

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



TANSCHÉ - CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - S

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.
 (An Autonomous Institution – Affiliated to Madurai Kamaraj University)
 (Re –accredited (3rd cycle) with Grade A⁺ and CGPA 3.51 by NAAC)
TANSCHÉ - CBCS with OBE

DEPARTMENT OF COMPUTER SCIENCE – UG
 (w.e.f. 2023– 2024 Batch onwards)

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 | After completion of B.Sc Computer Science the students will be able to | PO Addressed |
|-------|---|--------------|
| PSO-1 | Knowledge & Proficiency Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics. | PO1 |
| PSO-2 | Problem analysis and Problem Solving 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. | PO2 |
| PSO-3 | Modern tool usage Equip with Computer science technical ability, problem solving skills, creative talent and power of communication necessary for various forms of employment. | PO4 |
| PSO-4 | Social responsibility Develop a range of generic skills helpful in employment, internships & societal activities. | PO6 |

| | | |
|-------|---|-----|
| PSO-5 | Lifelong learning 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. | PO5 |
|-------|---|-----|

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

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 Upto K4 levels)** Assessment through K1, K2, K3 & K4

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(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

(Re –accredited (3rd cycle) with Grade A⁺ and CGPA 3.51 by NAAC)**TANSICHE - CBCS with OBE**

(w.e.f. 2023– 2024 Batch onwards)

(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 two tests) (Conducted for 100 marks and converted into 10 marks) | 10 |
| Assignment | 5 |
| Seminar | 5 |
| Quiz/ Documentation/Case lets/ ICT based Assignment/ Mini Project | 5 |
| Total | 25 |

- ✓ **Centralized system** of Internal Assessment Tests.
- ✓ There will be **Two Internal Assessment** Tests.
- ✓ Duration of Internal assessment test will be **2 hours for Test I and II.**
- ✓ 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 and II

| Multiple choice for Section | Marks |
|--|-----------|
| A-Multiple Choice Question(7 x 1 mark) | 7 |
| B-Short Answer(4 x 2 marks) | 8 |
| C-Either Or Type(3/6 x 5 marks) | 15 |
| D-Open Choice Type (2/3 x 10 marks) | 20 |
| Total | 50 |

Conducted for 100 marks and converted into 10 marks

Question Paper Pattern for Summative Examination

| Section | Marks |
|---|-----------|
| A-Multiple choice Questions without Choice(10 x 1 mark) | 10 |
| B-Short Answer without choice(5 x 2 marks) | 10 |
| C-Either Or type(5/10 x 5marks) | 25 |
| D-Open Choice type (3/5 x 10 marks) | 30 |
| Total | 75 |

In respect of Summative Examinations passing minimum is **36% for UG.**
 Latest amendments and revision as per **UGC** and **TANSICHE** 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) | (Open choice) | |
| | | | No. of Questions | K- Level | No. of Questions | K- Level | | | |
| 1 | CLO 1 | Upto K3 | 3 | (K1/K2) | 3 | (K1/K2) | 2(K2) / 2 (K3)/ 2 (K4) (Each set of questions must be in the same level) | 2 (K3) & 1 (K4) | |
| 2 | CLO 2 | Upto K3 | 2 | (K1/K2) | | | | | |
| 3 | CLO 3 | Upto K4 | 2 | (K1/K2) | 1 | (K1/K2) | | | |
| No. of Questions to be asked | | | 7 | | 4 | | 6 | 3 | 20 |
| No. of Questions to be answered | | | 7 | | 4 | | 3 | 2 | 16 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 | - |
| Total Marks for each section | | | 7 | | 8 | | 15 | 20 | 50 |

BLUE PRINT FOR INTERNAL ASSESSMENT – II
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 | CLO 3 | Upto K4 | 2 | (K1/ K2) | 1 | (K1/ K2) | 2 (K2) / 2 (K3)/ 2 (K4) (Each set of questions must be in the same level) | 2 (K3) & 1 (K4) | |
| 2 | CLO 4 | Upto K3 | 2 | (K1/ K2) | 3 | (K1/ K2) | | | |
| 3 | CLO 5 | Upto K4 | 3 | (K1/ K2) | | | | | |
| No. of Questions to be asked | | | 7 | | 4 | | 6 | 3 | 20 |
| No. of Questions to be answered | | | 7 | | 4 | | 3 | 2 | 16 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 | - |
| Total Marks for each section | | | 7 | | 8 | | 15 | 20 | 50 |

Distribution of Marks with K-Levels CIA I and CIA II

| 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 & II | K1 | 4 | 4 | - | - | 8 | 10 |
| | K2 | 3 | 4 | 10 | - | 17 | 23 |
| | K3 | - | - | 10 | 20 | 30 | 40 |
| | K4 | - | - | 10 | 10 | 20 | 27 |
| | Marks | 7 | 8 | 30 | 30 | 75 | 100 |

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 |

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.

EVALUATION (THEORY)**(PART IV - SEC / DSEC)**

| | |
|-----------------------------|------------|
| Internal (Formative) | : 25 marks |
| External (Summative) | : 75 marks |
| Total | :100 marks |

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

| Components | Marks |
|---|-----------|
| Test (Average of two Tests) (Conducted for 60 marks and converted into 20 marks) | 20 |
| Assignment/ Seminar/ Quiz/Documentation (from Unit 5) | 5 |
| Total | 25 |

- ✓ There will be Two Internal Assessment Test
- ✓ Duration of Internal assessment test will be 1 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 I & II

| Section | Marks |
|--------------------------------------|-----------|
| A-Multiple Choice Question(4x1 mark) | 4 |
| B-Short Answer(3x2marks) | 6 |
| C-Either Or type(2/4 x5marks) | 10 |
| D-Open choice type(1/2 x10marks) | 10 |
| Total | 30 |

Conducted for 60marks and converted into 20 marks

Question Paper Pattern for External Examination

| Section | Marks |
|---------------------------------------|-----------|
| A-Multiple Choice Question(10x1 mark) | 10 |
| B-Short Answer(5x2marks) | 10 |
| C-Either Or type(5/5 x 5marks) | 25 |
| D-Open choice type(3/5 x 10marks) | 30 |
| Total | 75 |

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) | (Open choice) | |
| | | | No. of Questions | K- Level | No. of Questi ons | K- Level | | | |
| 1 | CLO 1 | Upto K3 | 2 | K1 | 3 | K1 | 1(K2) / 1(K3) (Each set of questions must be in the same level) | 1 (K2) & 1(K3) | |
| 2 | CLO 2 | Upto K3 | 2 | | | | | | |
| No. of Questions to be asked | | | 4 | | 3 | | 4 | 2 | 13 |
| No. of Questions to be answered | | | 4 | | 3 | | 2 | 1 | 10 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 | - |
| Total Marks for each section | | | 4 | | 6 | | 10 | 10 | 30 |

BLUE PRINT FOR INTERNAL ASSESSMENT - II
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 Questi ons | K- Level | | | |
| 1 | CLO 3 | Upto K3 | 2 | K1 | 3 | K1 | 1 (K2) / 1(K3) (Each set of questions must be in the same level) | 1 (K2) & 1(K3) | |
| 2 | CLO 4 | Upto K3 | 2 | | | | | | |
| No. of Questions to be asked | | | 4 | | 3 | | 4 | 2 | 13 |
| No. of Questions to be answered | | | 4 | | 3 | | 2 | 1 | 10 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 | - |
| Total Marks for each section | | | 4 | | 6 | | 10 | 10 | 30 |

Distribution of Marks with K Levels CIA I & II

| CIA | K Levels | Section A MCQ | Section B (Short Answers) | Section C (Either/ Or Type) | Section D (Open Choice) | Total Marks | % of Marks |
|---------------------------|--------------|------------------|---------------------------------|-----------------------------------|-------------------------------|----------------|---------------|
| I & II | K1 | 4 | 6 | - | - | 10 | 20 |
| | K2 | - | - | 10 | 10 | 20 | 40 |
| | K3 | - | - | 10 | 10 | 20 | 40 |
| | Marks | 4 | 6 | 20 | 20 | 50 | 100 |

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 | | Short Answers | | | | |
| | | | No. of Questions | K- Level | No. of Questions | K- Level | | | |
| 1 | CLO 1 | Up to K3 | 2 | K1 | 1 | K1 | 6 (K2) & 4 (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 Type) | 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 |

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(w.e.f. 2023 – 2024 Batch onwards)

| Semester | Part | Course Code | Course Title | Teaching hrs (per week)) | Duration of Exam (hrs.) | Marks Allotted | | | Credits |
|----------|------|-------------|---|-----------------------------|----------------------------|----------------|----|-------|-----------|
| | | | | | | CIA | SE | Total | |
| I | I | 23OU1TA1 | Tamil | 6 | 3 | 25 | 75 | 100 | 3 |
| | II | 23OU2EN1 | General English - I | 6 | 3 | 25 | 75 | 100 | 3 |
| | III | 23OUCS11 | Core Course 1: Programming in C | 5 | 3 | 25 | 75 | 100 | 5 |
| | | 23OUCS1P | Core Course 2: Programming in C Lab | 5 | 3 | 40 | 60 | 100 | 5 |
| | | 23OUCSGEMA1 | GEC 1: Mathematics – I Numerical Methods | 4 | 3 | 25 | 75 | 100 | 3 |
| | IV | 23OUCSSECN1 | SEC 1 (NME): Fundamentals of Information Technology | 2 | 3 | 25 | 75 | 100 | 2 |
| | | 23OUCSFC1 | FC: Problem Solving Techniques | 2 | 3 | 25 | 75 | 100 | 2 |
| II | I | 23OU1TA2 | Tamil | 6 | 3 | 25 | 75 | 100 | 3 |
| | II | 23OU2EN2 | General English - II | 6 | 3 | 25 | 75 | 100 | 3 |
| | III | 23OUCS21 | Core Course 3: Data Structures and Algorithms | 5 | 3 | 25 | 75 | 100 | 5 |
| | | 23OUCS2P | Core Course 4: Data Structures and Algorithms Lab (C++) | 5 | 3 | 40 | 60 | 100 | 5 |
| | | 23OUCSGEMA2 | GEC 2: Mathematics – II Discrete Mathematics | 4 | 3 | 25 | 75 | 100 | 3 |
| | IV | 23OUCSSECN2 | SEC 2 (NME): Office Automation | 2 | 3 | 25 | 75 | 100 | 2 |
| | | 23OUCSSEC3P | SEC 3: Advanced Excel Lab | 2 | 3 | 40 | 60 | 100 | 2 |
| | | | Total | | | | | | 46 |

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|----------|-------------|------------------|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| I | Core | 23OUCS11 | Programming in C | 5 | 5 | 25 | 75 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship oriented |
| ✓ | | |

Course Objectives:

1. To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
2. To understand the concept using if statements and loops.
3. This unit covers the concept of Arrays and Functions.
4. This unit covers the concept of Structures and unions and Preprocessors.
5. To understand the concept of implementing pointers.

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*, Tata McGraw Hill Education Pvt. Ltd, 8th Edition.

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:

1. <https://www.tutorialpoint.com/Cprogramming>
2. <https://www.programiz.com/c-programming>
3. <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 | 3 | 3 | 3 | 3 | 3 | 3 |
| CLO2 | 3 | 3 | 3 | 2 | 3 | 3 |
| CLO3 | 2 | 3 | 2 | 3 | 3 | 2 |
| CLO4 | 3 | 3 | 3 | 3 | 3 | 3 |
| CLO5 | 3 | 3 | 3 | 3 | 3 | 2 |

1-Basic Level

2- Intermediate Level

3- Advanced Level

LESSON PLAN: TOTAL HOURS (75 HRS)

| 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 | 15 | 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 – 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. | 15 | Chalk and Talk, quiz, on the spot test |
| 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 – | 15 | Chalk and Talk, PPT, group discussion and |

| | | | |
|----|---|----|--|
| | 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. | | 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 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. | 15 | Chalk and Talk, PPT, quiz |
| 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. | 15 | 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 | Contact Hours/ Week | CIA | SE | Total |
| I | Core | 23OUCS1P | Programming in C Lab | 5 | 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: $a = 5 \leq 8 \ \&\& \ 6! = 5$
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 Nth 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 student's 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:

1. <https://www.tutorialspoint.com/cprogramming>
2. <https://www.programiz.com/c-programming>
3. <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 (75 HRS)

| 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: $a = 5 \leq 8 \ \&\& \ 6! = 5$ 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. | 15 | Writing and executing the program in a system |

| | | | |
|---|--|----|---|
| | Find the factorial of a number using while loop. 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

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|--|-------------|--|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| I | Skill Enhancement Course (SEC 1) (NME) | 23OUCSSECN1 | Fundamentals of Information Technology | 2 | 2 | 25 | 75 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship Oriented |
| ✓ | | |

Course Objectives:

1. Understand basic concepts and terminology of information technology.
2. Have a basic understanding of personal computers and their operation
3. Be able to identify data storage and its usage
4. Get great knowledge of software and its functionalities
5. Understand about operating system and their uses\

Course Content:

Unit – I Introduction to Computers: Introduction, Definition, Characteristics of computer, Evolution of Computer, Block Diagram of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer.

Unit – II Basic Computer Organization: Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.

Unit – III Storage Fundamentals: Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

Unit – IV Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w.

Unit – V Operating System: Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi-Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

Book for Study:

Alexis Leon, Mathews Leon, “*Fundamental of Information Technology*”, 2nd Edition.

Chapters:

| | |
|-------------------|-------------------------------------|
| Unit – I | : 1 |
| Unit – II | : 8, 9 |
| Unit – III | : 6 |
| Unit – IV | : 12.1 to 12.4, 13.1 to 13.3 |
| Unit – V | : 11.1 to 11.6 |

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:

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>

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.
- Able 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 | Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it. | K1 to K3 |
| CLO2 | Develop organizational structure using for the devices present currently under input or output unit. | K1 to K3 |
| CLO3 | Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis. | K1 to K3 |
| CLO4 | Work with different software, Write program in the software and applications of software. | K1 to K3 |
| CLO5 | Usage of Operating system in information technology which really acts as an interpreter between software and hardware. | 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 (30 HRS)

| UNIT | DESCRIPTION | HRS | MODE |
|------|---|-----|---|
| I | Introduction to Computers: Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer. | 6 | Chalk and Talk, PPT, group discussion and quiz. |
| II | Basic Computer Organization: Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers. | 6 | Chalk and Talk, PPT, group discussion and quiz. |
| III | Storage Fundamentals: Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives. | 6 | Chalk and Talk, PPT, group discussion and quiz. |
| IV | Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w. | 6 | Chalk and Talk, PPT, group discussion and quiz. |
| V | Operating System: Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi-Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux. | 6 | Chalk and Talk, PPT, group discussion and quiz. |

Course Designer**Mrs. R. CHINTHAMANI**

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|-------------------|-------------|----------------------------|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| I | Foundation Course | 23OUCSFC1 | Problem Solving Techniques | 2 | 2 | 25 | 75 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship Oriented |
| ✓ | | |

Course Objectives:

1. Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
2. Implement different programming constructs and decomposition of problems into functions.
3. Use data flow diagram, Pseudo code to implement solutions.
4. Define and use of arrays with simple applications.
5. Understand about operating system and their uses

Course Content:

Unit – I Introduction: History, characteristics and limitations of Computer.

Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. **Types of Computers:** PC, Workstation, Minicomputer, Main frame and Supercomputer. **Software:** System software and Application software. **Programming Languages:** Machine language, Assembly language, High- level language, 4 GL and 5GL- Features of good programming language. **Translators:** Interpreters and Compilers.

Unit – II Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). **Structured Programming: Algorithm:** Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. **Pseudocode:** Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.

Unit – III Selection Structures: Relational and Logical Operators - Selecting from Several Alternatives – Applications of Selection Structures. **Repetition Structures:** Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.

Unit – IV Data: Numeric Data and Character Based Data. **Arrays:** One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.

Unit – V Data Flow Diagrams: Definition, DFD symbols and types of DFDs. **Program Modules:** Subprograms-Value and Reference parameters- Scope of a variable - Functions – Recursion. **Files:** File Basics-Creating and reading a sequential file- Modifying Sequential Files.

Book for Study:

Stewart Venit (2010), “*Introduction to Programming: Concepts and Design*”, Fourth Edition, Dream Tech Publishers.

Chapters:

| | |
|-------------------|---------------------------|
| Unit – I | : 1.1 to 1.3 |
| Unit – II | : 1.4, 1.5. 2.1 to 2.4 |
| Unit – III | : 3.2 to 3.4, 4.2 to 4.4 |
| Unit – IV | : 5.1, 5.2, 6.1, 6.3, 6.4 |
| Unit – V | : 5.3, 5.4, 7.1 to 7.4 |

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. YatendraKumar(2018), *Office Automation Tools*, NageenPrakashan Publication, 4th Edition.

Web Resources / E.Books:

1. <https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm>
2. <http://www.nptel.iitm.ac.in/video.php?subjectId=106102067>
3. http://utubersity.com/?page_id=876

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 internal and external organization of computer.

Activities to be given: students shall be practiced to exploring basic concepts of computer architecture and organization.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (30 HRS)

| Cycle | Description | Hrs | Mode |
|-------|--|-----|---|
| 1 | Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language, 4GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers. | 6 | Chalk and Talk, PPT, quiz, on the spot test |
| 2 | Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). Structured programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming. | 6 | Chalk and Talk, PPT, quiz, on the spot test |
| 3 | Selection Structures: Relational and Logical Operators - Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures. | 6 | Chalk and Talk, PPT, quiz, on the spot test |
| 4 | Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters. | 6 | Chalk and Talk, PPT, quiz, on the spot test |
| 5 | Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms- Value and Reference parameters- Scope of a variable - Functions – | 6 | Chalk and Talk, PPT, quiz, on the spot test |

| | | | |
|--|---|--|--|
| | Recursion. Files: File Basics- Creating and reading a sequential file- Modifying Sequential Files. | | |
|--|---|--|--|

Course Designer
Mrs. V. JAYAVANI

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|----------|-------------|--------------------------------|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| II | Core | 23OUCS21 | Data Structures and Algorithms | 5 | 5 | 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 Abstract Data Types (ADTs) - List ADT - array-based implementation - linked list implementation singly linked lists - circular linked lists - doubly- linked lists - applications of lists - Polynomial Manipulation - All operations – Insertion – Deletion – Merge - Traversal.

Unit- II Stack ADT – Operations – Applications - Evaluating arithmetic expressions - Conversion of infix to postfix expression - Queue ADT – Operations - Circular Queue - Priority Queue - dequeuer applications of queues.

Unit- III TreeADT - tree traversals - Binary Tree ADT - expression trees - applications of trees - binary search tree ADT - Threaded Binary Trees - AVL Trees - B-Tree - B+ Tree – Heap - Applications of heap.

Unit- IV Definition - Representation of Graph - Types of graph - Breadth first traversal – Depth first traversal - Topological sort - Bi-connectivity – Cut vertex - Euler circuits -Applications of graphs.

Unit- V Searching- Linear search - Binary search – Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort - Radix sort – Hashing - Hash functions - Separate chaining - Open Addressing - Rehashing Extendible Hashing.

Books for study:

1. Mark Allen Weiss(2014), “Data Structures and Algorithm Analysis in C++”, Pearson Education , 4th Edition.

Chapters :

- Unit I** - 3.1, 3.2
- Unit II** - 3.6, 3.6.3, 3.7
- Unit III** - 4.4, 4.7
- Unit IV** - 9.1, 9.1.1, 9.2, 9.6.2, 9.6.3
- Unit V** - 7.2, 7.4, 5.2, 5.3

2. ReemaThareja(2014), “Data Structures Using C”, Oxford Universities Press , 2nd Edition

Chapters :

- Unit I** - 6.2, 6.3, 6.4, 6.8
- Unit II** - 7.7.3, 8.4.1, 8.4.3
- Unit III** - 10.3, 11.3, 12.5
- Unit IV** - 13.6.1, 13.6.2, 13.9
- Unit V** - 14.1 – 14.3, 14.6, 14.7, 14.9, 14.12, 15.1

Books for Reference:

1. Thomas H.Cormen,Chales E.Leiserson, Ronald L.Rivest, Clifford Stein(2009), “Introduction to Algorithms”, McGraw Hill , 3rd Edition.
2. Aho, Hopcroft and Ullman(2003), “Data Structures and Algorithms”, Pearson Education.
3. Subramanyam P.S. (2013), *C and C++ Programming concepts and Data Structures*,BS Publications.

Web Resources / E.Books:

1. <https://www.programiz.com/dsa>
2. <https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/>
3. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

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 data structure.

Activities to be given: students shall be practiced to the different data structures that are used to organize data in the computer.

Course learning Outcomes (CLO's):

| CLO | Course Outcomes Statement | Knowledge (According to Bloom's Taxonomy) |
|------|---|---|
| CLO1 | Understand the concept of Dynamic memory management, data types, algorithms, Big O notation. | K1 to K3 |
| CLO2 | Understand basic data structures such as arrays, linked lists, stacks and queues. | K1 to K3 |
| CLO3 | Describe the hash function and concepts of collision and its resolution methods. | K1 to K4 |
| CLO4 | Solve problem involving graphs, trees and heaps. | K1 to K3 |
| CLO5 | Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data. | K1 to K4 |

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

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

1-Basic Level**2- Intermediate Level****3- Advanced Level****LESSON PLAN : TOTAL HOURS (75 HRS)**

| UNIT | DESCRIPTION | HRS | MODE |
|------|---|-----|---|
| I | Abstract Data Types (ADTs)- List ADT-array-based implementation- linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations - Insertion- Deletion-Merge-Traversal | 15 | Chalk and Talk, PPT, quiz, on the spot test |
| II | Stack ADT-Operations- Applications- Evaluating arithmetic expressions- Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- dequeuer applications of queues. | 15 | Chalk and Talk, quiz, on the spot test |
| III | Tree ADT-tree traversals-Binary Tree ADT-expression trees- applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree | 15 | |

| | | | |
|----|--|----|---|
| | – Heap-Applications of heap. | | Chalk and Talk, PPT, group discussion, and You tube Links |
| IV | Definition- Representation of Graph- Types of graph- Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cutvertex- Euler circuits-Applications of graphs. | 15 | Chalk and Talk, PPT, quiz. |
| V | Searching- Linear Search-Binary Search-Sorting-Bubble Sort-SelectionSort - Insertion Sort-Shell Sort – Radix Sort - Hashing - Hash functions - Separate chaining- Open Addressing - Rehashing Extendible Hashing | 15 | 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 | Contact Hours/ Week | CIA | SE | Total |
| II | Core | 23OUCS2P | Data Structures and Algorithms Lab (C++) | 5 | 5 | 40 | 60 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship Oriented |
| ✓ | ✓ | |

PROGRAM LIST**STACKS AND QUEUES**

1. Implementation of Stacks
2. Implementation of postfix, prefix and Infix.
3. Implementation of Queues

LINKED LISTS

4. Single Linked Lists
5. Doubly Linked Lists
6. Circular Linked Lists

TREES AND GRAPHS

7. Binary tree traversals.
8. Binary Search Tree
9. Insertion into an AVL-tree
10. Deletion from an AVL-tree
11. Representation of Graph
12. DFS traversal technique
13. BFS traversal technique

SORTING AND SEARCHING

14. Linear Search
15. Binary Search
16. Insertion Sort
17. Merge Sort
18. Selection Sort

19. Bubble sort

20. Radix sort.

Books for Reference:

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 (2008), Data Structures using C, TataMcGrawHill.
3. G. Brassard and P. Bratley (1997), “Fundamentals of Algorithms”, PHI, New Delhi.

Web Resources / E.Books:

1. <https://www.programiz.com/dsa>
2. <https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/>
3. <https://www.studocu.com/in/document/amity-university/c-programming-lab/lab-exercises-data-structures-using-c/23508929>

Pedagogy

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

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (75 HRS)

| Cycle | Description | Hrs | Mode |
|-------|--|-----|---|
| 1 | STACKS AND QUEUES Implementation of Stacks Implementation of postfix , prefix and Infix Implementation of Queues | 15 | Writing and executing the program in a system |
| 2 | LINKED LISTS Single Linked Lists Doubly Linked Lists Circular Linked Lists | 20 | Writing and executing the program in a system |
| 3 | TREES AND GRAPHS Binary tree traversals. Binary Search Tree Insertion into an AVL-tree Deletion from an AVL-tree Representation of Graph DFS traversal technique BFS traversal technique | 20 | Writing and executing the program in a system |

| | | | |
|---|--|----|---|
| 4 | SORTING AND SEARCHING Linear Search Binary Search Insertion Sort Merge Sort Selection Sort Bubble sort Radix sort. | 20 | Writing and executing the program in a system |
|---|--|----|---|

Course Designer

Ms. K. SHALINI

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|--|-------------|-------------------|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| II | Skill Enhancement Course (SEC 2) (NME) | 23OUCSSECN2 | Office Automation | 2 | 2 | 25 | 75 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship Oriented |
| ✓ | ✓ | ✓ |

Course Objectives:

1. Understand the basics of computer systems and its components.
2. Understand and apply the basic concepts of a word processing package.
3. Understand and apply the basic concepts of electronic spreadsheet software.
4. Understand and apply the basic concepts of database management system.
5. Understand and create a presentation using PowerPoint tool.

Course Content:

Unit – I Introductory concepts: Memory unit – CPU. **Input Devices:** Key board, Mouse and Scanner. **Output devices:** Monitor, Printer. **Introduction to Operating systems & its features:** DOS–UNIX–Windows. Introduction to Programming Languages.

Unit – II Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.

Unit – III Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts– creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

Unit – IV Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access).

Unit – V Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.

Book for Study:

Vikas Gupta, (2006),” *Comdex Computer Course Kit*”, Dream tech Press, New Delhi First Edition.

Chapters:

Unit – I : i - (1)

Unit – II : ii - (1 – 7)

Unit – III : iii – (1 – 3)

Unit – IV : iv- (1 - 3)

Unit – V : v (1)

Books for Reference:

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGrawHill.
2. Dinesh Maidasani(2007), MS Office 2000, Laxmi Publications Pvt Ltd, New Delhi, 2nd Edition.
3. Sanjay Saxena (2008), MS Office XP for everyone, Vikas Publishing House Pvt. Ltd, 1st Edition, New Delhi.

Web Resources/ E.Books:

1. <https://www.udemy.com/course/office-automation-certificate-course/>
2. <https://www.javatpoint.com/automation-tools>
3. <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.

Rationale for nature of Course:**Knowledge and Skill:**

- Acquire the knowledge of basic components of computer.
- Able 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 | Possess the knowledge on the basics of computers and its components. | K1 to K3 |
| CLO2 | Gain knowledge on Creating Documents, spreadsheet and presentation. | K1 to K3 |
| CLO3 | Learn the concepts of Database and implement the Query in Database. | K1 to K3 |
| CLO4 | Demonstrate the understanding of different automation tools. | K1 to K3 |
| CLO5 | Utilize the automation tools for documentation, calculation and presentation purpose. | 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 (30 HRS)

| UNIT | DESCRIPTION | HRS | MODE |
|------|--|-----|---|
| I | Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX– Windows. Introduction to Programming Languages. | 5 | Chalk and Talk, PPT, group discussion and quiz. |
| II | Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge. | 5 | Chalk and Talk, PPT, group discussion and quiz. |
| III | Spreadsheets: Excel–opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts– creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics. | 6 | Chalk and Talk, PPT, group discussion and quiz. |
| IV | Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access). | 7 | Chalk and Talk, PPT, group discussion and quiz. |
| V | Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers. | 7 | Chalk and Talk, PPT, group discussion and quiz. |

Course Designer

Mrs. P. RUBY STELLA MARY

| Department of Computer Science | | | | Class: I B.Sc., | | | | |
|--------------------------------|----------------------------------|-------------|--------------------|-----------------|---------------------|-----|----|-------|
| Sem | Category | Course Code | Course Title | Credits | Contact Hours/ Week | CIA | SE | Total |
| II | Skill Enhancement Course (SEC 3) | 23OUCSSEC3P | Advanced Excel Lab | 2 | 2 | 40 | 60 | 100 |

| Nature of the Course | | |
|------------------------------|------------------------|---------------------------|
| Knowledge and Skill Oriented | Employability Oriented | Entrepreneurship Oriented |
| ✓ | ✓ | |

PROGRAM LIST

1. Excel Basics
2. Basic calculations
3. Charts
4. Pivot tables
5. Conditional functions
6. IF functions
7. Lookup functions
8. Conditional formatting
9. Sorting lists
10. Filtering lists
11. Drop-down lists
12. OFFSET function
13. Dynamic charts
14. Using combo boxes to create dynamic charts
15. Using check boxes to create dynamic charts

Books for Reference:

1. Bill Jelen, *Microsoft Excel 2019 Pivot Table*, 1st Edition, Microsoft Press.
2. Humphrey M.L, *Excel for Beginners*, 1st edition, Independently Published.
3. Michael Alexander, *Excel 2019 Bible*, 1st edition, Wiley.

Web Resources/ E.Books:

1. <https://www.simplilearn.com>
2. <https://www.javatpoint.com>
3. <https://www.w3schools.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 | Excel Basics Basic calculations Charts | 5 | Writing and executing the program in a system |
| 2 | Pivot tables Conditional functions IF functions | 5 | Writing and executing the program in a system |
| 3 | Lookup functions Conditional formatting Sorting lists | 7 | Writing and executing the program in a system |
| 4 | Filtering lists Drop-down lists OFFSET function | 7 | Writing and executing the program in a system |
| 5 | Dynamic charts Using combo boxes to create dynamic charts Using check boxes to create dynamic charts | 6 | Writing and executing the program in a system |

Course Designer

Mrs. P. KRISHNA GEETHA

EVALUATION (PRACTICAL)
Core Course 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 |