E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC

DEPARTMENT OF COMPUTER SCIENCE

CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - S

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

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(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
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DEPARTMENT OF COMPUTER SCIENCE – UG

(w.e.f. 2022– 2023 Batch onwards)

CBCS with OBE

Vision

To produce quality IT professional who can independently design, develop and implement computer applications.

To create competent professionals to become part of the industry and research organizations at the national and international level.

Mission

- To empowering the students in rural communities with computer knowledge.
- To achieve the excellent of quality education by keeping with rapidly changing technologies.
- To generate the manpower of global standards with potential of accepting the new challenges.
- To develop the programming skills of the students to meet the current trends of the computer field.

Programme Educational Objectives (PEOs):B.Sc. Computer Science

Sl.No.	Programme Educational Objective
PEO1	To acquire the knowledge in the field of computer Science.
PEO2	To exhibit inspired and innovative ideas with good logical and entrepreneur skills in the field of computer science.
PEO3	To make the students to effectively utilizing their knowledge to find the solutions of the current and future computing problems.
PEO4	To provide the practical training, hands-on training and project experience to meet the industrial needs.
PEO5	To motivate the students to pursue a higher education or continue their professional education.
PEO6	To accomplish any tasks with ethical values and commitment to meet the needs of the Society.

Programme Outcomes for Science Graduates

On completion of B.Sc., Programmes students will be able to

SL.No.	Programme Outcomes
PO1	Develop necessary foundation in fundamentals, aptitude, applications of sciences and other related subjects. Able to clear competitive examinations, appear with confidence and possess basic skills on the related subjects. Secure jobs in employment in Government / Private / Industry and entrepreneurship.
PO2	Receive basic experimental skills in the observation and study of nature, biological techniques, scientific research and demonstrate proficiency in critical analysis or creativity and provide scientific solutions to the problems of the society.
PO3	Enhance the digital knowledge of statistics and to understand its application in interpreting the obtained data.
PO4	Obtain knowledge with emerging trends in their disciplinary and inter-disciplinary areas. Usage of modern tools and software can also be put to use.
PO5	Lead lifelong learning & contribute sustainability to environment, equip students enough to takeup higher studies upto research in various disciplines to become professionals.
PO6	Imbibe democratic, ethical, moral, social & spiritual values in the minds of the learners to become responsible citizens and build a healthy nation.

Programme Specific Outcomes (PSOs):

PSOs	Graduate Attributes	After completion of B.Sc Computer Science the students will be able to	PO Addressed
PSO-1	Knowledge & Proficiency	Know the programming concepts and methodology & the functionality of hardware and software aspects of computer systems.	PO1
PSO-2	Problem analysis	An ability to analyze a problem and identify and define the project requirements appropriate to its solution.	PO2
PSO-3	Problem Solving	The knowledge of computer science to solve real world problems.	PO2
PSO-4	Modern tool usage	Use software development tools, software systems, and modern computing platforms.	PO4
PSO-5	Social responsibility	Ability to become software professionals with social responsibilities and ethical values.	PO6
PSO-6	Lifelong learning	Ability to engage in independent and life-long learning in the broadest context of technological change.	PO5
PSO-7	Ethical & Moral and Spiritual Values	Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.	PO6
PSO-8	Leadership, Team work & Communication	Ability to develop communication team work and leadership skills necessary to build their career.	PO3

Qualification for Admission

Candidates should have passed the Higher Secondary Examination, Mathematics as one of the subject, conducted by the Board of Higher Education, Government of Tamilnadu, CBSE & ICSE or any other examination approved by Madurai Kamaraj University as equivalent.

Duration of the Course

The students shall undergo this prescribed course of study for the period of three academic years under Choice Based Credit System (CBCS) semester pattern with Outcome Based Education (OBE).

Medium of Instruction: English

System: Choice Based Credit System with Outcome Based Education Model

Courses of Study with Credit Distribution for B.Sc Computer Science

Category	No. of Courses	No. of Credits
Part-I	4	12
Part –II	4	12
Major Core Paper	17	60
Discipline Specific Elective Course	3	15
Generic Elective Courses (Mathematics)	4	20
Skill Enhancement Course	6	12
Inter Disciplinary Course	2	4
Ability Enhancement Compulsory Course	2	4
NSS/Physical Education	1	1
Total	**43**	**140**

Nature of the Course

Courses are classified according to the following nature

1. Knowledge and skill oriented
2. Employability oriented
3. Entrepreneurship oriented

Outcome Based Education (OBE) & Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several basis , such as

1. **Based on purpose:**
   - Continuous Assessment (internal tests, Assignment, seminar, quiz, Documentation, Case lets,ICT based Assignment, Mini projects administered during the learning process)
   - External Assessment (Evaluation of students' learning at the end of instructional unit)
2. **Based on Domain Knowledge: (for UG Up to K4 levels)**
   Assessment through K1, K2, K3 & K4

EVALUATION (THEORY)
(PART I / PART II / PART III)

Internal (Formative) : 25 marks

External (Summative) : 75 marks

Total :100 marks

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

Components	Marks
Test (Average of three tests) (Conducted for 100 marks and converted into 20 marks)	**20**
Assignment(Quiz/ Documentation/ Case lets/ ICT based Assignment/ Mini Projects)	**5**
Total	**25**

- ✓ **Centralized system** of Internal Assessment Tests
- ✓ There will be **Three Internal Assessment** Tests
- ✓ Duration of Internal assessment test will be **1 hour for Test I and 2 hours for Test II and III** respectively.
- ✓ Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment- Test I

Section	Marks
A-Multiple Choice Question (3x1 mark)	3
B-Short Answer (1x2 marks)	2
C-Either Or type (1/2x 5 marks)	5
D-Open choice type (1/2 x 10 marks)	10
Total	**20**

Question Paper Pattern for Continuous Internal Assessment -Test II and III

Multiple choice for Section	Marks
A- Multiple Choice Question (6x1 mark)	6
B-Short Answer (2x2 marks)	4
C-Either Or Type (2/4 x5 marks)	10
D-Open Choice Type (2/3 x 10 marks)	20
Total	**40**

Conducted for 100 marks and converted into 20 marks

Question Paper Pattern for Summative Examination

Section	Marks
A- Multiple choice Questions without Choice (10x1 mark)	10
B-Short Answer without choice (5x2 marks)	10
C-Either Or type (5/10 x5 marks)	25
D-Open Choice type (3out of 5x10 marks)	30
Total	75

In respect of Summative Examinations passing minimum is **36 % for UG.**

Distribution of Marks in % with K Levels CIA I, II, III & External Assessment

Blooms Taxonomy	Internal Assessment			External Assessment
	I	II	III	
Knowledge (K1)	12%	12%	12%	13%
Understanding (K2)	44%	22%	22%	21%
Apply (K3)	44%	33%	33%	33%
Analyze (K4)	-	33%	33%	33%

Latest amendments and revision as per **UGC** and **TANSCHE** norms is taken into consideration in curriculum preparation.

BLUE PRINT FOR INTERNAL ASSESSMENT – I
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type) (Each set of questions must be in the same level)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	3	(K1)	1	K1	2 (K2)	1 (K2) & 2 (K3)	
No. of Questions to be asked			3		1		2	3	9
No. of Questions to be answered			3		1		1	1	6
Marks for each question			1		2		5	10	-
Total Marks for each section			3		2		5	10	20

BLUE PRINT FOR INTERNAL ASSESSMENT – II
Articulation Mapping - K Levels with Course Learning Outcomes (COs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 2	Up to K3	3	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K4)	2 (K3) & 1 (K4)	
2	CLO 3	Up to K4	3	(K1/ K2)	1	(K1/ K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

BLUE PRINT FOR INTERNAL ASSESSMENT – III
Articulation Mapping - K Levels with Course Learning Outcomes (COs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 4	Up to K3	3	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K4) (Each set of questions must be in the same level)	2 (K3) & 1 (K4)	
2	CLO 5	Up to K4	3	(K1/ K2)	1	(K1/ K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

Distribution of Marks with choice K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section -A MCQ (No choice)	Section -B Short Answer (No choice)	Section -C (Either or Type)	Section –D (Open choice)	Total Marks	% of Marks
I	K1	3	2	-	-	5	12
	K2	-	-	10	10	20	44
	K3	-	-	-	20	20	44
	K4	-	-	-	-	-	-
	Marks	**3**	**2**	**10**	**30**	**45**	**100**
II	K1	5	2	-		7	12
	K2	1	2	10	-	13	22
	K3	-	-	-	20	20	33
	K4	-	-	10	10	20	33
	Marks	**6**	**4**	**20**	**30**	**60**	**100**
III	K1	5	2	-		7	12
	K2	1	2	10	-	13	22
	K3	-	-	-	20	20	33
	K4	-	-	10	10	20	33
	Marks	**6**	**4**	**20**	**30**	**60**	**100**

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Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/ or Type)	Section D (open choice)	Total
			MCQs (No choice)		Short Answers (No choice)				
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K2)	
2	CLO 2	Up to K3	2	K1/K2	1	K1/K2	2(K2 & K2)	1(K3)	
3	CLO 3	Up to K4	2	K1/K2	1	K1/K2	2 (K4 &K4)	1(K4)	
4	CLO 4	Up to K 3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K3)	
5	CLO 5	Up to K 4	2	K1/K2	1	K1/K2	2 (K4 & K4)	1(K4)	
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75

Annexure – 12

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	**Total Marks**	% of Marks
K1	9	6	-	--	**15**	13
K2	1	4	10	10	**25**	21
K3	-	-	20	20	**40**	33
K4	-	-	20	20	**40**	33
Total Marks	10	10	50	50	**120**	100

K1- Remembering and recalling facts with specific answers.

K2- Basic understanding of facts and stating main ideas with general answers.

K3- Application oriented- Solving Problems, Justifying the statement and deriving Inferences.

K4- Examining, analyzing, presentation and make inferences with evidences.

Annexure – 12

EVALUATION (THEORY)

(PART IV - SEC & IDC)

Internal (Formative) : 25 marks

External (Summative) : 75 marks

Total :100 marks

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

Components	Marks
Test (Conducted for 50 marks and converted into 25 marks)	**25**

- ✓ There will be Only one Internal Assessment Test
- ✓ Duration of Internal assessment test will be 2 hour for Test
- ✓ Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment- Test

Section	Marks
A-Multiple Choice Question (5x1 mark)	5
B-Short Answer (5x2 marks)	10
C-Either Or type (3/6x 5 marks)	15
D-Open choice type (2/3 x 10 marks)	20
Total	50

Conducted for 50 marks and converted into 25 marks

Question Paper Pattern for External Examination

Section	Marks
A-Multiple Choice Question (10x1 mark)	10
B-Short Answer (5x2 marks)	10
C-Either Or type (5x 5 marks)	25
D-Open choice type (3/5 x 10 marks)	30
Total	75

Annexure – 12

BLUE PRINT FOR INTERNAL ASSESSMENT
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1.	CLO1	Up to K 3	1	K1	1	K1	4(K2) & 2(K3) (Each set of questions must be in the same level)	1(K2) & 2(K3)	
2.	CLO2	Up to K 3	1		1				
3.	CLO3	Up to K 3	1		1				
4	CLO4	Up to K 3	1		1				
5	CLO5	Up to K 3	1		1				
No. of Questions to be asked			5		5		6	3	19
No. of Questions to be answered			5		5		3	2	15
Marks for each question			1		2		5	10	
Total Marks for each section			**5**		**10**		**15**	**20**	**50**

Distribution of Marks with K Levels CIA

CIA	K Levels	Section A MCQ	Section B (Short Answers)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of Marks
I	K1	5	10	-	-	15	20
	K2	-	-	20	10	30	40
	K3	-	-	10	20	30	40
	K4	-	-	-	-	-	-
	Marks	**5**	**10**	**30**	**30**	**75**	**100**

Annexure – 12

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl. No	CLOs	K-Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)	Total
			MCQs		Short Answers				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2	K1	1	K1	3(K2) & 2(K3) (Each set of questions must be in the same level)	2(K2) & 3(K3)	
2	CLO 2	Up to K3	2		1				
3	CLO 3	Up to K3	2		1				
4	CLO 4	Up to K 3	2		1				
5	CLO 5	Up to K 3	2		1				
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S)	Section B (Short Answer)	Section C (Either/or)	Section D (Open Choice)	**Total Marks**	% of Marks without choice
K1	10	10	-	--	**20**	16
K2	-	-	30	20	**50**	42
K3	-	-	20	30	**50**	42
Total Marks	10	10	50	50	**120**	100

Annexure – 12

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CBCS with OBE
COURSE STRUCTURE
(w.e.f. 2022 – 2023 Batch onwards)

Semester	Part	Course Code	Title of the Course	Teaching hrs (per week))	Duration of Exam (hrs.)	Marks Allotted			Credits
						CIA	SE	Total	
I	I	**22OU1TA1**	Tamil	6	3	25	75	100	3
	II	**22OU2EN1**	English	6	3	25	75	100	3
	III	**22OUCS11**	**Core** : Programming in C	4	3	25	75	100	4
	III	**22OUCS1P**	**Core** : Programming in C Lab	5	3	40	60	100	3
	III	**22OUCSGEMA1**	**GEC** : Mathematics – 1 Discrete Mathematics	5	3	25	75	100	5
	IV	**22OUCSSE1P**	**SEC:** Office Automation Lab	2	3	40	60	100	2
	IV	**22OUCSID1**	**IDC** : Computing Fundamentals	2	3	25	75	100	2
II	I	**22OU1TA2**	Tamil	6	3	25	75	100	3
	II	**22OU2EN2**	English	6	3	25	75	100	3
	III	**22OUCS21**	**Core** : Object Oriented Programming with C++	4	3	25	75	100	4
	III	**22OUCS2P**	**Core** : Object Oriented Programming with C++ Lab	5	3	40	60	100	3
	III	**22OUCSGEMA2**	**GEC** : Mathematics – 2 Probability and Statistics	5	3	25	75	100	5
	IV	**22OUCSSE2**	**SEC:** Image Editing and Animation Tools	2	3	40	60	100	2
	IV	**22OUCSID2**	**IDC** : Internet Technology and Web Design	2	3	25	75	100	2
III	I	**22OU1TA3**	Tamil	6	3	25	75	100	3
	II	**22OU2EN3**	English	6	3	25	75	100	3
	III	**22OUCS31**	**Core** : Digital Principles and Computer Organization	4	3	25	75	100	3
	III	**22OUCS32**	**Core** : RDBMS	4	3	25	75	100	4
	III	**22OUCS3P**	**Core** : SQL and PL/SQL Lab	3	3	40	60	100	3
	III	**22OUCSGEMA3**	**GEC** : Mathematics – 3 Numerical Methods	5	3	25	75	100	5
	IV	**22OUCSSE3P**	**SEC:** VB.Net and ASP.Net Programming Lab	2	3	40	60	100	2
IV	I	**22OU1TA4**	Tamil	6	3	25	75	100	3
	II	**22OU2EN4**	English	6	3	25	75	100	3
	III	**22OUCS41**	**Core** : Data Structures	4	3	25	75	100	3
	III	**22OUCS42**	**Core** : Programming in JAVA	4	3	25	75	100	4
	III	**22OUCS4P**	**Core** : Programming in JAVA Lab	3	3	40	60	100	3

	III	**22OUCSGEMA4**	**GEC** : Mathematics – 4 Resource Management Techniques	5	3	25	75	100	5
	IV	**22OUCSSE4P**	**SEC:** Data Structures Lab	2	3	40	60	100	2
V	III	**22OUCS51**	**Core** : Operating Systems	5	3	25	75	100	4
	III	**22OUCS52**	**Core** : Software Engineering	5	3	25	75	100	4
	III	**22OUCS53**	**Core** : Programming in Python	5	3	25	75	100	4
	III	**22OUCS5P**	**Core** : Programming in Python Lab	6	3	40	60	100	3
	III		**DSEC I**	5	3	25	75	100	5
	IV	**22OUCSSE5P**	**SEC:** Linux Lab	2	3	40	60	100	2
	IV	**22OUAECEV5**	**AECC:** Environmental Studies	2	3	25	75	100	2
VI	III	**22OUCS61**	**Core** : Data Communications and Networking	5	3	25	75	100	4
	III	**22OUCS62**	**Core** :Web Programming	5	3	25	75	100	4
	III	**22OUCS6P**	**Core** : Web Programming Lab	6	3	40	60	100	3
	III		**DSEC II**	5	3	25	75	100	5
	III		**DSEC III (Project)**	5	3	20	80	100	5
	IV	**22OUCSSE6P**	**SEC:** Machine Learning Lab	2	3	40	60	100	2
	IV	**22OUAECVE6**	**AECC:** Value Education	2	3	25	75	100	2
	PART V	**22OU5NS4/ 22OU5PE4**	Extension Activities NSS / Physical Education	-	3	25	75	100	1
			Total	180					140

GEC- Generic Elective Course

SEC- Skill Enhancement Course

DSEC- Discipline Specific Elective Course

AECC- Ability Enhancement Compulsory Course

IDC- Inter Disciplinary Course

DSEC: Discipline Specific Elective Course:

Semester - V (DSEC - I Choose any one)

1. Computer Graphics - **22OUCSDSE5A**
2. Introduction to Data Science - **22OUCSDSE5B**

Semester - VI (DSEC – II Choose any one)

1. Machine Learning - **22OUCSDSE6A**
2. Artificial Intelligence - **22OUCSDSE6B**

Semester - VI (DSEC – III)

1. Project - **22OUCSDSEPR6**

NOTE:

The students are permitted to obtain additional credits (Optional)

- MOOCs / SWAYAM / NPTEL Course (Online)

Compulsory Courses:

Year	Semester	Nature of Course	Course Code	Title of the Course	Hours	Offered to students of
I	I	Add on Course	22CSAOC 22CSAOCP	1. DeskTop Publishing 2. DeskTop Publishing Lab	30	I B.Sc., Computer Science
II	III & IV	Diploma Course	22CSD1 22CSD1P 22CSD2 22CSD2P	1.PC-Software 2. PC- Software Lab 3.Web Designing 4. Web Designing Lab	90 per Year	II year of all other disciplines
III	V	Value Added Course	22CSVAC 22CSVACP	1. Graphic Design and Web Development 2. Graphic Design and Web Development Lab	30	III B.Sc., Computer Science

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
I	Core	22OUCS11	Programming in C	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔		

Course Objectives:

1. Make the students to understand programming language concepts.
2. The main emphasis of the subject is to write 'C' program in an efficient manner.
3. This programming language is utilized for the development of system software and desktop application.
4. To impart adequate knowledge of programming languages and problem solving techniques.
5. Make the Students to analyze different kinds of mathematical and scientific problems.

Course Content:

Unit – I Overview of C: History of C – Importance of C – Sample Programs – Basic Structure of C Programs – Executing a 'C' Program. **Constants, Variables and Data Types:** Introduction – Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types - Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables - Defining Symbolic Constants – Declaring a Variable as Constant - Declaring a Variable as Volatile. **Operators and Expressions:** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators.

Unit – II Managing Input and Output Operations: Introduction – Reading a Character – Writing a Character – Formatted Input – Formatted Output. **Decision Making and Branching:** Introduction – Decision Making with If Statement – Simple If Statement – The If…. Else statement – Nesting of If …. Else Statements – The Else If Ladder – The Switch Statement – The ?: Operator – The Goto Statement. **Decision Making and Looping:** Introduction - The while Statement – The do Statement – The for Statement – Jumps in Loops .

Unit – III Arrays: Introduction – One-Dimensional Arrays – Declaration of One-Dimensional Arrays – Initialization of One-Dimensional Arrays – Two-Dimensional Arrays – Initializing Two-Dimensional Arrays – Multi-Dimensional Arrays – Dynamic Arrays. **Character Arrays and Strings:** Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal - Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings Together – Comparison of Two Strings – String-Handling Functions.

Unit – IV User-Defined Functions: Introduction – Need for User-Defined Functions – A Multi-Function Program – Elements of User-Defined Functions – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration - Category of Functions – No Arguments and No Return Values –Arguments and but No Return Values – Arguments with Return Values – No Arguments and but Returns a Value –Nesting of Functions – Recursion – Passing Arrays to Functions –Searching and Sorting—Passing Strings to Functions- The Scope, Visibility and Lifetime of Variables. **Structures and Unions:** Introduction - Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure Variables – Operations on Individual Members – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions.

Unit – V Pointers: Introduction – Understanding Pointers - Accessing the Address of a Variable – Declaring Pointer Variables - Initialization of Pointer Variables – Accessing a Variable through its Pointer – Chain of Pointers – Pointer Expressions – Pointer Increments and Scale Factor – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Function that Return Multiple Values-Pointers as Function Arguments – Functions Returning Pointers – Pointers to Functions – Pointers and Structures. **File Management in C:** Introduction – Defining and Opening a File - Closing a File – Input/Output Operations on Files – Error Handling during I/O Operations – Random Access to Files – Command Line Arguments.

Book for Study:

Balagurusamy. E (2019), *Programming in ANSI C*, 8th Edition, Tata McGraw Hill Education Pvt. Ltd.

Chapters:

Unit – I : 2, 3, 4

Unit – II : 5, 6, 7

Unit – III : 8, 9

Unit – IV : 10, 11

Unit – V : 12, 13

Books for Reference:

1. Brian Kernighan.W & Dennis Ritchie (2015), *C Programming Language*, Pearson Education India, 2nd Edition.

2. David Griffiths , Dawn Griffiths(2012), *Head First C: A Brain-Friendly Guide*, Shroff Publicaitons 1st Edition.

3. Herbert Schildt (2017), *C: The Complete Reference*, McGraw Hill Education, 4th Edition,.

Web Resources / E.Books:

https://www.tutorialpoint.com/Cprogramming

https://www.programiz.com/c-programming

https://www.e-booksdirectory.com/details.php?ebook=11048

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill: To make the students to know the basic concepts of programming language.

Activities to be given: students shall be practiced with different programming concepts.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the basic concepts of C language	K1 to K3
CLO2	Apply the control statements to solve the mathematical problems.	K1 to K3
CLO3	Comprehend the different types of arrays and apply the concepts in Real time applications	K1 to K4
CLO4	Understand the Concept of function that can receive variables and Structures.	K1 to K3
CLO5	Examine the concept of pointers and file management	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	2	3	2	1
CLO2	3	3	3	2	2	1
CLO3	2	3	2	2	1	2
CLO4	3	3	2	1	3	2
CLO5	3	3	1	2	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN : TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Overview of C:** History of C – Importance of C – Sample Programs – Basic Structure of C Programs – Executing a 'C' Program. **Constants, Variables and Data Types:** Introduction – Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types - Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables - Defining Symbolic Constants – Declaring a Variable as Constant - Declaring a Variable as Volatile. **Operators and Expressions:** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators	10	Chalk and Talk, PPT, quiz, on the spot test
II	**Managing Input and Output Operations:** Introduction – Reading a Character – Writing a Character – Formatted Input – Formatted Output. **Decision Making and Branching:** Introduction	10	Chalk and Talk, quiz, on the spot test

	– Decision Making with If Statement – Simple If Statement – The If…. Else statement – Nesting of If …. Else Statements – The Else If Ladder – The Switch Statement – The ?: Operator – The Goto Statement. **Decision Making and Looping:** Introduction - The while Statement – The do Statement – The for Statement – Jumps in Loops.		
III	**Arrays:** Introduction – One-Dimensional Arrays – Declaration of One-Dimensional Arrays – Initialization of One-Dimensional Arrays – Two-Dimensional Arrays – Initializing Two-Dimensional Arrays – Multi-Dimensional Arrays – Dynamic Arrays. **Character Arrays and Strings:** Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal - Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings Together – Comparison of Two Strings – String-Handling Functions.	12	Chalk and Talk, PPT, group discussion and You tube Links
IV	**User-Defined Functions:** Introduction – Need for User-Defined Functions – A Multi-Function Program – Elements of User-Defined Functions – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration - Category of Functions – No Arguments and No Return Values –Arguments and but No Return Values – Arguments with Return Values – No Arguments and but Returns a Value –Nesting of Functions – Recursion – Passing Arrays to Functions –Searching and Sorting—Passing Strings to Functions- The Scope, Visibility and Lifetime of Variables. **Structures and Unions:** Introduction - Defining a Structure – Declaring Structure	14	Chalk and Talk, PPT, quiz

	Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure Variables – Operations on Individual Members – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions.		
V	**Pointers:** Introduction – Understanding Pointers - Accessing the Address of a Variable – Declaring Pointer Variables - Initialization of Pointer Variables – Accessing a Variable through its Pointer – Chain of Pointers – Pointer Expressions – Pointer Increments and Scale Factor – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Function that Return Multiple Values-Pointers as Function Arguments – Functions Returning Pointers – Pointers to Functions – Pointers and Structures. **File Management in C:** Introduction – Defining and Opening a File - Closing a File – Input/Output Operations on Files – Error Handling during I/O Operations – Random Access to Files – Command Line Arguments.	14	Chalk and Talk, PPT, group discussion, quiz, open book test

Course Designer
Mrs.N.KAVITHA

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
I	Core	22OUCS1P	Programming in C Lab	3	5	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔		

PROGRAM LIST

OPERATORS AND EVALUATION OF EXPRESSIONS

1. Convert days into months and number of days.
2. Calculate of average N numbers.
3. Evaluate the expression: a = 5 <= 8 && 6! = 5
4. Find the roots of a Quadratic equation.

CONTROL STRUCTURES

5. Check the type of character entered.
6. Read character from keyboard and print it in reverse case.
7. Print characters and strings.
8. Relate two integers entered by user using = or > or < sign using nested if…else.
9. Find the factorial of a number using while loop.
10. Print table for the given number using do while loop.
11. Print N^{th} fibonacci number using for loop.

ARRAYS AND STRINGS

12. Evaluate a square expression and their sum.
13. Find two's complement of binary number.
14. Sort a list of numbers and to determine the median.
15. Copy a given string into another and count the number of characters copied.
16. Count the number of vowels and constants in a string.

FUNCTIONS, STRUCTURES AND UNIONS

17. Check if a string is a palindrome or not using recursion.
18. Sort an array of integers using bubble sort algorithm.
19. Storing students details using structure.

POINTERS AND FILES

20. Access the address of a variable.
21. Access a variable through its pointer.

22. Evaluation of pointer expressions.
23. Reverse N characters in a file.
24. Read and write operations on a file.
25. Errors handling in file operations.

Books for Reference:

1. Greg Perry, Dean Miller (2013), *C Programming Absolute Beginner's Guide*, Pearson Publications 3rd Edition.
2. Yashavant Kanetkar (2017), *Let Us C*, BPB Publications, 16th Edition.
3. Byron C Gottfried(2006), *Programming with C*, Schaums outline series, 2nd Edition, Tata Mc - Graw Hill.

Web Resources / E.Books:

https://www.tutorialspoint.com/cprogramming

https://www.programiz.com/c-programming

https://www.geeksforgeeks.org/c-language-set-1-introduction

Pedagogy

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (75HRS)

Cycle	Description	Hrs	Mode
1	**Operators and Evaluation of Expressions** Convert days into months and number of days. Calculate of average N numbers. Evaluate the expression: a = 5 <= 8 && 6! = 5 Find the roots of a Quadratic equation.	15	Writing and executing the program in a system
2	**Control Structures** Check the type of character entered. Read character from keyboard and print it in reverse case. Print characters and strings. Relate two integers entered by user using = or > or < sign using nested if…else. Find the factorial of a number using while loop.	15	Writing and executing the program in a system

	Print table for the given number using do while loop. Print N^{th} fibonacci number using for loop.		
3	**Arrays and Strings** Evaluate a square expression and their sum. Find two's complement of binary number. Sort a list of numbers and to determine the median. Copy a given string into another and count the number of characters copied. Count the number of vowels and constants in a string.	15	Writing and executing the program in a system
4	**Functions, Structures and Unions** Check if a string is a palindrome or not using recursion. Sort an array of integers using bubble sort algorithm. Storing students details using structure.	15	Writing and executing the program in a system
5	**Pointers and Files** Access the address of a variable. Access a variable through its pointer. Evaluation of pointer expressions. Reverse N characters in a file. Read and write operations on a file. Errors handling in file operations.	15	Writing and executing the program in a system

Course Designer

Mrs.N.KAVITHA

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Annexure – 12

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
I	Skill Enhancement Course	22OUCSSE1P	Office Automation Lab	2	2	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	

PROGRAM LIST

MS-WORD

1. Cut, Copy, Paste the text
2. Format a document
3. Create an advertisement in word
4. Mail merge

MS-EXCEL

5. Edit options
6. Using Functions
7. Arithmetic and Formula
8. Drawing Charts

MS-POWER POINT

9. Design a slide
10. Insert pictures and Word art
11. Animation on slide
12. Prepare a presentation for market a product

MS-ACCESS

13. Create an employee table
14. Data filters on table
15. Prepare a report.

Books for Reference:

1. Dr. R. Deepalakshmi (2019), *Computer Fundamentals & Office Automation*, Charulatha Publications, 2nd Edition.
2. Dr. R. K. Chopra Priyanka Gauri (2021), *Office Management*, Himalaya Publishing House, 17th Revised & Updated ,Edition.
3. Yatendra Kumar(2018), *Office Automation Tools*, Nageen Prakashan Publication, 4th Edition.

Web Resources / E.Books:

https://books.google.co.in/books/about/The_Handbook_of_Office_Automation.html?id=zh3Wi0j3msIC&redir_esc=y

https://books.google.co.in/books/about/Office_Automation.html?id=cHWuAAAAIAAJ&redir_esc=y

https://www.ebooksread.com/authors-eng/michael-d-zisman/office-automation--revolution-or-evolution-msi.shtml

Pedagogy

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (30HRS)

Cycle	Description	Hrs	Mode
1	**MS-WORD** Cut, Copy, Paste the text Format a document Create an advertisement in word Mail merge	6	Writing and executing the program in a system
2	**MS-EXCEL** Edit options Using Functions Arithmetic and Formula Drawing Charts	10	Writing and executing the program in a system
3	**MS-POWER POINT** Design a slide. Insert pictures and Word art Animation on slide. Prepare a presentation for market a product.	8	Writing and executing the program in a system

4	**MS-ACCESS** Create an employee table. Data filters on table. Prepare a report.	6	Writing and executing the program in a system

Course Designer
Mrs. V. JAYAVANI

Annexure – 12

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total :100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Annexure – 12

Department of Computer Science				Class: I UG				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
I	Inter Disciplinary Course	22OUCSID1	Computing Fundamentals	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔		

Course Objectives:

1. Understand the basics components of computer.
2. Study the usage of input devices.
3. Identify the important characteristics of storage devices.
4. Explore the components of system software and output devices.
5. Gain the knowledge of working with word processors.

Course Content:

Unit – I The System Unit : What is the System Unit? – Computer Basics – The Motherboard – Microprocessors – Math Coprocessors – The System Clock – Architecture (System Data Bus) - Random Access Memory (RAM) – Read Only Memory (ROM).

Unit – II Input Devices : What do Input Devices do? – The Keyboard – Pointing Devices – Touch-Sensitive Devices – Optical Scanning Devices – How Optical Scanning Works – Magnetic Scanning – Digital Sound Processing – Voice Recognition Devices – Specialized Input Devices.

Unit – III Secondary Storage: Types of Secondary Storage Devices – Magnetic Disk (Floppy and Hard Disk) – How Data is Stored on a Magnetic Disk – Floppy Disks – Hard Disks – Optical Disks – Magnetic Tape Cartridges.

Unit – IV Output Devices: Monitors – Printers – Plotters – Voice Output. **System Software Utilities :** What is System Software? – System Start-up – Basic Input/Output System (BIOS) – The Operating System – The User Interface – The Operating Environment – The Development of Microcomputer Operating Systems – System Utility Programs.

Unit – V Word Processors : What is a Word Processors? – Basic Functions – Advanced Features – Word Processors – Special-Purpose Utilities.

Book for Study:

Marjorie Leeson (1993), *Computing Fundamentals*, Macmillan/McGraw-Hill, Newyork.

Chapters:

Unit – I : 2

Unit – II : 3

Unit – III : 4

Unit – IV : 5, 6

Unit – V : 7

Books for Reference:

1. Alexis Leon, Mathews Leon, Leena Leon (2013), *Introduction to Information Technology*, Vijay Nicole Imprints Private Limited.
2. Amitesh Goswami (2003), *Computer Fundamentals and Programming*, 2nd Edition, Wisdom Press, New Delhi.
3. Balagurusamy.E (2009), *Fundamentals of Computer*,Tata Mc- Graw Hill Publications, New Delhi,1st Edition.

Web Resources/ E.Books:

https://nios.ac.in/media/documents/vocational/CLS/Certificate_Course_in_Library_Science_english/M4_PDF/M4L1.pdf

http://www.mcrhrdi.gov.in/93fc/material/Computer%20Fundamentals%20&%20Office%20Applications.pdf

file:///C:/Users/Pc/Desktop/computer-fundamentals-pradeep-k-sinha-priti-sinha-computer-fundamentals-e39609301.html

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill:

- Acquire the knowledge of basic components of computer.
- **A**ble to use the basic technology in Computers required for the job.

Activities to be given:

To practice the students with word processing exercises.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge (According to Bloom's Taxonomy)
CLO1	Understand the relationship among bits, bytes and words.	K1 to K3
CLO2	Identify the purpose of input devices.	K1 to K3
CLO3	Study the evolution of secondary storage.	K1 to K3
CLO4	Understand the relation among pixels, display resolution, and the sharpness of an image and identify the components of system software.	K1 to K3
CLO5	Apply the basic and advanced functions of word processors.	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	1	3	1	2	1
CLO2	2	3	3	1	2	1
CLO3	2	3	3	2	1	1
CLO4	2	1	3	2	1	1
CLO5	3	3	1	2	1	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (ARTS)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	1	2	3	2
CLO2	3	3	2	3	3	2
CLO3	3	3	1	2	2	1
CLO4	3	2	2	1	1	2
CLO5	3	3	1	2	3	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN : TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**The System Unit :** What is the System Unit? – Computer Basics – The Motherboard – Microprocessors – Math Coprocessors – The System Clock – Architecture (System Data Bus) - Random Access Memory (RAM) – Read Only Memory (ROM).	5	Chalk and Talk, PPT, group discussion and quiz.
II	**Input Devices :** What do Input Devices do? – The Keyboard – Pointing Devices – Touch-Sensitive Devices – Optical Scanning Devices – How Optical Scanning Works – Magnetic Scanning – Digital Sound Processing – Voice Recognition Devices – Specialized Input Devices.	5	Chalk and Talk, PPT, group discussion and quiz.
III	**Secondary Storage:** Types of Secondary Storage Devices – Magnetic Disk (Floppy and Hard Disk) – How Data is Stored on a Magnetic Disk – Floppy Disks – Hard Disks – Optical Disks – Magnetic Tape Cartridges.	6	Chalk and Talk, PPT, group discussion and quiz.
IV	**Output Devices:** Monitors – Printers – Plotters – Voice Output. **System Software Utilities :** What is System Software? – System Start-up – Basic Input/Output System (BIOS) – The Operating System – The User Interface – The Operating Environment – The Development of Microcomputer Operating Systems – System Utility Programs.	7	Chalk and Talk, PPT, group discussion and quiz.

V	**Word Processors :** What is a Word Processors? – Basic Functions – Advanced Features – Word Processors – Special-Purpose Utilities.	7	Chalk and Talk, PPT, group discussion and quiz.

Course Designer

Mrs.V. JAYAVANI

Annexure – 12

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
II	Core	22OUCS21	Object Oriented Programming With C++	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	

Course Objectives:

1. Understand the concepts of oops and its applications.
2. Ability to understand the basic of Functions, Overloading, Class and Objects.
3. Apply the different types of Constructors, Destructors and Overloading functions.
4. Analyze the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
5. Develop the Console I/O operations, Stream Classes and File Handling.

Course Content:

Unit- I Principles of Object-Oriented Programming : Basic concepts of Object-Oriented Programming - Benefits of OOP – Object-Oriented Languages – Application of OOP . **Beginning with C++:** What is C++? – Application of C++ – A Simple C++ Program – More C++ Statements – An Example With Class – Structure of C++ Program – Creating the Source file – Compiling and Linking. **Tokens , Expressions and Control Structures :**Introduction– Tokens – Keywords – Identifiers and Constants – Basic Data Types – User –Defined Data Types – Storage Classes - Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator–Expressions and Their Types– Special Assignment Expressions –Implicit Conversions–Operator Overloading –Operator Precedence–Control Structures.

Unit- II Functions in C++ : Introduction - The Main Function – Function Prototyping – Call by Reference – Return by Reference – Inline Functions – Default Arguments – Const Arguments – Recursion - Function Overloading – Friend and Virtual Functions – Math Library Functions. **Classes and Objects:** Introduction – C Structures Revisited–Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory

Allocation for Objects – Static Data Members – Static Member Functions - Arrays of Objects – Objects as Function Arguments – Friendly Functions– Returning Objects – Const Member Functions – Pointers to Members – Local Classes.

Unit- III Constructors and Destructors : Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructor – Dynamic Constructors – Constructing Two Dimensional Arrays – Const Objects – Destructors . **Operator Overloading and Type Conversion :** Introduction – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friend – Manipulation of Strings using Operators – Rules for Overloading Operators.

Unit- IV Inheritance : Extending Classes : Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance –Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes. **Pointers , Virtual Functions and Polymorphism :** Introduction – Pointers – Pointers to Objects – this Pointer – Polymorphism – Pointers to Derived Classes– Virtual functions – Pure Virtual Functions – Virtual Constructors and Destructors.

Unit- V Managing Console I/O Operations: Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O Operations, Formatted Console I/O Operations – Managing Output with Manipulators . **Working with Files :** Introduction – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – More about Open(): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File : Random Access – Error Handling during File Operations - Command-line Arguments.

Book for study:

Balagurusamy.E (2017), *Object Oriented Programming with C++*, 7th Edition, McGraw Hill Education (India) Private Limited , New Delhi .

Chapters :

Unit I	-	1.5 - 1.8, 2, 3
Unit II	-	4, 5
Unit III	-	6, 7.1-7.6, 7.8
Unit IV	-	8.1-8.10, 9
Unit V	-	10, 11

Books for Reference:

1. Herbert Schildt (2003), *C++:The complete Reference* , 4th Edition, TMH Publications, New Delhi.
2. Mike McGrath(2011), *C++ Programming in easy steps*, 3rd Edition, Dreamtech Press, New Delhi.
3. RadhaGanesan.P(2002) , *Programming with C++*, 1st Edition, Scitech Publications.

Web Resources / E.Books:

https://riptutorial.com/ebook/cplusplus

https://www.e-booksdirectory.com/listing.php?category=16

https://books.google.co.in/books/about/Object_Oriented_Programming_With_C++.html?id=TN9wQjjDwp0C&redir_esc=y

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill: To make the students to know the basic concepts of programming language.

Activities to be given: students shall be practiced with different programming concepts.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge (According to Bloom's Taxonomy)
CLO1	Understand the fundamentals and basic concepts of OOPs and its applications.	K1 to K3
CLO2	Acquire the knowledge of Functions, Classes and Objects.	K1 to K3
CLO3	Perform the operations using different types of Constructors, Destructors and Operator Overloading.	K1 to K4
CLO4	Implement the inheritance concepts to develop the application programs.	K1 to K3
CLO5	Develop the Console I/O operations and File Handling mechanism.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2	3	2	2	1
CLO2	2	3	3	2	2	2
CLO3	1	2	3	2	3	2
CLO4	3	3	2	2	3	2
CLO5	2	3	3	2	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN : TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Principles of Object-Oriented Programming**: Basic concepts of Object-Oriented Programming - Benefits of OOP – Object-Oriented Languages – Application of OOP . **Beginning with C++:** What is C++? – Application of C++ – A Simple C++ Program – More C++ Statements – An Example With Class – Structure of C++ Program – Creating the Source file – Compiling and Linking. **Tokens , Expressions and Control Structures :**Introduction– Tokens – Keywords – Identifiers and Constants – Basic Data Types – User –Defined Data Types – Storage Classes - Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator–Expressions and Their Types–Special Assignment Expressions – Implicit Conversions– Operator Overloading – Operator Precedence– Control Structures.	10	Chalk and Talk, PPT, quiz, on the spot test

II	**Functions in C++ :** Introduction - The Main Function – Function Prototyping – Call by Reference – Return by Reference – Inline Functions – Default Arguments – Const Arguments – Recursion - Function Overloading – Friend and Virtual Functions – Math Library Functions. **Classes and Objects:** Introduction – C Structures Revisited–Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory Allocation for Objects – Static Data Members – Static Member Functions - Arrays of Objects – Objects as Function Arguments – Friendly Functions– Returning Objects – Const Member Functions – Pointers to Members – Local Classes.	10	Chalk and Talk, quiz, on the spot test
III	**Constructors and Destructors:** Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructor – Dynamic Constructors – Constructing Two Dimensional Arrays – Const Objects – Destructors . **Operator Overloading and Type Conversion:** Introduction – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friend – Manipulation of Strings using Operators – Rules for Overloading Operators.	12	Chalk and Talk, PPT, group discussion , and You tube Links
IV	**Inheritance: Extending Classes:** Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance –Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes. **Pointers , Virtual**	14	Chalk and Talk, PPT, quiz.

	Functions and Polymorphism : Introduction – Pointers – Pointers to Objects – this Pointer – Polymorphism – Pointers to Derived Classes– Virtual functions – Pure Virtual Functions – Virtual Constructors and Destructors.		
V	**Managing Console I/O Operations:** Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O Operations, Formatted Console I/O Operations – Managing Output with Manipulators . **Working with Files :** Introduction – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – More about Open(): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File : Random Access – Error Handling during File Operations - Command-line Arguments.	14	Chalk and Talk, PPT, group discussion , quiz, open book test

Course Designer
Ms.K.SHALINI

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
II	Core	22OUCS2P	Object Oriented Programming with C++ Lab	3	5	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	

List of Programs:

1. Find the sum of individual digits of a positive integer
2. Palindrome
3. Armstrong Number
4. Adam Number
5. Perfect Number
6. Prime Number
7. Factorial Number
8. Fibonacci Series
9. Generate all the prime numbers between 1 and n.
10. Find the factorial and Fibonacci number using recursive.
11. Swap the numbers and characters using functions.
12. Find both the largest and smallest number in a list of integers
13. Sort a list of numbers in ascending order.
14. Overload the + operator and relational operators to perform the concatenation and comparison of two strings.
15. Count the lines, words and characters in a given text.
16. Single Inheritance
17. Multiple Inheritances
18. Multilevel Inheritance
19. Hierarchical Inheritance
20. Virtual Function
21. String Manipulations
22. Exception Handling
23. Copies one file to another.
24. Change a specific character in a file.

25. List and print all files and folders in current directory.

Books for Reference:

1. Ravichandran.D(2002), *Programming with C++* , 2nd Edition, TMH Publications, New Delhi.
2. Robert Laffore (2002), Object *Oriented Programming using C++*, 4th Edition, Sams Publishing.
3. Bjarne Stroustrup (2013), *The C++ Programming language*, Addison-Wesley.

Web Resources / E.Books:

https://freecomputerbooks.com/langCppBooks.html

https://www.e-booksdirectory.com/details.php?ebook=11687

https://www.e-booksdirectory.com/details.php?ebook=11434

Pedagogy

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

LESSON PLAN FOR PRACTICAL : TOTAL HOURS (75HRS)

Cycle	Description	Hrs	Mode
1	Find the sum of individual digits of a positive integer. Palindrome. Armstrong Number. Adam Number. Perfect Number.	15	Writing and executing the program in a system
2	Prime Number. Factorial Number. Fibonacci Series. Generate all the prime numbers between 1 and n. Find the factorial and Fibonacci number using recursive	15	Writing and executing the program in a system
3	Swap the numbers and characters using functions.	15	Writing and executing the program in a system

	Find both the largest and smallest number in a list of integers Sort a list of numbers in ascending order. Overload the + operator and relational operators to perform the concatenation and comparison of two strings. Count the lines, words and characters in a given text		
4	. Single Inheritance Multiple Inheritances Multilevel Inheritance Hierarchical Inheritance Virtual Function	15	Writing and executing the program in a system
5	String Manipulations Exception Handling Copies one file to another. Change a specific character in a file. List and print all files and folders in current directory.	15	Writing and executing the program in a system

Course Designer
Ms. K. SHALINI

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
II	Skill Enhancement Course	22OUCSSE2	Image Editing and Animation Tools	2	2	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	✔

List of Programs

1. 2D to 3D Conversion in Blender
2. Introduction to Unity 3D
3. Modeling
4. Rolling Dice Animation
5. Extrude in Blender
6. Brick Wall Texture
7. Object Modeling
8. Rigging and Scripting
9. Face Builder
10. Animation in Nodes
11. 3D Animations
12. Dynamic Paint
13. Animate Text in Blender
14. Data-Blocks
15. 3D Eye Ball

Books for Reference:

1. John M.Blain (2022), *The Complete Guide to Blender Graphics: Computer Modeling & Animation*, 7th Edition.
2. Steve Roberts(2017), *Character Animation in 3D: Use traditional drawing techniques to produce stunning CGI animation*, Pearl Publications.
3. Gorden Fisher Blender 3D Basics(2015), *A quick and easy-to-use guide to create 3D modelin*g, 2nd Edition, Apress Publications.

Web Resources / E.Books:

https://www.blend4web.com

https://techbeacon.com

https://developer.chrome.com

Pedagogy

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (30HRS)

Cycle	Description	Hrs	Mode
1	2D to 3D Conversion in Blender. Introduction to Unity 3D. Modeling. Rolling Dice Animation. Extrude in Blender.	10	Writing and executing the program in a system
2	Brick Wall Texture. Object Modeling. Rigging and Scripting. Face Builder. Animation in Nodes.	10	Writing and executing the program in a system
3	3D Animations. Dynamic Paint. Animate Text in Blender. Data-Blocks. 3D Eye Ball.	10	Writing and executing the program in a system

Course Designer
Mrs. P. RUBY STELLA MARY

Annexure – 12

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Department of Computer Science				Class: I B.Sc.,				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**SE**	**Total**
II	Inter Disciplinary Course	22OUCSID2	Internet Technology and Web Design	2	2	25	75	100

Course Objectives:

1. Insight the students knowledge with basics of Internet Knowledge.
2. Equip the students to access the usage of Internet.
3. Gain the knowledge of working with, sending and receiving mails.
4. Make the students to recognize for accessing the usage of online purchase.
5. Take up self employment in the all Computer applied fields.

Course Content:

Unit I

Introduction to Internet: Introduction to Internet – History of Internet - How Internet Works? – HTML(Hypertext Markup Languages) – Internet Services and Governance.

Unit – II

Internet Technology and Protocols: Understanding Protocols – TCP/IP Protocols- Introduction to Networking- Types of Networking –Local Area Network- Wide Area Networks or WAN -Types of Wide Area Networks.

Unit III

World Wide Web: Introduction to World Wide Web- Evolution of World Wide Web – Web Browsers - Popular Web Browsers – Web Servers –Hypertext Transfer Protocol(HTTP) – Search Engine Categories.

Unit IV

Browsers: What is a Browser? – Basic Features of Web Browsers – Working of Internet Explorer –Toolbar Buttons – Working on the Web using the Browsers.

Unit V

Working with e-mail: e-mail –opening of e-mail account – Parts of e-mail text – Working with Messages – Reading a Message – Replying to a Message – Forwarding a Message – Deleting a Message – E-mail Clients.

Book for Study:

Ramesh Bangia (2005), *Internet Technology and Web Design*, Firewall Media, 2nd Edition.

Chapters:

Unit I	-	1
Unit II	-	2
Unit III	-	3
Unit IV	-	4
Unit V	-	5

Books for Reference:

1. Akilandeswari J, Gopolan N P(2008), *Web Technology*, 2nd Edition, Pearson Hall of India, New Delhi.
2. Glee Harrah Cady Pat McGregor, Mastering (1996), *The Internet*, 1st Edtion, BPB Publications, New Delhi.
3. Harley Hahn (2008), *The Internet Complete Reference*, 2nd Edition, Tata MC-Graw Hill, New Delhi.

Web Resources/ E.Books:

https://link.springer.com/book/10.1007/978-3-642-05019-0

https://www.routledge.com/Internet-Applications-of-Type-II-Uses-of-Technology-in-Education/Maddux-Johnson/p/book/9780789024954

https://www.oreilly.com/library/view/developing-large-web/9781449380090/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill:

- Can easily connect and share information with them using Network tools.

Activities to be given:

- To apply the knowledge of online transactions to create a web design.
- To practice the use of Internet, Search Engines and Web Browsing software.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy)
CLO1	Understand the basic concepts of Internet.	K1 to K3
CLO2	Identify the working principles of Internet.	K1 to K3
CLO3	Examine the role of Search Engines	K1 to K3
CLO4	Understand the features of Web browser.	K1 to K3
CLO5	Apply the knowledge of Internet access.	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	1	2	1	2	3	2
CLO2	1	2	1	2	3	3
CLO3	1	2	3	3	2	3
CLO4	2	2	2	2	3	2
CLO5	2	2	3	2	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (ARTS)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	1	3	1	2	3	2
CLO2	2	3	2	3	3	2
CLO3	2	3	1	2	2	1
CLO4	2	2	2	1	1	2
CLO5	3	3	1	2	3	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Introduction to Internet:** Introduction to Internet –History of Internet- How Internet Works?– HTML(Hypertext Markup Languages) – Internet Services and Governance.	**6**	**Chalk and Talk, PPT, group discussion.**
II	**Internet Technology and Protocols:** Understanding Protocols – TCP/IP Protocols- Introduction to Networking- Types of Networking –Local Area Network- Wide Area Networks or WAN -Types of Wide Area Networks.	**6**	**Chalk and Talk, PPT, group discussion.**
III	**World Wide Web:** Introduction to World Wide Web- Evolution of World Wide Web – Web Browsers - Popular Web Browsers – Web Servers – Hypertext Transfer Protocol(HTTP) – Search Engine Categories.	**6**	**Chalk and Talk, PPT, group discussion.**
IV	**Browsers:** What is a Browser? – Basic Features of Web Browsers – Working of Internet Explorer –Toolbar Buttons – working on the Web using the Browsers.	**6**	**Chalk and Talk, PPT, group discussion.**

V	**Working with e-mail:** e-mail –opening of e-mail account – Parts of e-mail text –Working with Messages – Reading a Message – Replaying to a Message – Forwarding a Message – Deleting a Message – E-mail Clients.	**6**	**Chalk and Talk, PPT, group discussion.**

Course Designer
Mrs. P. RUBY STELLA MARY