### **MOTHER TERESA WOMEN'S UNIVERSITY**

# KODAIKANAL



# B.Sc. Computer Science (2023-2024 Onwards) (As per TANSCHE Framework)

# May 2023

## **B.Sc. Computer Science**

#### **1. Introduction**

#### **B. Sc.** Computer Science

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Learning Outcomesbased Curriculum Framework (LOCF) which makes it student-centric, interactive and outcomeoriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the state which will help the students to ensure similar quality of education irrespective of the institute and location.

Computer Science is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer science is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Nowadays, practically everyone is a computer user, and many people are even computer programmers. Computer Science can be seen on a higher level, as a science of problem solving and problem solving requires precision, creativity, and careful reasoning. The ever-evolving discipline of computer science also has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers, but finding a solution requires both computer science expertise and knowledge of the particular application domain. Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Science is practiced by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Science provides the methodology for learning and refinement. Engineering provides the techniques for building hardware and software.

#### Programme Outcome, Programme Specific Outcome and Course Outcome

Computer Science is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics. The students completing this programme will be able to present Software application clearly and precisely, make abstract ideas precise by formulating them in the Computer languages. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in software industry, banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

#### 2. Programme Outcomes (PO) of B. Sc. degree programme in Computer Science

- Scientific aptitude will be developed in Students
- Students will acquire basic Practical skills & Technical knowledge along with domain knowledge of different subjects in the Computer Science & humanities stream.
- Students will become employable; Students will be eligible for career opportunities in education field, Industry, or will be able to opt for entrepreneurship.

- Students will possess basic subject knowledge required for higher studies, professional and applied courses.
- Students will be aware of and able to develop solution oriented approach towards various Social and Environmental issues.
- Ability to acquire in-depth knowledge of several branches of Computer Science and aligned areas. This Programme helps learners in building a solid foundation for higher studies in Computer Science and applications.
- The skills and knowledge gained leads to proficiency in analytical reasoning, which can be utilized in modelling and solving real life problems.
- Utilize computer programming skills to solve theoretical and applied problems by critical understanding, analysis and synthesis.
- > To recognize patterns and to identify essential and relevant aspects of problems.
- Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others.
- > Mould the students into responsible citizens in a rapidly changing interdependent society.

The above expectations generally can be pooled into 6 broad categories and can be modified according to institutional requirements:

- PO1: Knowledge
- PO2: Problem Analysis
- PO3: Design / Development of Solutions
- PO4: Conduct investigations of complex problems
- PO5: Modern tool usage
- PO6: Applying to society

#### 3. Programme Specific Outcomes of B.Sc. Degree Programme in Computer Science

- PSO1: Think in a critical and logical based manner
- PSO2: Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real time application related sciences.
- PSO3: Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
- PSO4: Understand, formulate, develop programming model with logical approaches to Address issues arising in social science, business and other contexts.
- PSO5: Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics.
- PO6: Provide students/learners sufficient knowledge and skills enabling them to undertake further studies in Computer Science or Applications or Information Technology and its allied areas on multiple disciplines linked with Computer Science.
- PO7: Equip with Computer science technical ability, problem solving skills, creative talent and power of communication necessary for various forms of employment.

PO8: Develop a range of generic skills helpful in employment, internships& societal activities.

Get adequate exposure to global and local concerns that provides

PO9: platform for further exploration into multi-dimensional aspects of Computing sciences.

#### 4.Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) can be carried out accordingly, assigning the appropriate level in the grids: (put tick mark in each row)

			Po	S			PSC	Ds	
	1	2	3	4	5	6	 1	2	
CLO1									
CLO2									
CLO3									
CLO4									
CLO5									
CLO6									

#### 5. Highlights of the Revamped Curriculum

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Computer Science based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a survey in a scientific

and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.

State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest – Statistics with R Programming, Data Science, Machine learing. Internet of Things and Artificial Intelligence etc.

0. value aut	Needla in the Revamped Curriculum:	Outermark Barraffer
Semester	Newly introduced Components	Outcome / Benefits
Ι	To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Mathematics and simulating mathematical concepts to real world.	<ul><li>Instill confidence among students</li><li>Create interest for the subject</li></ul>
I, II, III, IV	<b>Skill Enhancement papers</b> (Discipline centric / Generic / Entrepreneurial)	<ul> <li>Industry ready graduates</li> <li>Skilled human resource</li> <li>Students are equipped with essential skills to make them employable</li> <li>Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects</li> <li>Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc.</li> <li>Entrepreneurial skill training will provide an opportunity for independent livelihood</li> <li>Generates self – employment</li> <li>Create small scale entrepreneurs</li> <li>Training to girls leads to women empowerment</li> <li>Discipline centric skill will improve the Technical knowhow of solving real life problems using ICT tools</li> </ul>
III, IV, V & VI	Elective papers- An open choice of topics categorized under Generic and Discipline Centric	<ul> <li>Strengthening the domain knowledge</li> <li>Introducing the stakeholders to the State-of Art techniques from the streams of multi- disciplinary, cross disciplinary and inter disciplinary nature</li> <li>Students are exposed to Latest topics on Computer Science / IT, that require strong mathematical background</li> <li>Emerging topics in higher education / industry / communication network / health sector etc. are introduced with hands-on- training, facilitates designing of mathematical models in the respective sectors</li> </ul>
IV	Industrial Statistics	<ul> <li>Exposure to industry moulds students into solution providers</li> <li>Generates Industry ready graduates</li> <li>Employment opportunities enhanced</li> </ul>

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II year Vacation activity	Internship / Industrial Training	• Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens.
V Semester	Project with Viva – voce	<ul> <li>Self-learning is enhanced</li> <li>Application of the concept to real situation is conceived resulting in tangible outcome</li> </ul>
VI Semester	Introduction of Professional Competency component	<ul> <li>Curriculum design accommodates all category of learners; 'Mathematics for Advanced Explain' component will comprise of advanced topics in Mathematics and allied fields, for those in the peer group / aspiring researchers;</li> <li>'Training for Competitive Examinations' – caters to the needs of the aspirants towards most sought - after services of the nation viz, UPSC, CDS, NDA, Banking Services, CAT, TNPSC group services, etc.</li> </ul>
Extra Credi For Advanc	ts: ed Learners / Honors degree	• To cater to the needs of peer learners / research aspirants
Skills acquir	red from the Courses	<ul> <li>Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</li> </ul>

9. Consolidated Semester wise and Component wise Credit distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	<b>Total Credits</b>
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	_	12
Part III	13	13	13	13	22	18	92
Part IV & Part V	4	4	3	6	4	3	24
Part VI							
Total	23	23	22	25	26	21	140

\*Part I. II , and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree

**10. Illustration for B. Sc. Computer Science Curriculum Design** 

Semester-I								
Course Code	Course Title	Credits	Hours	CIA	ESE	Total		
U23TAL101/ U23MAL101/ U23FRL101/ U23HIL101	Language – 1: Tamil / Malayalam/French/Hindi	3	6	25	75	100		
U23ENL101	Language2 – English	3	6	25	75	100		
U23CST101	Core Theory – 1: OOPS using C++	5	5	25	75	100		
U23CSP102	Core 2 Practical – 1: OOPS using C++ Lab	5	5	25	75	100		
U23CSE11A	<b>Elective 1 – Discrete Mathematics</b>	3	4	25	75	100		
U23CSS101	SEC1 – Problem Solving Techniques	2	2	25	75	100		
U23CSF101	Foundation Course – Fundamentals of Information Technology	2	2	25	75	100		
Total		23	30	-	-	700		

#### FIRST YEAR (Academic Year 2023-2024 Onwards) Somestor I

	Semester-II					
Course Code	Course Title	Credits	Hours	CIA	ESE	Total
U23TAL202/ U23MAL202/ U23FRL202/ U23HIL202	Language – 1: Tamil / Malayalam/French/Hindi	3	6	25	75	100
U23ENL202	Language 2 – English	3	6	25	75	100
U23CST203	Core Theory – 3: Data Structures and Algorithms	5	5	25	75	100
U23CSP204	Core 4 Practical – 2: Data Structures and Algorithms Lab	5	5	25	75	100
U23CSE22A	Elective 2 – Digital Computer Fundamentals	3	4	25	75	100

U23CSS202	SEC 2 – Generic Course (Soft Skills)	2	2	25	75	100
Part 4 : U23CSNM21	SEC 3: Naan Mudhalvan Course – 1	2	2	25	75	100
Part 6: U23CSS203	SEC - 4: Web Designing- Additional Credits	-	-	25	75	100
	Total	23	30			

Semester-III						
Course Code	Course Title	Credits	Hours	CIA	ESE	Total
Part-1 U23TAL303/ U23MAL303/ U23FRL303/ U23HIL303	Language – 1: Tamil / Malayalam/French/Hindi	3	6	25	75	100
Part-2 U23ENL303	Language-2	3	6	25	75	100
Part-3 U23CST305	Core Theory – 5: Python Programming	5	5	25	75	100
U23CSP306	Core 6 Practical – 3: Python Programming Lab	5	5	25	75	100
U23CSE33A	Elective-3:Statistical Methods & its Applications–I	3	4	25	75	100
Part-4 U23CSS304	SEC-5:MicrosoftOffice(Practical)	1	2	25	75	100
U23CSNM32	SEC – 6: Naan Mudhalvan Course – 2	2	2	25	75	100
	Total	22	30			

Semester-IV						
Course	Course Title	Credits	Hours	CIA	ESE	Total
Code						
Part-1	Language – 1: Tamil /	3	6	25	75	100
U23TAL404/	Malayalam/French/Hindi					
U23MAL404/						

U23FRL404/						
U23HIL404						
Part-2	Language–2	3	6	25	75	100
U23ENL404						
U23CST407	Core Theory – 7: Database	5	4	25	75	100
	Management System					
U23CSP408	Core 8 Practical – 4: Database	5	5	25	75	100
	Management Lab					
Part – 4	Elective- 4: Statistical Methods &	3	3	25	75	100
U23CSE44A	its Application-II					
Part-4	SEC- 7: PHP Programming	2	2	25	75	100
U23CSS405						
U23CSNM43	Naan Mudhalvan Course – 3	2	2	25	75	100
Part-4	EVS	2	2	25	75	
U23EVS401						100
	Total	25	30			

Semester-V						
Course Code	Course Title	Credits	Hours	CIA	ESE	Total
Part-3 U23CST509	Core Theory - 9: Software Engineering	4	5	25	75	100
U23CST510	Core Theory - 10: Java Programming	4	5	25	75	100
U23CSP511	Core 11 Practical - : Java Programming Lab	4	5	25	75	100
U23CSPR51	Core- 7: Project with Viva	4	5	25	75	100
U23CSE55A	Elective-5:Numerical Methods	3	3	25	75	100
U23CSE56A	Elective-6:Cloud Computing	3	3	25	75	100
Part-4 U23VAE501	Value Education	2	2	25	75	100
U23CSI501	Summer Internship/Industrial Training	2	-	25	75	100
U23CSNM54	Naan Mudhalvan Course – 4		2	25	75	100
	Total	26	30			

Semester-VI						
Course Code	Course Title	Credits	Hours	CIA	ESE	Total

			1			
Part-3	Core Theory - 12: Computer Networks	4	6	25	75	100
U23CST612						
U23CST613	Core Theory - 13: .NET Programming	4	6	25	75	100
U23CSP614	Core 14 Practical -6: .NET Programming	4	6	25	75	100
	Lab					
U23CSE67A	Elective-7: Internet of Things (IoT) and its	3	5	25	75	100
	Applications					
U23CSE68A	Elective-8: Big Data Analytics	3	5	25	75	100
Part-4	Extension Activity	1	-	25	75	100
U23EAS601						
	Naan Mudhalvan Course – 5	2	2	25	75	100
U23CSNM65						
	Total	21	30			

First Tear (Semester = 1)					
Course Code U23CST101	Core 1 –OOPS using C++		Credits 5		
Lecture Hours:4(L)Per week	Tutorial Hours:5(T)per week	Lab Practice Hours: 0(P) per week	Total:(L+T+P) Per week: 5		
Course Category:	Year & Sem	ester:	<b>Admission Year:</b>		
Core	I Year I Semester		2023-2024		
Pre-requisite Basic Knowledge of Programming concept					
<b>Learning Objectives:</b> (for teachers :what they have to doing the class/lab/field)					

**SYLLABUS** Finat Ween (Comparton - T)

To gain knowledge in C++ language.

To inculcate fundamental programming skills. •

Course Outcomes: (for students : To know what they are going to learn)

**CO1:**Remember the program of C++ with its syntax and semantics

**CO2:**Understand the programming principles in C++ (data types, operators, branching and looping,

arrays, functions, structures, pointers and files)

**CO3:**Apply the programming principles learnt in real-time problems

CO4: Analyze the various methods of solving a problem and choose the best method

**CO5:** Code, debug and test the programs with appropriate test cases

Knowledge level - K1 (Remember), K2 (Understand), K3 (Apply), K4 (Analyze), K5(Evaluate),K6(Create).K1\*Through out the course, retention of all the concepts is emphasized after thorough understanding

CO1*	What is an language, Understand Beginning with C++ and Basic concepts of Object Oriented Programming and Learn evolution[PO3]. Define OOPs, List Object Oriented Language, Choose the Benefits of OOPS and Apply the Application of OOPS	K1K2K3K4K5
CO2*	What is Token, Why data type need, Explain Keyword, Identifier and constant Basic ,User defined and Derived data Types, Learn Operators and Control structures in C++ Understand the Expression and their types for the given problem and Evaluate its performance[PO3],	K1K2K3K4K5 K6
C03*	Learn the Classes and Objects, What is Constructor and Destructors, Learn Operator overloading and Type conversions. And present their work through PPT [PO2]).	K1K2K3K4K5
CO4*	<b>Define</b> Inheritance, <b>Learn</b> the various types of Extending Classes, Apply the Pointers, Virtual Function and Polymorphism and Learn the Managing consoles I/O operations [ <b>PO3</b> ].	K1K2K3K4 K5
CO5*	Able to <b>explain</b> file and Templates, Learn the concept of Exception Handling. <b>Analyze</b> when a problem is given and develop a software as a group activity[ <b>PO5</b> ]	K1K2K3K4K5

### Stronglycorrelated-3

Moderately correlated-2 Weaklycorrelated-1

CO/		РО								
PO/ PSO	Disciplinary Knowledge and Skills (1)	Skilled Communicator (2)	Critical Thinker and Problem Solver (3)	Sense of inquiry (4)	Team player/ Worker (5)	Skilled Project Manager (6)	Digitally Efficient (7)	Ethical Awareness Reasoning (8)	National and International Perspective (9)	Life/Long Learners (10)
CO1	3	1			1		2	1	3	1
CO2	3	1			1		2	1		1
CO3	3	1	1	1	1	1	2	1		1
CO4	3	1	1	1	1		2	1		1
CO5	3	1	1	1	1	1	2	1		1
CS- TOT	15	5	3	3	5	2	10	5	3	5
CS- AVG	3	1	1	1	1	1	2	1	3	1

Recap:(not for examination) Motivation /previous lecture /relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	Required Hours
Ι	Principles of object Oriented Programming : Software evolution – Basic concepts of objectOrientedProgramming– BenefitsofOOPS–ObjectOrientedLanguage– ApplicationofOOPS–BeginningwithC++.	15
II	Token, Expressions and Control Structure Functions : Token – Keyword – Identifier and constant– Basic Data Types– User defined data type-Derived data type– Operators in C++ -ScopeResolutionOperator–MemberdereferencingOperator– Manipulators–TypecastOperators–Expressionandtheirtypes–	15

Implicitconversion– Control structures.						
	Ш	Classes and Ob	jects – Constructor and	Destructors		15
		- Operator ove	rloading and Type conv	versions.		
	<b>TX</b> 7	Inheritance: Ex	tending Classes– Point	ers, Virtual		4 =
	IV	Function and P	olymorphism– Managi	ng consoles		15
		I/O operations.				
	V	Working with	Files-Templates-Excep	tion Handling.	•	15
				Tot	tal (Hrs.)	75
Extended Profe	essional Component		Questions related to	the above to	pics, fro	om various
(is a part of i	internal component	only, Not to be	competitive examinatio	ns UPSC /TRE	3 /NET /U	JGC–
niciuded in u paper)	le External Exami	nation question (	CSIR /GATE /TNPS	C /others to	be solv	red (To b
discussed during the Tutorial hour)						
Skills acquired from the course Knowledge, Problem Solving, Analytical a						al ability
-			Professional Competer	ncy, Professio	onal Con	nmunicatio
		ä	and Transferrable Skill	-		
Learning Re	sources:					
Text Book:						
1. 0	<b>D</b> bjectorientedProg	rammingwithC+	-+byE.BalagurusamyTa	ataMcGrawHill	lPublishir	ı
gComp	anyLimited1998C	hapter:1to11.				
<b>Reference B</b>	ook:					
1. (	C++,theCompleteR	eferenceHerbert	Schlitz,1997.			
Course Code	•		Core Practical -	- 1: OOPS	Cı	redits
	U23CSP102		using C++	Lab		5
			Tutorial	Lab		
Lecture Hours:O(L)Per week			1 utoriai	Practice	Total	$(\mathbf{L} + \mathbf{T} + \mathbf{P})$
			Houng $O(T)$ non	I lucite	i oturi	
	Hours:0(L)Per w	veek	Hours:0(T)per	Hours:5 (P)	Per	week: 5
	Hours:0(L)Per w	veek	Hours:0(T)per week	Hours:5 (P) per week	Per	week: 5
Course Cate	Hours:0(L)Per v gory: Core	veek	Hours:0(T)per week Year & Semester	Hours:5 (P) per week :I Year I	Admiss	week: 5
Course Cate	Hours:0(L)Per v gory: Core	veek	Hours:0(T)per week Year & Semester Semester Basic Knowledge of	Hours:5 (P) per week :I Year I	Admiss 202	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob	Hours:0(L)Per v gory: Core	veek	Hours:0(T)per week Year & Semester Semester Basic Knowledge o	Hours:5 (P) per week :I Year I f Programming	Admiss 202 concept	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob	Hours:0(L)Per v gory: Core ojectives:	ng skills using (	Hours:0(T)per week Year & Semester Semester Basic Knowledge of	Hours:5 (P) per week :I Year I f Programming	Admiss 202 concept	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and	ng skills using (	Hours:0(T)per week Year & Semester Semester Basic Knowledge of C++.	Hours:5 (P) per week :I Year I f Programming	Admiss 202 concept	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc	Hours:0(L)Per v gory: Core ojectives: lement programmi art knowledge and omes:(for students	ng skills using ( provide efficients: To know what	Hours:0(T)per week         Year & Semester         Semester         Basic Knowledge of         C++.         nt solutions for real time         they are going to learn	Hours:5 (P) per week :I Year I f Programming	Admiss 202 concept	week: 5 sion Year: 3-2024 anguage
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and omes:(for students ber and understand b	ng skills using ( provide efficients: To know what	Hours:0(T)per week         Year & Semester         Semester         Basic Knowledge or         C++.         nt solutions for real time         they are going to learn         ams using the basic synta	Hours:5 (P) per week :I Year I f Programming e problems usin	Admiss 202 concept ng C++ $la$	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t	Hours:0(L)Per v gory: Core ojectives: lement programmi art knowledge and omes:(for students ber and understand h he concepts of fund	ng skills using ( provide efficients: To know what ow to write progr ctions, arrays. po	Hours:0(T)per week         Year & Semester         Semester         Basic Knowledge or         C++.         nt solutions for real time         they are going to learned         ams using the basic syntate         pointers and files in program	Hours:5 (P) per week :I Year I f Programming e problems usin ) ax and semantics grams to solve	Admiss 202 concept ng C++ la	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememt CO2:Apply t CO3:Analyze	Hours:0(L)Per v gory: Core jectives: lement programmi part knowledge and omes:(for students ber and understand h he concepts of func- e and understand p	ng skills using ( provide efficients: To know what ow to write progr ctions, arrays, per rograms written	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge of         C++.         t solutions for real time         they are going to learn         ams using the basic synta         pointers and files in prog         in C++ language	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p	Admiss 202 concept ng C++ la s in C++	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememt CO2:Apply t CO3:Analyze CO4: Evaluat	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and omes:(for students ber and understand h he concepts of funder e and understand program execu	ng skills using 0 provide efficien To know what ow to write progr ctions, arrays, po rograms written tion flow with tes	Hours:0(T)per week         Year & Semester         Semester         Basic Knowledge or         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in proge         in C++ language         t cases and apply debugg	Hours:5 (P) per week :I Year I f Programming e problems usin ) ax and semantics grams to solve p ing	Admiss 202 concept ng C++ la s in C++ problems	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design	Hours:0(L)Per v gory: Core ojectives: element programminant omes:(for students ber and understand h he concepts of func- e and understand pre- e the program execu- algorithms and wr	ng skills using C provide efficien To know what ow to write progr ctions, arrays, per rograms written tion flow with tes tite programs in	Hours:0(T)per         week         Year & Semester         Basic Knowledge of         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in prog         in C++ language         t cases and apply debugg         C++ language for the ge	Hours:5 (P) per week :I Year I f Programming e problems using () () () () () () () () () () () () ()	Admiss 202 concept	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememt CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and omes:(for students ber and understand h he concepts of func- e and understand p e the program execu algorithms and wr	ng skills using 0 provide efficien To know what ow to write progr ctions, arrays, po rograms written tion flow with tes tite programs in	Hours:0(T)per week         Year & Semester         Semester         Basic Knowledge or         C++.         t solutions for real time         they are going to learn         ams using the basic synta         ointers and files in proge         in C++ language         t cases and apply debugg         C++ language for the ge	Hours:5 (P) per week :I Year I f Programming e problems usin ) ax and semantics grams to solve p ing iven problems	Admiss 202 concept ng C++ la s in C++ problems	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and omes:(for students ber and understand h he concepts of fund e and understand pi e the program execu algorithms and wr dge level - K1 (F	ng skills using ( provide efficien To know what ow to write progr ctions, arrays, per rograms written tion flow with tes tite programs in Remember), K2	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge of         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in proge         in C++ language         t cases and apply debugg         C++ language for the ge         2 (Understand), K3 (not see the second se	Hours:5 (P) per week :I Year I f Programming e problems usin ) ax and semantics grams to solve p ing iven problems Apply), K4 (A	Admiss 202 concept ng C++ la in C++ problems	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememt CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowley K5(Eval	Hours:0(L)Per v gory: Core jectives: lement programmi part knowledge and omes:(for students ber and understand h he concepts of func- e and understand pr e the program execu algorithms and wr dge level - K1 (F luate),K6(Create)	ng skills using ( provide efficients: To know what ow to write programs written tion flow with test tite programs in Remember), K2 .K1*Through o	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge or         C++.         t solutions for real time         they are going to learn         ams using the basic synta         pinters and files in progenin C++ language         t cases and apply debugg         C++ language for the generation         Q (Understand), K3 (not set the course, retention)	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Admiss 202 concept s in C++ la in C++ problems Analyze),	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core ojectives: lement programmi art knowledge and omes:(for students ber and understand p e the program execu algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough	ng skills using ( provide efficients: To know what ow to write programs written tion flow with test tite programs in Remember), K2 .K1*Through of understanding	Hours:0(T)per         week         Year & Semester         Basic Knowledge or         C++.         at solutions for real time         they are going to learn         ams using the basic synta         pinters and files in proge         t cases and apply debugg         C++ language for the ge         2 (Understand), K3 (at the course, retention	Hours:5 (P) per week :I Year I f Programming e problems usin ) ax and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Analyze),	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememt CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core jectives: lement programminart knowledge and omes:(for students ber and understand h he concepts of func- e and understand price e the program execu- algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough	ng skills using ( provide efficients: To know what ow to write programs written tion flow with test ite programs in Remember), K2 .K1*Through o understanding	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge or         C++.         t solutions for real time         they are going to learn         ams using the basic synta         binters and files in progenin C++ language         t cases and apply debugg         C++ language for the generation         C++ language         C++ lang	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Admiss 202 concept s in C++ la s in C++ problems Analyze),	week: 5 sion Year: 3-2024
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowled K5(Eval emphasi	Hours:0(L)Per v gory: Core jectives: lement programmi part knowledge and omes:(for students ber and understand h he concepts of func- e and understand pi e the program execu algorithms and wr dge level - K1 (Fe luate),K6(Create) zed after thorough	ng skills using ( provide efficients: To know what ow to write programs written tion flow with test tite programs in <b>Remember</b> ), <b>K</b> 2 .K1*Through of understanding	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge of         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in progent         t cases and apply debugg         C++ language for the generation         2 (Understand), K3 (and the course, retention	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Admiss 202 concept ng C++ la in C++ problems Analyze), oncepts is	week: 5 sion Year: 3-2024 anguage
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core jectives: lement programmine art knowledge and omes:(for students ber and understand h he concepts of func- e and understand prie the program execu- algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough	ng skills using ( provide efficients: To know what ow to write programs written tion flow with test tite programs in <b>Remember</b> ), <b>K</b> 2 .K1*Through ounderstanding	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge or         C++.         t solutions for real time         they are going to learn         ams using the basic synta         pinters and files in progenin C++ language         t cases and apply debugg         C++ language for the generation         Q (Understand), K3 (and the course, retention         grams and select the         ray write [PO3] simp	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Admiss         202         g concept         ang C++ la         and C++         problems	week: 5 sion Year: 3-2024 anguage
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core ojectives: lement programmi art knowledge and omes:(for students ber and understand p e the program execu algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough	ng skills using Q provide efficients: To know what ow to write programs written tion flow with test tite programs in Remember), K2 .K1*Through of understanding P07] C++ Programs and Arri- ilt-in functions a	Hours:0(T)per         week         Year & Semester         Basic Knowledge or         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in progenetic synta         pinters and files in progenetic synta         pinters and files in progenetic synta         pinters and apply debugg         C++ language for the genetic synta         Q (Understand), K3 (or         prams and select the         ray write [PO3] simp         and evaluate the result	Hours:5 (P) per week :I Year I f Programming e problems usin ) tx and semantics grams to solve p ing fiven problems Apply), K4 (A h of all the co syntax in C ole programs a s. Viva-Voce c	Admiss         202         g concept         ang C++ la         ain C++         problems         Analyze),         oncepts is         C++         K11         and         K5	week: 5 sion Year: 3-2024 anguage
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core jectives: lement programmi art knowledge and omes:(for students ber and understand h he concepts of fund e and understand pi e the program execu algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough Demonstrate [F programming lan compare with but be conducted [P	ng skills using ( provide efficients: To know what ow to write progr ctions, arrays, per rograms written tion flow with test tite programs in <b>Remember</b> ), <b>K</b> 2 .K1*Through of understanding <b>P07</b> ] C++ Prog- nguage and Arrai ilt-in functions a <b>O2</b> ].	Hours:0(T)per         week         Year & Semester         Basic Knowledge of         C++.         nt solutions for real time         they are going to learn         ams using the basic synta         pinters and files in progeners         in C++ language         t cases and apply debugg         C++ language for the generation         t cases and apply debugg         C++ language for the generation         grams and select the         ay write [PO3] simp         and evaluate the result	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A h of all the co syntax in C ole programs a s. Viva-Voce C	Admiss $202$ $3$ concept $3$ concept $3$ in C++ $3$ in C++problemsAnalyze),oncepts is $2++$ $2++$ $K1H$ $K5$	week: 5 sion Year: 3-2024 anguage
Course Cate Pre-requisite Learning Ob • To imp • To imp Course Outc CO1:Rememb CO2:Apply t CO3:Analyze CO4: Evaluat CO5: Design Knowlee K5(Eval emphasi	Hours:0(L)Per v gory: Core jectives: lement programmine art knowledge and omes:(for students ber and understand h he concepts of func- e and understand prie the program execu algorithms and wr dge level - K1 (F luate),K6(Create) zed after thorough Demonstrate [F programming lar compare with but be conducted [Performance]	veek ng skills using ( provide efficien : To know what ow to write progr ctions, arrays, per rograms written tion flow with tes ite programs in Remember), K2 .K1*Through o understanding P07] C++ Prognouse and Arri ilt-in functions a O2].	Hours:0(T)per         week         Year & Semester         Semester         Basic Knowledge of         C++.         t solutions for real time         they are going to learn         ams using the basic synta         ointers and files in progene         t cases and apply debugg         C++ language for the generation         2 (Understand), K3 (for the course, retention         grams and select the         ray write [PO3] simp         and evaluate the result	Hours:5 (P) per week :I Year I f Programming e problems usin ) ix and semantics grams to solve p ing iven problems Apply), K4 (A n of all the co	Admiss $202$ $3$ concept $3$ concept $3$ in C++ $3$ in C++problemsAnalyze),oncepts is $2++$ $2++$ $K1I$ $and$ $K5$	sion Year: 3-2024 anguage

CO2*	<b>Write[PO3]</b> simple C string and Recursion programs by <b>identifying</b> the functions and <b>applying</b> string functions to perform string manipulations and the results can be <b>evaluated[PO7]</b> .	K1K2K3K5 K6
CO3*	Write[PO4]simple C Pointers and Array programs to demonstrate recursion by selecting the syntax and the results can be evaluated [PO7].Viva Voce can be conducted[PO2].	K1K2K3 K4
CO4*	Write[PO4]C programs by analyzing and selecting the syntax oper form Overloading the results can be evaluated and demonstrated[PO7].	K1K2K3K4 K5
CO5*	Write [PO4] simple C Files and Inheritance programs by selecting the syntax to perform sorting and searching and the results can be demonstrated [PO7]. Viva Voce can be conducted[PO2].	K1K2K3K4

	Stro	onglycorrela	ted-3	Mo	derately	v correla	ted-2	Weaklyo	correlated-	1
CO/					Р	0				
PO/ PSO	Disciplinary Knowledge and Skills (1)	Skilled Communicator (2)	Critical Thinker and Problem Solver (3)	Sense of inquiry (4)	Team player/ Worker (5)	Skilled Project Manager (6)	Digitally Efficient (7)	Ethical Awareness Reasoning (8)	National and International Perspective (9)	Life/Long Learners (10)
CO1	3	1	1	1	1		3	1	3	1
CO2	3	1	1	1	1		1	1		1
CO3	3	1	1	1	1		1	1		1
CO4	3	1	1	1	1		1	1		1
CO5	3	1	1	1	1	1	1	1		1
CS- TOT	15	5	5	5	5	1	7	5	3	5
CS- AVG	3	1	1	1	1	1	1	1	3	1

**Recap:**(not for examination) Motivation /previous lecture/ relevant portions required for the course)(This is done during 2 Tutorial hours)

	Lab Exercises	Required
1.	Simple Programs	Hours
2.	Arrays – CO1	
3.	Strings	
4.	Functions	
5.	Recursion	
6.	Structures – CO2	
7.	Pointers	
8.	Arrays with Structures	
9.	Arrays with Pointers – CO3	
10.	Files	75
11.	Call by value & call by reference method	
12.	Inline function in C++	
13.	Function overloading	
14.	Default Arguments	
15.	Operator overloading –CO4	
16.	Program using Inheritance	
17.	Program using polymorphism and virtual functions	
18.	File concepts – <b>CO5</b>	

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	Total(Hrs.) 75					
ExtendedProfessional Component	Questions related to the above topics, from various					
(is a part of internal component only,	competitive examinations UPSC/TRB/NET/UGC-					
Not to be included in the External	CSIR/GATE/TNPSC/others to be solved (To be discussed					
Examination question paper)	during the Tutorial hour)					
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability,					
	Professional Competency, Professional Communication and					
	Transferrable Skill					
Learning Resources:						
<b>Recommended Texts</b>						
1. ObjectorientedProgrammingwithC++byE.BalagurusamyTataMcGrawHillPublishi ngCompanyLimited1998Chapter:1to11.						
Reference Book:1.C++,theCompleteReferenceHo	Reference Book: 1. C++,theCompleteReferenceHerbertSchlitz,1997.					

Course Code U23CSE11A	Disc	crete Mathematics	Credits 3			
Lecture Hours:4(L)Per week	Tutorial Hours:4(T)per week	Lab Practice Hours:0(P)per week	Total:(L+T+P) Per week: 4			
Course Category: ELECTIVE 1	Year& Semester: I Year I Semester		Admission Year: 2023-2024			
Pre-requisite	Basic Knowledge	of Mathematics				
Learning Objectives:						
• To under	stand problem solv	ving method.				
• To Unde	erstand about Bool	ean algebra.				
• To Descr	ibes Relations.					
• Students	completing this c	ourse will be able to evaluate Be	polean functions and simplify			
expressions using t	he properties of B	oolean algebra.				
Course Outcomes:(for st	tudents: To know	what they are going to learn)				
<b>CO1:</b> Know how to solve	set and logic prob	blems				
CO2:Use of Relations, and	nd Functions					
CO3:Use Groups and Lagrange's theorem						
CO4: Apply the methods	CO4: Apply the methods for solving Matrix problems					
CO5:Use of posets, Has	CO5:Use of posets, Hasse diagram, lattice and its properties.					
Knowledge level -	K1 (Remember)	), K2 (Understand), K3 (Appl	y), K4 (Analyze),			

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K5(E emph	valuate),K6(Create).K1*Through out the course, retention of all the cousied after thorough understanding	oncepts is
CO1*	<b>Identify</b> the Review of theory of sets, <b>Define</b> Relations, Equivalence Relations, partial Order, Function and Binary Operations, <b>Illustrate</b> it and <b>find</b> the solved problems and <b>analyze</b> [ <b>PO3</b> ]it.	K1K2K3K4 K5
CO2*	<b>Identify</b> Logic, connectives, <b>Define</b> Truth table, Tautology Implications, Equivalences <b>Illustrate</b> its Problems and <b>find</b> out the solved problems.	K1K2K3 K4 K5
CO3*	<b>Define</b> Groups and <b>apply</b> the Examples , <b>Define</b> Elementary Properties, Sub Groups, Cycle groups <b>Understand and Demonstrate</b> the Coset's and Lagrange's Theorem .	K1K2K3K4K5
CO4*	<b>Define</b> Matrices, Special type of Matrices, <b>Find</b> out its operations, Inverse and Rank of a Matrices, <b>Define and Solved</b> the Eigen values and Eigenvectors Understand and Demonstrate the Cayley Hamilton theorem <b>Find</b> out the Solved problems, <b>analyze [PO3]</b> it, <b>identify</b> it and <b>justify</b> it. <b>Group discussion on Formulas</b> .	K1K2K3K4K5
CO5*	<b>Define</b> Posets, Hasse Diagram, <b>Recall</b> Lattices and its Properties <b>Analyze</b> [ <b>PO3</b> ] the Solved Problems , <b>apply</b> , explain how to <b>Create</b> the Boolean Algebra and <b>justify</b> it. <b>Group discussion</b> Partial Ordering–Posets–Hasse Diagram-Lattices–Properties –Sub Lattices–Special lattices.	K1K2K3K4K5K6

Stronglycorrelated–3	Moderately correlated-2	Weaklycorrelated–1

CO/					Р	0				
PO/	Disciplinary	Skilled	Critical	Sense	Team	Skilled	Digitally	Ethical	National	Life/Long
PSO	Knowledge	Communicator	Thinker	of	player/	Project	Efficient	Awareness	and	Learners
	and Skills	(2)	and	inquiry	Worker	Manager	(7)	Reasoning	International	(10)
	(1)		Problem	(4)	(5)	(6)		(8)	Perspective	
			Solver						(9)	
			(3)							
CO1	3	1	1	1	1		3	1	3	1
CO2	3	1	1	1	1		1	1		1
CO3	3	1	1	1	1		1	1		1
CO4	3	1	1	1	1		1	1		1
CO5	3	1	1	1	1	1	1	1		1
CS-	15	5	5	5	5	1	7	5	3	5
TOT										
CS-	3	1	1	1	1	1	1	1	3	1
AVG										

**Recap:**(not for examination) Motivation / previous lecture/ relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	Required Hours
Ι	Review of theory of sets – Relations – Equivalence Relations – partial Order – Function –Binary Operations.	15
II	Logic–Introduction–connectives–TruthTable–Tautology– Implications–Equivalences.	15
III	Groups–Definitions&Examples–Elementary–Properties– SubGroups–Cyclegroups – Cosets and Lagrange's Theorem– Normal Subgroups.	15

IV	r a 15	
V	Partial Ordering– Posets – Hasse Diagram-Lattices–Properties - Sub Lattices–Special lattices–Boolean Alegbra.	- 15
	Total (Hr	s.) 75
Extended Component (is a part of component only, included in th Examination quess Skills acquired course	Professional       Questionsrelatedtotheabovetopics,fromvariouscon         UPSC/TRB/NET/UGC/CSIR/GATE/TNPSC/othe         of       internal         Not       to         Not       to         ie       External         stion paper)       Knowledge,ProblemSolving,Analyticalability,Pr         ProfessionalCommunicationandTransferrable Sk	npetitiveexaminations erstobesolved(Tobedisc ofessionalCompetency, ill
Learning Resource Recommended Te 1.Modern algebra & 2.Discrete mathema Chennai.	ces: exts cS.Arumugam&ThangapandiIssac,NewGammaPublishingHouse tics by M.K.Venkataramanan and N.Chandrasekaran, nation pul	,Palamkottai. blishing &CO.,

Course Code U23CSS101	Part 4 – Problem So	Credits 2						
Lecture Hours: 2(L)Per week	Tutorial Hours:2(T)per week	Total:(L+T+P) Per week: 2						
<b>Course Category:</b>	Year &S	emester:	<b>Admission Year:</b>					
SEC 1	I Year I S	Semester	2023-2024					
Pre-requisite	Basic of Problem-solving	Basic of Problem-solving skills						
Learning Objectives:	·							
• To understand the importance of algorithms and programs, and to know of the basic								

problem solving strategies.

- To learn efficient strategies and algorithms to solve standard problems, thus laying a firm • foundation for designing algorithmic solutions to problems.
- Course Outcomes: (for students: To know what they are going to learn)

**CO1:** Understand the systematic approach to problem solving.

**CO2:** Know the approach and algorithms to solve specific fundamental problems.

**CO3:** Understand the efficient approach to solve specific factoring-related problems.

**CO4:** Understand the efficient array-related techniques to solve specific problems.

**CO5:** Understand the efficient methods to solve specific problems related to text processing. Understand how recursion works.

### Knowledge level - K1 (Remember), K2 (Understand), K3 (Apply), K4

(Analyze), K5(Evaluate), K6(Create). K1\*Through out the course, retention of all the concepts is emphasized after thorough understanding

CO1*	What is an algorithm, Compare different algorithms and Choose the best algorithm [PO3].Define Problem definition phase and Recursion, List their use of specific examples, Choose the General problem with solving strategies and Analyze the Implementation of the algorithm. (Assignment on choosing a small real-world problem[PO1],creatively choosing the appropriate one writing an algorithm and computing its Problem solving techniques using top-down design [PO3].Present it as a word document[PO2])	K1 K2 K3 K4 K5
CO2*	What is Exchanging the values of two variables ,Counting , Summation of a set of numbers, <b>Define</b> Factorial computation , Sine function computation , Fibonacci Series generation, <b>Apply</b> Reversing the digits of an integer and Base Conversion, <b>Explain</b> the implementation, <b>Creatively choose</b> the best algorithm for the given problem and <b>Evaluate</b> its performance[ <b>PO3</b> ],	K1 K2 K3 K4 K5 K6
CO3*	Learn the algorithms, What is Finding the square root of a number ,The smallest divisor of an integer ,Greatest common divisor of two integers ,Generating prime numbers , Computing the prime factors of an integer ,Generation of pseudo-random numbers ,Raising a number to a large power and Computing the <i>n</i> th Fibonacci number and Illustrate and Identify the best suitable for real life problem, Compare and contrast the various solutions Justify the selection of a algorithm[PO3]. (A group activity [PO5] on identifying the various algorithms and techniques available, their applications in real life problems [PO1] from various e-resources[PO7],creatively choose the appropriate techniques[PO3] and present their work through PPT [PO2])	K1 K2 K3 K4 K5
CO4*	<b>Define</b> Algorithm, Learn, compare and contrast the Array order reversal, Array counting or histogramming ,Finding the maximum number in a set , Removal of duplicates from an ordered array , Partitioning an array , Finding the $k^{th}$ smallest element and the Longest monotone sub sequence techniques, Apply the relevant algorithm techniques based on the problem and Justify the selection [PO7].	K1 K2 K3 K4 K5
CO5*	<ul> <li>Learn, compare and contrast the Text and Pattern searching and Recursive algorithms t</li> <li>Apply the relevant techniques based on the problem and Justify the selection.</li> <li>(Implement algorithm techniques using any programming language and analyse Their performance[PO7,PO10])</li> </ul>	K1 K2 K3 K4 K5

### Stronglycorrelated–3 Moderately correlated–2 Weaklycorrelated–1

PO/ Di	sciplinary	Skilled	Critical Thinkor	a						
		omica	Chucai Thinker	Sense	Team	Skilled	Digitally	Ethical	National	Lif
PSO Ki	nowledge	Comm	and Problem	of	player/	Project	Efficient	Awareness	and	Lea
an	d Skills	unicat	Solver (3)	inquiry	Worker	Manager	(7)	Reasoning	International	(10
(1)	)	or (2)		(4)	(5)	(6)		(8)	Perspective	
									(9)	
CO1	3	1	1	1	1		3	1	3	
CO2	3	1	1	1	1		1	1		
CO3	3	1	1	1	1		1	1		
CO4	3	1	1	1	1		1	1		
CO5	3	1	1	1	1	1	1	1		
CS-	15	5	5	5	5	1	7	5	3	
ТОТ										
CS-	3	1	1	1	1	1	1	1	3	
AVG										

# **Recap:**(not for examination) Motivation/previous lecture/ relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	Required Hours	

I	<b>Introduction:</b> Notion of algorithm solving problems by computer – definition phase, Getting started examples, Similarities among pro- solution – General problem-solvin top-down design – Implementati Recursion.	ms and programs – Requirements for The problem-solving aspect: Problem on a problem, The use of specific blems, Working backwards from the ng strategies - Problem solving using on of algorithms – The concept of	6			
II	<b>Fundamental Algorithms:</b> Exchanging the values of two variables – Counting - Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer – Base Conversion					
III	<b>Factoring Methods:</b> Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers – Generating prime numbers – Computing the prime factors of an integer – Generation of pseudo-random numbers - Raising a number to a large power – Computing the <i>n</i> th Fibonacci number					
IV	<b>Array Techniques:</b> Array order reversal – Array counting or histo- gramming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the $k^{\text{th}}$ smallest element – Longest monotone subsequence.					
V	<b>Text Processing and Pattern Sea</b> Left and right justification of text line editing – Linear pattern search Recursive algorithms: Towers of H	<b>Trching:</b> Text line length adjustment – t – Keyword searching in text – Text Ianoi – Permutation generation.	6			
		Total (Hrs.)	30			
Extende	d Professional Component	Questions related to the above to	opics, from			
(is a pa	art of internal component only,	various competitive examinations U	PSC /TRB			
Not to	be included in the External	/NET /UGC /CSIR /GATE /TNPSC /	others to be			
Examina	ation question paper)	solved (10 be discussed during the 1 u	torial hour)			
Skills ac	equired from the course	Knowledge, Problem Solving, Analy Professional Competency, I Communication and Transferrable Sk	tical ability, Professional ill			
Learnin	g Resources:					
Recomn	nended Texts					
1. ]	R. G. Dromey, How to Solve it by C	Computer, Pearson India, 2007.				
Referen	ce Books					

- 1. George Polya, Jeremy Kilpatrick, The Stanford Mathematics Problem Book: With Hints and Solutions, Dover Publications, 2009 (Kindle Edition 2013).
- 2. Greg W. Scragg, Problem Solving with Computers, Jones & Bartlett 1st edition, 1996.

#### Web Resources

- https://onlinecourses.nptel.ac.in/noc22\_cs101/preview
- https://onlinecourses.nptel.ac.in/noc19\_cs43/preview

	Cor U2	urse Co 3CSF1	ode 01	Fun	ndame	entals	Part of Infor	6 mation 7	Fechnol	ogy	Credits 2			
н	l ours:	Lecture 2(L)Pe	e er week	Tu Hours 2(T)p	torial s: er we	ek	Ηοι	Lab Pra irs:0(P)p	ctice er week		Total:( Per w	(L+T+P) week: 2		
(	Cours	se Cate	gory:			Ye	ar & Se	emester:			Admiss	ion Year:		
AEC1 I Year I Semester 2									2023	8-2024				
Pre	-requ		<b>ti</b> vog.	Basics	OI COI	mputer	[							
Lea	rning To	underst	tand the i	m <b>nor</b> tar	nce of	Inform	nation T	echnolog	TX/					
•	То	learn al	bout softy	ware and	d One	ration	System.	cennolog	, <b>y</b> .					
Cou	irse C	outcom	es:(for st	udents:	To kn	now wh	hat they	are going	to learn	ı)				
CO	<b>1:</b> Un	derstar	nd basic c	concept	ts and	termir	nology	of inform	nation te	chnology	•			
CO	2: Hav	ve a basi	ic understa	unding of	of perso	onal cor	nputers a	and their c	peration.					
CO	<b>3:</b> Be	able to i	dentify da	ta storag	ge and	its usag	ge.							
	<b>4:</b> Get	great k	nowledge	of softw	vare and	d its fu	nctionali	ties.						
CO:	o: Uno miada	lerstand	d about of	perating	g syste	m and	their us	es.	stand)	V2 (A	nnlu) V	1 (Ano)	lwao)	
KIO K5(F	wieug Evalue	e lev ate) K6	ei - J S(Create)	XI (R K1*Th	rough	nout fl	<b>K</b> 2	(Unders	ion of a	Il the con	ppiy), <b>k</b>	4 (Alla unhasized	after	
thoro	ugh u	ndersta	inding	•111	nougn	i out ti		se, reterit				ipilasizea	arter	
	~ <u>8</u>													
	C01	* Learn	the bas	ics of	Compu	iters, <b>E</b>	Explain	the Char	acteristi	ics , Eve	olution,	K1K2K3		
		Gene	erations,	Classif	ficatio	on and	l comp	onents of	Compute	ers, Draw	Block	K4		
		Diag	ram of	Comp	outer	and A	Apply the	he Appl	ications	of Co	mputer,	K5		
			bilities a	ind lim	itatioi	ns of c	compute	er(E-Quiz	: Basics o	of Compute	ers [PO7,			
		POSJ												
	CO2	* Learn	the Role	e of I/C	O dev	vices i	n a co	mputer s	system.	Input Un	its and	K1K2K3		
		Outp	ut Units	Explain	about	various	input an	d output u	nits and A	Analyze its	types the	K4		
		same.									]	K5		
	CON	*						1 4	1 Duine a	V. C.		VIVAVA		
	003	Stors	e storage I	the Secu	ompare ondar	e and c	ontrast i age	inderstand	i Primai	ry vs Sec	condary	NIN2NJ Ka		
		51012	ige Leann	the See	onuar	y 51017	age					K5		
	CO4	* Study	the Soft	ware a	nd its	needs	s, Explai	<b>n</b> about T	ypes of	S/W, Op	berating <sup>1</sup>	K1K2K3K4	4K5	
		Syste	em and Aj	pplicati	ion S/	W and	l its type	es, Analyz	e the sam	ne.				
		*												
	CO5	Study	about the	Function	ns Exp	plain the	e Meası	iring Sys	stem Per	rformance	e, Define	K1K2K3K4	4K5	
Assemblers, Complers and Interpreters Learn about Batch Processing, Multiprogramming Multi Tasking Multiprocessing Time Sharing								baring	K0					
DOS, Windows, Unix/Linux and creatively [K6,PO3] present the work through a								through a						
PPT [PO7] as a group activity [PO5] and face question session[PO4].														
<u>Stronglycorrelated-3</u> Moderately correlated-2 Weaklycorrelated-1						-1	1							
PO PO/ Disciplinary Skilled Critical Sense Team Skilled Digitally Ethical National Life/Low							Life/Long							
PSC	) Kn	owledge	Communic	ator Thi	inker	of	player/	Project	Efficient	Awareness	and	Learners		
	(1)	SKIIIS	(2)	and Pro	u oblem	inquiry (4)	(5)	Manager (6)	(7)	(8)	International Perspective	(10)		
				Sol <sup>3</sup>	lver						(9)			
CO	1	3	1				1		2	1	3	1	1	

CO2	3	1			1		2	1		1
CO3	3	1	1	1	1	1	2	1		1
CO4	3	1	1	1	1		2	1		1
CO5	3	1	1	1	1	1	2	1		1
CS- TOT	15	5	3	3	5	2	10	5	3	5
CS- AVG	3	1	1	1	1	1	2	1	3	1

**Recap:**(not for examination) Motivation / previous lecture/ relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	Required Hours
	Introduction to Computers:	
	Introduction, Definition, Characteristics of computer,	
I	Evolution of Computer, Block Diagram Of a computer,	6
	Generations of Computer, Classification Of Computers,	-
	Applications of Computer, Capabilities and limitations of	
	Computer Organization:	
	Role of I/O devices in a computer system. Input Units:	
	Keyboard, Terminals and its types. Pointing Devices, Scanners	
II	and its types, Voice Recognition Systems, Vision Input System,	6
	Touch Screen, Output Units: Monitors and its types. Printers:	
	Plotters, types of plotters, Sound cards, Speakers,	
	Storage Fundamentals:	
	Primary Vs Secondary Storage, Data storage & retrieval	
	methods. Primary Storage: RAM ROM, PROM, EPROM,	
111	EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks Cartridge tape hard disks Floppy disks Optical Disks	0
	Compact Disks, Zip Drive, Flash Drives	
	Software:	
	Software and its needs, Types of S/W. System Software:	
IV	Machine Language, Assembly Language, High Level Language	6
	their advantages & disadvantages. Application S/W and its	-
	types: Word Processing, Spread Sheets Presentation, Graphics,	
	DBMS s/w	
	Functions, Measuring System Performance, Assemblers,	
V	Compilers and Interpreters.Batch Processing,	6
	Multiprogramming, Multi Tasking, Multiprocessing, Time	
	Sharing, DOS, Windows, Unix/Linux.	20
Extended	I Otal (Hrs.) Professional Quastions related to the above tonics from w	JU prious compatitive
Component	evaninations LIPSC /TRB /NET /LIGC /CSIR /GATE	TNPSC /others to
(is a part	of internal be solved (To be discussed during the Tutorial hour)	
component only.	Not to be	
included in th	ne External	
Examination que	stion paper)	
Skills acquired	from the Knowledge, Problem Solving, Analytical abi	lity, Professional
course	Competency, Professional Communication and Trans	ferrable Skill

#### Learning Resources: Recommended Texts

# 1. Anoop Mathew, S. Kavitha Murugeshan (2009), "Fundamental of Information Technology", Majestic Books.

- 2. Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2<sup>nd</sup> Edition.
- 3.S. K Bansal, "Fundamental of Information Technology".

#### **Reference Books**

- 1. Bhardwaj SushilPuneet Kumar, "Fundamental of Information Technology"
- 2. GG WILKINSON, "Fundamentals of Information Technology", Wiley-Blackwell
- 3. A Ravichandran, "Fundamentals of Information Technology", Khanna Book Publishing

#### Web Resources

- 1. https://testbook.com/learn/computer-fundamentals
- 2. https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html
- 3. https://www.javatpoint.com/computer-fundamentals-tutorial
- 4. https://www.tutorialspoint.com/computer\_fundamentals/index.htm
- 5. <u>https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf</u>

First Year (Semester – II)									
Cours U23C	e Code ST203	Core Theory –	2: Data Structures and Algorithms	Credits 5					
Lec	ture	Tutorial	I ab Practica	Total: (I   T   D)					
Hours:	5(L)Per	(L)Per Hours:5(T)per Hours:0(D)por week							
We	eek	week	nours:0(r)per week	Per week: 5					
Course (	Category:		Year & Semester:	Admission Year:					
Co	re 3	I Year II Semester 202							
Pre-requi	site	Basic knowledge in c	lata storage and representations						
Learning	Ohiective	s (for teachers: what t	they have to doing the class/lab/field)						
	import the l	basic concents of data	structures and algorithms						
• 101		a student with the head	is a of the various data structures and males t	a students					
• 10 8	acquaint ui	e student with the bas	ics of the various data structures and make t	le students					
Kno	wiedgeable	e in the area of data st	ructures.						
• This	s course als	so gives insight into the	ne various algorithm design techniques						
Course O	ut comes:(	for students :To know	v what they are going to learn)						
<b>CO1:</b> To i	ntroduce th	e concepts of Data st	ructures and to understand simple linear data						
structures.									
CO2:Lean	rn the basic	s of stack data structu	are, its implementation and application						
CO3:Use	the approp	riate data structure in	context of solution of given problem and						
demonstra	te a familia	arity with major data	structures.						
<b>CO4:</b> To i	introduce th	he basic concepts of a	lgorithms						
CO5: To :	give clear i	dea on algorithmic de	sign paradigms like Dynamic Programming						
Backtrack	ing Branch	n and Bound							
Knowld K5(Eva thoroug	<ul> <li>Knowledge level - K1 (Remember), K2 (Understand), K3 (Apply), K4 (Analyze), K5(Evaluate),K6(Create).K1*Through out the course, retention of all the concepts is emphasized after thorough understanding.</li> <li>CO1 Whatisanarray,DefinedifferentalgorithmsandChoosethebestalgorithm[PO3].Define sparse matrix and its representation, List their applications in real life, Choose the best data structure for there all ife problem using array and Analyze the performance Time &amp; Space Complexity of the algorithm. What is linked list, Why linked list, Explain the implementation of stacks and queues using arrays and linked list, Creatively choose array or linked list for the given problem and Evaluate its performance[PO3], (Assignment on choosing a small real-world problem[PO1],creatively choosing the memory (total, property) with a memory of the algorithm and problem[PO1].</li> </ul>								
<b>CO2</b>	What is St infix to po Evaluate it	ack, <b>Explain</b> the implem ostfix conversion, postf s performance[ <b>PO3</b> ],	entation, representations of stack, <b>Creatively cho</b> fix expression evaluation for the given problem	ose K1K2K3K4 und K5 K6					
<b>CO3</b>	What is qu queue, circ Learn and graph, Wha traversal a the best trav	eues, array and linked cular queue and application <b>define</b> the concepts, repr <b>at</b> is binary tree, Binary s and its applications <b>Illus</b> wersal for real life problem	representations, <b>Explain</b> the implementation of ons. essentations, operations and terminologies in tree and earch trees, Breadth first traversal, Depth first trate the various tree and graph traversals, <b>Identify</b> h, <b>Compare and contrast</b> the various traversal sand	K1K2K3K4K 5					
	Justify the	selection of a traversal[P	D3].						

	(A group activity [PO5] on identifying the various tree and graph traversal techniques available, their applications in real life problems [PO1] from various e-resources[PO7],creativelychoosetheappropriatetechniques[PO3]andpresenttheirworkthroug hPPT [PO2])	
<b>CO4</b>	Define Algorithms, Learn, compare and contrast the various Asymptotic notations,	K1K2K3K4
*	practical complexities, Apply the relevant pseudo-code conventions based on the problem and Justify the selection [PO7].	K5
	Define Algorithms of General Method, Binary Search, Quick Sort, Merge	
	Sort, Learn and Illustrate with suitable Examples Analyze[PO7] it.	
	Define Greedy method-, Knapsack problem, Tree vertex splitting, Job sequencing	
	with deadlines Learn and Illustrate with suitable Examples Analyze[PO7] it.	
CO5 *	Learn and Understand the General method, Multistage Graphs, All pairs shortest	K1K2K3K4K
	path, Single source shortest path, compare and contrast the various problems, Apply the relevant technique based on the problem and Justify the selection[PO7].	5
	Learn and Understand the General method, 8 Queens, Graph coloring, Hamiltonian cycle. compare and contrast the various problems, Apply the relevant technique based on the problem and Justify the selection[PO7].	
	<b>Learn and Understand</b> the Branch and Bound General method, Travelling salesperson problem, <b>compare and contrast</b> the various problems, <b>Apply</b> the relevant technique based on the problem and <b>Justify</b> the selection[ <b>PO7</b> ].	
	Strongly correlated–3 Moderately correlated–2 Weakly correlated	d–1

CO/					F	0				
PO/ PSO	Disciplinary Knowledge and Skills (1)	Skilled Communicator (2)	Critical Thinker and Problem Solver (3)	Sense of inquiry (4)	Team player/ Worker (5)	Skilled Project Manager (6)	Digitally Efficient (7)	Ethical Awareness Reasoning (8)	National and International Perspective (9)	Life/Long Learners (10)
CO1	3	2	2	2	1	1	2	1	1	1
CO2	3	1	2	2	1	1	1	1	1	1
CO3	3	2	2	2	2	1	2	1	1	1
CO4	3	1	1	2	1	1	1	1	1	1
CO5	3	2	2	2	1	1	3	1	1	2
CS- TOT	15	8	9	10	6	5	9	5	5	6
CS- AVG	3	2	2	2	1	1	2	1	1	1

**Recap:**(not for examination) Motivation /previous lecture/ relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	Required Hours
I	INTRODUCTION TO DATA STRUCTURES: Data Structures: Definition- Time & Space Complexity, Arrays: Representation of arrays, Applications of arrays, sparse matrix and its representation, Linear list: Singly linked list implementation, insertion, deletion and searching operations on linear list, Circular linked list: implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists- Dynamic Storage management.	15

II	<b>STACKS:</b> Operations, array and linked representations of stack, stack applications, infix to postfix conversion, postfix expression evaluation, recursion implementation	15
III	<ul> <li><b>TREES &amp; GRAPHS:</b></li> <li><b>Queues:</b> operations on queues, array and linked representations.</li> <li><b>Circular Queue:</b> operations,, applications of queues.</li> <li><b>Trees:</b> Definitions and Concepts- Representation of binary tree, Binary tree traversals (Inorder, Postorder, preorder), Binary search trees</li> <li><b>Graphs :</b> Representation of Graphs- Types of graphs -Breadth first traversal – Depth first traversalApplications of graphs.</li> </ul>	15
IV	<ul> <li>INTRODUCTION TO ALGORITHMS:</li> <li>INTRODUCTION: Definition of Algorithms- Overview and importance of algorithms- pseudocode conventions, Asymptotic notations, practical complexities.</li> <li>Divide-and-Conquer: General Method – Binary Search- Quick Sort-Merge Sort.</li> <li>Greedy Method: General method- Knapsack problem- Tree vertex splitting- Job sequencing with deadlines</li> </ul>	15
V	<ul> <li>DYNAMIC PROGRAMMING, BACKTRACKING &amp; BRANCH</li> <li>&amp; BOUND</li> <li>Dynamic programming: General method, Multistage Graphs, All pairs shortest path, Single source shortest path.</li> <li>Backtracking: General method, 8 Queens, Graph coloring, Hamiltonian cycle.</li> <li>Branch &amp; Bound: General method, Travelling salesperson problem.</li> </ul>	15
	Total (Hrs.)	75
Extended P	<b>rofessional Component</b> Questions related to the above topics, from	various competitive

$\mathbf{C}$
examinations UPSC /TRB /NET /UGC / CSIR /GATE /TNPSC
others to be solved (To be discussed during the Tutorial hour)
Knowledge, Problem Solving, Analytical ability, Professional
Competency, Professional Communication and Transferrable
Skill
-

#### **Learning Resources:**

#### **Recommended Texts**

- 1. Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, Second Edition, "Fundamentals of Data in C", Universities Press
- 2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition ,"Fundamentals of Computer Algorithms "Universities Press

#### **Reference Books**

- 1. Seymour Lipschutz ,"Data Structures with C", First Edition, Schaum's outline series in computers, Tata McGraw Hill.
- 2. R.Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, TataMcGrawHill 2008.
- 3. A.K.Sharma, Data Structures using C, Pearson Education India, 2011.
- 4. G. Brassard and P. Bratley, "Fundamentals of Algorithms", PHI, New Delhi, 1997.
- 5. A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, "The design and analysis of Computer Algorithms", Addison Wesley, Boston, 1974
- 6. Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms, Third edition, MIT Press, 2009
- 7. Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani , Algorithms , Tata McGraw-Hill, 2008.

#### Web Resources:

- <u>https://archive.nptel.ac.in/courses/106/102/106102064/</u>
- https://nptel.ac.in/courses/106102064

Cours U23C	se Code SP204	Core 4 – Data Stru		Credits 5				
Lec Hours:0(I	cture L)Per week	Tutorial Hours:0(T)per week	Lab Practice Hours:5(P)per week	Tot Po	al:(L+T+P) er week: 5			
Course (	Category:	Yea	ar& Semester: ear II Semester	Adm 2	nission Year: 023-2024			
Pre-requisi	te	Basic skills in problem	n solving and					
Learning O	bjectives:(fo	or teachers: what they	have to doing the class/lab/field)	)				
• To un	derstand and	implement basic data	structures using C					
• To ap	ply linear and	d non-linear data struc	ctures in problem solving.					
• To lea	arn to implen	nent functions and rec	ursive functions by means of dat	a structure	es			
To im	plement sear	ching and sorting algo	orithms					
Course Out	tcomes:(for s	tudents: To know what	at they are going to learn)					
CO1:Imple	ment data stru	uctures using C						
CO2:Implei	ment various	types of linked lists a	nd their applications					
CO3:Implei	ment Tree Tr	aversals						
CO4. Imple	ement differen	nt sorting and searchir	ng algorithms					
Knowled	dge level - Ki	1 (Remember) K2 (II	nderstand) K3 (Annly) K4 (An	alvze) K5	(Evaluate)			
K6(Crea	ate).K1*Throu	igh out the course, ret	ention of all the concepts is emp	hasized aft	ter thorough			
understa	nding.	Sh out the course, fet	endon of an and concepts is emp	nusizea un	unorough			
	ingin Bi							
	·			<u> </u>				
CO1*	Remember	all the syntaxes in $\mathbf{C}$ []	PO7], understand the computation	nal tools	K1K2K3K4			
	[PO7], appr	y built in functions in (	evaluating [PO3] the input data, ty take printouts[PO7] and analyse the	/pe, save,	K5			
		program, sene eman, ( )].	and printouts[107]and analyse u	ie results				
	Keep in min	<b>d</b> the concept of Tree t	raversal, <b>solve</b> a specific problem.					
	(Interneting							
<u>CO2*</u>	(Interactive Keen in min	d the concept of Linker	)(VIVA-VOCE III IA)[PO2].	te	K1K2K3K4K5			
	application	in real life situations.	i list, stack and queue, <b>appreciate</b> i	15	KIN2NSN4NS K6			
	evaluaten[P	<b>O3</b> ] the desired activity	by creating the required codes to	solve a	IXU			
	specific prob	olem.						
	Internative	cossion with quastions						
	(Interactive	session with questions	)(viva-voce in IA)[rO2].					
CO3*	Understand	the Sorting, Searchin	g concept, develop the code for	creating	K1K2K3K4K5			
	nodes, creat	ively evaluate [PO3]co	des to perform various operations i	n Sorting	K6			
	, Searching and analyse the results.[PO7].							
	(Interpretive session with questions) (Vive Veccin IA) [DO2]							
	(Interactive	session with questions	)(*1va=*0cc m iA)[102].					
CO4*	<b>CO4</b> <sup>*</sup> <b>Sum up</b> the concepts learnt on linked list nodes, <b>understand</b> how Breadth and <b>K</b>							
	Depth first s	earch can be construct	ed, <b>apply</b> the concept and <b>creativ</b>	ely think	K6			
	[PUS] to eva	nuate [FO3] and perfor	in the various operations on the bin	ary tree.				
	(Interactive	session with questions	)(Viva-Voce in IA)[PO2].					
	l							

	CO5*Recalls All pairs of Shortest path and Single source of shortest path, understand the various techniques, apply the concept and critically evaluate[PO3] the performance and analyze the result.(Interactive session with questions)(Viva–Voce in IA)[PO2].									X3K4
	Stre	ongly correla	ted –3	Mode	erately c	orrelated	1–2 W	eakly cor	related–1	
CO/ PO/ PSO	Disciplinary Knowledge and Skills (1)	Skilled Communicator (2)	Critical Thinker and Problem	Sense of inquiry (4)	F Team player/ Worker (5)	PO Skilled Project Manager (6)	Digitally Efficient (7)	Ethical Awareness Reasoning (8)	National and International Perspective	Life/Long Learners (10)
601			Solver (3)						(9)	
	3	1	2	2	1	1	2	1	1	
CO2 CO3	3	1	2	2	1	1	2	1	1	1
<u>CO4</u>	3	1	2	2	1	1	2	1	1	1
CO5	3	1	2	2	2	1	2	1	1	2
CS- TOT	15	5	10	10	6	5	10	5	5	6
CS-	3	1	2	2	1	1	2	1	1	1
<b>Imp</b> 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	List of Exercises:Required HoursImplement the following exercises using C Programming language:1.1. Array implementation of stacks2.2. Array implementation of Queues3.3. Linked list implementation of stacks4.4. Linked list implementation of Queues5.5. Binary Tree Traversals (Inorder, Preorder, Postorder)756. Implementation of Linear search and binary search757. Implementation Insertion sort, Quick sort and Merge Sort8.8. Implementation of Depth-First Search & Breadth-First Search of Graphs.759. Finding all pairs of Shortest Path of a Graph.10. Finding single source shortest path of a Graph.								quired lours 75	
					_			Total (H	lrs.)	75
Exter Profe Com (is inter comp only, inclu Exter Exam	nded essional ponent a part o nal ponent Not to be ded in the rnal nination	Questions 1 UPSC/TRB/ during the T f	related to /NET/UG /utorial ho	o the a C/ CSI our)	above to	opics, fr E/TNPSC	om vari	ous comp to be solv	oetitive exa ved(To be	minations discussed

Skills acquired	Knowledge, Problem Solving, Analytical ability, Professional Competency,
from the course	Professional Communication and Transferrable Skill
Learning Resour	ces:
Recommended T	exts
1. Ellis Horo	witz, Sartaj Sahni, Susan Anderson Freed, Second Edition, "Fundamentals of Data in
C", Univ	ersities Press
2. E. Horow	itz, S. Sahni and S. Rajasekaran, Second Edition, "Fundamentals of Computer
Algorithr	ns " Universities Press
Reference Books	
I. Seymour	Lipschutz, "Data Structures with C", First Edition, Schaum's outline series in
computers	
2.  K.Krishn	amoorthy and G.Indirani Kumaravel, Data Structures using C, 1 ata McGrawHill – 2008.
J. A.K.Sha	ind, Data Structures using C, Pearson Education mula, 2011.
-4. 0. Diasa	LE Honcroft ID Illimann "The design and analysis of Computer Algorithms"
Addison V	Veslev Boston 1974
6. Thomas I	H. Cormen, C.E. Leiserson, R L. Rivest and C. Stein, Introduction to Algorithms, Third
edition, M	IT Press, 2009
7. Sanjoy D	asgupta, C.Papadimitriou and U.Vazirani, Algorithms, Tata McGraw-Hill, 2008.
Web Resources:	
• <u>https://a</u>	rchive.nptel.ac.in/noc/courses/noc18/SEM1/noc18-cs25/
• <u>https://a</u>	rchive.nptel.ac.in/courses/106/106/106106127/

Course Code U23CSE22A		Elective 2 – Digita	al Computer Fundamentals	Credits 3		
Le Hours: 4(	cture L)Per week	Tutorial Hours: 4(T)per week	Lab Practice Hours:0(P)per week	To P	otal:(L+T+P) Per week: 4	
Course Elec	Category: ctive 2	Yea I Ye	r & Semester: ar II Semester	Adı	mission Year: 2023-2024	
Pre-requi	site	Basic knowledge in	Mathematics (numbers, algebr	a, Gates)		
Learning • It air • To in sec	<b>Objectives:</b> ( ms to train the mpart the in-c uential circuit	for teachers : what the e student of the basic lepth knowledge of lo its. students: To know w	ey have to doing the class/lab/fi concepts of Digital Computer I ogic gates, Boolean algebra	ield) Fundamenta , combina	als tional circuits and	
CO1.Iden	tify the logic	gates and their function	onality			
CO2:Perf	orm number of	conversions from one	system to another system			
CO3:Und	erstand the fu	nctions of combinatio	onal circuits			
CO4: Perf	orm number	conversions.				
CO5: Perf	form Counter	design and learn its o	operations.			
Knowle K1*Thr	edgelevel-K1(l oughout the co	Remember),K2(Under ourse, retention of all th	e concepts is emphasized after the	<b>(Evaluate</b> brough unde	e), K6(Create). rstanding	
	Acquire thore the various lo logic circu https://www.	ougn knowledge on the ogic Gates used in dig its and <b>demonstra</b> .allaboutcircuits.com/	e various types of number system ital communication systems and ate it. Video lecture [ <b>P</b> video-lectures/logic-gates-logic-s	n. Define build the O9] on tates/	K1K2K3	
C02*	Build differe various mapp techniques to mathematical Construct k present the w	ent types of laws and t ping and logical tools prepare the most sim methods and <b>analy</b> -maps for new express ork through a PPT.	heorems of digital electronic circ and Boolean functions <b>infer</b> [ pplified circuit using various map yze, determine the results and ssions and Arithmetic building	cuit using PO3] the pping and show it. blocks to	K1K2K3K4K5 K6	
CO3*	CO3 <sup>*</sup> Show the Combinational logic design and working of Multiplexers, De- multiplexers, and Encoders, Decoders and Parity checkers and generators and explain it. Find out the solution [PO3] for error checking using Parity checkers and generators					
CO4*	Find out the and analyze circuits(RS,T discussion[P	fundamental compone digital circuits, learn , D, and JK), apply O5] on the various typ	ents of digital circuits, design of building various sequential log and <b>justify</b> their applications <b>bes of sequential circuits.</b>	Registers fic digital s. <b>Group</b>	K1K2K3K4 K5	
CO5*	<b>Define</b> the di its functions.	fferent types of counter	rs, and types of ROMs and RAMs	s explain	K1K2	
	Strongly c	orrelated –3 Mo	derately correlated– 2 Wea	kly correla	ated –1	
			Mother Teresa	Women's Univ	versitv. Kodaikanal 31	

CO/	РО									
PO/	Disciplinary	Skilled	Critical	Sense	Team	Skilled	Digitally	Ethical	National	Life/Long
PSO	Knowledge	Communicator	Thinker	of	player/	Project	Efficient	Awareness	and	Learners
	and Skills (1)	(2)	and	inquiry	Worker	Manager	(7)	Reasoning	International	(10)
			Problem	(4)	(5)	(6)		(8)	Perspective	
			Solver (3)						(9)	
CO1	3	3	2	1		1	2	1	2	2
CO2	3	3	3	1	1		1		3	2
CO3	3	3	2	1	2	2	2	1	3	2
CO4	3	3	3	3	3	1	3	1	3	2
CO5	3	2	1	1		1	2	2	2	2
CS-	15	14	11	7	6	5	10	5	13	10
TOT										
CS-	3	3	2	1	1	1	2	1	3	2
AVG										

**Recap:**(not for examination) Motivation /previous lecture/relevant portions required for the course)(This is done during 2 Tutorial hours)

Units	Contents	<b>Required Hours</b>			
I	<b>Number Systems and Codes:</b> Number System–Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	12			
п	12				
III	<b>Combinational Logic:</b> Multiplexers – De-multiplexers – Decoders – Encoders –Code Converters–Parity Generators and Checkers.	12			
IV	IV Sequential Logic: RS, JK, D and T Flip-Flops–Master- Slave Flip-Flops. <b>Registers:</b> Shift Registers–Types of Shift Registers.				
V	V Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs				
	Total (Hrs.)	60			
Extended Professional Component (is a part internal component Not to be inclu- in the Extended Examination <u>question paper</u> Skills acqu from the cours	Questions related to the above topics, from various competitiv /TRB /NET /UGC / CSIR /GATE /TNPSC /others to be solduring the Tutorial hour) of only, uded ernal c) hired Knowledge, Problem Solving, Analytical ability, Profe Professional Communication and Transferrable Skill	ve examinations UPSC lved (To be discussed			

# Learning Resources:

#### **Recommended Texts**

- 1. V.Rajaraman and T.Radhakrishnan, Digital Computer Design, Prentice HallofIndia, 2001
- 2. D.P.Leach and A.P.Malvino, Digital PrinciplesandApplications-TMH-FifthEdition-2002.
- 3. M.Moris Mano, Digital Logic and Computer Design, PHI, 2001.

#### **Reference Books**

1. T.C.Bartee, Digital Computer Fundamentals, 6<sup>th</sup>Edition, TataMcGrawHill, 1991.

#### Web Resources

- <u>https://onlinecourses.swayam2.ac.in/cec19\_cs06/preview</u>
- https://onlinecourses.swayam2.ac.in/cec21\_cs17/preview

Category	Skill Enhanceme	ent Course (SEC-II)						
U23CSS202	Skill EnhancementCourse-SEC-2		Year	Ι	Credits	2		
	SOFT SKILLS		Semester	II				
Instructional	Lecture	Tutorial	Lab Practice Total					
hours per week	1	1	- 2			2		
Prerequisites	Communicative s	skills acquired in Hi	igher Secondary					
<b>Objectives of</b>	The Course aims at							
the Course	• Enabling the learners to make self-discovery							
	• Enhancing the learners overall personality							
	• Instilling the learners with positive attitudes to life							
	• Enabling the learners to efficiently manage their Time in							
	learning and working environments							
	• Improving the communication skill soft the learners							
	• Equipping the learners with interview skills							
Ι	<b>Soft Skills-Introduction</b> What are soft skills?- Importance of Soft Skills-Difference between Hard Skills and Soft Skills-Kinds of Soft Skills Self-Discovery-SWOC Analysis-Advantages of SWOC analysis							
II	Attitude							
	WhatisAttitude?-Formationofattitudes-PositiveandNegativeattitudes- Power							
	of positive attitude- Obstacles in Developing Positive Attitudes-							
	Overcoming Negative Attitude and its Impacts- Developing Positive							
III	Attitude							
111	Lime Management Value of Time Sense of Time management Dessons for progressingtion							
	Over coming procrastination-Tips for Time Management-Deciding upon							
	Priorities-Effective Scheduling							
IV	Communication Skills							
	Listening-Listening and Hearing-Active and Passive Listening							
	Speaking-Verbal and Non-verbal Communications							
	Writing-Formal a	and Informal Letters	sive and Lx s-Drafting N	Aails a	and Memo	S DS		
V	Interview Skills	Preparing Resume	e/CV					
	Preparing Resume/CV-Covering Letter							
	Interview Etique	tte, Dress Code, Do	's, and Don	'ts				
Recommended	1. Alex,K. S	oft Skills .SChand&	c CoLtd.,Ch	ennai	:2009.			
1 exts	2. Butterfiel	d, Jeff et.al. SoftSk	ills for Eve	ryone	.Cengage	India,New		
	Delhi: 2022.							
	5. Harmaran, S., N. Sundararajan, S. P. Shannugapriya. Soft Skuls. Gauvray Books, Chennai 2020							
	4. Sharma, Prashant, SoftSkills; PersonalityDevelopment for							
	Success.	BPB Publications, E	Bengalaru: 2	2019.	1			

Reference	1. Almonte, Richard. A Practical Guide to Soft Skills:
Books	Communication, Psychology, and Ethics for Your Professional Life.
	Routledge, Oxford: 2021.
	2. Bardhan, PeetaBobby&Dr.KrishaveerAbhishekChalla.A
	Complete Textbook on Soft Skills. Kanishka Publisher,
	Chennai:2020.
	3. Mitra, Barun K. Personality Development and Soft Skills (Second
	Edition). Oxford UVP., New Delhi:2016.
	4. BAOU.Business Communication & Soft Skills.
	https://baou.edu.in/assets/pdf/BBAATR-304.pdf
	5. GoSkills.Learn Soft Skills.
	https://www.goskills.comNationalCouncilofEducational
	ResearchandTraining.
	Softskillsforeffective communication.
	https://ncert.nic.in/textbook/pdf/kect108.pdf
	6. SIRC of ICAI. Soft Skills and Personality Development.
	https://www.sirc-
	icai.org/images/cabf/SoftSkills&PersonalityDevelopment.pdf

#### **Course Learning Outcomes (for Mapping with Pos and PSOs)**

On completion of the course, the learners will be able to

- CO1: Identify their strengths and weaknesses
- CO2: Identify the opportunities and the challenges

CO3: Inculcate a positive attitude

- CO4: Understand the importance of scheduling their work based on priority
- CO5: Cultivate their LSRW skills for effective communication

CO6: Prepare their CV / Resume on their own and discharge efficient interview skills

Course Code U23CSS203		Part	6 – WEB DESIGNING	Additional Credits 2					
Lecture Hours: 2(L)Per week		Tutorial Hours:0(T)per weekLab Practice Hours:2(P) per weekTo P		Tota Pe	al:(L+T+P) er week: 2				
Course Category:		Year & Semester:		Admission Year: 2023-2024					
Pre-requisite		Basic knowledge of Programming language							
Learning Objectives: (for teachers: what they have to doing the class/lab/field)									
• To improve the programming skills of the students									
<ul> <li>I 0 10</li> <li>Effor</li> </ul>	crease the cl	nances of employate to accommod	ability late fundamental aspects to instill co	nfidence am	ong students				
Enric	h their know	vledge and to deve	elop their programming ability.	indence and	ong students.				
Course Ou	tcomes:(for	students: To know	w what they are going to learn)						
After success	After successful completion of this course, students will have the knowledge and skills to								
<ul> <li>CO1: to Understand the basic concepts of HTML programming languages.</li> <li>CO2:to create the web programming</li> <li>CO3:to helpful them to create the websites.</li> <li>CO4: Analyze the problems logically and approach the problems in a different manner.</li> </ul>									
Knowledgelevel-K1(Remember),K2(Understand),K3(Apply),K4Analyse),K5(Evaluate), K6(Create). K1*Throughout the course, retention of all the concepts is emphasized after thorough understanding									
CO1*	<b>Introduce</b> the concepts of HTML and <b>recognize</b> the role of HTML in web designing <b>K1K2</b>								
CO2*	Introduce them. Con the forms	K1K2 K3K4							
CO3*	Understat table. Ana understand	<b>Understand</b> the concepts of Table design in HTML and <b>construction</b> of table. Analyze various ordering and un ordering list for better understanding.							
CO4*	Understand and Identify various features of Frames and construction of frames with the help of commands. Analyze frame attributes and evaluate the same.K1K2K3K4K								
CO5*	CO5*Understand and Define the form attributes. Design the Form with the help of HTML commands. Evaluate the pros and cons for designing forms with attributes. Create an application with the help of forms (A Small application will be presented in the GOOGLE MEET by the students)K1K2K3K5 K6								
Strongly correlated –3 Moderately correlated– 2 Weakly correlated –1									
Г

CO/		-		-	P	0				-	
PO/ PSO	Disciplinary Knowledge and Skills (1)	Skilled Communicator (2)	Critical Thinker and Problem Solver (3)	Sense of inquiry (4)	Team player/ Worker (5)	Skilled Project Manager (6)	Digitally Efficient (7)	Ethical Awareness Reasoning (8)	National and International Perspective (9)	Life/Long Learners (10)	
CO1	3						3	1		1	
CO2	3	1	2	1			1	1	1	1	
CO3	3	1	1	1	1		1	1	1	1	
CO5	3	2	2	1	2	1	1	1		1	
CS- TOT	15	4	6	4	3	1	7	1	2	5	
CS- AVG	3	1	1	1	1	1	1	1	1	1	
Recap:(not for examination) Motivation /previous lecture/relevant portions required for the course)(This is done during 2 Tutorial hours)											
			List of	Exercis	es				Hou	rs	
	<ol> <li>We et</li> <li>We et</li> <li>O</li> <li>U</li> <li>D</li> <li>D</li> <li>D</li> <li>N</li> <li>W</li> <li></li></ol>	Veb page creat Vebpage creat (c.,) ordered list foordered list foordered list foordered list vefinition list farquee creati Veb page with Vebpage creat typer link ables rames orms	tion using ion using on images ion with y	; head, ti formatti	itle, bod <u>y</u> ing tags(	y,h1–h6. bold, ital: es and boo	ic, under dy colors	line	30		
		1					Tota	l (Hrs.)	30		
ExtendedProfessional ComponentQuestions related to the above topics, from various competitive examinations UPSC /TRB /NET /UGC / CSIR /GATE /TNPSC /others to be solved (To be discussed during the Tutorial hour)component only, Not to be included in the External Examination question paper)discussed during the Tutorial hour)SkillsacquiredfromKnowledge, Problem Solving, Analytical ability											
theco	killsacquiredfromKnowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill										

Learning Resources: Recommended Texts 1. World Wide Web Design with HTML, Xavier. C, TMH,14<sup>th</sup>Reprint 2006. Reference Books 1. How to do everything with HTML, James H.Pence,TMH,Edition 2001. Web Resources 1. https://html.com/ 2. https://www.w3schools.com/

## Second Year (Semester - III)

Subject	Subject Name	ry	L	T	P	S	S		Marks	
Code		Catego					Credit	CIA	Exter nal	Total
U23CST305	Python programming	Core 5	5	-	-	-	5	25	75	100
	Le	earning O	bject	ives		1	I	I	I	
LO1	To make students unde	erstand the	e coi	ncep	ts of	f Pyt	hon prog	gramming	g.	
LO2	To apply the OOPs concept in PYTHON programming.									
LO3	To impart knowledge on demand and supply concepts									
LO4	To make the students learn best practices in PYTHON programming									
LO5	To know the costs and profit maximization									
UNITS	Contents									No. of Hours
Ι	<b>Basics of Python Programming:</b> History of Python-Features of Python- Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types- Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. <b>Python Arrays:</b> Defining and Processing Arrays – Array methods.								15	
II	<b>Control Statements:</b> else, nested if and if-el for loop, else suite in continue and pass state	Selection if-else sta loop and ments.	/Con item nes	nditio ents. ted l	onal Iter loop	Bra ativ s. J	nching s e Statemo ump Sta	tatement ents: wh <b>tements</b>	s: if, if- ile loop, : break,	15
III	Functions: Function Definition – Function Call – Variable Scope and itsLifetime-Return Statement. Function Arguments: Required Arguments,Keyword Arguments, Default Arguments and Variable Length Arguments-Recursion. Python Strings: String operations- Immutable Strings - Built-inString Methods and Functions - String Comparison. Modules: importstatement- The Python module – dir() function – Modules and Namespace –Defining our own modules.								15	
IV	statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.								s-Nested eccessing, fference ting and ethods -	15

V	Python File Handling: Types of files in Python - Opening	and Closing					
	files-Reading and Writing files: write() and writelines() method	ds- append()	15				
	method – read() and readlines() methods – with keyword – Split	tting words –	10				
	File methods - File Positions- Renaming and deleting files.						
	ТОТ	AL HOURS	75				
	Course Outcomes	Program	me				
		Outcom	ies				
СО	On completion of this course, students will						
	Learn the basics of python. Do simple programs on python	PO1. PO2. PC	03.				
CO1	Learn how to use an array.	PO4, PO5, PC	<b>)</b> 6				
		, ,					
$CO^{2}$	Develop program using selection statement, Work with	PO1, PO2, PO	03,				
02	Looping and jump statements, Do programs on Loops and jump	PO4, PO5, PO6					
	statements.						
$CO^{2}$	Concept of function, function arguments, Implementing the concept	PO1, PO2, PC	03,				
05	strings in various application, Significance of Modules, Work with	PO4, PO5, PO	)6				
	functions, Strings and modules.						
CO4	Work with List, tuples and dictionary, Write program using	PO1, PO2, PC	03,				
	list, tuples and dictionary.	PO4, PO5, PC	06				
005	Usage of File handlings in python, Concept of reading and writing	PO1, PO2, PC	03,				
05	files, Do programs using files. PO4, PO4						
	Textbooks						
1	ReemaThareja, "Python Programming using problem solving approac Oxford University Press.	h", First Edition	n, 2017,				
2	Dr. R. NageswaraRao, "Core Python Programming", First Edition, 201 Publishers.	7, Dream tech					
	<b>Reference Books</b>						
1.	Vamsi Kurama, "Python Programming: A Modern Approach", Pearson	n Education.					
2.	Mark Lutz, "Learning Python", Orielly.						
3.	Adam Stewarts, "Python Programming", Online.						
4.	Fabio Nelli, "Python Data Analytics", APress.						
5.	Kenneth A. Lambert, "Fundamentals of Python – First Programs", CE	NGAGE Public	ation.				
	Web Resources						
1.	https://www.programiz.com/python-programming						
2.	https://www.guru99.com/python-tutorials.html						

3.	https://www.w3schools.com/python_intro.asp
4.	https://www.geeksforgeeks.org/python-programming-language/
5.	https://en.wikipedia.org/wiki/Python_(programming_language)

## Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	14	15	15	13	14

Subject Code	Subject Name	ry	L	Т	Р	S	S		Marks	
		Catego					Credit	CIA	Exter nal	Total
U23CSP306	Python Programming Lab	Core6	-	-	5	-	5	25	75	100
	Learni	ng Object	tives					1	1	
LO1	Be able to design and program Pytho	n applicat	ions.							
LO2 Be able to create loops and decision statements in Python.										
LO3	LO3 Be able to work with functions and pass arguments in Python.									
LO4	Be able to build and package Python	modules f	for re	eusał	oility	<i>'</i> .				
LO5	Be able to read and write files in Pytl	non.								
	LAB EXERCIS	ES						R	equired	Hours
1. Pro 2. Pro 3. Pro 4. Pro 5. Pro 6. Pro 7. Pro 8. Pro 9. Pro 10. Pro 11. Pro 12. Pro 13. Pro 14. Pro	agram using variables, constants, I/C ogram using Operators in Python. ogram using Conditional Statements ogram using Loops. ogram using Jump Statements. ogram using Functions. ogram using Recursion. ogram using Arrays. ogram using Strings. ogram using Modules. ogram using Lists. ogram using Tuples. ogram using Dictionaries. ogram for File Handling.	) stateme	nts i	n Py	∕tho	n.			60	
	Course	• Outcom	les	1		•11				
	Un completion of the understanding of	118 COURSE	e, stund	aden	ts W	$\frac{111}{200}$	рүтис	)N lang	1906	
CO1		symax a	10.50	IIIa		5 01		i ang	uaze	
CO2	Identify the problem and solve usi	ng PYTH	ION	pro	grai	nmi	ng tech	niques.		
	Identify suitable programming con	nstructs for	or pr	oble	em s	olvi	ng.			
CO3			-							
CO4	Analyze various concepts of PYT	HON lang	guag	ge to	sol	ve tl	ne probl	em in a	n efficiei	nt way.
CO5	Develop a PYTHON program for	a given p	robl	em	and	test	for its c	correctne	ess.	

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

Subjec	t Subject Name	LY.	L	Τ	Р	S	Ń		Marks	
Code		Catego					Credit	CIA	Exter nal	Total
U23CSE A	33 Statistical Methods and its Applications – I	Elective3	4	-	-	-	3	25	75	100
	Lea	arning Objee	ctives	5		1		I	1	
LO1	To have abroad background	d in Statistics	fund	lame	ntals	and	techniqu	es.		
LO2	<b>LO2</b> To recognize the importance and value of mathematical and statistical thinking, training and approach to problem solving, on adverse variety of disciplines.									ing,
LO3	To become familiar with a variety of examples where mathematics or statistics helps accurately explain abstract or physical phenomena.									elps
LO4	Creatingconfidencetohavetheversatilitytoworkeffectivelyinabroadrangeofanalytic,scientific,government,financial, health, technical and other positions.									ntifi
LO5	To understand and computing Statistical Methods by which to develop the programming skills.									
UNITS	Contents									No. of Hours
Ι	I Introduction and Scope of Statistical Methods and Their Limitations Classifications, Tabulation and Diagrammatic Representation of various types of statistical data -Graphical determination of Quartiles, Deciles and percentiles.								12	
II	Measures of Location—An Harmonic Mean and their	rithmetic Mea	ın, M	edia	n, M	ode,	Geometr	ic Mean,		12
III	Measures of Dispersion — Deviation, Combined Stan	Range, Mea dard Deviatio	n De <sup>y</sup> on an	viatio d the	on, Q ir rel	)uart lative	ile Devia e measure	tion, Star es.	ndard	12
IV	Measures of Skewness Ka Skewness and kurtosis bas	rl Pearson's	, Bov nts.	vley'	s and	l Kel	ly's and	coefficie	nt of	12
V	Correlation – Karl Pearson methods – Regression Ana	– Spearman <sup>*</sup> lysis: simple	's Ra Regr	nk C essic	orrel on Ec	atior Juati	n – Concu ons .	urrent de	viation	12
							ТС	OTAL H	IOURS	60
	Course	Outcomes							Progra Outco	mme mes
CO	On completion of this course	, students wi	11	-		-		_	4	
CO1	Acquire the knowledge of S	tatistics fund	amen	tals a	and t	echn	iques	PO PO	01, PO2, P 05, PO6	PO3, PO4,
CO2	Solve the measures	of location pro	obler	ns				PO PO	91, PO2, F 95, PO6	PO3, PO4,

CO3	Describe the solution methods using measures of Dispersion	PO1, PO2, PO3, PO4, PO5, PO6							
CO4	Evaluate problems using measures of skewness	PO1, PO2, PO3, PO4, PO5, PO6							
CO5	Understand the concepts Correlation and Regression analysis.	PO1, PO2, PO3, PO4, PO5, PO6							
	Textbooks								
1	1       S.ArumugamIssac- Statistics-NewGammaPublishingHouse,Palayamkottai,2014.								
2	M.Haj Meeral - Statistical Methods and their Applications I – Laxmi	Publications.							
3	Larry.J.Stephens-Beginningstatistics-Schaum'sOutlineSeries,McGravedition, January2006	w-HillEducation;2nd							
	Reference Books								
1.	Fundamental of Mathematical Statistics - S.C.Gupta, V.K.Kapoor								
2.	Dr.S.P.Gupta-StatisticalMethods-SultanChand&Sons,2012.								
3.	3.       S.C.Gupta, V.K.Kapoor – Element of Mathematical Statistics – Sultan Chand & Sons, 2014.								

## Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	2	3	3	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	14	14	15	13	15

								Š		Marks	
Subject Code	Subject Name	Category	L	Т	Р	S	Credits	Inst. Hour	CIA	External	Total
U23CSS304	Microsoft Office(Practical)	SEC 4	1	-	-	-	2	2	25	75	100
Learning Objectives											
LO1	To understand the basi	ics of Off	ice	Pacl	cage	es a	nd softw	vare req	uireme	ents	
LO2	To get knowledge by a	To get knowledge by comparing different office suites									
LO3	To study the advanced features of MS Office										
LO4	To explore Spreadsheet application, Office and its advanced aspects										
LO5	To learn and usage of Presentation software MS-PowerPoint										
UNIT	Details									No. of H	lours
Ι	Office packages: MS word Basics: Introduction to MS Office, Introduction to MS word, Features - Working with MS Word, Menus &Commands, Toolbars & Buttons, Creating a New							fice, ford, New	3		
Ш	Spell Check, Thesaur Inserting – Page Num etc., Working with Working with Tables.	us, Find bers, Pic Columns	& eture	Rep es, F Fabs	lace Files	e; F s, A zInc	Headers Luto text lents, (	& Foo ts, Sym Creation	ters, bols 1 &	3	
III	MS Excel: Menus - co Working with Data & Column & Rows.	oncepts o z Ranges	f W - In	orkl sert	oool ing	k & , R	Worksh Cemovin	eets - ( g, Resi	Cell- zing	3	
IV	Use of Formulas, Ca Functions Working w	lculations	s &	Fu Cha	ncti	ons	, Vario	us type	s of	3	
V	MS PowerPoint: Working Presentation, Working Deleting and copying	king with g with p of slides.	n Ma	S Po enta	tion	rPo: ., S	int, Crea lides -	ating a l Inserti	New ng ,	3	
		T	'otal							15	
	1	Cours	se O	utco	ome	5			<u> </u>		
Course	On completion of this	course, stu	ıden	ts w	ill;						

Outcomes		
C01	Understand the basics of MS package	PO1, PO2, PO6
CO2	Identify different features of WORD	PO2, PO3, PO4
	Understand, the Eyzel worksheets and calls	
CO3	Understand the Excel worksheets and cens	PO1, PO3, PO6
CO4	Discuss the Excel Functions and Charts	PO2 PO6
		102,100
CO5	Understand the Power point presentations	PO1, PO3, PO5
<b>Text Book :</b>		
1.	MS OFFICE XP Complete Reference, BPB P	ublications.
2.	MS WINDOWS XPHOME EDITION COMP.	LETE, BPB PUBLICATION.
	JOE HABRAKEN, MICROSOFT OFFICE 2	2000, 8 IN 1 PRENTICE HALL OF
3.	INDIA.	
References .		
Kelefences.	Mississ from Windows have the Shaila S Dia	
1.	Microsoft office for Windows by Shella S.Dje	nu.

#### **SEMESTER IV**

Subject	Subject Name		L	Т	Р	S			Marks		
Code		ory					its	ours		_	
		Categ					Cred	Inst. H	CIA	External	Total
U23CST407	Database Management System	Core 7	4	-	-	-	5	4	25	75	100
	Lea	rning Obje	ectiv	es						1	
LO1	To enable the students to lear relational model of data and	arn the desi l normal for	gnin ms.	g of	data	base	e sys	tems	, found	ation o	on the
LO2	To understood the concepts models	of data bas	e ma	inage	emer	nt sys	stem	, des	ign sim	ple Da	atabase
LO3	To learn and understand to w	vrite queries	usir	ng SO	QL, I	PL/S	QL.				
LO4	To enable the students to lear relational model of data and	arn the desi l normal for	gnin ms.	g of	data	base	e sys	tems	, found	ation o	on the
LO5	To understood the concepts of data base management system, desi models								ign sim	ple Da	atabase
UNITS		Contents							No	No. of Hours	
Ι	Database Concepts: Datab	ase System	s - 1	Data	VS .	Infor	mati	on -			
	Introducing the database -Fi	le system -	Prob	olem	s wi	th fil	e sy	stem	15		
	– Database systems. Data n	nodels - Im	porta Dote	ance	- B	asic	Buil	ding			
	Data Abstraction	volution of	Data	i mo	ueis	- D	egree	28 01			
II	Design Concepts: Relation	al database	mo	del ·	- log	gical	viev	w of	,		
	data-keys -Integrity rules	- relation	al s	set o	oper	ators	-	data		15	
	dictionary and the system ca	talog - relat	tions	hips	-dat	a rec	lund	ancy			
	diagram	ules. Entity	/ rei	ation	ismp	0 1110	der -	· EK			
III	Normalization of Database	Tables: Da	itaba	se	ta	ables		and			
	Normalization – The Need f	or Normaliz	zatio	n –T	he N	Norm	naliza	ation			
	Process – Higher level Norm	al Form.								15	
	<b>Introduction to SQL</b> : Data Manipulation Commands – S Definition Commands – Add Joining Database Tables.	Definition ( SELECT Qu litional SEL	Com ierie LECT	mano s – Α Γ Qu	ds – Addi ery l	Data tiona Keyv	ı ll Da vord:	ta s —			

IV	Advanced SQL:Relational SET Operators: UNION – UNION ALL – INTERSECT - MINUS.SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join.Sub Queries and Correlated Queries: WHERE – IN – HAVING – ANY and ALL – FROM. SQL Functions: Date and Time Function – Numeric Function – String Function – Conversion Function	15
V	<b>PL/SQL</b> :A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Variable Declaration – Assignment operation –Arithmetic operators. <b>Control Structures and Embedded SQL</b> : Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. <b>PL/SQL Cursors and Exceptions</b> : Cursors – Implicit Cursors, Explicit Cursors and Attributes – Cursor FOR loops – SELECTFOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	15
	Total	75
	Course Outcomes	Programme Outcomes
СО	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	PO4, PO6
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SOL programs Learn basics of PL/SOL and develop	PO3, PO5
	programs using Cursors, Exceptions	,

1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management",
	Ninth Edition
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India,
	2016
	Reference Books
1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,"Database System
	Concepts", McGraw Hill International Publication ,VI Edition
2.	Shio Kumar Singh, "Database Systems ",Pearson publications ,II Edition
	Web Resources
1.	Web resources from NDL Library, E-content from open-source libraries

### Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	2	1	2
CO2	3	3	2	2	3	3
CO3	3	3	2	3	3	2
CO4	3	2	3	2	2	3
CO5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

Subject Code	Subject Name		L	Т	Р	S	s	s		Mark	s
		Category					Credits	Inst. Hour	CIA	External	Total
U23CSP408	Database Management System lab	Core 8	-	-	5	-	5	5	25	75	100
	Lea	arning Obje	ective	s							
LO1	To enable the students to learn relational model of data and no	the designing the designing	ng of	data	base	syste	ems,	foun	dation o	n the	
LO2	To understood the concepts of	data base m	anag	emer	t sys	tem,	desig	gn sii	nple Da	tabase	models
LO3	To learn and understand to writ	e queries usi	ng S	QL, I	PL/S	QL.					
LO4	To enable the students to learn relational model of data and no	the designing the designing ormal forms.	ng of	data	base	syste	ems,	foun	dation o	n the	
LO5	To understood the concepts of	data base m	anag	emer	ıt sys	tem,	desig	gn sii	nple Da	tabase	models
List of Exercises: No of Hours						ours					
I. SQL         1. DDLCOMMANDS         2. DMLCOMMANDS         3. TCLCOMMANDS         II. PL/SQL         4. FIBONACCI SERIES         5. FACTORIAL         6. STRING REVERSE         75         7. SUM OF SERIES         8. TRIGGER         III. CURSOR         9. STUDENT MARK ANALYSIS USING CURSOR         IV. APPLICATION         10. LIBRARY MANAGEMENTSYSTEM         11. STUDENT MARK ANALYSIS											
	Tot	al								75	
	Course Outcomes						Programme Outcomes				

СО	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	PO4, PO6
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	PO3, PO4
	Text Book	
1	Coronel, Morris, Rob, "Database Systems, Design, Impler Edition	nentation and Management", Ninth
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition	n, Pearson Education India, 2016
	<b>Reference Books</b>	
1.	Abraham Silberschatz, Henry F.Korth and Concepts", McGraw Hill International Publication ,VI Editi	S.Sudarshan,"Database System
2.	Shio Kumar Singh, "Database Systems ",Pearson publication	ons ,II Edition
	Web Resources	
1.	Web resources from NDL Library, E-content from open-sou	urce libraries

## Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	3	3	3	2
CO2	3	3	1	2	2	2
CO3	2	2	3	3	3	3
CO4	2	2	3	3	3	1
CO5	2	3	3	3	3	3

Weightage of course contributed to each PSO	12	12	13	14	14	11
150						

Subject	Subject Name		L	Т	Р	S		S		Mark	s
Code		Category					Credits	Inst. Hour:	CIA	External	Total
U23CSE44A	Elective-4 : Statistical Methods & its Application-II	Elective 4	3	-	-	-	3	3	25	75	100
	Lea	rning Obj	ectiv	es							
LO1	Understand the concept of c	curve fitting	,								
LO2	basic knowledge of complete enumeration and sample, sampling frame, sampling distribution										
LO3	knowledge about comparing	knowledge about comparing various sampling techniques.									
LO4	an idea of conducting the sa techniques	imple surve	ys ai	nd se	electi	ng a	ppro	priat	e samp	ling	
LO5	carry out one way and two	way Analys	is of	Var	ianc	e,					
UNIT	(	Contents							No	. of H	ours
Ι	Curve fitting by the methods $x^2 + b x + c$ , $Y = a xb$ , $Y = a$	of least squ a e bx	lares	s - Y	= a	x + t	<b>), Y</b> :	= a		15	
II	SampleSpace - events - probability - Addition and Multiplication15MultiplicationTheorem - conditional probability -Baye's Theorem. Mathematical expectation Addition and Multiplication theorem, Chebychev's Inequality.15										
III	Standard distributions - Bino and fitting of these distribution	omial, Poiss ons.	on, N	Norm	nal d	istrit	outio	n		15	

IV	Test of Significance- small sample and large sample test based on mean, S.D. correlation and proportion - confidence interval.	15		
V	<ul> <li>V Analysis of variance - One and Two way classifications - Basic principle of design of Experiments - Randomization, Replication and Local control - C.R.D., R.B.D. and L.S.D.</li> <li>Application of Statistics in Different Fields: finance-banking-medical-government sectors-mathematics-economics-business-psychology, geology, sociology, weather forecasting, probability</li> </ul>			
	Total	75		
	Course Outcomes	Programme Outcomes		
СО	On completion of this course, students will			
CO1	On completion of this program, a student would have in depth understanding of the key statistical, mathematical, computer programming & economics concepts to have a strong knowledge base in Analytics domain.	PO1		
CO2	apply these advanced statistical methods to analyze real-world data sets.	PO1, PO2		
CO3	involves selecting appropriate techniques, conducting analyses using statistical software, and interpreting the results in the context of the problem being addressed.	PO4, PO6		
CO4	able to effectively communicate the results of their analyses, both orally and in writing, to a diverse audience	PO4, PO5, PO6		
CO5	students may also develop collaboration and teamwork skills through group projects or activities that require them to work together to analyze and interpret data.	PO3, PO5		
	Text Book			
1	. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kap	ooor - Sultan Chand		
2	Fundamental of Applied Statistics - S.C. Gupta & V.K. Kapoor - S	Sultan Chand		
3	Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +	DII		
4	Elements of Statistics - Mode . E.B. – Prentice Hall			
	Web Resources			

https://study.com/academy/lesson/application-of-statistics-in-daily-life.html

### Mapping with Programme Outcomes:

1

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	3	3	3	2
CO2	3	3	1	2	2	2
CO3	2	2	3	3	3	3
CO4	2	2	3	3	3	1
CO5	2	3	3	3	3	3
Weightage of course contributed to each PSO	12	12	13	14	14	11

Subject Code	Subject Name	ý	L	T	Р	S		SI		Mai	rks
cour		Category					Credits	Inst. Hou	CIA	External	Total
Part4 U23CSS405	PHP PROGRAMMING	Skill Enha. Course (SEC)	2	_	-	-	1	2	25	75	100
		Learn	ing	Obj	ecti	ves		•		•	
LO1	To provide the necessary	knowledg	e on	bas	sics	of l	PHP.				
LO2	To design and develop dy	mamic, da	taba	.se-d	lrive	en w	veb appl	ications	using H	PHP ver	rsion.
LO3	3 To get an experience on various web application development techniques.										
LO4	To learn the necessary co	ncepts for	woi	king	g wi	th tl	he files	using P	HP.		
LO5	To get a knowledge on O	OPS with	PHI	<b>P</b> .							
UNITS		Cor	nten	ts						No.	of Hours
Ι	Introduction to PHP -Basic Knowledge of websites -Introduction of Dynamic Website -Introduction to PHP -Scope of PHP -XAMPP and WAMP Installation										
II	PHP Programming Basics Embedding HTML in PH Introduction to PHP V Operators -Using Condi condition Statement.	s -Syntax P. Variable - tional Sta	of P Und item	HP ersta	-Em andi -If	ing ing	lding Pl Data else if	HP in H Types () and	TML - -Using else if		

	Switch() Statements -Using the while() Loop -U	Using the for() Loop PHP	
	Functions.		
III	PHP Functions -Creating an Array -Modify Processing Arrays with Loops - Grouping Form Using Array Functions.	ying Array Elements - Selections with Arrays -	
IV	PHP Advanced Concepts -Reading and Writi from a File.	ng Files -Reading Data	
V	Managing Sessions and Using Session Variables Storing Data in Cookies -Setting Cookies.		
	Total		30
	Course Outcomes	Programme	Outcomes
СО	On completion of this course, students will		
CO1	Write PHP scripts to handle HTML forms		
CO2	Write regular expressions including modifiers, operators, and meta characters.	PO2,PO5,PO7.	
CO3	Create PHP Program using the concept of array.	PO3,PO4,PO5.	
CO4	Create PHP programs that use various PHP library functions	PO2,PO3,PO5	
CO5	Manipulate files and directories.	PO3,PO5,PO6.	
	Text Book		
1	Head First PHP & My SQL: A Brain-Frier Morrison.	ndly Guide- 2009-Lynn m	ighley and Michael
2	The Joy of PHP: A Beginner's Guide to Pro PHP and My SQL- Alan Forbes	ogramming Interactive We	b Applications with
	Reference Books	s	
1.	PHP: The Complete Reference-Steven Holzner.		
2.	DT Editorial Services (Author), "HTML 5 Black XHTML, AJAX, PHP, jQuery)", Paperback 2016	x <i>Book (Covers CSS3, Java</i> 5, 2 <sup>nd</sup> Edition.	ıScript, XML,
	Web Resources		
1.	Open source digital libraries: PHP Programmin	g	
2.	https://www.w3schools.com/php/default.asp		

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	2	1	2
CO2	3	3	2	2	3	3
CO3	3	3	2	3	3	2
CO4	3	2	3	2	2	3
CO5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

Mapping with Programme Outcomes:

S-Strong-3 M-Medium-2 L-Low-1

### Third Year (SEMESTER-V)

								Inst		Marks			
Subject Code	Subject Name	Categ ory	L	Т	Р	S	Credit s 4	Hour s	CI A	Externa l	Tota l		
U23CST 509	Software Engineering	Core 9	5	-	-	-	4	5	25	75	100		
	Learning Objectives												
LO1	Gain basic know	wledge of an	naly	sis a	and o	desi	gn of system	18					
LO2	Ability to apply	v software ei	ngin	eeri	ng p	orin	ciples and te	chniques					
LO3	Model a reliabl	e and cost-e	ffec	tive	soft	twa	re system						
LO4	Ability to desig	n an effectiv	ve m	node	el of	the	system						
LO5	LO5 Perform Testing at various levels and produce an efficient system.												
UNIT				Co	ntei	nts				No. of H	lours		

	Total	75
V	<b>Computer Aided Software Engineering:</b> CASE and its scope; CASE environment; CASE support in software life cycle; other characteristics of CASE tools; towards second generation CASE tool; architecture of a CASE environment. <b>Software Maintenance:</b> Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost.	15
IV	<b>Coding and Testing:</b> Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing. <b>Software Reliability and Quality Management:</b> Software reliability; statistical testing; software quality; software quality management system; SEI capability maturity model; personal software process.	15
III	<b>Function-Oriented Software Design:</b> Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design. <b>User-Interface design:</b> Characteristics of a good interface; basic concepts; types of user interfaces; component based GUI development, a user interface methodology.	15
II	<ul> <li>Requirements Analysis and Specification: Requirements gathering and analysis, Software requirements specification (SRS)</li> <li>Software Design: Good software design, cohesion and coupling, neat arrangement, software design approaches, object- oriented vs function-oriented design</li> </ul>	15
Ι	<ul> <li>Introduction: The software engineering discipline, programs vs. software products, why study software engineering, emergence of software engineering, Notable changes in software development practices, computer systems engineering.</li> <li>Software Life Cycle Models: Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.</li> </ul>	15

				Course	Outcomes			
Course Outcome s	On co	ompletio	n of this cou	rrse, students	will;			
CO1	Gain b	asic know	wledge of an	alysis and de	sign of systems	PO1		
CO2	Ability	Ability to apply software engineering principles and techniques PO1, PO2						
CO3	Model	a reliabl	e and cost-e	ffective softw	vare system	PO4, PO6		
CO4	Ability	to desig	n an effectiv	ve model of th	ne system	PO4, PO5, PO6		
CO5	Perform	n Testing	g at various	levels and pro	oduce an efficient system.	PO3, PO6		
				Text	Books	I		
1.	Rajib N	Mall, <i>Fur</i>	ndamentals o	of Software E	ngineering, Fifth Edition, Pr	entice-Hall of India, 2018		
				Referer	nces Books			
1.	Richa Editio	rd Fairle n 1997	y, Software	Engineering (	Concepts, Tata McGraw-Hill	publishing company Ltd,		
2.	Roger	S. Pressr	nan, <i>Softwar</i>	re Engineerin	g, Seventh Edition, McGraw	7-Hill.		
3.	James Interna	A. Senn ational Ec	, <i>Analysis</i> d litions.	& Design of	Information Systems, Sec	cond Edition, McGraw-H	ill	
CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6		
CO1	3	2	3	2	2	3		
CO2	3	2	2	2	1	2		
CO3	3	3	3	2	3	2		
CO4	3	3	3	2	2	2		
CO5	3	3	3	2	2	2		
Weightage of course contribute d to each PO/PSO	15	13	14	10	10	11		

Subject	Subject	Catego	L	Т	Р	S	Cre	Inst.		Marks	
Code	Name	ry					dits	Hour s	CIA	E xt	Total
U23CST 510	Java Programmi ng	Core 10	5	-	-	-	4	5	25	75	100
			Lea	rni	ng (	Obj	ectives				
LO1	To provide fur	ndamental kn	owl	edg	e of	ob	ject-orien	ted progra	mming		
LO2	To equip the s	tudent with p	orog	ram	min	ıg k	nowledge	in Core Ja	ava fron	n the basi	cs up.
LO3	To enable the	students to u	se A	W7	C co	ntro	ols, Event	Handling	and Sw	ing for G	UI.
LO4	To provide fur	ndamental kn	owl	edg	e of	ob	ject-orien	ted progra	mming.		
LO5	To equip the s	tudent with p	orog	ram	min	g k	nowledge	in Core Ja	ava fron	n the basi	cs up.
UNITS			C	onte	ents					No. of	Hours

Ι	<b>Introduction:</b> Review of Object Oriented concepts – History of Java – Java buzz words – JVM architecture – Data types - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.	15
Π	<ul> <li>Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword.</li> <li>Packages: Definition- Access Protection –Importing Packages.</li> <li>Interfaces: Definition– Implementation–Extending Interfaces.</li> <li>Exception Handling: <i>try – catch- throw - throws – finally –</i> Built-in exceptions - Creating own Exception classes.</li> </ul>	15
III	<ul> <li>Multithreaded Programming: Thread Class - Runnable interface –Synchronization–Using synchronized methods–Using synchronized statement- Inter thread Communication – Deadlock.</li> <li>I/O Streams: Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.</li> </ul>	15
IV	<ul> <li>AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Color - Fonts and layout managers.</li> <li>Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes</li> </ul>	15
V	<b>Swing:</b> Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox - JScrollPane.	15
	Total	75
	Course Outcomes	
Course Outcom es	On completion of this course, students will;	

Understand the basic Object-oriented	
concepts. Implement the basic constructs of	PO1, PO2, PO6
Core Java.	
Implement inheritance, packages, interfaces	PO2, PO3, PO8
and exception handling of Core Java.	
Implement multi-threading and I/O Streams	PO1, PO3, PO5
of Core Java	
Implement AWT and Event handling.	PO2, PO6
Use Swing to create GUI.	PO1, PO3, PO6
KS:	
Harbart Schildt The Complete Deference Tete	McGrow Hill Now Dolhi 7th Edition
2010	i McOlaw IIII, New Delli, /III Editioli,
2010	
Gary Cornell, Core Java 2 Volume I – Fundam	entals, Addison Wesley, 1999
	, 11001001 (
25:	
[	
Head First Java, O'Rielly Publications,	
Y. Daniel Liang, Introduction to Java Program	nming, 7th Edition, Pearson
Education India, 2010	-
Web Resources	
https://javabeginnerstutorial.com/core-java-tuto	<u>orial</u>
http://docs.oracle.com/javase/tutorial/	
https://www.coursera.org/	
	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java. Implement inheritance, packages, interfaces and exception handling of Core Java. Implement multi-threading and I/O Streams of Core Java Implement AWT and Event handling. Use Swing to create GUI. Use Swing to create GUI. <b>cs:</b> Herbert Schildt, The Complete Reference, Tata 2010 Gary Cornell, <i>Core Java 2 Volume I – Fundama</i> <b>es :</b> Head First Java, O'Rielly Publications, Y. Daniel Liang, <i>Introduction to Java Program</i> Education India, 2010 <b>Web Resources</b> <u>https://javabeginnerstutorial.com/core-java-tuto</u> http://docs.oracle.com/javase/tutorial/ https://www.coursera.org/

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	3	2
CO2	3	3	3	2	2	3
CO3	2	2	1	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	1
Weightage of course contributed to each PSO	14	14	13	14	14	11

Subject Code	Subject Name	Categor y	L	T	Р	S	Credit s	Inst. Hour	Marks		
								S	CI A	Extern al	Tota l
U23CSP51 1	Java Programmin g Lab	Core 11	-	-	4	-	4	5	25	75	100
			L	eari	ning	g Ob	ojectives				
LO1	To provide fun	damental kno	wle	dge	of	obje	ct-oriented	programm	ing.		
LO2	To equip the student with programming knowledge in Core Java from the basics up.										
LO3	To enable the students to know about Event Handling										
LO4	To enable the s	students to us	e Sti	ring	Co	ncep	ots.				
LO5	To equip the st	udent with pr	ogra	amn	ning	g kno	owledge in t	to creat GL	JI using .	AWT control	s.
s.no						La	b Exercises				
1	Write a Java product out all the prime	rogram that program that program that provide the second sec	rom o to	pts that	the the t	user eger	for an integ	ger and the	n prints		
2	Write a Java j	program to m	ultip	oly t	wo	give	en matrices.				
3	Write a Java p words in a tex	program that o	lisp	lays	the	nur	mber of char	racters, line	es and		
4	Generate rando class and print	om numbers b messages acc	etw ord	een ing	two to tł	o giv ne ra	ven limits us	sing Rando value gener	m rated.		
5	Write a progra perform the for String length	am to do Strin ollowing strin - Finding a ch	ng M g op narae	Iani bera oter	pulation	ation s: par	n using Cha	racterArray	y and		
	Concatenating	g two strings				1	1				
6	Write a progr String class: S substring from	am to perforn String Concaton n given string	n the enat	e fol ion	low - Se	ring earcl	string opera h a substring	ations using g -To extra	g ct		
7	Write a progra class: -Length the given strin	am to perforn 1 of a string -I 1g	n str Reve	ing erse	ope a st	ratio ring	ons using St g-Delete a s	ring Buffe ubstring fr	r om		
8	Write a java p has three three and if the value number and p value of cube	brogram that i ads. First thre ue is even, sec rints. If the va of the numbe	mpl ad g conc alue r.	eme gene l thr is c	ents erate read odd,	a m es ra con the	ulti-thread a ndom intego nputes the s third thread	application er every 1 quare of th will print	that second e the		
9	Write a thread asynchronous 90 to100 usin	ling program ly to print the g Thread2.	whi nui	ch ι nbe	ises rs 1	the to1(	same metho ) using Thre	od ead1 and to	print		

	Write a program to demonstrate the use of	of following exceptions.				
10	Arithmetic Exception -Number Format Bound Exception –Negative Array Size	Exception –Array Index Out of Exception				
11	Write a Java program that reads on file n displays information about whether the f readable, whether the file is writable, the the file in bytes	name from the user, then file exists, whether the file is type of file and the length of				
12	Write a program to accept a text and cha bold italic options. Use frames and contr	nge its size and font. Include ols.				
13	Write a Java program that handles all more event name at the center of the window w (Use adapter classes).					
14	Write a Java program that works as a sim layout to arrange buttons for the digits ar Add a text field to display the result. Har like divide by zero.	60				
15	15 Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.					
	Total		60			
	Course Outcomes	Programme Ou	itcome			
СО	Course Outcomes On completion of this course, students will	Programme Ou	itcome			
CO 1	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.	Programme Ou PO1	itcome			
CO 1 2	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.	Programme Ou PO1 PO1, PO2	itcome			
CO 1 2 3	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.Implement multi-threading and I/O Streams of Core Java	Programme Ou PO1 PO1, PO2 PO4, PO6	itcome			
CO 1 2 3 4	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.Implement multi-threading and I/O Streams of Core JavaImplement AWT and Event handling.	Programme Ou PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO	06			
CO 1 2 3 4	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.Implement multi-threading and I/O Streams of Core JavaImplement AWT and Event handling.Use Swing to create GUI.	Programme Ou PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO PO3, PO6	06			
CO 1 2 3 4 5	Course Outcomes         On completion of this course, students will         Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.         Implement inheritance, packages, interfaces and exception handling of Core Java.         Implement multi-threading and I/O Streams of Core Java         Implement AWT and Event handling.         Use Swing to create GUI.	Programme Ou PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO PO3, PO6 Book	06			
CO 1 2 3 4 5 1	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.Implement multi-threading and I/O Streams of Core JavaImplement AWT and Event handling.Use Swing to create GUI.Text H Herbert Schildt, The Complete Reference	Programme Ou PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO PO3, PO6 Book , Tata McGraw Hill, New Delhi,	06 , 7th Edition, 2010.			
CO 1 2 3 4 5 1 2.	Course OutcomesOn completion of this course, students willUnderstand the basic Object-oriented concepts.Implement the basic constructs of Core Java.Implement inheritance, packages, interfaces and exception handling of Core Java.Implement multi-threading and I/O Streams of Core JavaImplement AWT and Event handling.Use Swing to create GUI.Text EHerbert Schildt, The Complete ReferenceGary Cornell, Core Java 2 Volume I – Fut	Programme Ou PO1 PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO PO3, PO6 Book , Tata McGraw Hill, New Delhi, ndamentals, Addison Wesley, 19	06 06 7th Edition, 2010.			
CO 1 2 3 4 5 1 2.	Course Outcomes         On completion of this course, students will         Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.         Implement inheritance, packages, interfaces and exception handling of Core Java.         Implement multi-threading and I/O Streams of Core Java         Implement AWT and Event handling.         Use Swing to create GUI.         Text F         Herbert Schildt, The Complete Reference         Gary Cornell, Core Java 2 Volume I – Fut         Reference	Programme Ou PO1 PO1 PO1, PO2 PO4, PO6 PO4, PO5, PO PO3, PO6 Book , Tata McGraw Hill, New Delhi, <i>ndamentals</i> , Addison Wesley, 19 e Books	06 06 , 7th Edition, 2010. 999.			
CO 1 2 3 4 5 1 2. 1 1.	Course Outcomes         On completion of this course, students will         Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.         Implement inheritance, packages, interfaces and exception handling of Core Java.         Implement multi-threading and I/O Streams of Core Java         Implement AWT and Event handling.         Use Swing to create GUI.         Text Herbert Schildt, The Complete Reference.         Gary Cornell, Core Java 2 Volume 1 – Fu.         Head First Java, O'Rielly Publications,	Programme Ou PO1 PO1 PO1, PO2 PO4, PO6 PO4, PO6 PO4, PO5, PO PO3, PO6 <b>Book</b> , Tata McGraw Hill, New Delhi, <i>ndamentals</i> , Addison Wesley, 19 <b>e Books</b>	06 06 , 7th Edition, 2010. 999.			

Web Resources							
1.	https://www.w3schools.com/java/						
2.	http://java.sun.com						
3.	http://www.afu.com/javafaq.html						

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
C01	3	3	3	3	3	2
CO2	3	3	3	2	2	3
CO3	2	2	1	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	14	13	14	14	12

Subje	Subject	Categ	L	Т	Р	S	Credi	Inst.		Marks			
ct Code	Name	ory					ts	Hou	CI	Extern	Tot		
Coue								15	Α	al	al		
	Numerical	Flective											
	Methods	5											
U23C			5	-	-	-	4	5	25	75	100		
SE55													
А													
Learning Objectives													
LO1	LO1 To learn about basics of numerical computation												
LO2	To learn abo	ut different	iter	ativ	e m	etho	ods						
LO3	To learn abo	ut methods	app	lied	for	inte	erpolation						
LO4	To learn abo	ut different	iatic	on a	nd i	nteg	gration						
LO5	To learn abo	ut numerica	ıl so	luti	on								
UNIT S	Contents									No. of Hours			
Ι	Algebraic as computations false method	nd transce s – iteratio s – Newton	ndei n m Rai	ntal neth	eq ods	uati – 1 netho	ons : Erro bisection m	ors in nu ethods –	merical regular	9			
II	Simultaneous equations – back substitutions – gauss elimination         method – gauss serial iteration method – comparison of direct and         iterative method.												
III	Interpolation – Newton"s Formulae – gauss interpolation formulae LanguageInterpolation formula – inverse interpolation.								mulae	9			
IV	Numerical D integration –	ifferentiation Simpson''s	on: l Ru	New le –	vton Ga	."s f ussi	ormulae – N an Quadratu	Numerical are.		9			
V	Numerical solution of differential equations: Euler"s method - Taylor series method –Range Kati methods – Predictor Corrector methods.												
				,	Tot	al				45			
Course Outcomes								Progra Outco	mme ome				

СО	On completion of this course, students will								
CO1	Understand the basics of numerical computation	PO1							
CO2	Understand overview of direct and indirect iterative methods	PO1, PO2							
CO3	Understand various formulae applied on interpolation	PO3, PO6							
CO4	Understand the numerical differentiation techniques	PO4, PO5							
CO5	Understand the various numerical solution	PO3, PO5							
	Text Book								
1	1S.Arumugam and S.Thangapandi Issac, A.Somasundaram, Numerical MethodsScitech publications, Chennai -2005								
	<b>Reference Books</b>								
1.	Dr. B.S.Grewal, <i>Numerical Methods in Engineering &amp; Science with Pr</i> C++ & MATLAB, KHANNA PUBLISHERS Eleventh Edition - 1 Janu	<i>ograms in C,</i> ary 2013							
2.	Kandasamy P.& et Al., Numerical Methods, S.Chand&Company, Decen	mber 2006							
3.	Ravendra Kumar, Professor B. R. Sharma, <i>Numerical Methods</i> , Mahave 1st edition (1 January 2021)	eer Publications;							
	Web Resources								
1.	https://www.sciencedirect.com/topics/mathematics/numerical-methods	5							
2.	https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-method	ls-spring-2019/							
3.	https://onlinecourses.nptel.ac.in/noc23_ma94/preview								

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	3	2
Weightage ofcoursecontributedtoea chPSO	15	14	11	15	11	10

Subject	Subject	Categor	L	Τ	Р	S	Credit	Inst.	Marks			
Code	Name	У					S	Hour s	CI A	Externa l	Tota l	
U23CSE56 A	Cloud Computin g	Elective6	3	-	-	-	3	3	25	75	100	
	I			Co	urs	e Ol	bjective					
LO1	Learning fur	ndamental cor	ncep	ts ai	nd T	`ech	nologies of	Cloud Cor	nputing.			
LO2	Learning var	rious cloud se	rvic	e ty	pes	and	their uses a	nd pitfalls.				
LO3	To learn abo	out Cloud Arc	hite	cture	e an	d A	pplication d	esign.				
LO4	To know the	various aspe	cts o	of ap	plic	atic	on design, be	enchmarkir	ng and se	curity on the	Cloud.	
LO5	To learn the	various Case	Stu	dies	in (	Clou	ıd Computir	ıg.				
UNIT				Co	nte	nts				No. of H	lours	
Ι	Introduction to Cloud Computing: Definition of Cloud Computing – Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples – Cloud-based Services and Applications. Cloud Concepts and Technologies: Virtualization – Load balancing – Scalability and Belasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network Function Virtualization – Map Reduce – Identity and Access Management – Service Level Agreements –Introduction Internet Privile											

11	Compute Services: Amazon Elastic Computer Cloud - Google Compute Engine - Windows Azure Virtual Machines -Storage Services: Amazon Simple Storage Service - Google Cloud Storage - Windows Azure Storage -Database Services: Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database - Windows Azure Table Service- Application Services: Application Runtimes and Frameworks - Queuing Services - Email Services - Notifiction Services - Media Services- Content Delivery Services: Amazon Cloud Front - Windows Azure Content Delivery Network -Analytics Services: Amazon Elastic MapReduce - Google Map Reduce Service - Google BigQuery - Windows Azure HDInsight -Deployment and Management Services: Amazon Elastic Beanstack - Amazon CloudFormation-Identity and Access Management Services: Amazon Identiy and Access Management - Windows Azure Active Directory -Open Source Private Cloud Software: CloudStack – Eucalyptus – OpenStack	9						
III	<b>Cloud Application Design:</b> Introduction – Design Consideration for Cloud Applications – Scalability – Reliability and Availability – Security – Maintenance and Upgradation – Performance – Reference Architectures for Cloud Applications – Cloud Application Design Methodologies: Service Oriented Architecture (SOA), Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), RESTful Web Services – Data Storage Approaches: RelationalApproach (SQL), Non- RelationalApproach (NoSQL).	9						
IV	<ul> <li>Cloud Application Bench marking and Tuning: Introduction to Bench marking – Steps in Bench marking – Work load Characteristics</li> <li>– Application Performance Metrics – Design Consideration for Bench marking Methodology – Bench marking Tools and Types of Tests – Deployment Prototyping.</li> <li>Cloud Security: Introduction – CSA Cloud Security Architecture – Authentication (SSO) – Authorization – Identity and Access Management – Data Security : Securing data atrest, securing data in motion – Key Management – Auditing.</li> </ul>	9						
V	<b>Case Studies:</b> Cloud Computing for Health care – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems - Cloud Computing for Manufacturing Industry - Cloud Computing for Education.	9						
	Total	45						
	Programme Outcome							
СО	On completion of this course, students will							
CO 1	Understand the fundamental concepts and Technologies in Cloud Computing.							

CO 2	Able to understand various cloud service types and their uses and pitfalls.	PO1, PO2							
CO 3	Able to understand Cloud Architecture and Application design.	PO4, PO5							
CO 4	4 Understand the various aspects of application design, benchmarking and security in the Cloud.								
CO 5	Understand various Case Studies in Cloud Computing.								
	Text Book	•							
1	ArshdeepBahga, Vijay Madisetti, Cloud Computing – A Hands On Approach,	Universities							
1	Press (India) Pvt. Ltd., 2018								
	<b>Reference Books</b>								
1	Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing: A Pract	ical Approach,							
	Tata McGraw-Hill, 2013.								
2.	Barrie Sosinsky, <i>Cloud Computing Bible</i> , Wiley India Pvt. Ltd., 2013.								
3.	David Crookes, <i>Cloud Computing in Easy Steps</i> , Tata McGraw Hill, 2015.								
4.	Dr. Kumar Saurabh, <i>Cloud Computing</i> , Wiley India, Second Edition 2012.								
	Web Resources								
1.	https://en.wikipedia.org/wiki/Cloud_computing								
2.	https://link.springer.com/chapter/10.1007/978-3-030-34957-8_7								
3.	3. https://webobjects.cdw.com/webobjects/media/pdf/solutions/cloud-computing/121838-CDW-								
	Cloud-Computing-Reference-Guide.pdf								

# Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
C01	3	2	2	3	3	2
CO2	3	3	2	3	3	2
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	10

## **SEMESTER-VI**

Subject	Subject Name	•	L	Т	Р	S		SJ	Marks			
Coue		Category					Credits	Inst. Hou	CIA	External	Total	
U23CST612	Computer Networks	Core 13	6	-	-	-	4	6	25	75	100	
	Course Objective											
LO1	To learn the basic concepts	of Data cor	nmu	nicat	tion	and (	Comp	outer	networl	κ.		
LO2	To learn about wireless	Transmiss	sion	and	dat	a lin	k la	yer				
LO3	To learn about Network	communi	cati	on.								
LO4	To study about Transport	laye										
LO5	To learn the concept of App	plication lay	yer									
UNIT	Contents								N H	o. of ours		
Ι	Uses of Computer Networks-Types of Computer Networks-Network Technology, from Local to Global-Examples of Networks-Network Protocols-Reference Models - Guided Transmission Media											
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Ш	Wireless Transmission-Cellular Networks-Communic Data Link Layer Design Issues-Error Detection and C Elementary Data Link Protocols	ation Satellites- orrection-	15									
III	Multiple Access Protocols-Ethernet-Wireless LANs-B Layer Design Issues-Traffic Management at the Network Internetworking-The Network Layer in the Internet	luetoothNetwork ork Layer-	15									
IV	The Transport Service-Elements of Transport Protocol Control-The Internet Transport Protocols: UDP-The In Protocols: TCP, QUIC, BBR	ls-Congestion nternet Transport	15									
V	VDNS — The Domain Name System-Electronic Mail-The World Wide Web -Fundamentals of Network Security Web											
	Total											
	Course Outcomes	Programme (	Dutcome									
СО	On completion of this course, students will											
CO1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models	PO1										
CO2	To gain knowledge on Telephone systems using wireless network	PO1, PC	02									
CO3	To understand the concept of MAC	PO4, PC	06									
CO4	To analyze the characteristics of Routing and Congestion control algorithms	PO4, PO5,	PO6									
CO5	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS	PO3, PC	)4									
	Text Book											
1	A. S. Tanenbaum, "Computer Networks", 6th Editi	on, Prentice-Hall of	India, 2021									
	Reference Books											
1.	1.B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 6th Edition, 2022											
2.	F. Halsall, "Data Communications, Compute Systems", Pearson Education, 2008	r Networks and Ope	n									
3.	D. Bertsekas and R. Gallagher, "Data Networks", 2nd	Edition, PHI, 2008.										
4.	Lamarca, "Communication Networks", Tata McGraw	- Hill, 2002										
	Web Resources											

1.	https://en.wikipedia.org/wiki/Computer_network
2.	https://citationsy.com/styles/computer-networks

# Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	3
CO2	3	2	2	2	2	2
CO3	3	2	3	3	2	3
CO4	3	2	2	2	2	2
CO5	3	2	2	2	2	3
Weightage of course contributed to each PSO	15	11	11	12	10	13

Subject	Subject Name		L	Т	P	S				Marks	5
Code		ry					S	sın	-	Γ	1
		Catego					Credit	Inst. Ho	CIA	External	Total
	.Net Programming	Core	6	-	-	-	4	6	25	75	100
U23CST613		14									
		Cours	se O	bjec	tive	•					
C1	To identify and understa	and the go	bals	and	objec	tive	s of the	.NET f	ramewo	rk and	
	ASP.NET with C# lang	uage.									
C2	To develop ASP.NET V	Veb appli	catic	on us	sing s	tand	lard con	trols.			
C3	To implement file hand	ling opera	tion	s.							
C4	To handles SQL Server Database using ADO.NET.										
C5	Understand the Grid vie	ew control	l and	I XM	1L cl	asse	s.				

UNITS	Contents		No. of Hours
I	Overview of .NET framework: Common I Runtime (CLR), Framework Class Libr Fundamentals: Primitive types and Var Operators - Conditional statements -Looping s –Creating and using Objects – Arrays	Language rary- C# iables – tatements – String	
	operations.	Sumg	18
	Introduction to ASP.NET - IDE-Languages	supported Web_form	
II	standard controls: Properties and its events controls -List Controls: Properties and its even	– HTML ts.	18
	Rich Controls: Properties and its events – v controls: Properties and its events– File Stream	validation	
III	File Modes – File Share – Reading and Writir – Creating, Moving, Copying and Deletingfi uploading.	ng to files iles – File	
			18
	ADO.NET Overview – Database Conne Commanda Data Data Adaptar Ad	ections –	
IV	Data Sets - Data Controls and its Propertie	es - Data	18
	Binding		
V	Grid View control: Deleting, editing, Son Paging. XML classes – Web form to manipul files - Website Security - Authentic Authorization – Creating a Web application.	ting and late XML cation -	18
	Total		90
	Course Outcomes	P	rogramme Outcome
СО	On completion of this course, students will		
1	Develop working knowledge of C#	DO1 DO2	
	Framework	PO1, PO2,	PO6
2	To develop a software to solve real-world problems using ASP.NET	PO2, PO3,	PO5
3	To Work On Various Controls Files	PO1, PO3,	PO6
4	To create a web application using MicrosoftADO.NET.	PO2, PO6	
5	To develop web applications using XML	PO1, PO3,	PO6
1	Text Book		
1	SvetlinNakov,VeselinKolev& Co, Fundamer	ntals of Co	omputer Programming with
	C#,Faber publication,2019.		
2	Mathew, Mac Donald, The Complete Referenc	e ASP.NET	, Tata McGraw-Hill,2015.
1	Reference Books		
1.	Herbert Schildt, The Complete Reference C#.N	NET, TataM	cGraw-Hill,2017.
2.	Kogent Learning Solutions, C# 2012 Progra	amming Co	overs .NET 4.5 Black Book,

	Dreamtechpres,2013.
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4.	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5.	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS, 2010.
	Web Resources
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/
2.	https://www.javatpoint.com/net-framework

# Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	2	3
CO2	3	2	2	3	3	3
CO3	3	3	3	2	3	3
CO4	2	2	1	3	3	2
CO5	3	3	3	3	3	3
Weightage of course contributed to each PSO	14	13	12	14	14	14

Subject Code	Subject Name	Т	Р	S		Irs	Marks				
		Categor					Credits	Inst. Hou	CIA	External	Total
U23CSP614	.Net Programming	Core 15	-	-	6	-	4	6	25	75	100
	LAB										
	С	ourse Obje	ctive	•							
LO1	To develop ASP.NET W	eb applicati	on u	sing	stan	dard	cont	rols			
LO2	To create rich database a	To create rich database applications usingADO.NET.									
LO3	To implement file handling operations.										
LO4	To implement XML class	ses.									

LO5	To utilize ASP.NET security features for authenticating the website				
Sl. No	Sl. No Programs				
1.	Create an exposure of Web applications and tools				
2	Implement the Html Controls	_			
2.	Implement the Server Controls	-			
3.	Web application using Web controls	_			
	Web application using List controls	_			
5.	Web Page design using Pick control. Validate user input using	_			
0.	Validation controls. Working with Filoconcents				
7	Web application using Data Controls	-			
7.	Data binding with Web controls	-			
9	Data binding with Data Controls.	-			
10.	Database application to perform insert, update and delete	-			
	operations.				
11.	Database application using Data Controls to perform insert, delete,	75			
12	edit, paging and sorting operation.	-			
12.	Implement the Xml classes.	_			
13.	Implement Authentication – Authorization.	-			
14.	The reservation using ASP. NET controls.	_			
15.	Online examination using ASP.NET controls				
		75			
	Course Outcomes	Programme Outcome			
СО	On completion of this course, students will				
CO 1	To create web applications and implement various controls	PO1, PO2, PO4			
CO2	Create web pages in Rich control.	PO3, PO5			
CO3	Develop knowledge about file handling operations	PO1, PO4, PO5			
CO4	An ability to design XML classes	PO2, PO4, PO6			
CO5	To develop a software to solve real-world problems using ASP.NET	PO1,PO3, PO5, PO6			
	Text Book	1			
1					
	Svetlin Nakov, Veselin Kolev & Co, Fundamentals of Computer Progra C#, Faber publication, 2019.	amming with			
2	Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGra	aw-Hill,2015.			
	Reference Books				

2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtechpres, 2013.
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4.	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5.	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS,2010.
	Web Resources
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/
2.	https://www.javatpoint.com/net-framework

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	2	1	2
CO2	3	3	2	2	3	3
CO3	3	3	2	3	3	2
CO4	3	2	3	2	2	3
CO5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

Subject Code	Subject Name	v	L	Т	Р	S		IIS		Mark	KS
		Categor					Credits	Inst. Hou	CIA	External	Total
	Big Data Analytics	Elective 7	5	-	-	-	3	5	25	75	100
		Course Ob	jecti <sup>,</sup>	ve							
C1	Understand the Big Data Pl	atform and	its U	Jse c	ases,	, Maj	p Rec	luce J	obs		
C2	To identify and understand	the basics of	of clu	ister	and	deci	sion t	ree			
C3	To study about the Associa	To study about the Association Rules, Recommendation System									
C4	To learn about the concept	of stream									
C5	Understand the concepts of	f NoSQL D	ataba	ases							

UNIT	Contents	No. of Hours				
Ι	Evolution of Big data — Best Practices for Big data A data characteristics — Validating — The Promotion Big Data — Big Data Use Cases- Characteristic Applications — Perception and Quantification Understanding Big Data Storage — A General Ove Performance Architecture — HDFS — Map Reduce Map Reduce Programming Model	Analytics — Big of the Value of es of Big Data of Value - erview of High- e and YARN —	12			
II	Advanced Analytical Theory and Methods: Overvie — K-means — Use Cases — Overview of t Determining the Number of Clusters — Diagnostics Choose and Cautions Classification: Decision Tre of a Decision Tree — The General Algorithm — Algorithms — Evaluating a Decision Tree — Decision Naïve Bayes — Bayes Theorem — Naïve Bayes Classification	12				
III	Advanced Analytical Theory and Methods: Associ Overview — Apriori Algorithm — Evaluation of Car Applications of Association Rules — Finding Associ similarity — Recommendation System: Recommendation- Content Based Recommendation Based Recommendation- Hybrid Recommendation Applied Recommendation App	iation Rules — ndidate Rules — ciation& finding Collaborative — Knowledge pproaches.	12			
IV	IVIntroduction to Streams Concepts — Stream Data Model and Architecture — Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics					
V	V NoSQL Databases : Schema-less Models : Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores — Tabular Stores — Object Data Stores — Graph Databases Hive — Sharding —Hbase — Analyzing big data with twitter — Big data for E- Commerce Big data for blogs — Review of Basic Data Analytic Methods using R.					
	Total					
	Course Outcomes Programme					
	On completion of this course, students will					
1	Work with big data tools and its analysis techniques.	D1				
2	Analyze data by utilizing clustering and classification algorithms.	by utilizing clustering and algorithms. PO1, PO2				
3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	nining algorithms and PO4, PO5 large volumes of data.				

4	Perform analy	tics on da	ta stream	reams. PO3, PO5, PO6					
5	Learn NoSQI	databases	s and mai	nagemen	t.		PO	3, PO4	
	Text Book								
1	AnandRajara University Pr	man and Je ess,3 <sup>rd</sup> edit	effrey Da ion, 202	vid Ullm 20	an, "Min	ing of M	assive Dat	tasets", Cambridge	
2	David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration								
	with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El sevier Publishers,								
	2013								
	l		Refe	rence Bo	oks				
1	EMC Educat	tion Servi	ces, "D	ata Scie	nce and	Big Da	ata Analy	tics: Discovering,	
	Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.								
			Web	Resour	ces				
1.	https://www.s	implilearn.	com						
2.	https://www.s	as.com/en	us/insigh	nts/analyti	cs/big-da	ta-analyti	<u>cs.html</u>		
Mapping with	Mapping with Programme Outcomes:								
CO/PSO		PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6		

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	13

Subject	Subject Name		L	Τ	Р	S				Mark	s
Code		Category					Credits	Inst. Hours	CIA	External	Total
	Elective – 7: Internet of	Elective	5	-	-	-	3	5	25	75	100
U23CSE67A	Things (IoT) and its	8									
	applications										
Course Objective											
C1	Use of Devices, Gateways and Data Management in IoT.										
C2	Design IoT applications in different domain and be able to analyze their performance										
C3	Implement basic IoT applications on embedded platform										
C4	To gain knowledge on Industry Internet of Things										
C5	To Learn about the privacy a	To Learn about the privacy and Security issues in IoT									
UNITS	Details							]	No. of 1	Hours	
Ι	IoT& Web Technology, The Internet of Things Today, Time for										
	Convergence, Towards the IoT Universe, Internet of Things Vision,							on,	11	,	
	IoT Strategic Research and Innovation Directions, IoT Applications,						-				
	Future Internet Technolo	gies, Infr	astru	ctur	e, 1	Netw	vorks	s a	nd		
	Communication, Processes, Data Management, Security, Privacy &								&		

	Trust, Device Level Energy Issues, IoT Related Sta				
	Recommendations on Research Topics.				
II	M2M to IoT – A Basic Perspective– Introduction, Som M2M Value Chains, IoT Value Chains, An emerg structure for IoT, The international driven global va global information monopolies. M2M to IoT-An Overview– Building an architecture, Main design p needed capabilities, An IoT architecture outlin	e Definitions, ing industrial lue chain and Architectural principles and ae, standards	12		
III	IoT Architecture -State of the Art – Introduction, Sta Architecture. Reference Model- Introduction, Reference architecture, IoT reference Model, IoT Reference Introduction, Functional View, Information View, Da	ate of the art, ce Model and Architecture-	12		
	Operational View, Other Relevant architectural views	pioyment and			
IV	operational view, other Relevant architectural views				
	IV IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and GasIndustry, Opinions on IoT Application and Value for Industry, Home Management				
V	V Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data- Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security				
	Total		60		
	Course Outcomes	Program	ne Outcomes		
СО	On completion of this course, students will				
1	Work with big data tools and its analysis techniques.	I	201		
2	Analyze data by utilizing clustering and classification algorithms.	1, PO2			
3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	94, PO6			
4	Perform analytics on data streams.	PO5, PO6			
5	Learn NoSQL databases and management.	PO	3, PO5		
	Text Book				
1	Vijay Madisetti and ArshdeepBahga, "Internet of Things: (A Hands-on Approach)",				
	dition.				
	Reference Books				
1.	Michael Miller, "The Internet of Things: How Smart	TVs, Smart $\overline{Ca}$	rs, Smart Homes,		
	and Smart Cities Are Changing the World", kindle version.				

2.	Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to
	Connecting Everything", Apress Publications 2013, 1st Edition,.
3	WaltenegusDargie, ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks:
	Theory and Practice" 4 CunoPfister, "Getting Started with the Internet of Things",
	O"Reilly Media 2011
	Web Resources
1.	https://www.simplilearn.com
2.	https://www.javatpoint.com
3.	https://www.w3schools.com

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	3	3
CO3	3	2	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	12	11	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

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