Total Hours	**60**

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 PUBICATION
1	T.Veerarajan	Discrete mathematics	Tata McGraw Hill	2007
2	GeorgeKlir& Tina A Folger	Fuzzy Sets, Uncertainity& Information	Prentice hall of India, Eighth Edition	2003
3	Narasingh Deo	Graph theory with applications to Engineering and computer science	Prentice hall	2008

REFERENCE BOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	V. Sundaresan, K.S. Ganapathi Subramanian, K. Ganesan	Discrete Mathematics	A.P.Publications, Sirkali	2006
2	RaniSironmani	Formal Languages	The Christian Literature Societry, First Edition	1984
3	J.P.Tremplay & R. Manohar	Discrete Mathematical structures with Applications to computer Science	Tata Mc Graw-Hill Pub.Co. Ltd, New Delhi	2003

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

Programme Code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS2A2	Title:	Batch :	2021-2024
		Allied-2:	Semester	II
Hrs/Week:	4	Discrete Mathematical Structure Level-II	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 and trees.

Course Outcomes (CO)

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

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

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**	**M**	**H**	**M**	**L**	**H**	**H**	**M**	**H**	**M**	**H**
CO3	**H**	**M**	**H**	**M**	**H**	**H**	**M**	**H**	**M**	**H**	**H**	**M**
CO4	**H**	**H**	**H**	**M**	**H**	**M**	**M**	**H**	**H**	**H**	**H**	**M**

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	**12**
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.	**13**

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.	**11**
UNIT IV	**Algebric Structure:** Semigroups & monoids- Homomorphism of semigroups and monoids- sub semigroups and submonoids-*groups* **Formal languages:** Basic definitions-phase structure grammar- types of phase structure grammar-Worked examples	**11**
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*	**13**
	Total Hours	**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 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**
M.Malathi S.Sharmila	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			Programme Title :	Bachelor of Science (ComputerScience)	
Course Code:	21UCS206			Title :	Batch :	2021-2024
				Core Lab II: Programming Lab in Java	Semester:	II
Hrs/Week:	5	Tutorial Hrs./Sem.	75		Credits:	02

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 (CO)

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

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 networking, event handling, applets, AWT controls, swing, beans, Servlets and files.	K5

Mapping

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

H-High; M – Medium; L – Low;

Syllabus

Units	Contents	Hrs
	SET A **1. Program to determine whether two string are anagram or not.** 2. Program to calculate area of different shapes using methodoverloading. 3. Program for processing Bank details using the concept of multiple inheritance using Interfaces. 4. Program for Employee salary details usingpackages 5. Program to implement the concept of multithreading. 6. Program to check division by zero usingexceptionhandling. 7. Draw smiley using Applet. 8. Play sound using Applet. 9. Program to get the parts of the URL using Networking concepts 10. Program to check whether a file is modified at a server or not using Networking Concepts. 11. Program for Mouse Events. 12. Program for Key Events. 13. Program to perform arithmetic operations using AWT controls. **SET B** 14. Program to demonstrate the Multiple Selection List-box. 15. Program to create Menu Bars and pull down menus. 16. Program to create a frame with four text fields name, street, city and pin code with suitable tables. Also add a button called my details. When the button is clicked its corresponding values are to be appeared in the text fields. 17. Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address. 18. Program to display the student information system using swing. 19. Program to reverse a number using Swing 20. Program for maintaining Book details using Java beans.. 21. Program for displaying department details using Java Beans. 22. Program for showing calculator using Servlet. 23. Program using Servlet to accept two numbers and display all the even numbers between those two numbers. 24. Program to copy one file to another file. 25. Program for processing random access file. **Total Contact Hrs** **INTERNAL MARK(25Marks)** **EXTERNAL MARK (25Marks)**	**75**

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. R . Manicka Chezian S.S.Shanthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			Programme Title:	Bachelor of Science (Computer Science)	
Course Code:	21UCS307			Title	Batch:	2021 - 2024
				Core V: .Net Technologies	Semester:	III
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60		Credits:	04

Course Objective

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

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic concepts and applications of database systems and SQL.	K1
CO2	To understand the relational database theory, and be able to write relational algebra expressions for queries	K2
CO3	To apply design principles using the E-R method and normalization approach	K3
CO4	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
CO5	To 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
CO1	H	H	M	M	M	H	H	M	M	M
CO2	H	H	H	H	M	H	H	H	H	M
CO3	H	M	S	H	H	H	M	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**C# LANGUAGE BASICS** :C# and the .NET framework - C# basics - Objects and types - Inheritance - Arrays – Operators and casts	10
Unit II	**C# ADVANCED FEATURES :** Delegates and events - Strings and regular expressions - Generics - Collections – Memory management and pointers - Errors and exceptions	10
Unit III	**BASE CLASS LIBRARIES AND DATA MANIPULATION:** Tracing and events - Threading and synchronization - .Net security - Localization –Managing the file system - Basic network programming	11
Unit IV	**DATABASE AND WEB SERVICES:** Window based applications - Data access with .NET - basics of ASP .NET - Introduction to web services	11
Unit V	**.NET FRAMEWORK:** Architecture - Assemblies - Shared assemblies - CLR hosting - Reflection	10
	Total Contact Hrs	**52**

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	Christian Nagel	Professional C# 2005 with .NET 3.0	Wiley India	2007

Reference Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ian Gariffiths, Mathew Adams, Jesse Liberty	Programming C# 4.0	O'Reilly,Fourth Edition	2010

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
M.Malathi N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS308			**Title**	**Batch:**	2021 - 2024
				Core VI: Relational Database Management System	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	75		**Credits:**	04

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

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To remember the basic concepts and applications of database systems and SQL.	K1
CO2	To understand the relational database theory, and be able to write relational algebra expressions for queries	K2
CO3	To apply design principles using the E-R method and normalization approach	K3
CO4	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
CO5	To 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

Syllabus

Units	Content	Hrs
Unit I	**Database Concepts: A Relational 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
Unit II	**Normalization:** Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF) – Dependency Diagrams – *Denormalization.* **Oracle SQL:** Personal Databases-Client/Server Databases- 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-in functions- Grouping Data.	12
Unit IV	**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
Unit V	**PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR Loops – SELECT…FOR UPDATE – WHERE CRRENT OF Clause – Cursor with 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., 6 th 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 - Oracle 8i	Tata McGraw Hill publication.	2000

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS309	**Title :**	**Batch :**	2021-2024
		Core VII: System software and Operating System	**Semester:**	III
Hrs/Week:	4		**Credits:**	04

Course Objective

To objective of the course is to enable the students to understand the concepts of operating system including process management, storage management, scheduling and windows.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Know the program generation and program execution activities in detail	K1
CO2	Understand the concepts of Macro Expansions and Gain the knowledge of Editing processes	K2-K3
CO3	Remember the basic concepts of operating system	K1
CO4	Understand the concepts like interrupts, deadlock , memory management and file management	K2
CO5	Analyze the need for scheduling algorithms and implement different algorithms used for representation, scheduling, and allocation in DOS and UNIX operating system.	K1-K4

Mapping

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

H - High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	Introduction to system software: Introduction–System Software and machine architecture. Loader and Linkers: Basic Loader Functions - Machine dependent loader features –Machine independent loader features - Loader design options.	12
Unit II	Machine and compiler: Machine dependent compiler features - Intermediate form of the program - Machine dependent code optimization - Machine independent compiler features - Compiler design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers. Unit:	12
Unit III	OPERATING SYSTEM: What is an Operating System? – Process Concepts: Definition of Process - Process States - Process States Transition – Interrupt Processing – Interrupt Classes . Storage Management: Real Storage: Real Storage Management Strategies – Contiguous versus Non-contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming. .	12
Unit IV	Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Working Sets – Demand Paging – Page Size. Processor Management: Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling.	12
Unit V	Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization. File and Database Systems: File System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

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

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Leland L.Beck, System Software	An Introduction to Systems Programming	Pearson	Third Edition
2	H.M. Deitel	Operating Systems	Perason	2nd Edition ,2003

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Achy8ut S. Godbole,	Operating systems	TMH	2002.
2	John J. Donovan, Systems Programming	Systems Programming	TMH	1991
3	D.M. Dhamdhere	Systems Programming and Operating Systems	TMH	2nd Revised Edition

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. R.Manicka Chezian M.Malathi, N. Yasodha	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS3A3			**Title :**	**Batch :**	2021-2024
				Allied-3: Computer Based Optimization Techniques	**Semester:**	III
Lecture Hrs/Week:	5	Tutorial Hrs/Sem.	75		**Credits:**	04

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	Remember and understand the concepts of relations	K1,K2
CO2	Understand the concept of transportation, networking, replacement, etc.,	K2
CO3	Apply the appropriate optimization techniques to solve the computer based business problems	K3,K5
CO4	Become familiar with, LPP, Hungarian method, Game theory, Replacement problem.	K4,K5
CO5	Analyze the ability of critical thinking, to find shortest time duration	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

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 – Big-M Method -Two Phase 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-MODI Method (U-V Method for OBFS). **Assignment Problem:** Balanced and Un-Balanced Assignment problem– Hungarian method – Routing problem.	15
Unit III	**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: PERT Tabulation and Calculations.	14
Unit IV	**Replacement Problem and System Reliability:** Model 1: Value of Money does not change with time. Model 2: 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
Unit V	**Sequencing problem:** Problems with n jobs and 2 machines – Problems with 'n' jobs and 'k' machines. **Inventory control** – 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. **EOQ Problem with Price Breaks:** Model 1: EOQ Problem with one price breaks.	16
	Total Contact Hrs	**75**

Pedagogy and Assessment Methods:

Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, Group Task.

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. DharaniVenkatakrishnan	Operations Research	Keerthi Publishing P.Ltd	2015
2	PK Gupta , Man Mohan	Problems in 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. R.Manicka Chezian Dr.R.Nandhakumar, S.Sharmila	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS310	Title :	Batch :	2021-2024
		Core Lab III:Programming Lab in .Net Technologies	Semester:	III
Hrs/Week:	5		Credits:	02

Course Objective

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

1. Introduce to .Net IDE Component Framework.
2. Programming concepts in .Net Framework.
3. Creating website using ASP.Net Controls**.**

Course Outcomes

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

CO Number	**CO Statement**	**Knowledge Level**
CO1	To Create user interactive web pages using ASP.Net.	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 / 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 • 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. **INTERNAL MARK (25 Marks)** **EXTERNAL MARK (25 Marks)** .	**75**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE

M.Malathi N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS311			**Title**	**Batch:**	2021 - 2024
				Core IV: Programming lab in RDBMS	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	75		**Credits:**	02

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 them into well-informed database application developers.

Course Outcomes (CO)

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	H	M	H	H	L	L	M	H	H	M	H
CO2	H	H	M	M	M	M	H	M	M	M	M	M
CO3	H	H	M	H	M	M	H	M	H	M	M	H

Units	**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 Sub Queries
- 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

SET B

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

Table Name: Users

Name	**Company**	**Company_Address**	**Url1**	**Url2**
Joe	ABC	Work Lane	abc.com	xyz.com
Jill	XYZ	1 Job Street	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 the given data
- Create a cursor, which displays names of employees having salary > 50000
- Cursor For Loop
- **Database Schema for a Employee-pay scenario**
  Tables: Employee , department, pay details, 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 the details 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 netsalary>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 his netsalary

INTERNAL MARK (25Marks) **EXTERNAL MARK (25 Marks)**

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., 6 th 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 - Oracle 8i	Tata McGraw Hill publication.	2000

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. Aruchamy Rajini P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS3N1	**Title :**	**Batch :**	2021-2024
		Non-Major Elective Paper-I: Photoshop Lab	**Semester:**	III
Hrs/Week:	1		**Credits:**	02

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 tool bar, layers, and the adjustments panel.

Course Outcomes (CO)

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 access the new tools for designing multi-layered applications.	K1
CO4	To Create simple shapes by applying shape tweens and motion tweens.	K2
CO5	To Identify the basic tools and components of multimedia components.	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 • Special Effects-Feathered Portraits (Soft fade) using Photoshop	

	INTERNAL MARK(25 Marks) **EXTERNAL MARK (25 Marks)**	

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
M.Malathi N.Yasodha	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS3N2	**Title :**	**Batch :**	2021-2024
		Non-Major Elective Paper-I: Advanced Applications in MS Excel Lab	**Semester:**	III
Hrs/Week:	1		**Credits:**	02

Course Objective

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

Course Outcomes (CO)

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 access the new tools for designing multi-layered applications.	K1
CO4	To Create simple shapes by applying shape tweens and motion tweens.	K2
CO5	To Identify the basic tools and components of multimedia components.	K5

Syllabus

Units	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 sumif and countif formulas **SET B** • Create and write complex formulas. • Create and use IF statements. • Apply custom and prebuilt conditional formatting. • Work with functions 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 perform Vlookup concept **INTERNAL MARKS (25)** **EXTERNAL MARK (25 Marks)**	

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
M.Malathi N.Yasodha	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS412			**Title**	**Batch:**	2021 - 2024
				Core XIV: Python Programming	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	04

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

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

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

Mapping

PO /PSO 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

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 – else if 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 – calling functions – 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
Unit IV	**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 IO Exceptions - Working with Directories.	12
Unit V	**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, Group Task.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Mark Summerfield	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. Drake Jr	An Introduction to Python	Network Theory Ltd	2011
3	Wesley J Chun	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**
Dr.M.Sakthi P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS413			**Title:**	**Batch :**	2021-2024
				Core IX: Open Source Technologies	**Semester:**	IV
Lecture Hrs/Week:	4	**Tutorial Hrs./ Sem.**	60		**Credits:**	4

Course Objective

On successful completion of the course the students are enabling to learn about creating dynamic web pages using different open source technology like PHP, MYSQL and Apache.

Course Outcomes (CO)

CO1	To understand PHP functions and arrays	K1
CO2	To remember PHP basic syntax for variables types, operators and flow controls	K2
CO3	To analyze basic MySQL commands	K3
CO4	To apply MYSQL commands to create and connect PHP application	K4
CO5	To evaluate application accessing restrictions, logging and monitoring Apache web server activity, optimizing and tuning MYSQL	K5

Mapping

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

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

Syllabus

Units	Contents	Hrs
Unit I	**PHP Language Structure**: The Building Blocks of PHP-Variables-Data Types-Operators and Expressions-Constants-Flow Control Functions in PHP-Switching Flow-Loops-Code Blocks and Browser Output.	12
Unit II	**Working with Functions:** What Is a Function?-Calling Functions- Defining a Function- Returning Values from User-Defined Functions-Variable Scope-Saving State Between Function Calls with the static Statement-More About Arguments-Testing for the Existence of a Function. **Working with Arrays:** What Are Arrays?-Creating Arrays-Some Array-Related Constructs and Functions.	12

Unit III	**PHP and MySQL Integration.** Learning Basic SQL Commands- Learning the MySQL Data Types-Learning the Table-Creation Syntax-Using the INSERT Command-Using the SELECT Command-Using WHERE in Your Queries-Selecting from Multiple Tables-Using the UPDATE Command to Modify Records-Using the REPLACE Command-Using the DELETE Command-Frequently Used String Functions in MySQL-Using Date and Time Functions in MySQL.	12
Unit IV	**Using Transactions and Stored Procedures in MySQL:** What Are Transactions?-What Are Stored Procedures?-Interacting with MySQL Using PHP-MySQL or MySQLi Functions?-Connecting to MySQL with PHP-Working with MySQL Data.	12
Unit V	**Restricting Access to Your Applications:** Authentication Overview-Apache Authentication Module Functionality-Using Apache for Access Control-Combining Apache Access Methods-Limiting Access Based on HTTP Methods-Restricting Access Based on Cookie Values. Logging and Monitoring Web Server Activity-Standard Apache Access Logging, Standard Apache Error Logging-Managing Apache Logs-Logging Custom Information to a Database. **Optimizing and Tuning MySQL:** Building an Optimized Platform, Benchmarking Your Database Server-MySQL Startup Options, Optimizing Your Table Structure-Optimizing Your Queries-Using the FLUSH Command-Using the SHOW Command.	12
	Total Contact Hrs	60

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Julie C.Meloni	Sams Teach Yourself PHP, MSQL and Apache	Pearson Education, Inc.	2012

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Robert Sheldon, Geoff Moes	Beginning MySQL	Wiley Publishing	2005
2	Jason Gerner, Elizabeth Naramore, Morgan L. Owens, Matt Warden	Professional LAMP Linux, Apache, MySQL, and PHP5 Web Development	Wiley Publishing	2006

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.Antony Selvadoss Thanamani Dr.A.Kanagaraj N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS414			**Title :**	**Batch :**	2021-2024
				Core IX: Data Communication and Computer Networks	**Semester:**	IV
Lecture Hrs/Week:	4	**Tutorial Hrs./ Sem**	60		**Credits:**	04

Course Objective

To enable the students to understand the concepts and principles of data communication 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 and functionalities in OSI Reference 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 - Error Detection.	12

Unit II	Transmission Media: Guided Media-Twisted Pair-Coaxial Cable-Optical fiber- Unguided Media –Microwave Communication-Satellite Communication– FDMA, CDMA, and SDMA. 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-Internet 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.25 protocol.TCP/IP: An Introduction to TCP/IP- Basics- IP Addresses-Logical Addresses-TCP/IP Example. ARP-RARP.	12
	Total Contact Hrs	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Achyut S. Godbole	Data Communications and Computer Networks	Tata Mc GrawHill	2007

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Prakash. C. Gupta	Data Communication and Computer Networks	PHI Publicaitons, Second Edition	2013
2.	Brijendra Singh	Data Communication and Computer Networks	PHI Publicaitons, Fourth Edition	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	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS415			**Title**	**Batch:**	2021 - 2024
				Core Lab IX: Python Programming Lab	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	5	**Pratical Hrs./Sem.**	**75**		**Credits:**	02

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

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

S- Strong; H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
	SET A • Write a Python Program to solve quadratic equation. • 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 in reverse 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 from 1 to n and display. • Write a Python Program using apply ( ), filter ( ), map ( ) and reduce ( ) functions. **SET B** • Write a Python Program to convert list to dictionary, sort a dictionary, 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 count number of words, 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 to Illustrate Different Set Operations . **INTERNAL MARK (25 Marks) EXTERNAL MARK (25 Marks)**	**75**

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Mark Summerfield	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. Drake Jr	An Introduction to Python	Network Theory Ltd	2011
3	Wesley J Chun	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**
Dr.M.Sakthi P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS416			**Title**	**Batch:**	2021 - 2024
				Core Lab VI:Web Programming using Open Source Technologies	**Semester:**	IV
Practical Hrs./Week	5	**Practical Hrs./Sem.**	75		**Credits:**	2

Course Objective

To learn about creating dynamic web pages using different open source technology like 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	1. To remember PHP basic syntax for variables types, operators and flow controls	K1
CO2	2. To understand PHP functions and arrays	K2
CO3	3. To analyze basic MySQL commands	K4
CO4	4. To apply MYSQL commands to create and connect PHP application	K3
CO5	5. To 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

Units	Contents	Hrs
	Set A 1. Write a PHP program to check student grade based on the marks using if-else statement. 2. Write a PHP program to convert a string into uppercase. 3. Write a PHP program to reverse the string. 4. Write a PHP program to count the words in the string. 5. Write a Program to create following pattern with * using for loops.  6. Write a PHP program using nested for loop that creates a chess board. 7. Write a PHP program to find factorial of a number using recursive function. 8. Write a PHP program for shopping cart. 9. Create a table and implement all DCL commands. 10. Write a query to get the first 3 characters of first name from employees table 11. Write a query to get unique department ID from employee table. 12. Write a query to get the firstname, lastname who joined in the month of June. **Set B** 1. Write a PHP program for students marklist preparation using database connection. 2. Write a PHP program to check if a person is eligible to vote or not. 3. write a program in PHP to remove specific element by value from an array using PHP program. 4. Write a simple calculator program in PHP using switch case 5. Create a table and implement all DDL Commands. 6. Create a table and implement all DML commands. 7. 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. 8. 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. 9. 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. 10. Create salesman table with fields like salesman_id, name, city, commission and create cusstomer table with column names like customer_id, cust_name,	**75**

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	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. 11. Create salesman table with fields like salesman_id, name, city, commission and create cusstomer table with column names like customer_id, cust_name, city, grade, salesman_id. Write a SQL statement to know which salesman are working for which customer. 12. Create a MYSQL database for electricity bill processing. 13. Create salesman table with fields like salesman_id, name, city, commission and create cusstomer 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 (25 Marks) EXTERNAL MARK (25 Marks)**	

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr Antony Selvadoss Thanamani N.Yasodha Dr A.Kanagaraj	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS4N1	**Title :**	**Batch :**	2021-2024
		Non-Major Elective Paper-II: Flash Lab	**Semester:**	IV
Hrs/Week:	2		**Credits:**	02

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)

CO Number	CO Statement	Knowledge Level
CO1	To Remember the concepts of animation with flash Software.	K1
CO2	To understand 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

Units	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 **SET B** • Rotating globe using Flash • Fog Effect using Flash • Lightning Effect using Flash • Animated Effect using Flash • Raining Effect using Flash • Bouncing ball using flash **INTERNAL MARK(25 Marks)** **EXTERNAL MARK (25 Marks)**	

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
M.Meena Krithika N.Yasodha	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS4N2	**Title :**	**Batch :**	2021-2024
		Non-Major Elective Paper-II: Internet Applications Lab	**Semester:**	IV
Hrs/Week:	1		**Credits:**	02

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 to

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

Units	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. • Pay EB-Bill through online • Create a new video using online video editing tools **INTERNAL MARK (25 Marks) EXTERNAL MARK (25 Marks)**	**15**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
M.Malathi N.Yasodha	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc. CS			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS517			**Title**	**Batch:**	2021 - 2024
				Core XI: Linux and Shell Programming	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	3

Course Objective

To inculcate knowledge on open source Linux operating system and enrich the programming skills in shell programming, system calls, libraries, processes, signals, Inter Process Communication and Sockets.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the history of Linux, Linux architecture, GNU, Free software foundation and Distributions.	K1
CO2	Understand about shell scripts, files, directories, system calls and library functions.	K2
CO3	Apply the concept of threads for managing the processes in Linux.	K3
CO4	Analyze various mechanisms provided by Linux to allow the processes to manage shared data.	K4
CO5	Understand socket programming and socket communication.	K2, K5

Mapping

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

H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	**Introduction to UNIX and Linux:** History-Architecture of UNIX operating system- Features of UNIX- Basic commands- Working with files and directories- Commands- File types- File access processes permissions redirection-filters- What is Linux?- Distributions- The GNU Project and the Free Software Foundation.	12
Unit II	**Shell Programming in Linux and System Calls and Library:** VI editor- Shell syntax- variables- conditions and control structures- command execution- simple programs- System calls and library: Read- Write- File and record locking- Adjusting the position of file I/O- Lseek- Close- File creation- Creation of special files- Changing directory, root, owner, mode- stat and fstat .	12

Unit III	**Processes and Signals:** Introduction of process- Process structure- Process states- Process termination- command line arguments- Process control- Process identifiers- Process relationships- Zombie process- Signals: Sending signals- Signal sets- Threads: Synchronization- Thread attributes- Cancelling Threads.	12
Unit IV	**Inter Process Communication:** Communication between related processes - popen() and pclose()- Pipes- Communication between unrelated processes - Named pipes (FIFO)- Message queues- Semaphores, Synchronization- Shared Memory- Developing Client-Server applications using IPC.	12
Unit V	**Sockets:** Introduction to Sockets –Types of socket - Socket Connections- TCP sockets- TCP echo client server- UDP sockets- UDP echo client server- Socket options.	12
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation,

Assessment Methods:

Seminar, Online Quiz, Digital Assignments, Group Task: GD

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Petersen and Richard	LINUX: The Complete Reference	McGraw Hill, Sixth edition	2007
2	Richard Stones, Neil Matthew	Beginning Linux Programming	Wiley, Fourth edition	2008
3	W. Richard Stevens, Bill Fenner, Andrew Rudoff	UNIX Network Programming, Vol. 1, The Sockets Networking API	Pearson education, Third edition	2003

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Richard Blum and Christine Bresnahan	Linux Command Line and Shell Scripting Bible	Wiley, Fourth edition	2021
2	Sean Walton	Linux Socket Programming	Sams Publisher, First edition	2001

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr. K.Srinivasan N.Arulkumar	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Program me Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS518			**Title:**	**Batch :**	2021-2024
				Core XII: Kotlin Programming	**Semester:**	V
Lecture Hrs/Week:	4	**Tuto rial Hrs./ Sem.**	60		**Credits:**	3

Course Objective

On successful completion of this course, the students will be able to understand the kotlin programming concepts,to develop multi- platform applications and hands on practices by applying these concepts to implement in both mobile and web based applications.

Course Outcomes (CO)

CO1	To remember the coding conventions used for kotlin programming.	K1
CO2	To get an idea about classes, objects, properties, fields and interfaces of kotlin.	K2
CO3	To deploy multi-platform mobile and web based applications.	K3
CO4	To analyze the composition of suspending functions.	K4
CO5	To validate the execution of applications on various platforms.	K5

Mapping

S-Strong;M-Medium;L-Low.

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Overview-Using Kotlin for Server-side Development - Using Kotlin for Android Development - Kotlin JavaScript Overview - Kotlin/Native for Native - Kotlin for Data Science - Coroutines for asynchronous programming and more - Multiplatform Programming. **Getting Started:** Basic Syntax – Idioms - Coding Conventions. **Basics:** Basic Types – Packages - Control Flow: if, when, for, while - Returns and Jumps.	12
Unit II	**Classes and Objects :** Classes and Inheritance - Properties and Fields – Interfaces – Visibility Modifiers – Extensions - Data Classes - Sealed Classes – Generics - Nested and Inner Classes - Enum Classes - Object Expressions and Declarations - Inline classes – Delegation - Delegated Properties. **Functions and Lambdas:** Functions - Higher-Order Functions and Lambdas - Inline Functions.	12
Unit III	**Collections :** Kotlin Collections Overview - Constructing Collections – Iterators - Ranges and Progressions – Sequences - Collection Operations Overview - Collection Transformations – Filtering - plus and minus Operators – Grouping - Retrieving Collection Parts - Retrieving Single Elements - Collection Ordering - Collection Aggregate Operations - Collection Write Operations - List Specific Operations - Set Specific Operations - Map Specific Operations.	12

Unit IV	**Coroutines :** Coroutine Basics - Cancellation and Timeouts - Composing Suspending – Functions - Coroutine Context and Dispatchers - Asynchronous Flow – Channels - Exception Handling - Shared mutable state and concurrency - Select Expression.	12
Unit V	**Getting Started with Android:**Exploring android studio and the Project Structure-Layouts and Material design-the Android Life cycle-Bringing Android Widgets to Life-Android Dialogue Windows-Data Persistance and Sharing-Android Databases.	12
	Total Contact Hrs	60

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	https://kotlinlang.org/docs/kotlin-docs.pdf, Kotlin official website.	Kotlin 1.3 Language Documentation	-	2021
2.	John Horton	Android Programming with Kotlin for Beginners: Build Android Apps starting from zero programming experience with the new Kotlin Programming Language	Packt Publications	2019
3.	Marcin Moskala, Igor Wojda	Android Development with Kotlin: Enhance your skills for android development using Kotlin	Packt Publications	2017

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Ken Kousen	Kotlin Cookbook,	O'Reilly Media, Inc.,/ First Edition	2019
2	David Griffiths, Dawn Griffiths	Head First Kotlin	O'Reilly Media, Inc., /First Edition	2019

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.R.ManickaChezian Dr.R.Nandhakumar M.Meenakrithika	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS519			**Title**	**Batch:**	2021 - 2024
				Core XIII: Cyber Security	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	2

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(CO)

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Why Network Security is needed – Management principles – Security principles - Network management - Security attacks – Qualities of 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	10
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	10
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	11
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.	11
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.	10
	Total Contact Hrs	52

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	Brijendra Singh	Network Security and Management	PHI	2007

Reference Books

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

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Aruchamy Rajini N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5E1			**Title**	**Batch:**	2021 - 2024
				Core Elective I : Data mining and Warehousing	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**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(CO)

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

CO Number	CO Statement	Knowledge Level
CO1	6. To remember the basics of data mining and data warehousing	K1
CO2	7. To understand the methodology of data mining and its best practices	K2
CO3	8. To analyze how data mining fits in with data warehousing, OLAP as well as architecture of data warehousing.	K4
CO4	9. To apply data for data mining	K3
CO5	10. To evaluate different kinds of patterns with many data mining algorithms	K5

Mapping

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

H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	Why and What Is Data Mining?: Analytic Customer Relationship Management, What Is Data Mining?, What Tasks Can Be Performed with Data Mining?, Why Now?, How Data Mining Is Being Used Today.	11
Unit II	Data Mining Methodology and Best Practices: The Methodology, Step One: Translate the Business Problem into a Data Mining Problem, Step Two: Select Appropriate Data, Step Three: Get to Know the Data, Step Four: Create a Model Set, Step Five: Fix Problems with the Data Step Six: Transform Data to Bring Information to the Surface, Step Seven: Build Models, Step Eight: Assess Models, Step Nine: Deploy Models, Step Ten: Assess Results, Step Eleven: Begin Again.	13

Unit III	Data Warehousing, OLAP, and Data Mining: The Architecture of Data, A General Architecture for Data Warehousing, Where Does OLAP Fit In?, What's in a Cube?, Where Data Mining Fits in with Data Warehousing.	13
Unit IV	Preparing Data for Mining: What Data Should Look Like, The Customer Signature, The Columns, Model Roles in Modeling, Variable Measures, Data for Data Mining, The Dark Side of Data, Computational Issues.	11
Unit V	Association Pattern Mining: Introduction, The Frequent Pattern Mining Model, The Apriori algorithm. Cluster Analysis: Introduction, The K-Means Algorithm. Data Classification: Introduction, Decision Trees, Split Criteria, Stopping Criterion and Pruning, Practical Issues. Mining Web Data: Introduction, Ranking Algorithms, Page Rank.	12
	Total Contact Hrs	**60**

Pedagogy and Assessment Methods:

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

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Michael J.A. Berry, Gordon S.Linoff	Data Mining Techniques - For Marketing, Sales, and Customer Relationship Management	Wiley Publishing, Inc.	2004
2	Charu C. Aggarwal	Data Mining: The Textbook	Springer	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	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	2008
3	Arun K. Pujari	Data Mining Techniques	Universities Press (India) Private Limited	2008

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr R.Manicka Chezian, Dr A.Kanagaraj N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS5E2			Title:	Batch :	2021-2024
				Core Elective-I: Data Engineering with Google Cloud	Semester:	V
Lecture Hrs/Week:	6	Tuto rial Hrs./ Sem.	90		Credits:	5

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)

CO1	To remember the concepts of Data and storage.	K1
CO2	To understand the idea of designing data models	K2
CO3	To ApplyData Engineering Concepts in building Data Processing Systems	K3
CO4	To Analyze the Operationalizing of Data Processing Systems.	K4
CO5	To evaluate the Data Processing System.	K5

Mapping

P0/POS CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	H	H	M	M	H	M	L	M	H	M	L
CO2	M	H	H	M	M	M	M	H	M	M	M	M
CO3	H	M	H	M	M	H	H	L	M	H	M	H
CO4	H	M	M	M	H	H	H	M	L	M	M	H
CO5	M	M	H	H	H	H	M	M	M	H	H	M

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 predictionsJob 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 state and how to migrate a design to a future state migrating from on-premises to cloud validating a migration.	18
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	18

	management of data.**Building and operationalizing pipelines:**Data cleansingBatch and streaming-Transformation Data acquisition and import integrating with new data sources. **Building and operationalizing processing infrastructure:** Provisioning resources Monitoring pipelines Adjusting pipelines testing and quality control.	
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).	18
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 modelsCommon sources of error (e.g., assumptions about data)**Designing for security and compliance:** Identity and access management (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))	18
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 quality control (e.g., Cloud Dataprep)-Verification and monitoringPlanning, 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.	18
	Total Contact Hrs	90

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	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 PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Alasdair Gilchrist	Google Cloud Platform for Data Engineering: Learn Fundamental to advanced data Engineering concepts and techniques using 30+ real-world use cases	Kindle Edition	2019.
2	Laura Lemay, Rafe Colburn, Jennifer Kyrnin	Data Analytics with Google Cloud Platform: Build Real time data Analytics on Google Cloud Platform.	BPB Publications, Kindle Edition	2019.

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Antony Selvadoss Thanamani N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5E3			**Title**	**Batch:**	2021 - 2024
				Core Elective I: Mobile Application Development	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	4+2	**Tutorial Hrs./Sem.**	90		**Credits:**	4

Course Objective

To understand the need and characteristics of mobile application and to design the right user interface of mobile application

To understand the design issues in the development of mobile application and to develop mobile applications using various tools and platforms

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals and characteristics of mobile applicationand apply the right user interface for designing mobile application	K2, K3
CO2	Implement mobile application using UI toolkits and frameworks and also implement android application with multimedia support	K3
CO3	Design a mobile application that is aware of the resource constraints of mobile devices.	K5
CO4	Develop web based mobile application that accesses internet and location data	K5
CO5	Implement android application to use telephony for SMS communication	K3

Mapping

PO / 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	Content	Hrs
Unit I	INTRODUCTION Mobile Applications – Characteristics and Benefits – Application Model – Infrastructure and Managing Resources – Mobile Device Profiles – Frameworks and Tools.	18
Unit II	USER INTERFACE Generic UI Development – Designing the Right UI – Multimodal and Multichannel UI – Gesture Based UI – Screen Elements and Layouts – Voice XML	18
Unit III	APPLICATION DESIGN Memory Management – Design Patterns for Limited Memory – Work Flow for Application Development – Java API – Dynamic Linking – Plug-ins and Rule of Thumb for using DLLs – Concurrency and Resource Management.	18
Unit IV	APPLICATION DEVELOPMENT I Mobile OS: Android, iOS – Android Application Architecture – Android basic Components – Intents and Services – Storing and Retrieving data – Packaging and Deployment – Security and Hacking.	18
Unit V	APPLICATION DEVELOPMENT II Communication via the Web – Notification and Alarms – Graphics and Multimedia: Layer Animation, Event Handling and Graphics Services – Telephony – Location Based Services.	18
	Total Contact Hrs	90

Pedagogy and Assessment Methods:

DirectInstruction, FlippedClass, DigitalPresentation

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Reto Meier	Professional Android 4 Application Development	Wiley	2012
2	Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura	Programming Android	O'Reilly	2012
3	Alasdair Allan	iPhone Programming	O'Reilly	2010

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Charlie Collins, Michael Galpin and Matthias Kappler	Android in Practice	DreamTech	2012
2	David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson,	Beginning iOS 6 Development: Exploring the iOS SDK	Apress	2013

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
K. Srinivasan G. Angayarkanni	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc. CS			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS520			**Title**	**Batch:**	2021 - 2024
				Core Lab VII: Linux and Shell Programming Lab	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	75		**Credits:**	3

Course Objective

To familiarize basic concepts of shell programming, demonstrate Inter Process Communication and socket communication in Linux.

Course Outcomes

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

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 TCP and UDP socket communication.	K3, K4, K5

Mapping

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

H-High; M-Medium; L-Low

Content	Hrs
SET A • Write programs for various commands like cat, tail, head, sort, grep, cut, paste, join, etc., • Write programs using file and directory commands. • Write a shell script program to display list of users currently logged in. • Write a shell script program to develop a scientific calculator. • Write a shell script program to check whether the given number is even or odd. • Write a shell script program to check a number is prime or not. • Write a shell script program to search whether element is present is in the list or not. • Write a shell script program to copy contents of one file to another. **SET B** • Write a shell script program to display the process attributes. • Write a shell script program to change the priority of processes. • Write a program to create a Zombie process. • Write a program to handle the signals like SIGINT, SIGQUIT, SIGFPE. • Write a program to implement the IPC form - FIFO. • Write a program to implement the IPC form - Pipe. • Write a socket program to print system date and time (using TCP/IP). • Write a socket program for client/server application to send a message (using UDP). **INTERNAL MARK (50 Marks)** **EXTERNAL MARK (50 Marks)**	75

Total Contact Hrs	**75**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Mr. K.Srinivasan N.Arulkumar	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (ComputerScience)	
Course Code:	21UCS521			**Title :**	**Batch :**	2021-2024
				Core Lab VIII: Programming Lab using Kotlin	**Semester:**	V
Hrs/Week:	5	**Tutorial Hrs./Sem.**	75		**Credits:**	03

Course Objective

To enable the students to design and validate web applications using markup languages and scripts.

Course Outcomes (CO)

CO1	To Recall programming basics with coding conventions in kotlin programming	K1
CO2	To Categorize classes,objects,Functions and lamdas in Intellijidea	K2
CO3	To Integrate views with different collections and grouping	K3
CO4	To Design and develop User interface functions in kotlin	K4
CO3	To Apply Java programming concepts to Android application development.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	**Contents**	**Hrs**
	SET A 1. Write a Kotlin program to find the frequency of character in a string 2. Write a Kotlin program to check whether given year is leap year or not 3. Create a Kotlin program to generate multiplication table. 4. Write a Kotlin program to create a simple calculator using switch...case statement 5. Develop a Kotlin program to calculate average using arrays 6. Develop a Kotlin program to find transpose of a matrix 7. Write a program to implement inheritance and overriding function in kotlin. 8. Write a Kotlin program to determine interfaces. 9. Write a kotin program to implement collections.	

	10. Write a Kotlin program to implement lambda expressions. **SET B** 11. Write a Function to convert from normal numbers to Roman Numeral. 12.Write a Kotlin program to check if a given string is a valid ISBN-10 number.. 13. Write a kotlin program to convert larger data type to smaller data type. 14. Write a kotlin program to implement standard user-defined functions. 15. Write a Kotlin program to call anonymous functions. 16. Simulate a bank account supporting opening/closing withdraws and deposits using kotlin. 17. Write a Kotlin program for different types of if-else expressions. 18. Write a Kotlin program to implement various operators. 19.Create a Kotlin program for interface properties. 20.Create a Kotlin program for exception handling. 21. Implement the widgets TextView, Button, Check Box Using Kotlin 22.Implement the Image components Imagebutton, Image Slider, ImagebSwitcher Using Kotlin 23.Implement the PopUp Menu , Option Menu, Context Menu components using Kotlin 24. Implement Text Clock Using Kotlin Program 25. Implement the Component Time Picker using Kotlin Program. **INTERNAL MARK (50 Marks)** **EXTERNAL MARK (50 Marks)** .	

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr. R. Manicka Chezian M.Meenakrithika	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5S1			**Title**	**Batch:**	2021 - 2024
				Skill Based Elective -I: Word Press	**Semester :**	V
Lecture Hrs./Week or Practical Hrs./Week	2	**Tutorial Hrs./Sem.**	15		**Credits:**	2

Course Objective

The objective of this course is to enable the students to know how to work with Word press and to create blogs or dynamic websites.

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 available templates for creating blogs or dynamic websites.	K3
CO2	To analyze the various plugins and apply them appropriately	K4
CO3	To validate the available content in the blog or website	K5

Mapping

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

H-High; M-Medium; L-Low

Units	Content	Hrs
	SET A • To create a Blogs Web site • To create a Web site for online books shopping • To create a E-commerce Web site • To create a Web site for Mobile device • To create a Web site for photo sharing **SET B** • To create a Web site for online business brochure • To create a informational Web site • To create a Authors Web site • To create a community building Web site • To create a personal Web site	
	Total Contact Hrs	**15**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr. Aruchamy Rajini , Dr. M. Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5S2			**Title**	**Batch:**	2021 - 2024
				Skill Based Elective -I: Dream Weaver	**Semester:**	V
Lecture Hrs./Week or Practical Hrs./Week	2	**Tutorial Hrs./Sem.**	15		**Credits:**	2

Course Objective

The objective of this course is to train the students to use a friendly interface for creating and editing the web pages using HTML, XML, CSS, and JavaScript.

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 controls in dreamweaver for creating a webpage	K3
CO2	To analyze the markup languages and using them based on the requirements	K4
CO3	To validate the webpage using javascript and create page layouts with CSS	K5

Mapping

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

H-High; M-Medium; L-Low

Units	Content	Hrs
	SET A • To create a picture gallery. • To create a template. • To create CSS text rollovers. • To create Mailto Links. • To create small pop-up windows for ads or news. SET B • To create a website. • To create a link to different pages from the same image. • To create customizing input boxes, list menus, submit buttons. • To create a webpage using internal and external CSS. • To create links without an underline using CSS Styles.	30
	Total Contact Hrs	30

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Aruchamy Rajini Dr.M.Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5S3			**Title**	**Batch:**	2021 - 2024
				Skill Based Elective -I: Quantitative Aptitude Skills	**Semester :**	V
Lecture Hrs./Week or Practical Hrs./Week	1	**Tutorial Hrs./Sem.**	15		**Credits:**	2

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)

On the 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

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

H-High; M-Medium; L-Low

Units	Content	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.	3

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.	3
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.	3
Unit IV	Problems On Ages- Percentage- Profit And Loss- Discount- . Simple Interest- Compound Interest-Installments- Stocks And Shares- True Discount.	3
Unit V	Logarithms- Linear Equations - Quadratic Equations And In-Equations Volume And Surface Area- Permutations And Combinations - Probability – Bar Graphs-Pie Charts-Line Graphs.	3
		15

Text Book

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

Reference Books

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

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr. Aruchamy Rajini Dr. M. Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS622			**Title**	**Batch:**	2021 - 2024
				Core XIV: R Programming	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	03

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)

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

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

H-High; M: Medium ; L: 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 file, Excel File, Binary file, XML File - R -Mean,Median,Mode- Regression.	12
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, Group Task.

Text Book

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.R.Manicka Chezian P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name:Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS6E4			Title:	Batch :	2021-2024
				Core -II: Artificial Intelligence and Machine learning	Semester:	VI
Lecture Hrs/Week:6	6	Tutorial Hrs./ Sem.	90		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)

CO1	To recall the basic logical searches, learning algorithms and improve decision making systems.	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

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	M	M	M	H	H	H	H	M	M
CO2	H	M	H	H	H	M	M	M	M	L	M	M
CO3	M	M	M	L	L	L	L	H	H	H	M	M
CO4	M	L	M	M	M	H	M	M	L	L	H	M
CO5	H	H	M	L	L	H	M	M	L	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	18
Unit II	**KNOWLEDGE REPRESENTATION AND REASONING**:Knowledge representation - Logics - bivalent logic - inference - Fuzzy logic: membership - Fuzzy rules and reasoning - Fuzzy inference	18
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	18
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 decision making	18

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.	18
	Total Contact Hrs	90

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Stuart Russell and Peter Norvig	Artificial Intelligence: A Modern 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 PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	C. S. Krishnamoorthy, S. Rajeev	Artificial Intelligence and Expert Systems for 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.R.ManickaChezian M. Meena Krithika Dr.A.Kanagaraj	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS6E5			**Title:**	**Batch :**	2021-2024
				Core Elective-II: Front-end web development with React	**Semester:**	VI
Lecture Hrs/Week:	6	**Tutorial Hrs./ Sem.**	90		**Credits:**	5

Course Objective

On successful completion of the course the students are able to build a real world application along the way in plain react without complicated tooling.

Course Outcomes (CO)

CO1	To remember the concepts of front end design.	K1
CO2	To understand the idea of designing and scripting web pages	K2
CO3	To Applyessential hacks and simple techniques to solve React application development challenges.	K3
CO4	To Analyze the to wield complex topics such as Webpack and server-side rendering..	K4
CO5	To Learn to maximize the performance of React applications .	K5

Mapping

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

H-High; M: Medium; L: Low

Syllabus

Units	**Contents**	**Hrs**
Unit I	Introduction to React101: Structure-Objective-React is Component based-React is declarative-Quick JS version-Classes-Closures-More JavaScript.	12
Unit II	Setting up react: Structure-objective-choosing an text editor-Setting up nNode and NPM-Setting up React projects-JSX-Moving to type script.	12
Unit III	Components: Structure-Objective-About the Component-class versus functional component-Functional Component-Class Component-Life cycle management.	12
Unit IV	Introduction to Next.JS-Structure-Objective-what is Next.JS-Istallation-Next.JS default-pages-routing-Next.JS Component-Important of CSS files.	12

Unit V	Bleeding edge React: Structure-Objective-How does React work- Concurrent mode-Opting in Concurrent mode-suspense(code fetching)-Suspense(Data fetching).	12
	Total Contact Hrs	60

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Mehul Mohan	Advanced Web Development with React: SSR and PWA with Next.js using React with advanced concepts	First Edition	2020

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Robin Wieruch	The Road to Learn React: Your Journey to Master Plain Yet Pragmatic React.Js	BPB Publications, First Edition	2018.
2	Carlos Santana Roldán	React Cookbook: Create dynamic web apps with React using Redux, Webpack, Node.js, and GraphQL	Packt Publishing Ltd., Kindle Edition	2018.

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.Antony Selvadoss Thanamani N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			Programme Title:	Bachelor of Science (Computer Science)	
Course Code:	21UCS6E6			Title	Batch:	2021 - 2024
				Core elective II: MongoDB	Semester:	VI
Lecture Hrs./Week or Practical Hrs./Week	6	Tutorial Hrs./Sem.	90		Credits:	4

Course Objective

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

Course Outcomes(CO)

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

Pedagogy and Assessment Methods:

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

Text Book

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**
K. Srinivasan G. Angayarkanni	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	21UCS6E7			Title:	Batch :	2021-2024
				Core Elective-III: Information Retrieval	Semester:	VI
Lecture Hrs/Week:	6	Tutorial Hrs./ Sem.	90		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)

CO1	To remember the concepts of artificial intelligence and Information retrivel systems.	K1
CO2	To understand the idea of retrieval models with similarity measures and ranking	K2
CO3	To ApplyQueries using categorization and clustering	K3
CO4	To Analyze the filtering techniques using web search.	K4
CO5	To evaluate the extraction and integration of data with many 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	**INTRODUCTION:** Overview of IR Systems - Historical Perspectives - Goals of IR - The impact of the web on IR - The role of artificial intelligence (AI) in IR. **TEXT REPRESENTATION**: Statistical Characteristics of Text: Zipf's law; Porter stemmer; morphology; index term selection; using thesauri.**Basic Tokenizing, Indexing:** Simple tokenizing, stop-word removal, and stemming; inverted indices; Data Structure and File Organization for IR - efficient processing with sparse vectors.	13
Unit II	**RETRIEVAL MODELS:** Similarity Measures and Ranking - Boolean Matching – Extended Boolean models - Ranked retrieval - Vector Space Models -, text-similarity metrics - TF-IDF (term frequency/inverse document frequency) weighting - cosine similarity, Probabilistic Models, Evaluations on benchmark text collections.	13

Unit III	**QUERY PROCESSING**: **Query Operations and Languages**- Query expansion; Experimental Evaluation of IR: Performance metrics: recall, precision, and F-measure.**TEXT CATEGORIZATION AND CLUSTERING:** Categorization :Rocchio; Naive Bayes, KNN; Clustering: Agglomerative clustering; k-means; Expectation Maximization (EM); Dimension Reduction: LSI, PCA	13
Unit IV	**INFORMATION FILTERING TECHNIQUES:** Introduction to Information Filtering, Relevance Feedback-Applicationsof Information Filtering:**RECOMMENDER SYSTEMS**: Collaborativefiltering and Content-Based recommendation of documents and products. **WEB SEARCH:** IR Systems and the WWW - Search Engines: Spidering, Meta Crawlers; Link analysis : Hubs and Authorities, Google PageRank, Duplicate Detection	13
Unit V	**INFORMATION EXTRACTION AND INTEGRATION**: Extracting data from text; Basic Techniques: NE Recognition, Co-reference Resolution, Relation Extraction, Event Extraction; Extracting and Integrating specialized information on the web, Web Mining and Its Applications.	13
	Total Contact Hrs	65

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Christopher D. Manning, PrabhakarRaghavan and HinrichSchütze	Introduction to Information Retrieval	Cambridge University Press	2012.
2	Ricardo Baeza-Yates and Berthier Ribeiro-Neto	Modern Information Retrieval	Pearson Education,	2010.
3	Croft B., Metzler D., Strohman T	Information Retrieval in Practice	Pearson Education,	2010

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Stephan Buttcher, Charles L. A. Clarke and Gordon Gormack,.	Information Retrieval Implementing and Evaluating Search Engines	MIT Press	2010.
2	Francesco Ricci, LiorRokach, BrachaShapira, Paul B. Kantor	Recommender Systems –	Handbook	2011.
3	AnandRajaraman and Jeffrey Ullman	Mining Massive Data sets	Cambridge University Press,	2014.

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R.ManicaChezian M. MeenaKrithika Dr.A.Kanagaraj	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc			**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS6E8			**Title:**	**Batch :**	2021-2024
				Core Elective-III : HTML, JavaScript and JQuery For web designing	**Semester:**	VI
Lecture Hrs/Week:	6	**Tutorial Hrs./ Sem.**	90		**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)

CO1	To remember the concepts of basic web designing languages.	K1
CO2	To understand the idea of designing and scripting web pages	K2
CO3	To ApplyQueries using categorization and clustering	K3
CO4	To Analyze the validation and querying techniques using Javascript and jQuery.	K4
CO5	To 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	**HTML :** Introduction – Getting started – Creating and saving an HTML document – Document Layout of HTML Page – HTML elements – Some other formatting Styles – Hypertext Links.CSS: CSS syntax and Style-Class Selectors-Id –Selectors-Cascading-Style attribute-Style Container-CSS Properties-Color-Font-Text-Border-Element Box-Padding Property-Margin Property.	18
Unit II	HTML Tables and CSS Layout: Table Elements-Formatting a Data Table-CSS Pseudo class Selectors- thead and tbody elements-Cell spanning-Web Accessibility –CSS Display properties with Table values- Links and Images: Introduction- a Element- Relative URLs-index.html file-webdesign-Navigation within a Webpage-CSS for Links-img element.	18

Unit III	**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 IV	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 V	jQuery Overview-Basics-Selectors-Attributes-jQuery Traversing-Events-jQuery Ajax-jQuery UI: Interactions-Widgets-Theming	18
	Total Contact Hrs	90

Pedagogy

DirectInstruction, FlippedClass, DigitalPresentation

Assessment Methods

Seminar, Quiz, Assignments, GroupTask

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	John Dean	Web Programming with HTML5, CSS, and JavaScript	Jones &Bartlett Learning, Fifth Edition	2018
2	John Pullock	Java Script-A Beginners Guide	Tata McgrawHill, Fifth Edition	2020
3	Jonathan Chaffer, Karl Swedberg	jQuery	Packt, Fourth Edition	2010

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	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 Script Web 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.Antony Selvadoss Thanamani Dr.A.Kanagaraj	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc. CS			**Programme Title:**	Bachelor of Computer Science	
Course Code:	21UCS6E9			**Title**	**Batch:**	2021 - 2024
				Core Elective III: Angular and Node JS	**Semester:**	VI
Lecture Hrs./Week	6	**Tutorial Hrs./Sem.**	90		**Credits:**	5

Course Objective

Able to understand the theory and practical front end tools of web full stack developments: Angular and Node JS

Course Outcomes(CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Client Side MVC and SPA	K2
CO2	Explore AngularJS Component and develop an Angular JS	K3,K4
CO3	Develop an AngularJS Single Page Application from scratch	K3,K6
CO4	Demonstrate an Understanding of the use of and Node.js core modules	K1,K3
CO5	Apply MongoDB ,Middleware and make connectivity with front end tools	K3,K6

Mapping

PO / CO	PO1	PO2	PO 3	PO4	PO 5	PO6	PO 7	PO 8	PO 9	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	Content	Hrs
Unit I	**AngularJS Core Concepts** What is AngularJS?, Advantages of Angular, AngularJS MVC ,Introduction to SPA, Setting up the environment, First App using MVC architecture, Understanding ng attributes, Expression and Data Binding, Working with directives, Angular Modules, Controller, Scope and View ,Create Controller and Module, $scope hierarchy	**18**
Unit II	**Filter, Forms and Ajax** Filters - Built-in filters - upper case and lower case filters, date ,currency and number formatting ,orderBy, filter ,custom filter, Angular JS Forms – Working with AngularJS forms, model binding, form controller ,Using CSS classes, form events ,custom model	**18**

	update triggers ,custom validation ,$http service ,Ajax implementation using $http	
Unit III	**Dependency Injection, Services ,Routing and Navigation** What is dependency injection?, Using dependency injection, Angular JS service – Understanding services , Using built-in service, Creating custom service, Injecting dependency in service, Routing – What is Routing?, Routing using ngRoute and UIRouter, ngView Directive, Configuring $routeProvider ,$stateProvider, Animating Angular App	**18**
Unit IV	**Introduction to Node.js** What is Node.js?, Features of Node.js, Setup Development Environment- Installing Node.js, Working with REPL, Node.js Console, Node.js Module, Node Package Manager, Node.js Basics, File System ,HTTP and HTTPs, Creating Web Server-Handling http request, Node.js Callbacks, Node.js Events	**18**
Unit V	**Database Connectivity** Promises, Express.js, Database Connectivity – Connecting to RDBMS and NoSQL database, Performing CRUD operations	**18**
	Total Contact Hrs	**90**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation
Seminar, Online Quiz, DIGITAL Assignments, Grouptask:APS

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Brad Dayley	Node.js, MongoDB and AngularJS Web Development	Addison-Wesley **2nd** Edition	2018

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Adam Freeman	Pro Angular JS	Apress **1ST** Edition	2014
2	Agus Kurniawan	AngularJS Programming by Example	PE Press **1ST** Edition	2014
3	Amos Q. Haviv	MEAN Web Development	Packt Publishing Limited **1ST** Edition	2014

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Srinivasan K Angayarkanni G	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS623			**Title**	**Batch:**	2021 - 2024
				Core Lab IX: R Programming Lab	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	75		**Credits:**	03

Course Objective

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

Course Outcomes (CO)

CO1	To implement Vector R operations	K3
CO2	To review and analyze data frames and objects	K4
CO3	To validate how Bar charts and Pie charts are implemented	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	**Contents**	**Hrs**
	1. R Program for Vector operations. 2. Create a R- list. 3. Implement matrices addition, subtraction and Multiplication. 4. Create a Data frame. 5. Create a factor object. 6. Import data, copy data from CSV file to R. 7. Create a R program for Mean median and mode. 8. Draw Bar charts and Pie charts in R. 9. Make visual representations of data for plotting functions in R. 10. Create a R program for Regression Model. . **INTERNAL MARK (50 Marks)** **EXTERNAL MARK (50 Marks)**	**75**

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R.Manicka Chezian P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS624			**Title**	**Batch:**	2021 - 2024
				Core Lab X: Advanced Applications in MS Excel Lab	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	4

Course Objective

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

Course Outcomes (CO)

CO1	To implement, Interpret data using MS Excel.	K3
CO2	To review and analyze the mathematical functions, data analytics using MS Excel	K4
CO3	To validate the macros and manipulation for objects and data using MS Excel	K5

Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CO1	H	M	M	M	H	H	H	M	H	H	H	M
CO2	H	H	M	M	M	M	H	M	M	M	H	M
CO3	M	M	H	L	L	H	M	L	M	L	M	M

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
	SET A • Create an excel worksheet for entering data and apply the auto function in Excel. • Create an excel worksheet to calculate Electricity Bill • Create an excel worksheet to calculate salary with basic pay, net pay, Gross Pay with deductions. • Create an excel Worksheet to apply Statistical functions. • Create an excel Worksheet to calculate Student Mark sheet. **SET B** • Create a macro and assign to an object or graphic or control. • Create a macro by using Microsoft Visual Basic and run it.	**52**

	• Create a macro and do edit, copy, delete operations. • Create an excel worksheet to enter the given data and use filter options to get the required result. • Create an excel worksheet to enter the given data and use sorting functions to get the required results **INTERNAL MARK (25 Marks) EXTERNAL MARK (25 Marks)**	

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
M.Malathi N.Karthikeyan	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:		B.Sc		**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:		21UCS6S4		**Title :**	**Batch :**	2021-2024
				Skill Based Elective -II: Joomla	**Semester:**	VI
Lecture Hrs/Week:	2	**Tutorial Hrs./ Sem**	30		**Credits:**	02

Course Objective

This course was designed for the purpose of introducing to the students in the field of programming using Joomla. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in Joomla.

Course Outcomes (CO)

CO1	To apply the basic concepts to solve real world problems using Joomla	K3
CO2	To analyze design issues in developing various applications	K4
CO3	To validate Web based applications	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
	SET A • To create the Corporate Web sites or portals • To create a web site for online newspaper • To create a web site for Online magazines • To create a Web site for online bus ticket reservation • To create a Government application **SET B** • To create a Small business Web site • To create a organizational Web site • To create a web site for Community-based portal • To create a School Web site • To create a Web site for family homepage **INTERNAL MARK (25 Marks)** **EXTERNAL MARK (25 Marks)**	**13**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Aruchamy Rajini S.Sharmila	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:		B.Sc		**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:		21UCS6S5		**Title :**	**Batch :**	2021-2024
				Skill Based Elective -II: Macromedia Director	**Semester:**	VI
Lecture Hrs/Week:	2	**Tutorial Hrs./ Sem**	13		**Credits:**	02

Course Objective

The objective of this course is to make the students to implement several features of Macromedia Director by using various specialized tools.

Course Outcomes (CO)

CO1	To apply the basic tools of macromedia director.	K3
CO2	To analyze specialized tools and implement it in animation.	K4
CO3	To validate website designing using the scripts.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
	SET A • Create basic animation • Create interactive slide show presentation • Change of circle into a square using tweening • Create bouncing ball • Shape Zooming • Create basic animation using script **SET B** • Create basic animation using script • Create text display using tooltip • Create rollover animation • Create customized cursor • Create interactive slide show presentation • Create Man Walking animation **INTERNAL MARK (25 Marks)** **EXTERNAL MARK (25 Marks)**	**13**

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
M. Dhavapriya M. Malathi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:		B.Sc		**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:		21UCS6S6		**Title :**	**Batch :**	2021-2024
				Skill Based Elective -II: Soft Skills	**Semester:**	VI
Lecture Hrs/Week:	1	**Tutorial Hrs./ Sem**	13		**Credits:**	02

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)

CO1	To remember the basics of communication skills	K1
CO2	To understand the relationship between leadership networking and team work	K2
CO3	To apply the skills required for a good leadership	K3
CO4	To analyze the causes of stress and its impact	K4
CO5	To build the interpersonal skills for being an effective goal oriented team player.	K5

Mapping

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

H-High; M-Medium; L-Low

Syllabus

Units	Contents	Hrs
Unit I	**Self Analysis:** SWOT Analysis- Who am I- Attributes- Importance of Self Confidence- Self Esteem. **Creativity:** Out of box thinking- Lateral Thinking. **Attitude:** Factors influencing Attitude- Challenges and lessons from Attitude- Etiquette.	2
Unit II	**Motivation:** Factors of motivation- Self talk- Intrinsic & Extrinsic Motivators. **Goal Setting:** Wish List- SMART Goals- Blue print for success- Short Term- Long Term- Life Time Goals.	2
Unit III	**Gratitude:** Understanding the relationship between Leadership Networking & Team work- Assessing Interpersonal Skills Situation-Description of Interpersonal Skills. **Team Work:** Necessity of Team Work Personally, Socially and Educationally.	3

Unit IV	**Leadership:** Skills for a good Leader- Assessment of Leadership Skills. **Decision Making:** Importance and necessity of Decision Making- Process and practical way of Decision Making- Weighing Positives & Negatives.	3
Unit V	**Stress Management:** Causes of Stress and its impact- how to manage & distress- Circle of control- Stress Busters. **Emotional Intelligence:** What is Emotional Intelligence- emotional quotient -why Emotional Intelligence matters- Emotion Scales- Managing Emotions.	3
	Total Contact Hrs	13

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task

TEXT BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	-	Soft Skills	Career Development Centre, Green Pearl Publications	2015

REFERENCE BOOKS

S.NO.	AUTHOR	TITLE OF THE PAPER	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Frederick H. Wentz	Soft Skills Training: A workbook to develop skills for employment	Amazon Digital Services, Lrg edition	2012
2	Daniel Coleman	Emotional Intelligence	Bantam Book	2006

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE

Dr.Antony Selvadoss Thanamani Dr.R.Nandhakumar	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS625			**Title**	**Batch:**	2021 - 2024
				Project andViva-Voce	**Semester:**	VI
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	60		**Credits:**	3

Internal Marks: 50 Marks

Criterion	Mode of Evaluation	Marks	Total

I	Synopsis, Company Profile, System Specification, Existing System, Proposed System OR (For Android Developments) Planning Stage	10	50
II	Supporting Diagrams like system flowchart, ER, DFD, Usecase and Table Design OR UI and UX Design Application Architect and Prototyping	10	
III	Coding, Input forms, Output format, Testing OR Development, Testing	20	
IV	Preparation of Report & Submission	10	

External Assessment: 50 Marks

Mode of Evaluation	Marks	Total	Grand Total
Project Report			50
Title Relevance of the Industry/Institute	05	30	
Technology	05		
Design and development Publishing	10		
Testing, Report	10		
Viva Voce			
Project Presentation	10	20	
Q&A Performance	10		

COMPUTER SCIENCE PROJECT and VIVA VOCE

Guidelines

Introduction

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

Area of Work

- Web Based Development
- Mobile app development
- Website development
- IoT Projects
- 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 as follows:

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

Format of Table of Contents

TABLE OF CONTENTS

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 maximum of not exceeding 70 pages.

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Science)	
Course Code:	21UCS5AL1			**Title**	**Batch:**	2021 - 2024
				Advanced Mathematics and applied Statistics	**Semester:**	v
Lecture Hrs./Week or Practical Hrs./Week		**Tutorial Hrs./Sem.**			**Credits:**	3

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 to

CO Number	CO Statement	Knowledge Level
CO1	Understand and analyze the statistical formula and apply them in 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 spaceandalso learn its moment generating function	K4
CO3	Analyze the concept of most powerful test and analyze the samples based onmost 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 algebraic equations and compute 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, Karl Pearson Co-efficient of Correlation, Rank Correlation, Bivariate Correlation – Regression: Lines of Regression, Co-efficient of Regression.	12
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 (Definition only)	12
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	12
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.	12
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 interpolation-Trapezoidal rule-Simpson 1/3 rule and 3/8 rule for Numerical Integration.	12
	Total Contact Hrs	60

Pedagogy and Assessment 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 and Sons, 17/e	2017
2	RSN Pillai &Bagavathi	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	Santosh Kumar	Computer Oriented Statistical and Numerical Methods	S.Chand and Co , 5/e	2013

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
K. Srinivasan G. Angayarkanni	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	21UCS6AL2	**Title**	**Batch :**	2021-2024
		Software Testing	**Semester**	VI
Hrs/Week:			**Credits:**	3

Course Objective

The objective of this course is to make the students to understand the various features of testing such as software test automation, test metrics and measurement. Software testing tool win runner is used for applications.

Course Outcomes (CO)

K1	CO1	To remember the software development life cycle phases,quality assurance and quality control.
K2	CO2	To understand the types of testing, scenarios, process,methodologies, challenges in testing.
K3	CO3	To implement design and architecture for automation, software testing tools are applied.
K4	CO4	To evaluate performance ,test metrics and measurement , WinRunner software is used.
K5	CO5	To Access verification and validation, integrate functional and non-functional testing,to perform regression testing, framework for test tools, testing an application using WinRunner.

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

Syllabus

Units	Contents	Hrs
Unit I	***Software development life cycle:*** Phases of Software Project-Quality, Quality Assurance,and Quality Control-Testing, Verification, and Validation. White Box Testing: Static Testing-Structural Testing-*Challenges.* Black Box Testing: What is Black Box Testing, Why Black Box Testing-When to do Black Box Testing-How to do Black Box Testing	12
Unit II	***Integration Testing***: Integration Testing as a type of Testing- Integration Testing as a phase of Testing- Scenario Testing-Defect Bash. System and Acceptance Testing: Functional System Testing- Non Functional Testing- Acceptance Testing.	12

Unit III	***Performance Testing:*** Methodology-Tools-Process-Challenges. Regression Testing: Types-When to do Regression Testing- How to do Regression Testing. Internationalization Testing.	12
Unit IV	Test Cases Design: Write Test cases, Review Test cases, Test Cases Template, Types of Test Cases, Difference between Test Scenarios and Test Cases. Test Environment setup, Understand the SRS, Hardware and software requirements, Test Data	12
Unit V	Test Execution: Execute test cases, Error/Defect Detecting and Reporting, DRE(Defect Removal Efficiency), Object ,Types of Bugs , Art of Debugging,. Debugging Approaches, Reporting the Bugs, Severity and priority, Test Closure, Criteria for test closure, Test summary report.	12
	Total Contact Hrs	**60**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	

TEXT BOOKS	1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practices"pearsonEducation-7th impression 2009 2. Dr K.V.K.K Prasad, "Software Testing Tools", Dreamtech press, New Delhi, 2007 (for unit V)
REFERENCES	1.Roger S.Pressman,"Software Engineering", Tata McGraw Hill Publication, Sixth Edition, 2009.

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr. R.Manicka Chezian M. Meena Krithika	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature: