# V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
*Re-accredited with 'A++' Grade (4th Cycle) by NAAC*
**VIRUDHUNAGAR**
**Quality Education with Wisdom and Values**

## OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM REGULATIONS AND SYLLABUS
## (with effect from Academic Year 2023 - 2024)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 13 UG Programmes (Aided), 15 UG Programmes (SF), 15 PG Programmes and 6 Ph.D. Programmes. The curricula for all these Programmes, except Ph.D. Programmes, have been framed as per the guidelines given by the University Grants Commission (UGC) &Tamil Nadu State Council for Higher Education (TANSCHE) under Choice Based Credit System (CBCS) and the guidelines for Outcome Based Education (OBE).

The Departments of Commerce, English, History, Mathematics, Biochemistry and Tamil upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

### A. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose Courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The performance of students is evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

### List of Programmes in which CBCS/Elective Course System is implemented

**UG PROGRAMMES**

| | | |
|---|---|---|
| Arts & Humanities | : | History (E.M. & T.M.), English, Tamil |
| Physical & Life Sciences | : | Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology, Data Science, Computer Applications and Computer Applications - Graphic Design |
| Commerce & Management | : | Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration |

**PG PROGRAMMES**

| | | |
|---|---|---|
| Arts & Humanities | : | History, English, Tamil |
| Physical & Life Sciences | : | Mathematics, Physics, Chemistry, Zoology, Biochemistry, Home Science - Nutrition and Dietetics, Biotechnology, Computer Science, Computer Science (Data Science) and Computer Applications (MCA) * |
| Commerce & Management | : | Commerce, Business Administration (MBA) * |
| | | * AICTE approved Programmes |

**OUTLINE OF CHOICE BASED CREDIT SYSTEM – UG**

1. Core Courses
2. Elective Courses
   - Generic Elective Courses
   - Discipline Specific Elective Courses (DSEC)
   - Non Major Elective Courses (NMEC)
3. Skill Enhancement Courses (SEC)
4. Environmental Studies (EVS)
5. Value Education
6. Self Study Courses (Online)
7. Extra Credit Courses (Self Study Courses) (Optional)

**List of Non Major Elective Courses (NME)**
**(2023-2024 onwards)**

**UG PROGRAMMES**

| Name of the Course | Course Code | Semester | Department |
|---|---|---|---|
| Introduction to Tourism | 23UHIN11 | I | History(EM) |
| Indian Constitution | 23UHIN21 | II | History(EM) |
| சுற்றுலா ஓர் அறிமுகம் | 23UHIN11 | I | History (TM) |
| இந்திய அரசியலமைப்பு | 23UHIN21 | II | History(TM) |
| Popular Literature and Culture | 23UENN11 | I | English |
| English for Professions | 23UENN21 | II | |
| பேச்சுக்கலைத்திறன் | 23UTAN11 | I | Tamil |
| பயன்முறைத் தமிழ் | 23UTAN21 | II | |
| Practical Banking<br>Basic Accounting Principles | 23UCON11<br>23UCON22 | I<br>II | Commerce (Aided) |
| Financial Literacy-I<br>Financial Literacy -II | 23UCON12<br>23UCON21 | I<br>II | Commerce (SF) |
| Self-Employment and Startup Business | 23UCCN11 | I | Commerce CA (SF) |

| | | | |
|---|---|---|---|
| Fundamentals of Marketing | 23UCCN21 | II | |
| Women Protection Laws | 23UCPN11 | I | Commerce (Professional Accounting) |
| Basic Labour Laws | 23UCPN21 | II | |
| Basics of Event Management | 23UBAN11 | I | Business Administration |
| Business Management | 23UBAN21 | II | |
| Quantitative Aptitude I | 23UMTN11 | I | Mathematics |
| Quantitative Aptitude II | 23UMTN21 | II | |
| Physics for Everyday life -I | 23UPHN11 | I | Physics |
| Physics for Everyday life -II | 23UPHN21 | II | |
| Food Chemistry | 23UCHN11 | I | Chemistry |
| Drugs and Natural Products | 23UCHN21 | II | |
| Ornamental fish farming and Management | 23UZYN11 | I | Zoology |
| Biocomposting for Entrepreneurship | 23UZYN21 | II | |
| Foundations of Baking and Confectionery | 23UHSN11 | I | Home Science – Nutrition and Dietetics |
| Basic Nutrition and Dietetics | 23UHSN21 | II | |
| Nutrition and Health | 23UBCN11 | I | Biochemistry |
| Life Style Diseases | 23UBCN21 | II | |
| Social and Preventive Medicine | 23UMBN11 | I | Microbiology |
| Nutrition & Health Hygiene | 23UMBN21 | II | |
| Herbal Medicine | 23UBON11 | I | Biotechnology |
| Organic farming and Health Management | 23UBON21 | II | |
| Basics of Fashion | 23UCFN11 | I | Costume Design And Fashion |
| Interior Designing | 23UCFN21 | II | |
| Office Automation | 23UCSN11 | I | Computer Science |
| Introduction to Internet and HTML 5 | 23UCSN21 | II | |
| Office Automation | 23UITN11 | I | Information Technology |
| Introduction to HTML | 23UITN21 | II | |
| Introduction to HTML | 23UCAN11 | I | Computer Applications |
| Fundamentals of Computers | 23UCAN21 | II | |
| Introduction to HTML | 23UGDN11 | I | Computer Applications - Graphic Design |
| Fundamentals of Computers | 23UGDN21 | II | |
| Organic Farming | 23UBYN11 | I | Botany |
| Nursery and Landscaping | 23UBYN12 | | |
| Mushroom Cultivation | 23UBYN21 | II | |
| Medicinal Botany | 23UBYN22 | | |
| Cadet Corps for Career Development I | 23UNCN11 | I | National Cadet Corps |
| Cadet Corps for Career Development II | 23UNCN21 | II | |

## B. OUTCOME BASED EDUCATION (OBE) FRAMEWORK

The core philosophy of Outcome Based Education rests in employing a student - centric learning approach to measure the performance of students based on a set of pre-determined outcomes. The significant advantage of OBE is that it enables a revamp of the curriculum based on the learning outcomes, upgrade of academic resources, quality enhancement in research and integration of technology in the teaching –learning process. It also helps in bringing clarity among

students as to what is expected of them after completion of the Programme in general and the Course in particular. The OBE directs the teachers to channelize their teaching methodologies and evaluation strategies to attain the PEOs and fulfil the Vision and Mission of the Institution.

**Vision of the Institution**

The founding vision of the Institution is to impart Quality Education to the rural womenfolk and to empower them with knowledge and leadership quality.

**Mission of the Institution**

The mission of the Institution is to impart liberal education committed to quality and excellence. Its quest is to mould learners into globally competent individuals instilling in them life-oriented skills, personal integrity, leadership qualities and service mindedness.

## B.1 Programme Educational Objectives, Programme Outcomes and Programme Specific Outcomes

It is imperative for the institution to set the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Course Outcomes (COs), consistent with its Vision and Mission statements. The PEOs and the POs should be driven by the mission of the institution and should provide distinctive paths to achieve the stated goals. The PEOs for each Programme have to fulfil the Vision and Mission of the Department offering the Programme.

**Vision of the Department of Computer Science**

The Department of Computer Science is envisioned to create industry ready Computer Science students with ardour for personal growth.

**Mission of the Department of Computer Science**

To create an environment conducive for transforming rural women students into eminent students prepared for a globalized technological era and to instil in them a passion to strive for perpetual personal uplift.

**Programme Educational Objectives (PEOs) of B.Sc. Computer Science**

| | |
|---|---|
| **PEO1** | Students gain knowledge and expertise in advanced domains of Computer Science like website design, mobile apps development and data analytics. |
| **PEO2** | The rural women students will emerge as eminent software professionals with team building capacity and leadership quality to suit the modern software industry. |
| **PEO3** | The students imbibe moral values and professional ethics to shape themselves as skilled persons to work as an individual with topical updates and as a team to contribute towards the need of industry and society. |

| **Key Components of Mission Statement** | **P**rogramme **E**ducational **O**bjectives (**PEOs**) | | |
|---|---|---|---|
| | **PEO1** | **PEO2** | **PEO3** |
| transforming rural women students | | √ | |
| eminent students | √ | √ | √ |
| prepared for a globalized technological era | √ | √ | |
| a passion to strive for perpetual personal uplift | | | √ |

**B.1.2 Programme Outcomes (POs)**

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

**On successful completion of the Programme, the students will be able to**

1 apply effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)

2 articulate innovative thoughts and ideas proficiently in both in spoken and written forms. (*Communication Skills)*

3 identify, formulate and solve problems in real life situations scientifically / systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving)*

*4* critically analyse, synthesize and evaluate data, theories and ideas to provide valid suggestions through assignments, case studies, Internship and projects for the fullfillment of the local, national and global developmental needs. (*Critical Thinking and Analytical Reasoning)*

*5* use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning)*

6 self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence)*

7 uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness)*

**B.1.3 Programme Specific Outcomes (PSOs)**

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each UG Programme**.** Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme specific. It is mandatory that each PO should be mapped to the respective PSO.

**PROGRAMME SPECIFIC OUTCOMES**

**On completion of B.Sc. Computer Science programme, the students will be able to**

**PO1 -** *Disciplinary Knowledge*

**PSO 1.a:** apply principles, methods and techniques of various domains of Computer Science and courses related to Computer Science to a wide range of applications.

**PSO 1.b:** use modern software development tools, packages and platforms.

**PO2 –** *Communication Skills*

**PSO 2.a:** give and receive clear instructions, write effectual reports, design documentation and make remarkable presentations on concepts related to Computer Science.

**PSO 2.b:** express complex technical ideas effectively to peers, other assemblage like IT community and the entire society.

**PO3 -** *Scientific Reasoning and Problem Solving*

**PSO 3:** design and develop computer programs using programming languages efficiently, in the areas related to database management, mobile applications, operating systems and web design.

**PO4 -** *Critical Thinking and Analytical Reasoning*

**PSO 4:** analyse real world problems, identify and formulate the computing requirements appropriate to give efficient and constructive solutions in different research fields of Computer

Science and for environmental sustainability.

**PO5 -** *Digital Literacy, Self - directed and Lifelong Learning*

**PSO 5.a:** create high quality e-content for demonstrating complex concepts ; pursue the appropriate Massive Open Online Courses.

**PSO 5.b:** adapt to an ever-changing technological landscape either by pursuing higher studies and engaging in independent and life-long learning or use their potential in their career or entrepreneurial endeavours.

**PO6 -** *Cooperation/Team Work and Multi-Cultural Competence*

**PSO 6:** demonstrate the knowledge of technological and management principles to work as a member or leader, with multicultural competence in diverse teams of software projects.

**PO7 -** *Moral and Ethical Awareness*

**PSO 7**: develop innovative applications as an employee of a company or an entrepreneur, employing contemporary technologies adhering to ethical, security and legal issues of Internet and Cyber systems.

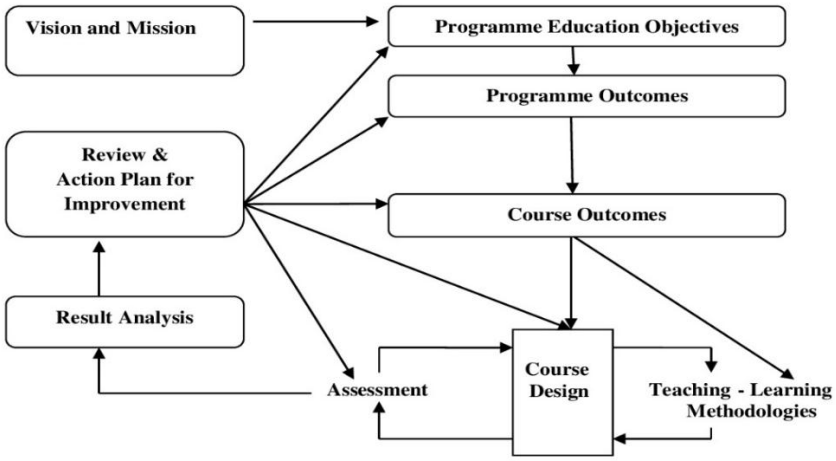
**PO-PEO Mapping Matrix**

Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, *etc*. It is mandatory that each PEO should be mapped to at least one of the POs.

| **PEOs** / **POs/PSOs** | **PEO1** | **PEO2** | **PEO3** |
|---|---|---|---|
| **PO1/PSO1.a** | - | ✓ | ✓ |
| **PO1/PSO1.b** | ✓ | ✓ | ✓ |
| **PO2/PSO2.a** | ✓ | ✓ | - |
| **PO2/PSO2.b** | ✓ | ✓ | - |
| **PO3/PSO3** | - | ✓ | ✓ |
| **PO4/PSO4.a** | - | ✓ | ✓ |
| **PO4/PSO4.b** | ✓ | ✓ | - |
| **PO5/PSO5** | ✓ | ✓ | - |
| **PO6/PSO6** | - | ✓ | ✓ |
| **PO7/PSO7** | - | - | ✓ |

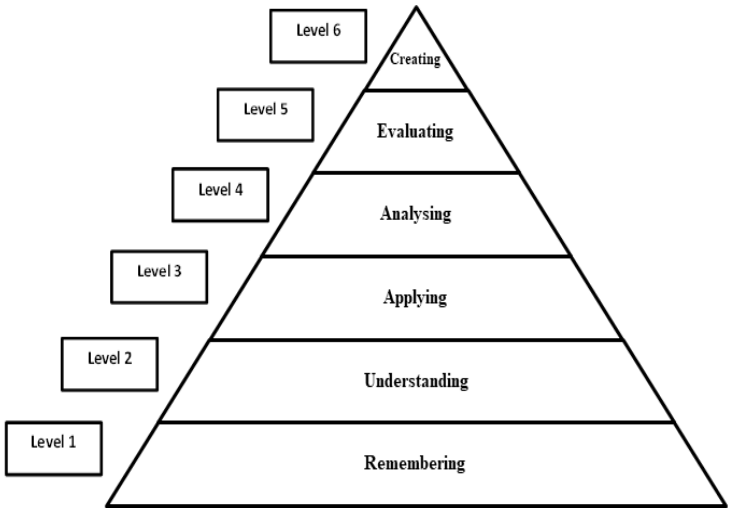
### B.1.4 Course Outcomes (COs)

Course Outcomes are narrow statements restricted to the Course contents given in five units. Course Outcomes describe what students would be capable of, after learning the contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after learning of Course contents. COs are measurable, attainable and manageable in number. COs contribute to attain POs in such a way that each CO addresses at least one of the POs and also each PO is reasonably addressed by adequate number of COs.




It is important to determine the methods of assessment. A comprehensive assessment strategy may be outlined using the revised Bloom's Taxonomy levels.

**BLOOM'S TAXONOMY**




### CO – PO Mapping of Courses

After framing the CO statements, the COs framed for each Course is mapped with POs based on the relationship that exists between them. The COs which are not related to any of the POs is indicated with (-), signifying Nil. Measurement Mapping is based on Four Points Scale [High (H), Medium (M), Low (L) and Nil (-)]. For calculating weighted percentage of contribution of each

Course in the attainment of the respective POs, the weights assigned for H, M and L are 3, 2and 1 respectively.

**CO-PO/PSO Mapping Table (Course Articulation Matrix)**

| PO/PSOs / COs | PO1/ PSO1 | PO2/ PSO2 | PO3/ PSO3 | PO4/ PSO4 | PO5/ PSO5 | PO6/ PSO6 | PO7/ PSO7 |
|---|---|---|---|---|---|---|---|
| **CO1** | | | | | | | |
| **CO2** | | | | | | | |
| **CO3** | | | | | | | |
| **CO4** | | | | | | | |
| **CO5** | | | | | | | |

## ELIGIBILITY FOR ADMISSION

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamil Nadu or any other examination accepted by Academic Council with Mathematics as one of the subjects.

## DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period of three academic years (six semesters).

## MEDIUM OF INSTRUCTION

English

## COURSES OFFERED

| | | |
|---|---|---|
| Part I | : | Tamil/Hindi Course |
| Part II | : | English |
| Part III | : | Core Courses |
| | | Elective Courses<br>• Generic Elective Courses<br>• Discipline Specific Elective Courses |
| | | Self Study Course - online |
| Part IV | : | Skill Enhancement Courses (SEC) |
| | | Elective Course (NMEC) |
| | | Environmental Studies<br>Value Education |
| | | Field Project/Internship |
| | | Self Study Course - online |
| Part V | : | National Service Scheme/ Physical Education/ Youth Red Cross Society/ Red Ribbon Club/ Science Forum/ Eco Club/ Library and Information Science/ Consumer Club/ Health and Fitness Club/ National Cadet Corps/ Rotaract Club |

## B.2 EVALUATION SCHEME

### B.2.1.PART II

| Components | Internal Assessment Marks | Summative Examination Marks | Total Marks |
|---|---|---|---|
| Theory | 15 | 60 | 100 |
| Practical | 5 | 15 | |
| Assignment | 5 | - | |

Three Periodic Tests - Average of the best two will be considered

### B.2.2.Part I & PART III - Core Courses, Elective Courses (Generic, DSEC)

| Components | Internal Assessment Marks | External Examination Marks | Total Marks |
|---|---|---|---|
| Theory | 25 | 75 | **100** |

**INTERNAL ASSESSMENT**

**Distribution of Marks**

**Theory**

| Mode of Evaluation | | | Marks |
|---|---|---|---|
| Periodic Test | | : | 15 |
| Assignment | K3 Level | : | 5 |
| Quiz | K1 Level | : | 5 |
| **Total** | | **:** | **25** |

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Three Quiz Tests - Best of the three will be considered

**Practical**

| Mode of Evaluation | | Marks |
|---|---|---|
| Practical Test* | : | 30 |
| Record & Performance | : | 10 |
| **Total** | **:** | **40** |

*Average of the two Practical Tests will be considered

**Question Pattern for Internal Tests** **Duration: 2 Hours**

| Section | Q. No. | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|---|
| A | 1 - 4 | Multiple Choice | 4 | 4 | 1 | 4 |
| B | 5 -6 | Internal Choice - Either … or Type | 3 | 3 | 7 | 21 |
| C | 8 -9 | Internal Choice - Either… or Type | 2 | 2 | 10 | 20 |
| | | | | | **Total** | **45*** |

*The total marks obtained in the Periodic Test will be calculated for 15 marks

**SUMMATIVE EXAMINATION**

**Question Pattern** **Duration: 3 Hours**

| Section | Q. No. | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|---|
| A | 1 -10 | Multiple Choice | 10 | 10 | 1 | 10 |
| B | 11 - 15 | Internal Choice – Either …or Type | 5 | 5 | 7 | 35 |
| C | 16 - 18 | Internal Choice – Either… or Type | 3 | 3 | 10 | 30 |
| | | | | | **Total** | **75** |

**PROJECT**

**Assessment by Internal Examiner Only**

**Internal Assessment**

**Distribution of Marks**

| | | |
|---|---|---|
| Mode of Evaluation | : | Marks |
| Project work and Report | : | 60 |
| Presentation and Viva –Voce | : | 40 |
| **Total** | **:** | **100** |

## B.2.3 PART IV - Skill Enhancement Courses, Non Major Elective Courses and Foundation Course

### B.2.3.1 FOUNDATATION COURSE

**INTERNAL ASSESSMENT**
**Distribution of Marks**
**Theory**

| **Mode of Evaluation** | | | **Marks** |
|---|---|---|---|
| Periodic Test | | : | 15 |
| Assignment | K2 Level | : | 5 |
| Quiz | K1 Level | : | 5 |
| **Total** | | **:** | **25** |

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Three Quiz Tests - Best of the three will be considered

**Question Pattern for Periodic Tests** **Duration: 1 Hour**

| **Section** | **Q.No.** | **Types of Question** | **No. of Questions** | **No. of Questions to be answered** | **Marks for each Question** | **Total Marks** |
|---|---|---|---|---|---|---|
| A | 1 - 3 | Internal Choice - Either …or Type | 3 | 3 | 5 | 15 |
| B | 4 | Internal Choice – Either …or Type | 1 | 1 | 10 | 10 |
| | **Total** | | | | | **25*** |

*The total marks obtained in the Periodic Test will be calculated for 15 marks

**SUMMATIVE EXAMINATION**

| **Mode of Evaluation** | | **Marks** |
|---|---|---|
| Summative Examination | : | 50 |
| Online Quiz (Multiple Choice Questions - K2 Level) | : | 25 |
| **Total** | **:** | **75** |

**Question Pattern** **Duration: 2 Hours**

| Section | Q.No. | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|---|
| A | 1 - 5 | Internal Choice - Either … or Type | 5 | 5 | 6 | 30 |
| B | 6 - 7 | Internal Choice – Either… or Type | 2 | 2 | 10 | 20 |
| | **Total** | | | | | **50** |

## B.2.3.2 Skill Enhancement Course - Entrepreneurial skills

**INTERNAL ASSESSMENT ONLY**
**Distribution of Marks**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 15 |
| Assignment | : | 5 |
| Quiz | : | 5 |
| Model Examinations | : | 60 |
| Online Quiz(Multiple Choice Questions - K2 Level) | : | 15 |
| **Total** | **:** | **100** |

**Question Pattern for Periodic Tests** **Duration: 1 Hour**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 3) | Internal Choice – Either Or Type | 3 | 3 | 6 | 18 |
| B<br>Q. No.(4) | Internal Choice – Either Or Type | 1 | 1 | 12 | 12 |
| **Total** | | | | | **30** |

Two Periodic Tests - Better of the two will be considered
Two Assignments - Better of the two will be considered
Two Quiz Tests - Better of the two will be considered

**Question Pattern for Model Examination** **Duration: 2 Hours**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1-5) | Internal Choice – Either Or Type | 5 | 5 | 6 | 30 |
| B<br>Q. No.(6- 8) | Internal Choice – Either Or Type | 3 | 3 | 10 | 30 |
| **Total** | | | | | **60** |

## B.2.3.3 Skill Enhancement Courses/ Non Major Elective Courses

**INTERNAL ASSESSMENT**

**Distribution of Marks**

**Theory**

| **Mode of Evaluation** | | | **Marks** |
|---|---|---|---|
| Periodic Test | | : | 15 |
| Assignment | K3 Level | : | 5 |
| Quiz | K2 Level | : | 5 |
| **Total** | | **:** | **25** |

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Three Quiz Tests - Best of the three will be considered

**Question Pattern for Periodic Tests** **Duration: 1 Hour**

| **Section** | **Q.No.** | **Types of Question** | **No. of Questions** | **No. of Questions to be answered** | **Marks for each Question** | **Total Marks** |
|---|---|---|---|---|---|---|
| A | 1 - 3 | Internal Choice - Either …or Type | 3 | 3 | 5 | 15 |
| B | 4 | Internal Choice – Either …or Type | 1 | 1 | 10 | 10 |
| | **Total** | | | | | **25*** |

*The total marks obtained in the Periodic Test will be calculated for 15 marks

**SUMMATIVE EXAMINATION**

| **Mode of Evaluation** | | **Marks** |
|---|---|---|
| Summative Examination | : | 50 |
| Online Quiz (Multiple Choice Questions - K2 Level) | : | 25 |
| **Total** | **:** | **75** |

**Question Pattern** **Duration: 2 Hours**

| **Section** | **Q.No.** | **Types of Question** | **No. of Questions** | **No. of Questions to be answered** | **Marks for each Question** | **Total Marks** |
|---|---|---|---|---|---|---|
| A | 1 - 5 | Internal Choice - Either … or Type | 5 | 5 | 6 | 30 |
| B | 6 - 7 | Internal Choice – Either… or Type | 2 | 2 | 10 | 20 |
| | **Total** | | | | | **50** |

## B.2.4 PART IV- ENVIRONMENTAL STUDIES / VALUE EDUCATION

**INTERNAL ASSESSMENT ONLY**

**Evaluation Pattern**

| **Mode of Evaluation** | | **Marks** |
|---|---|---|
| Periodic Test | : | 15 |
| Assignment (Based on the listed activities) - K3 Level | : | 10 |
| Online Quiz (Multiple Choice Questions - K2 Level) | : | 25 |
| Poster Presentation - K3 Level | | 10 |
| Report on student's Awareness creation on Environmental Protection /Ethical Values - K3 Level | | 10 |
| Model Examination | : | 30 |
| **Total** | **:** | **100** |

Three Assignment - Best of the three will be considered

**Question Pattern for Periodic Tests** **Duration: 1 Hour**

| **Section** | **Types of Question** | **No. of Questions** | **No. of Questions to be answered** | **Marks for each Question** | **Total Marks** |
|---|---|---|---|---|---|
| A Q. No.(1- 3) | Internal Choice – Either Or Type | 3 | 3 | 6 | 18 |
| B Q. No.(4) | Internal Choice – Either Or Type | 1 | 1 | 12 | 12 |
| **Total** | | | | | **30*** |

Two Periodic tests - Better of the two will be considered

The total marks obtained in the Periodic test will be calculated for 15 marks

**Question Pattern for Model Examination** **Duration: 2 ½ Hours**

| **Section** | **Q.No.** | **Types of Question** | **No. of Questions** | **No. of Questions to be answered** | **Marks for each Question** | **Total Marks** |
|---|---|---|---|---|---|---|
| A | 1 - 5 | Internal Choice - Either … or Type | 5 | 5 | 6 | 30 |
| B | 6 - 8 | Internal Choice – Either… or Type | 3 | 3 | 10 | 30 |
| | **Total** | | | | | **60*** |

*The total marks obtained in the Model Examination will be calculated for 30 marks

### B.2.5 PART IV- Internship/ Field Project

Internship / Field Project is compulsory for II year UG Science Students

- **Internship:** A designated activity that carries one credit involving not less than 15 days of working in an organization under the guidance of an identified mentor
- **Field Project:** Students comprising of maximum 5 members in a team need to undertake project that involve conducting surveys inside/outside the college premises and collection of data from designated communities or natural places.
- Assessment by Internal Examiner only

| Mode of Evaluation | | Marks |
|---|---|---|
| Onsite Learning/Survey | : | 50 |
| Report | : | 25 |
| Viva-Voce | : | 25 |
| **Total** | | **100** |

### B.2.6 SELF STUDY COURSE

### B.2.6 .1 PART III - Core & Elective Courses Quiz – Online

- Assessment by Internal Examiner only
- Question Bank is prepared by the Faculty Members of the Departments for all the Core and Elective Courses offered in all the Semesters.
- No. of Questions to be taken 700.
- Multiple Choice Question pattern is followed.
- Online Test will be conducted in VI Semester for 100 Marks.
- Model Examination is conducted after two periodic tests.

**Distribution of Marks**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 25 |
| Model Examination | : | 75 |
| **Total** | **:** | **100** |

Two Periodic Tests - Better of the two will be considered

### B.2.6 .2 PART IV - Practice for Competitive Examinations – Online

Assessment by Internal Examiner only

- Question Bank prepared by the Faculty Members of the respective Departments will be followed.
- Multiple Choice Question pattern is followed.
- Online Test will be conducted in V Semester for 100 Marks.
- Model Examination is conducted after two periodic tests.

**Subject wise Allotment of Marks**

| Subject | | Marks |
|---|---|---|
| Tamil | : | 10 |
| English | : | 10 |
| History | : | 10 |
| Mathematics | : | 10 |
| Current affairs | : | 10 |
| Commerce, Law & Economics | : | 10 |
| Physical Sciences | : | 10 |
| Life Sciences | : | 15 |
| Computer Science | : | 5 |
| Food and Nutrition | : | 5 |
| Sports and Games | : | 5 |
| **Total** | **:** | **100** |

**Distribution of Marks**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 25 |
| Model Examination | : | 75 |
| **Total** | **:** | **100** |

Two Periodic Tests - Better of the two will be considered

**B.2.7. Part V – Extension Activities**

**INTERNAL ASSESSMENT ONLY**

**Distribution of Marks**

| Mode of Evaluation | | Marks |
|---|---|---|
| Attendance | : | 5 |
| Performance | : | 10 |
| Report/Assignment/Project/Camp/Practical | : | 10 |
| **Total** | **:** | **25*** |

*The marks obtained will be calculated for 100 marks

**B.2.8 EXTRA CREDIT COURSES (OPTIONAL)**

**2.8.1 Extra Credit Course offered by the Department.**

Assessment by Internal Examiner Only (To be conducted along with the III Periodic Test)

**Distribution of Marks**

| Mode of Evaluation | | Marks |
|---|---|---|
| Quiz<br>(Multiple Choice Questions) | : | 25 |
| Model Examination | : | 75 |
| **Total** | **:** | **100** |

**Question Pattern for Model Examination**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A Q.No.(1-5) | Internal Choice-Either or Type | 5 | 5 | 7 | 35 |
| B Q.No.(6-9) | Internal Choice-Either or Type | 4 | 4 | 10 | 40 |
| | | | | **Total** | **75** |

**2.8.2 Extra credit Course offered by MOOC (Massive Open Online Course)**

- The Courses shall be completed within the first V Semesters of the Programme.
- The allotment of credits is as follows **(Maximum of 10 credits)**

4weeks Course - 1 credit

8 weeks Course - 2 credits

12 weeks Course - 3 credits

**ELIGIBILITY FOR THE DEGREE**

- The candidate will not be eligible for the Degree without completing the prescribed Courses of study, lab work, *etc.*, and a minimum Pass marks in all the Courses.

- No Pass minimum for Internal Assessment.
- Pass minimum for External Examination is 27 marks out of 75 marks for Core Courses, Elective Courses (Generic Elective, DSEC Courses)
- Pass minimum for External Examination is 18 marks out of 50 marks for Skill Enhancement Courses and Non Major Elective Courses (NMEC).
- The aggregate minimum pass percentage is 40.
- Pass minimum for External Practical Examination is 21 marks out of 60 marks.
- Pass minimum for Ability Enhancement Compulsory Courses is 40 marks.
- Pass minimum for Self Study Courses is 40 marks.

- Attendance
  - For UG, PG Programmes,

a) The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.

b) The students who have only 60-75 days (66% - 84%) of attendance are permitted to appear for the Summative Examinations after paying the required fine amount and fulfilling other conditions according to the respective cases.

c) The students who have attended the classes for 59 days and less – upto 45 days (50% - 65%) can appear for the Summative Examinations only after getting special permission from the Principal.

d) The students who have attended the classes for 44 days or less (<50%) cannot appear for the Summative Examinations and have to repeat the whole semester.

- For Part V in UG Programmes, the students require 75 % of attendance to get a credit.
- For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

These rules come into effect from 2023-2024 onwards.

## B.3 ASSESSMENT MANAGEMENT PLAN

An Assessment Management Plan that details the assessment strategy both at the Programme and the Course levels is prepared. The continuous assessment is implemented using an assessment rubric to interpret and grade students.

### B.3.1 Assessment Process for CO Attainment

Assessment is one or more processes carried out by the institution that identify, collect and prepare data to evaluate the achievement of Course Outcomes and Programme Outcomes. Course Outcome is evaluated based on the performance of students in the Continuous Internal Assessments and in End Semester Examination of a Course. Target levels of attainment shall be fixed by the Course teacher and Heads of the respective departments.

**Direct Assessment (Rubric based)** - Conventional assessment tools such as Term Test, Assignment, Quiz and End Semester Summative Examination are used.

**Indirect Assessment** – Done through Course Exit Survey.

**CO Assessment Rubrics**

For the evaluation and assessment of COs and POs, rubrics are used. Internal assessment contributes 40% and End Semester assessment contributes 60% to the total attainment of a CO for the theory Courses. For the practical Courses, internal assessment contributes 50% and Semester assessment contributes 50% to the total attainment of a CO. Once the Course Outcome is measured, the PO can be measured using a CO-PO matrix.

**CO Attainment**

**Direct CO Attainment**

Course Outcomes of all Courses are assessed and the CO – wise marks obtained by all the students are recorded for all the assessment tools. The respective CO attainment level is evaluated based on set attainment rubrics.

**Target Setting for Assessment Method**

For setting up the target of internal assessment tools, 55% of the maximum mark is fixed as target. For setting up the target of End Semester Examination, the average mark of the class shall be set as target.

**Formula for Attainment for each CO**

Attainment = Percentage of students who have scored more than the target marks

$$\text{Percentage of Attainment} = \frac{\text{Number of Students who scored more than the Target}}{\text{Total Number of Students}} \times 100$$

**Attainment Levels of COs**

| **Assessment Methods** | **Attainment Levels** | |
|---|---|---|
| Internal Assessment | Level 1 | 50% of students scoring more than set target marks in Internal Assessment tools |
| | Level 2 | 55% of students scoring more than set target marks in Internal Assessment tools |
| | Level 3 | 60% of students scoring more than set target marks in internal Assessment tools |
| End Semester Summative Examination | Level 1 | 50% of students scoring more than average marks in End Semester Summative Examination |
| | Level 2 | 55% of students scoring more than average marks in End Semester Summative Examination |
| | Level 3 | 60% of students scoring more than average marks in End Semester Summative Examination |

**Indirect CO Attainment**

At the end of each Course, an exit survey is conducted to collect the opinion of the students on attainment of Course Outcomes. A questionnaire is designed to reflect the views of the students about the Course Outcomes.

**Overall CO Attainment= 75% of Direct CO Attainment + 25 % of Indirect CO Attainment**

In each course, the level of attainment of each CO is compared with the predefined targets. If the target is not reached, the Course teacher takes necessary steps for the improvement to reach the target.

For continuous improvement, if the target is reached, the Course teacher can set the target as a value greater than the CO attainment of the previous year.

### B.3.2 Assessment Process for Overall PO Attainment

With the help of CO against PO mapping, the PO attainment is calculated. PO assessment is done by giving 75% weightage to direct assessment and 25% weightage to indirect assessment. Direct assessment is based on CO attainment, where 75% weightage is given to attainment through End Semester Examination and 25% weightage is given to attainment through Internal assessments. Indirect assessment is done through Graduate Exit Survey and participation of students in Co-curricular/ Extra curricular activities.

**PO Assessment Tools**

| Mode of Assessment | Assessment Tool | Description |
|---|---|---|
| Direct Attainment (Weightage -75%) | CO Assessment | This is computed from the calculated CO Attainment value for each Course |
| Indirect Attainment (Weightage - 25%) | Graduate Exit Survey 10% | At the end of the Programme, Graduate Exit Survey is collected from the graduates and it gives the opinion of the graduates on attainment of Programme Outcomes |
| | Co-curricular/ Extra-curricular activities 15% | For participation in Co-curricular/Extra-curricular activities during the period of their study. |

**Programme Articulation Matrix (PAM)**

| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| Average Direct PO Attainment | | | | | | | | |
| Direct PO Attainment in percentage | | | | | | | | |

**Indirect Attainment of POs for all Courses**

| Pos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| Graduate Exit Survey | | | | | | | |
| Indirect PO Attainment | | | | | | | |

**Attainments of POs for all Courses**

| Pos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| Direct Attainment (Weightage - 75%) | | | | | | | |
| Indirect Attainment (Weightage - 25%) | | | | | | | |
| Overall PO Attainment | | | | | | | |

**Overall PO Attainment= 75% of Direct PO Attainment +**
**25% of Indirect PO Attainment (Graduate Exit Survey & Participation in Co- curricular and Extra curricular Activities)**

**Expected Level of Attainment for each of the Programme Outcomes**

| POs | Level of Attainment |
|---|---|
| Attainment Value ≥70% | Excellent |
| 60% ≤ Attainment Value < 70% | Very Good |
| 50% ≤ Attainment Value < 60% | Good |
| 40% ≤ Attainment Value < 50% | Satisfactory |
| Attainment Value <40% | Not Satisfactory |

**Level of PO Attainment**

| Graduation Batch | Overall PO Attainment (in percentage) | Whether Expected Level of PO is Achieved? (Yes/No) |
|---|---|---|
| | | |

**B.3.3 Assessment Process for PEOs**

The curriculum is designed so that all the Courses contribute to the achievement of PEOs. The attainment of PEOs is measured after 5 years of completion of the Programme only through indirect methods.

**Target for PEO Attainment**

| Assessment Criteria | Target (UG) | Target (PG) |
|---|---|---|
| Record of Employment | 15% of the class strength | 30% of the class strength |
| Progression to Higher Education | 50% of the class strength | 5% of the class strength |
| Record of Entrepreneurship | 2% of the class strength | 5% of the class strength |

**Attainment of PEOs**

| Assessment Criteria & Tool | Weightage |
|---|---|
| Record of Employment | 10 |
| Progression to Higher Education | 20 |
| Record of Entrepreneurship | 10 |
| Feedback from Alumnae | 30 |
| Feedback from Parents | 10 |
| Feedback from Employers | 20 |
| **Total Attainment** | **100** |

$$\text{Percentage of PEO Attainment from Employment} = \frac{\text{Number of Students who have got Employment}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Higher Education} = \frac{\text{Number of Students who pursue Higher Education}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Entrepreneurship} = \frac{\text{Number of Students who have become Entrepreneurs}}{\text{Target}} \times 100$$

**Expected Level of Attainment for each of the Programme Educational Objectives**

| POs | Level of Attainment |
|---|---|
| Attainment Value ≥70% | Excellent |
| 60% ≤ Attainment Value < 70% | Very Good |
| 50% ≤ Attainment Value < 60% | Good |
| 40% ≤ Attainment Value < 50% | Satisfactory |
| Attainment Value <40% | Not Satisfactory |

**Level of PEO Attainment**

| Graduation Batch | Overall PEO Attainment (in percentage) | Whether Expected Level of PEO is Achieved? (Yes/No) |
|---|---|---|
| | | |

## C. PROCESS OF REDEFINING THE PROGRMME EDUCATIONAL OBJECTIVES

The college has always been involving the key stakeholders in collecting information and suggestions with regard to curriculum development and curriculum revision. Based on the information collected the objectives of the Programme are defined, refined and are inscribed in the form of PEOs. The level of attainment of PEOs defined earlier will be analysed and will identify the need for redefining PEOs. Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like Board of Studies, Academic Council and Governing Body may recommend appropriate actions. As per the Outcome Based Education Framework implemented from the Academic Year 2020 -2021, the following are the Programme Structure, the Programme Contents and the Course Contents of B.Sc. Computer Science Programme.

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# BACHELOR OF SCIENCE
# COMPUTER SCIENCE (UG) (2019)

*Outcome Based Education with Choice Based Credit System*

Programme Structure - Allotment of Hours and Credits

For those who joined in the Academic Year 2023-2024 and after

| Components | Semester | | | | | | Total Number of Hours (Credits) |
|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | |
| **Part I :** Tamil /Hindi | 6 (3) | 6 (3) | 6 (3) | 6 (3) | - | - | 24 (12) |
| **Part II :** English | 6 (3) | 6(3) | 6 (3) | 6 (3) | - | - | 24 (12) |
| **Part III :** Core Courses, Elective Courses & Self Study Course | | | | | | | |
| Core Course | 5 (5) | 5 (5) | 5 (5) | 5 (5) | 5 (4) | 5 (4) | 30 (28) |
| Core Course | - | - | - | - | 5 (4) | 5 (4) | 10 (8) |
| Core Course | - | - | - | - | 5 (4) | 5(4) | 10(8) |
| Core Course Practical | 5(3) | 5 (3) | 5(3) | 4 (3) | 4 (3) | 5 (3) | 28(18) |
| Core Course Project | - | - | - | - | 1 (3) | - | 1 (3) |
| Elective Course (DSEC) | - | - | - | - | 5(3) | 5 (3) | 10 (6) |
| Elective Course (DSEC Practical) | - | - | - | - | 3(2) | 3(2) | 6(4) |
| Elective Course I | 4 (4) | 4 (4) | 4 (4) | 4 (4) | - | - | 16(16) |
| Elective Course I Practical I | - | - | - | - | - | - | - |
| Elective Course II | - | - | | | - | - | - |
| Elective Course II Practical II | - | - | | | - | - | - |
| Self Study Course | - | - | - | - | - | 0 (1) | 0 (1) |
| **Part IV :** Skill Enhancement Courses, Elective Courses, Environmental Studies, Value Education, Self Study Course &Internship/ Field Project | | | | | | | |
| SEC | 2 (2) | - | 1 (1) | 2 (2) | - | - | 5(5) |
| SEC | - | 2 (2) | 2 (2) | 2 (2) | - | 2 (2) | 8 (8) |
| Elective Course(NME) | 2 (2) | 2 (2) | - | - | - | - | 4 (4) |
| Value Education | - | - | - | - | 2 (2) | - | 2 (2) |
| Environmental Studies | - | - | 1 (0) | 1 (2) | - | - | 2 (2) |
| Self Study Course | - | - | - | - | 0 (1) | - | 0 (1) |
| Internship/ Field Project | - | - | - | - | 0 (1) | - | 0 (1) |
| **Part V :** Extension Activities | - | - | - | | - | 0 (1) | 0 (1) |
| **Total** | **30 (22)** | **30 (22)** | **30(21)** | **30 (24)** | **30 (27)** | **30(24)** | **180 (140)** |
| Extra Credit Course ( Self Study Course) | - | - | - | - | 0(2) | - | 0(2) |

DSEC: Discipline Specific Elective Course SEC: Skill Enhancement Course

NMEC: Non Major Elective Course

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## B.Sc. COMPUTER SCIENCE -2019
## PROGRAMME CONTENT

### SEMESTER I

| S. No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part I** | | Tamil/ Hindi | 23UTAG11/ 23UHDG11 | 6 | 3 | 3 | 25 | 75 | 100 |
| 2. | **Part II** | | English | 23UENG11 | 6 | 3 | 3 | 25 | 75 | 100 |
| 3. | **Part III** | Core Course - 1 | Python Programming | 23UCSC11 | 5 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 2 Practical I | Python Programming Practical | 23UCSC11P | 5 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Elective Course | Discrete Mathematics - I | 23UCSA11 | 4 | 4 | 3 | 25 | 75 | 100 |
| 6. | **Part IV** | NME – 1 | Office Automation | 23UCSN11 | 2 | 2 | 3 | 25 | 75 | 100 |
| 7 | | SEC - 1 Foundation Course | Problem Solving Techniques | 23UCSF11 | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | | **Total** | **30** | **22** | | | | **700** |

**B.Sc. COMPUTER SCIENCE**
**SEMESTER II**

| S. No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part I** | | Tamil/ Hindi | 23UTAG21/ 23UHDG21 | 6 | 3 | 3 | 25 | 75 | 100 |
| 2. | **Part II** | | English | 23UENG21 | 6 | 3 | 3 | 25 | 75 | 100 |
| 3. | **Part III** | Core Course - 3 | Programming in C | 23UCSC21 | 5 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 4 Practical II | Programming using C Practical | 23UCSC21P | 5 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Elective Course | Probability and Statistics | 23UCSA21 | 4 | 4 | 3 | 25 | 75 | 100 |
| 6. | **Part IV** | NME – 2 | Introduction to Internet and HTML 5 | 23UCSN21 | 2 | 2 | 3 | 25 | 75 | 100 |
| 7 | | SEC - 2 | Digital Principles | 23UCSS21 | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | | **Total** | **30** | **22** | | | | **700** |

**B.Sc. COMPUTER SCIENCE -2019**

**(for those who join in 2023 - 2024)**
**PROGRAMME CONTENT**
**SEMESTER III**

| Sl. No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part I** | | Tamil/ Hindi | 23UTAG31/ 23UHDG31 | 6 | 3 | 3 | 25 | 75 | 100 |
| 2. | **Part II** | | English | 23UENG31 | 6 | 3 | 3 | 25 | 75 | 100 |
| 3. | **Part III** | Core Course – 5 | Data Structures and Algorithms | 23UCSC31 | 5 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 6 Practical – III | Data Structures and Algorithms Practical | 23UCSC31P | 5 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Elective Course - 3 | Numerical Methods | 23UCSA31 | 4 | 4 | 3 | 25 | 75 | 100 |
| 6. | **Part IV** | SEC – 3 Practical - I | DTP Practical | 23UCSS31P | 1 | 1 | 2 | 100 | - | 100 |
| 7. | | SEC – 4 Practical – II | Web Designing Practical | 23UCSS32P | 2 | 2 | 2 | 40 | 60 | 100 |
| 8 | | | Environmental Studies | 23UGES41 | 1 | - | - | - | - | - |
| | | | | **Total** | **30** | **21** | | | | **700** |

## SEMESTER IV

| S. No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part I** | | Tamil/ Hindi | 23UTAG41/ 23UHDG41 | 6 | 3 | 3 | 25 | 75 | 100 |
| 2. | **Part II** | | English | 23UENG41 | 6 | 3 | 3 | 25 | 75 | 100 |
| 3. | **Part III** | Core Course – 7 | Java Programming | 23UCSC41 | 5 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 8 Practical – IV | Java Programming Practical | 23UCSC41P | 4 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Elective Course - 4 | Resource Management Techniques | 23UCSA41 | 4 | 4 | 3 | 25 | 75 | 100 |
| 6. | **Part IV** | SEC – 5 | Computer Organization | 23UCSS41 | 2 | 2 | 2 | 25 | 75 | 100 |
| 7. | | SEC – 6 Practical – III | PHP Programming Practical | 23UCSS41P | 2 | 2 | 2 | 40 | 60 | 100 |
| 8 | | | Environmental Studies | 23UGES41 | 1 | 2 | 2 | 100 | - | 100 |
| | | | | **Total** | **30** | **24** | | | | **800** |

## SEMESTER V

| S.No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part III** | Core Course – 9 | Database Management Systems | 23UCSC51 | 6 | 5 | 3 | 25 | 75 | 100 |
| 3. | | Core Course – 10 | Computer Networks | 23UCSC52 | 6 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 11 Practical – V | Database Management Systems Practical | 23UCSC51P | 5 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Core Course – 12 | Project | 23UCSC54PR | 1 | 3 | - | 100 | - | 100 |
| 6. | | Elective Course - 7 | Operating System Concepts / Introduction to Data Science/ Artificial Intelligence | 23UCSE51 23UCSE52 23UCSE53 | 5 | 4 | 3 | 25 | 75 | 100 |
| 7. | | Elective Course DSEC Practical - I | Artificial Intelligence using AI Tools Practical /Operating System Practical/ Data Science Practical | 23UCSE51P 23UCSE52P 23UCSE53P | 5 | 3 | 3 | 40 | 60 | 100 |
| 8. | **Part IV** | | Value Education | 23UGVE51 | 2 | 2 | 2 | 100 | - | 100 |
| 9. | | Self Study Course | Practice for Competitive Examinations - Online | 23UGCE51 | - | 1 | - | 100 | - | 100 |
| 10. | | | Internship/ Industrial Training | 23UCSI51G | - | 1 | - | 100 | - | 100 |
| | | | | **Total** | **30** | **27** | - | | | **1000** |
| | | Extra Credit Course | C and C++ Aptitude | 23UCSO51 | - | 2 | 3 | 100 | - | 100 |

## SEMESTER VI

| S. No. | Components | | Title of the Course | Course Code | Hours Per Week | Credits | Exam. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Int. | Ext. | Total |
| 1. | **Part III** | Core Course – 13 | Mobile Applications Development | 23UCSC61 | 6 | 5 | 3 | 25 | 75 | 100 |
| 3. | | Core Course – 14 | Data Analytics using R | 23UCSC62 | 6 | 5 | 3 | 25 | 75 | 100 |
| 4. | | Core Course – 15 Practical – VI | Mobile Applications Development Practical | 23UCSC61P | 6 | 3 | 3 | 40 | 60 | 100 |
| 5. | | Elective Course - 9 | Image Processing/ IoT and its Applications/ Multimedia | 23UCSE61 23UCSE62 23UCSE63 | 5 | 4 | 3 | 25 | 75 | 100 |
| 6. | | Elective Course DSEC Practical - II | Image Processing Practical/ IoT Practical/ Multimedia Practical | 23UCSE61P 23UCSE62P 23UCSE63P | 5 | 3 | 3 | 40 | 60 | 100 |
| 7. | | Self Study Course | Core Courses Quiz- Online | 23UCSQ61 | - | 1 | - | 100 | - | 100 |
| 8. | **Part IV** | SEC 7 Practical – IV Professional Competency Skill Enhancement Course | Advanced Excel Practical | 23UCSS61P | 2 | 2 | 2 | 40 | 60 | 100 |
| 9. | **Part V** | | Extension Activities | | - | 1 | - | 100 | - | 100 |
| | | | | **Total** | **30** | **24** | | | | **900** |

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**B.Sc. Computer Science**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester I | **PYTHON PROGRAMMING** | Hours/Week: 5 | |
| Core Course - 1 | | Credits: 5 | |
| Course Code **23UCSC11** | | Internal 25 | External 75 |

**Course Outcomes:**

On completion of the course, students will be able to

**CO1:** describe fundamental concepts in Python Programming. [K1]

**CO2:** interpret the concepts of basic Python, functions, operations on files and string manipulation. [K2]

**CO3:** infer looping, control statements and representation of complex data using lists, tuples and dictionaries. [K2]

**CO4** apply the concepts of basic programming, functions, strings, modules and file handling in Python programs. [K3]

**CO5:** determine the methods to develop Python programs utilizing control statements, jump statements, list, tuples and dictionaries. [K3]

**UNIT I**

**Basics of Python Programming:** History of Python – Features of Python – Literal Constants - Variables and Identifiers - Data Types – Input operations- Comments – Indentation – Operators and Expressions – Type conversions. (15 Hours)

**UNIT II**

**Decision Control Statements:** Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Basic Loop Structures/Iterative Statements: while loop, for loop - nested loops- break, continue and pass statements**.** (15 Hours)

**UNIT III**

**Functions and Modules :** Function Declaration and Definition – Function Call – Variable Scope and its Lifetime-Return Statement - More on Defining Function -

Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. **Modules**: The from import statement– Name of the Modules – Making your own modules. **Python Strings Revisited :** Concatenating, Appending and Multiplying Strings - String are Immutable – Built-in String Methods and Functions – Comparison Strings. (15 Hours)

**UNIT IV**

**Data Structures: Lists:** Access values in List- Updating values in Lists- Nested lists – Cloning Lists - Basic list operations - List Methods. Tuples: Creating Tuples - Accessing values in a Tuples, Updating Tuples - Deleting Elements in Tuple – Nested Tuples– Advantages of Tuples over Lists. **Dictionaries:** Creating a Dictionaries, Adding and Modifying an item in a Dictionaries – Modifying an entry – Deleting items – Built-in Dictionary Functions and Methods - Difference between Lists and Dictionaries.

(15 Hours)

**UNIT V**

**File Handling:** Types of Files - Opening and Closing Files -Reading and Writing Files: write() and writelines() Methods- append() Method – read() and readlines() Methods – Opening Files with keyword – Splitting words – some other useful File Methods - File Positions- Renaming and deleting files. (15 Hours)

**SELF-STUDY:**

**Jump Statements:** break, continue and pass statements**.**

**TEXT BOOK**

Reema Thareja. (2017). *Python Programming using problem solving approach*, 1st Edition, Oxford University Press.

| Unit | Chapter | Section |
|---|---|---|
| I | 3 | 3.1, 3.2,3.5-3.9,3.11,3.12,3.16 |
| II | 4 | 4.2 – 4.7 |
| III | 5, 6 | 5.2-5.6 ,5.10, 5.11.1-5.11.3<br>6.1, 6.2,6.4,6,8 |
| IV | 8 | 8.2.1- 8.2.6 , 8.4.1,8.4.3-8.4.6, 8.4.9,8.4.16,8.6.1-8.6.4 , 8.6.8 - 8.6.9 |
| V | 7 | 7.3-7.7 |

**REFERENCE BOOKS**


1. Vamsi Kurama. *Python Programming: A Modern Approach*, Pearson Education.
2. Mark Lutz. *Learning Python*, Orielly.
3. Adam Stewarts. *Python Programming, Online.*
4. Fabio Nelli. *Python Data Analytics,* APress.
5. Kenneth A. Lambert. *Fundamentals of Python – First Programs,* CENGAGE Publication.


**WEB RESOURCES**

1. https://www.programiz.com/python-programming
2. https://www.guru99.com/python-tutorials.html
3. https://www.w3schools.com/python/python_intro.asp
4. https://www.geeksforgeeks.org/python-programming-language/
5. https://en.wikipedia.org/wiki/Python_(programming_language)

| Course Code 23UCSC11 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | - |
| CO2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | - |
| CO3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | - |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |

**Strong (3) Medium (2) Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Dr. M. Chamundeeswari
Ms. A. Dhivya
Course Designers

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. COMPUTER SCIENCE**

**(2023 - 2024 onwards)**

| | | | |
|---|---|---|---|
| Semester I | **PYTHON PROGRAMMING PRACTICAL** | Hours/Week: 5 | |
| Core Course – 2 Practical I | | Credits: 3 | |
| Course Code **23UCSC11P** | | Internal 40 | External 60 |

**COURSE OUTCOMES**

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

CO1: write Python programs using I/O statements and various operators of Python. [K2]

CO2: draw flow chart and write programs with various program structures of Python, functions and modules. [K2]

CO3: demonstrate data representation using Arrays, Strings, List, Tuple, Dictionaries and Files in Python. [K3]

CO4: demonstrate various programs with different inputs and complete the record work. [K3]

CO5: explore the uses of Python compound data in real life. [K3]

**Write Python Programs for the following**

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.
7. Program using Recursion.
8. Program using Arrays.
9. Program using Strings.
10. Program using Modules.
11. Program using Lists.
12. Program using Tuples.
13. Program using Dictionaries.
14. Program for File Handling.

| Course Code 23UCSC11P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | - |
| CO2 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | - |
| CO3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 |

**Strong (3)  Medium (2)  Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Dr.G.Karthigai Lakshmi
Mrs.T.Chitra
Course Designers

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. Computer Science**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester I | **DISCRETE MATHEMATICS - I** | Hours/Week: 4 | |
| Elective Course | | Credits: 4 | |
| Course Code **23UCSA11** | | Internal 25 | External 75 |

**Course Outcomes**
On completion of the course the students will be able to

CO1: define the basic concepts in propositional logic, relations, counting, graph theory and matrices [K1]

CO2: understand the mathematical concepts in logic, relations, permutation and combinations, graphs and matrices.[K2]

CO3: explain the concepts in predicates and quantifiers, partial orderings, recurrence relations, graphs and matrices. [K2]

CO4: solve problems in discrete mathematics. [K3]

CO5: apply the knowledge gained in discrete mathematics to other fields [K3]

**UNIT I**

The Foundations: Logic and Proofs: Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers. (12 Hours)

**UNIT II**

Relations: Relations and their properties – Representing relations – Partial orderings (Theorems statement only; Exclude lexicographic order - Exclude Lattices and Topological sorting) (12 Hours)

**UNIT III**

**Counting**: The basic of counting - The pigeonhole principle (Exclude Generalized Pigeonhole principle, Some Elegant Applications of the Pigeonhole Principle) – Permutation and

Combinations – Applications of recurrence relations(Exclude Algorithms and Recurrence Relations) – Solving linear recurrence relations(Exclude Linear Non homogeneous recurrence Relations with constant coefficients). (All theorems and Result statements only) (12 Hours)

**UNIT IV**

**Graphs**: Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs (Thorems statement only, Exclude Some Applications of Special Types of Graphs, New Graphs from Old) – Representing graphs and Graph isomorphism – Connectivity – paths – connectedness in undirected graphs(Exclude How connected is a graph?, Connectedness in Directed Graphs) – paths and isomorphism – counting paths between vertices – shortest path problems. (12 Hours)

**UNIT V**

**Matrices:** Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors. (12 Hours)

**TEXT BOOKS**

1. Kenneth.H.Rosen. (2012). *Discrete Mathematics and its applications*, 7th Edition, Mc Graw Hill Publishing Company.
2. Venkataraman M., Sridharan N. and Chandrasekaran N. (2009). *Discrete Mathematics*, The National Publishing Company.

| Unit | Chapter | Section |
|---|---|---|
| **Text Book 1** | | |
| I | 1 | 1.1, 1.2, 1.3, 1.4 |
| II | 9 | 9.1, 9.3, 9.6 |
| III | 6 | 6.1, 6.2, 6.3 |
| | 8 | 8.1, 8.2 |
| IV | 10 | 10.1, 10.2, 10.3, 10.4, 10.6 |
| **Text Book 2** | | |
| V | 6 | 6.1, 6.2, 6.3, 6.4, 6.5, 6.7 |

**REFERENCE BOOKS**

1. Arumugam S. and Thangapandi Isaac A. (2005). *Modern Algebra*, Scitech Publications.
2. Arumugam S. and Ramachandran S. (2005). *Invitation to Graph Theory*, Scitech Publications, Chennai.
3. Tremblay and Manohar. (1997). *Discrete Mathematical Structures with applications to Computer Science*, McGraw Hill.

**Web Resources**

Web resources from NDL Library, E-content from open-source libraries

| Course Code **23UCSA11** | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 1 | - | 1 | - |
| CO2 | 3 | 1 | 3 | 3 | 3 | 1 | - |
| CO3 | 3 | 3 | 3 | 3 | 2 | 1 | - |
| CO4 | 3 | 1 | 3 | 3 | 2 | 3 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |

**Strong (3) Medium (2) Low (1)**

Dr.A.Uma Devi
Head of the Department

Dr.A.Uma Devi
Course Designer

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. Computer Science**
**(2023-2024 onwards)**

| Semester I | **OFFICE AUTOMATION** | Hours/Week: 2 | |
|---|---|---|---|
| NME - 1 | | Credits: 2 | |
| Course Code **23UCSN11** | | Internal 25 | External 75 |

**Course Outcomes:**

CO1: outline the basic concepts of memory, components of computer systems and word processing software. [K1]

CO2: recognize the features of operating systems, Microsoft Office Word 2010 and spreadsheet. [K1]

CO3: describe the evolution of programming languages, types of memory, document editing, document formatting and insertion of tables in documents. [K2]

CO4: discuss the ribbons in Microsoft Office 2010, Mail Merge in Word, functions and charts in Excel. [K2]

CO5: use the elements of Microsoft Office Word 2010 and Microsoft Office Excel 2010 to create an useful application. [K3]

**UNIT I**

**Introductory concepts:** Memory unit – CPU - **Input Devices:** Keyboard, Mouse and Scanner-**Output devices:** Monitor, Printer-Introduction to Operating system & its features: DOS– UNIX – Windows-Introduction to Programming Languages. (6 Hours)

**UNIT II**

**Introducing Microsoft Word 2010:** Starting Microsoft Word 2010 – Exploring the User Interface of Microsoft Word 2010 – Exploring Tabs in Ribbon: Home Tab, Insert Tab, Page Layout Tab – Saving the Document – Creating a New Document: Creating a Blank Document – Opening an Existing Document – Closing the Document – Quitting from Microsoft Word 2010.

**Working with First Document in MS Word 2010:** Working with Text: Adding Text in a Document, Editing Text, Creating Bulleted and Numbered Lists – Applying Text Formatting: Changing Font and Font Size of Text, Applying Bold, Italic, and Underline, Changing the Color of the Text – Inserting Header and Footer. (6 Hours)

**UNIT III**

**Working with Pictures and Tables:** Working with Graphical Object: Inserting a Picture, Inserting Clip Art, Inserting a Shape, Inserting a WordArt – Performing Advance Operation on Graphical Object: Cropping a Picture, Adding a Border to a Picture – Working with Table: Inserting a Table, Adding Rows and Columns in an Existing Table, Merging and Splitting Cells.

**Using Mail Merge, Envelopes, and Labels:** Creating and Using Mail Merge: Setting the Environment for Mail Merge, Adding and Editing Recipients, Inserting Merge Fields, Previewing and Finishing Mail Merge. (6 Hours)

**UNIT IV**

**Introduction to Excel 2010:** Understanding Workbooks and Worksheets – Starting Microsoft Excel 2010 – Exploring the Microsoft Excel 2010 User Interface: The File Tab, Quick Access Toolbar, The Title Bar, The Minimize, Maximize/Restore, and Close Buttons, The Ribbon, The Formula Bar, The Name box, The Worksheet, Scroll Bars, The Sheet Tab, The Status Bar.

**Working with Worksheets and Cells:** Exploring the Different Types of Data used in Excel: Entering Data in a Worksheet – Saving a Workbook – Opening an Existing Workbook – Working with Rows and Columns: Inserting Rows and Columns, Deleting Rows and Columns – Describing the Cut, Copy, and Paste Commands: Using the Cut Command, Using the Copy Command, Using the Paste Command. (6 Hours)

**UNIT V**

**Working with Charts, Smart Art Graphics, and Sparklines:** Understanding Charts: Understanding Chart Type: Column Chart, Bar Chart, Line Chart and Pie Chart, Working with Charts: Creating a Chart.

**Working with Formulas and Functions:** Exploring the Basic Concepts used in Formulas: Understanding Operators in Formulas, Understanding Cell Referencing – Working with Mathematical and Statistical Functions: Using the PRODUCT Function, Using the SUM

Function, Using the AVERAGE Function – Working with Logical Functions: Using the AND Function, Using the IF Function, Using the OR Function. (6 Hours)

**TEXT BOOK**

Vikas Gupta. (2017). *Comdex Computer Course Kit Windows 7 with Office 2010,* Dreamtech Press, New Delhi, India.

| UNIT | PAGES |
|---|---|
| **I** | **Material will be provided** |
| **II** | **173-175, 177-180, 184-190, 195-205, 207, 217-220** |
| **III** | **238-241, 243-245, 250-255, 262-270** |
| **IV** | **277-283, 302-309, 313-319** |
| **V** | **366-368, 371-372, 388-398, 403-407** |

**REFERENCE BOOKS**

1. Dinesh Maidasani. (2011). *Learning Computer Fundamentals, MS Office and Internet & Web Technology*, 3rd Edition, Firewall Media, Kerala, India.
2. Ramesh Bangia. (2015). *Learning Microsoft Office 2010,* UBS Publishers, Bengaluru, India.

**WEB RESOURCE**

https://www.udemy.com/course/office-automation-certificate-course/

| PO/CO Course Code 23UCSN11 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 2 | - | - |
| CO2 | 3 | 2 | 2 | 2 | 2 | - | - |
| CO3 | 3 | 3 | 2 | 2 | 3 | 1 | - |
| CO4 | 3 | 1 | 1 | 2 | 3 | 2 | - |
| CO5 | 3 | 3 | 1 | 2 | 3 | 2 | - |

**Strong (3) Medium (2) Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Mrs. M. Sangeetha Alias Sheeba
Ms. M. Porkalai Selvi
Course Designers

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. COMPUTER SCIENCE**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester I | **PROBLEM SOLVING TECHNIQUES** | Hours/Week: 2 | |
| SEC - 1 Foundation Course | | Credits: 2 | |
| Course Code **23UCSF11** | | Internal 25 | External 75 |

**Course Outcomes:**

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

CO1 : familiarize with basics of computer, programming languages, data, flowchart and program. [K1]

CO2 : realize the hardware components, software, steps in programming, concepts of programming and data structures. [K1]

CO3 : explain the need for data, different programming languages, programming structures and modules for problem solving. [K2]

CO4 : identify the use of hardware, software and the relationship between the program steps and flow of data in the program. [K2]

CO5 : explore various programming languages, programming structures to manipulate data, file operation and the use of flowcharts to write programs for the solution of a problem. [K2]

**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, 4GL and 5GL - Features of good programming language - Translators: Interpreters and Compilers. (6 Hours)

**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 (6 Hours)

**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. (6 Hours)

**UNIT IV**

**Data:** Numeric Data and Character Based Data. **Arrays:** One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters. (6 Hours)

**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. (6 Hours)

**SELF-STUDY:**

Characteristics and limitations of Computer, Hardware/Anatomy of Computer

**TEXT BOOK**

Stewart Venit. (2010)**.** *Introduction to Programming: Concepts and Design*, 4th Edition, DreamTech Publishers.

**WEB RESOURCES**

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

| Course Code 23UCSF11 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO7 |
| CO1 | 3 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 2 |
| CO2 | 2 | 2 | - | 1 | 2 | 2 | 1 | 2 | 2 | 1 |
| CO3 | 3 | 1 | - | 1 | 3 | 3 | 2 | 2 | 1 | 3 |
| CO4 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 3 | 2 | 1 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 3 |

**Strong (3) Medium (2) Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Dr. R .Barani
Mrs. P. Aruna Devi
Course Designers

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**VIRUDHUNAGAR - 626 001**

**B.Sc. Computer Science**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **PROGRAMMING IN C** | Hours/Week: 5 | |
| Core Course - 3 | | Credits: 5 | |
| Course Code **23UCSC21** | | Internal 25 | External 75 |

**Course Outcomes:**

On completion of the course, students will be able to

**CO1:** identify the features of C language. [K1]

**CO2:** interpret the concepts of data types, homogeneous data structures, functional models and file manipulation. [K2]

**CO3:** describe control structures, pointers, input and output operations in C. [K2]

**CO4** apply the concepts of user-defined functions, strings, arrays, pointers and file management in C programs. [K3]

**CO5:** implement control & data structures in C. [K3]

**UNIT I**

**Overview of C:** History of C – Importance of C–Basic structure of C Programs. **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 – Overflow and Underflow of Data. **Operators and Expressions:** Introduction – Arithmetic Operators – Relational Operators – Logical Operators - Assignment Operators – Increment and Decrement Operators - Conditional Operator - Bitwise Operators - Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions. **Managing Input and Output Operations:** Introduction – Reading a Character – Writing a Character - Formatted Input - Formatted Output.

(15 Hours)

**UNIT II**

**Decision Making and Branching:** Introduction- Decision Making with IF Statements - Simple IF Statement, The If…Else Statement – Nesting of If…Else Statements–The Else If Ladder –The Switch Statement – The ? : Operator – The Go to Statement. **Decision Making and Looping:** Introduction – The While Statement – The Do Statement – The For Statement– Jumps in Loops. (15 Hours)

**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 of String Variables – Reading Strings from Terminals - Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings Together – Comparison of Two Strings – String-handling Functions – Table of Strings.

(15 Hours)

**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 but no Return Values- Arguments with Return Values- No Arguments but Return a Value – 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 – Arrays of Structures - Unions – Size of Structures. (15Hours)

**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 – Pointer Expressions – Pointer Increments and Scale Factor .**File Management in C:** Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error Handling during I/O Operations — Command Line Arguments. (15 Hours)

**SELF-STUDY:**

Some Computational Problems (Page No: 66-67)

Bit Level Programming (Page No: 480-484)

**TEXT BOOK**

E. Balagurusamy, (2012). *Programming in ANSI C*, 6th Edition, McGraw Hill Education (India) Ltd.

| Unit | Chapters | Sections |
|---|---|---|
| I | 1 | 1.1,1.2,1.8 |
| | 2 | 2.1-2.14 |
| | 3 | 3.1- 3.12, 3.14-3.16 |
| II | 4 | 4.1- 4.5 |
| | 5 | 5.1 – 5.9 |
| | 6 | 6.1-6.5 |
| III | 7 | 7.1-7.8 |
| | 8 | 8.1-8.9 |
| IV | 9 | 9.1-9.13 |
| | 10 | 10.1-10.6,10.8, 10.12-10.13 |
| V | 11 | 11.1-11.6,11.8-11.9 |
| | 12 | 12.1-12.5,12.7 |

**REFERENCE BOOKS**

1. E. Balagurusamy. (2013). *Computing fundamentals and C programming*, Tata McGraw Hill Publishing Company.
2. Byron Gottfried. (2005). *Theory and Problems of Programming with C*, Tata McGraw Hill Publishing Company.

| Course Code 23UCSC21 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | - |
| CO2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | - |
| CO3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | - |
| CO4 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | - |
| CO5 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | - |

**Strong (3)  Medium (2)  Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Dr. M.Chamundeeswari
Mrs.R.Sabitha
Course Designers

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**B.Sc. COMPUTER SCIENCE**

**(2023 - 2024 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **PROGRAMMING USING C PRACTICAL** | Hours/Week: 5 | |
| Core Course – 4 Practical II | | Credits: 3 | |
| Course Code **23UCSC21P** | | Internal 40 | External 60 |

## COURSE OUTCOMES

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

CO1: write C programs using various operators and control structures. [K2]

CO2: identify input-process-output model of a program. [K2]

CO3: implement homogeneous and heterogeneous data structures using C [K3]

CO4: develop C programs using functions and pointers[K3]

CO5: design C programs to give solution to real world problems. [K3]

**Develop programs in C language for the following concepts**

1. Operators
2. Control structures
3. Arrays
4. String manipulation
5. Formatted input and output
6. Built-in functions
7. User defined functions
8. Structures, Unions
9. Pointers
10. Recursion
11. Text files
12. Data files

| Course Code 23UCSC21P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | - |
| CO2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | - |
| CO3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | - |
| CO4 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 |

**Strong (3)  Medium (2)  Low (1)**

Dr. G. Karthigai Lakshmi
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Heads of the Departments

Dr. G. Karthigai Lakshmi
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**B.Sc. Computer Science**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **PROBABII.ITY AND STATISTICS** | Hours/Week: 4 | |
| Elective Course | | Credits: 4 | |
| Course Code:23UCSA21 | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

CO1: define the basic concepts in Probability and Statistics. [K1]

CO2: explain the statistical tools used in data analysis. [K2]

CO3: infer the data to draw conclusion in Probability and Statistics. [K2]

CO4: apply the statistical methods to solve real life problems. [K3]

CO5: calculate some statistical constants to get statistical inference. [K3]

**UNIT I**

**Skewness, Moments &Kurtosis:** Introduction, Skewness Defined, Tests of Skewness, Measures of Skewness, Moments, Kurtosis. (12 Hours)

**UNIT II**

**Correlation Analysis:** Types of Correlation, Methods of Studying Correlation, Karl Pearson's coefficient of correlation, Interpreting Coefficient of Correlation, Coefficient of Correlation and Probable Error, Rank Correlation.

**Regression Analysis:** Regression Lines, Regression Equations, Deviation taken from Arithmetic Means of X and Y- Deviation taken from Assumed Means (Except Graphing Regression Lines). (12 Hours)

**UNIT III**

**Probability& Expected Value:** Calculation of Probability, Theorems of Probability, Conditional Probability, Bayes Theorem, Mathematical Expectation (12 Hours)

**UNIT IV**

**Statistical Inference**–**Tests of Hypotheses:** Student's, t-Distribution-Properties of t-Distribution-The t-Table– Application of the t-Distribution. (12 Hours)

**UNITV**

**Chi–Square Test and Goodness of Fit:** The Chi-Square Distribution – Constants of Chi-Square Distribution- the Chi-Square test-when the degrees of freedom Exceed 30-Grouping When Individual Frequencies are Small- Uses of Chi-Square Test. (12 Hours)

**TEXTBOOK**

Gupta.S.P. (2004). *Statistical Methods*, 32nd Revised Edition, Sultan Chand and Sons.

| Unit | Volume | Chapter | Pages |
|---|---|---|---|
| I | I | 9 | 330–370(Up to Problem No: 40) |
| II | I | 10 | 381–394(Up to ProblemNo:11) |
| | | | 399–411(Up to ProblemNo:22) |
| | I | 11 | 439-451 |
| III | II | 1 | 759–792(Up to ProblemNo:59) |
| IV | II | 3 | 911-926(Up to ProblemNo:45) |
| V | II | 4 | 957–992(Up to ProblemNo:40) |

| Course Code 23UCSA21 | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 3 | 3 | 1 | 2 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 1 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 1 | 2 |
| CO4 | 3 | 2 | 3 | 3 | 3 | 3 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |

Dr.A.Uma Devi
Head of the Department

Dr.A.Uma Devi
Course Designer

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. Computer Science**
**(2023-2024 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **INTRODUCTION TO INTERNET AND HTML 5** | Hours/Week: 2 | |
| NME - 2 | | Credits: 2 | |
| Course Code **23UCSN21** | | Internal 25 | External 75 |

**Course Outcomes:**

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

CO1: describe the features of the web, web browser, Internet, E-Mail and HTML tags. K1]

CO2: summarize the purpose of browsers, Mailing software, HTML tags. [K1]

CO3: elucidate the working of web browsers, e-mail, creation of webpage, page layouts, HTML Forms and formatting of images in HTML. [K2]

CO4: illustrate the working of Internet, browsers and HTML tags. [K2]

CO5: use table, paragraph, list, text style tags and different components in HTML Forms. [ K3]

**UNIT I**

**Introduction to Internet:** Introduction to Internet - History of Internet - IETF-IRTF-IAB - Working of Internet and Intranet - Information on Internet - Requirements for connecting to Internet - Basic Internet terms – HTML - Internet Services and Governance - Impact of Internet on society.

**Browsers:** Definition of Browser - Basic Features of Web Browsers - Running a Browser - Working of Internet Explorer - Toolbar Buttons - Getting to a Website - Working with Favorites - Working with History - Back and Forward Buttons – Bookmarks - Working on the web using the Browsers - Customization of Browsers - Netscape Browser - Keyboard Shortcuts for Working in Internet Explorer. (6 Hours)

**UNIT II**

**Working with E-mail :** E-Mail - Opening of E-Mail Account - E-Mail Organization - Parts of E-Mail Text - Working with Messages - Reading a Message - Replying to a Message -

Forwarding a Message - Deleting a Message - Changing View - Attaching a file or an item to a message. (6 Hours)

**UNIT III**

**HTML:** Introduction - HTML Command Tags - Quotation Marks – Spacing - Special Symbols - New Web Page Creation – Looking at your page in a Browser - Defining Web Page – Main Body of the text - Putting Headers - Adding Paragraph – Formatting Text in HTML - Font Type - Font size - Using Big and Small - Using predefined fonts – Making bold and italic - Setting colors - Text color - Superscripts and Subscripts - Striking out or Underlining text – Inserting Graphics - Scaling an Image - Images alignment - Creating banner - Adding horizontal rules – Wrapping text between two images - Ending text wrap - Adding space around an image - Using low resolution images. (6 Hours)

**UNIT IV**

**HTML:** Page layouts - Setting margins - Space between paragraphs - Leaving block of space - Line Breaks - Indents - Centering text - Creating columns - Setting background color - Block quotes – Tables - A way of representing data - Creating table - Dividing table into columns - Dividing table into horizontal sections - Creating headers - Adding a border - Putting a background image - Heading across two or more columns - Changing color of a Cell - Aligning the contents of cells - Display of tables. (6 Hours)

**UNIT V**

**Working with Forms**: Creating a Form - Working with Menus - Working with Radio Buttons - Check Boxes - Text Boxes - Larger Text Areas - Password Boxes - Submit Button - Resetting the Form - Allowing Visitors to Upload File - Active Images. (6 Hours)

**TEXT BOOK**

Ramesh Bangia. (2010). *Internet and Web Design*, 2nd Edition, Firewall Media.

| UNIT | CHAPTER | PAGES |
|---|---|---|
| **I** | **1** | **1 – 8 (Except Net Etiquette)** |
| | **4** | **54 - 64** |
| **II** | **5** | **68 – 79, 85** |
| **III** | **10** | **171 – 192** |
| **IV** | **10** | **192 – 206** |
| **V** | **10** | **206 - 216** |

**REFERENCE BOOKS**

1. Rohit Khurana. (2010). *Computer Fundamentals and Internet Basics*, APH Publishing Corporation.
2. Kogent Learning Solutions Inc. *HTML 5 in Simple Steps*, DreamTech Press.

| PO/CO Course Code 23UCSN21 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 1 | 1 | - | - | 2 | - | - |
| CO2 | 1 | 1 | 1 | - | 2 | 1 | - |
| CO3 | 2 | 2 | 2 | 2 | 3 | 1 | - |
| CO4 | 2 | 2 | - | - | - | - | - |
| CO5 | 2 | 2 | 2 | 1 | 3 | 1 | - |

**Strong (3) Medium (2) Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Mrs. V. Subhasini
Course Designer

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR - 626 001**

**B.Sc. COMPUTER SCIENCE**

**(2023 - 2024 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **DIGITAL PRINCIPLES** | Hours/Week: 2 | |
| SEC- 2 | | Credits: 2 | |
| Course Code **23UCSS21** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

CO1: outline the basics of Number System, Digital Logic, Arithmetic & Data Processing Circuits, Registers and Counters. [K1]

CO2: infer the fundamentals of Combinational Logic Circuits and Flipflops. [K1]

CO3: describe Code Conversion, Logic Gates, Multiplexer, Demultiplexer, Decoders, Encoders, Arithmetic Logic unit, types of Registers and Counters. [K2]

CO4: interpret Boolean Laws and Theorems, Karnaugh Map, Gated and Edge-triggered Flipflops. [K2]

CO5: implement Number System, Code Conversions, Universal Logic Gates, Boolean Laws, Karnaugh Simplification, Data processing Circuits, Arithmetic Circuits, types of flipflops, Registers, Asynchronous and Synchronous Counters for the problem. [K3]

**UNIT I**

**Number Systems and Codes:** Binary Number System - Binary-to-Decimal Conversion - Decimal-to-Binary Conversion - Octal Numbers - Hexadecimal Numbers - The ASCII Code - The Excess 3 Code - The Gray Code. **Digital Logic:** The Basic Gates - NOT, OR, AND Gates - Universal Logic Gates - NOR, NAND. (4 Hours)

**UNIT II**

**Combinational Logic Circuits:** Boolean Laws and Theorems - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads and Octets - Karnaugh Simplifications – Don't Care Conditions - Product-of-sums Method - Product-of-sums Simplifications.

(5 Hours)

**UNIT III**

**Data Processing Circuits:** Multiplexers – Demultiplexers - 1-of-16 Decoders - BCD-to-decimal Decoders – Encoders - Exclusive-OR gates. **Arithmetic Circuits:** Binary Addition - Binary Subtraction – 2's Complement Representation – 2's Complement Arithmetic - Arithmetic Building Blocks - The Adder - Subtractor - Arithmetic Logic Unit.

(7 Hours)

**UNIT IV**

**Flip-Flops:** RS Flip-Flops - Basic Idea - NOR-Gate Latch - Gated Flip-Flops - Edge-triggered RS Flip-Flops - Edge-triggered JK Flip-Flops - JK Master-Slave Flip-Flops.

(7 Hours)

**UNIT V**

**Registers:** Types of Registers - Serial In-Serial Out - Serial In-Parallel Out. **Counters:** Asynchronous Counters - Synchronous Counters - Mod-8 binary counter with parallel clock input - Synchronous 4-bit up-down counter.

(7 Hours)

**SELF-STUDY: (Not included for examination)**

Parallel In-Serial Out - Parallel In-Parallel Out – **Page Nos. : 316 - 324**

**TEXT BOOK**

Albert Paul Malvino, Donald P.Leach & GoutamSaha (2011). *Digital Principles and Applications,* 7th Edition, Tata McGraw-Hill, New Delhi.

| UNIT | CHAPTER | SECTIONS |
|---|---|---|
| I | 5 | 5.1 - 5.8 |
| | 2 | 2.1 - 2.2 |
| II | 3 | 3.1 – 3.8 |
| III | 4 | 4.1 - 4.4, 4.6 - 4.7 |
| | 6 | 6.1 - 6.2, 6.5 - 6.8, 6.10 |
| IV | 8 | 8.1 - 8.3, 8.5, 8.8 |
| V | 9 | 9.1 - 9.3 |
| | 10 | 10.1, 10.3 |

**REFERENCE BOOKS**


1. Sanjay Sharma (2013). *Digital Electronics and Logic Design,* S.K. Kataria & Sons publishers, India.
2. Raj Kamal (2012). *Digital Systems: Principles and Design*, Pearson Education India.
3. John F. Wakerly (2009). *Digital Design Principles and Practices*, 4th Edition, Pearson Education.
4. Morris Mano, M., Michael D. Ciletti (2008). *Digital Design*, 4th Edition, Pearson Education.


| Course Code 23UCSS21 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | - | 1 | - | - | - | 2 | 2 | - | - |
| CO2 | 3 | - | 2 | - | - | - | 3 | 3 | - | - |
| CO3 | 3 | - | 3 | 3 | 2 | - | 3 | 3 | 2 | 2 |
| CO4 | 3 | - | 3 | 3 | - | 2 | 3 | 3 | 2 | - |
| CO5 | 3 | - | 3 | 2 | 2 | 3 | 3 | 3 | 2 | - |

**Strong (3) Medium (2) Low (1)**

Dr. G. Karthigai Lakshmi
Mrs. P. Aruna Devi
Heads of the Departments

Ms. A. Dhivya
Course Designer

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**VIRUDHUNAGAR**
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**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester III | **DATA STRUCTURES AND ALGORITHMS** | Hours/Week: 5 | |
| Core Course – 5 | | Credits: 5 | |
| Course Code **23UCSC31** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

CO1: define the data structures used to represent data in memory. [K1]

CO2: explain the linear and non-linear data structures as ADT and algorithmic techniques. [K2]

CO3: describe the operations of data structures and algorithmic procedures. [K2]

CO4: use suitable data structures and algorithms for solving problems. [K3]

CO5: implement the operations of data structures and algorithmic procedures . [K3]

**UNIT I**

**ARRAY-BASED LISTS:** Search - Insert – Remove – Time Complexity of List Operations. **Linked Lists:** Some Properties - Item Insertion and Deletion - Building a Linked List - Linked List as an ADT - Structure of Linked List Nodes – Destroy the List - Initialize the List - Print the List - Length of a List - Retrieve the Data of the First Node - Retrieve the Data of the Last Node. **Unordered Linked Lists:** Search the List - Insert the First Node - Insert the Last Node. **Definition of Doubly and Circular linked list**

(15 Hours)

**UNIT II**

**STACKS : Implementation of Stacks as Arrays :** Initialize Stack - Empty Stack - Full Stack - Push - Return the Top Element - Pop. **Linked Implementation of Stacks :** Empty Stack and Full Stack - Initialize Stack - Push - Return the Top Element - Pop.

**Queues** : **Queue Operations : Implementation of Queues as Arrays** - Empty Queue and Full - Queue - Initialize Queue - Front - Back - Add Queue - Delete Queue. **Linked Implementation of Queues :** Empty and Full Queue - Initialize Queue - addQueue, front, back, and deleteQueue Operations. (15 Hours)

**UNIT III**

**Binary Trees :** Binary Trees - Copy Tree - Binary Tree Traversal: Inorder Traversal - Preorder Traversal - Postorder Traversal - Implementing Binary Trees - Binary Search Trees - Search - Insert. (15 Hours)

**UNIT IV**

**Graphs :** Introduction - Graph Definitions and Notations - Graph Representation - Adjacency Matrices - Adjacency Lists - Operations on Graphs - Graphs as ADTs - Graph Traversals - Depth-First Traversal - Breadth-First Traversal. (15 Hours)

**UNIT V**

**REFERENCE BOOKS**

1. Mark Allen Weiss (2014). *Data Structures and Algorithm Analysis in C++*, 4th Edition, Pearson Education.
2. Reema Thareja (2014). *Data Structures Using C*, 2nd Edition, Oxford Universities Press
3. ISRD Group (2011). *Data Structures through C++*, 1st Edition, McGraw-Hill Company.
4. John R.Hubbard (2000). *Data Structures with C++*, 2nd Edition, Schaum's Outline.
5. Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, (June 2006). *Fundamentals of Data Structures in C++*, 2nd Edition, Silicon Press.
6. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran (2005). *Fundamentals of Computer Algorithms*. Galgotia Publications, India.

2 **Divide-and-Conquer:** Binary Search – Mergesort – Quicksort. **The Greedy Approach:** Minimum Spanning Trees: Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm for Single Source Shortest Paths. (15 Hours)

**SELF-STUDY: (Not included for Examination)**

Polynomial Operations, Application of Stacks: Postfix Expressions Calculator

(Page Nos. : 187 – 194, 428 – 437)

**TEXT BOOKS**

1. D.S. Malik (2009). *Data Structures Using C++*, 2nd Edition, Cengage Learning, India.
2. Richard Neapolitan & Kumarss Naimipour (2008). Foundations of Algorithms Using C++ Pseudocode. 3rd Edition. Jones and Bartlett Publishers, Inc, Sudbury, MA, United States.

| UNIT | TEXT BOOKS | CHAPTERS | PAGES |
|---|---|---|---|
| I | Text Book1 | 3 | 181-194 |
| | | 5 | 266-280, 286-288, 292-299, 310, 326 |
| II | | 7 | 400-406, 415-422 |
| | | 8 | 454-469 |
| III | | 11 | 600-621 |
| IV | | 12 | 686-699 |
| V | Text Book2 | 2 | 48–51, 53-55, 60-62 |
| | | 4 | 140-148, 150-152, 156-158 |

| Course Code 23UCSC31 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | - | - | - | 3 | - | - | 2 | - | - |
| CO2 | 3 | - | 2 | 2 | 2 | - | 2 | 2 | 2 | - |
| CO3 | 3 | - | 2 | 2 | 2 | 2 | - | 2 | - | - |
| CO4 | 3 | 2 | - | 2 | 3 | 2 | - | 3 | - | - |
| CO5 | 3 | 2 | - | 2 | 3 | 2 | 2 | 3 | 2 | - |

**Strong (3) Medium (2) Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. K. Annbuselvi
Mrs. S. Veni
**Course Designers**

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**Quality Education with Wisdom and Values**

**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester III | **DATA STRUCTURES AND ALGORITHMS PRACTICAL** | Hours/Week: 5 | |
| Core Course – 6 (Practical – III) | | Credits: 3 | |
| Course Code **23UCSC31P** | | Internal 40 | External 60 |

## COURSE OUTCOMES

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

CO1: write programs to implement data structures and algorithmic techniques. [K2]

CO2: identify ADT required for linear and non-linear data structures. [K2]

CO3: implement operations like search, merge, insertion and deletion on various linear data structures. [K3]

CO4: apply traversals algorithms on tree data structure. [K3]

CO5: execute searching and sorting algorithms for solving problems. [K3]

**Write C++ programs for the following**

1. to perform insertion and deletion operation in the given one dimensional dynamic array.
2. to perform the insertion operation in a singly Linked list.
3. to perform the deletion operation in a singly Linked list.
4. to perform search operation in a singly linked list.
5. to perform push and pop operations in a stack – (represent stack as array).
6. to perform push and pop operations in a stack – (represent stack as linked list).
7. to perform insert and delete operations in a queue – (represent queue as array).
8. to perform insert and delete operations in a queue – (represent queue as linked list).
9. to traverse a binary search tree – (Inorder , Preorder, Postorder).
10. to count number of leaf nodes in the given binary search tree.
11. to search an element in the given one dimensional dynamic array using binary search.
12. to sort an array of numbers using selection sort.
13. to sort an array of numbers using insertion sort.
14. to sort an array of numbers using quicksort.
15. to sort an array of numbers using mergesort.

| Course Code 23UCSC31P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | 2 | 2 | 2 | 2 | - | 3 | - | - |
| CO2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | - | - |
| CO3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | - | - |
| CO4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | - |
| CO5 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | - | - |

**Strong (3)  Medium (2)  Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. K. Annbuselvi
Mrs. S.Veni
**Course Designers**

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**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester III | **NUMERICAL METHODS** | Hours/Week: 4 | |
| Elective Course | | Credits: 4 | |
| Course Code **23UCSA31** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

On completion of the course the students will be able to

CO1: recall the fundamental concepts of algebraic, transcendental and simultaneous equations. [K1]

CO2: derive the solutions of equations by various iterative methods. [K2]

CO3: find the missing data by using interpolation and inverse interpolation methods. [K2]

CO4: perform numerical differentiation and integration to find the derivatives and integral value numerically. [K3]

CO5: apply Taylor series method, Picard's method, Euler's and Runge-kutta methods to obtain the solution of the initial value problems. [K3]

**UNIT I**

**Algebraic and Transcendental Equations:**

Introduction - Errors in numerical computation - Iteration method - Bisection method - Regula - Falsi method - Newton-Raphson method - Horner's method. (12 hours)

**UNIT II**

**Simultaneous Equations:**

Introduction - Simultaneous equations - Back substitution - Gauss Elimination method - Gauss-Jordan Elimination method - Calculation of Inverse of a matrix - Crout's method - Iterative methods - Gauss-Jacobi Iteration method - Gauss Seidal Iteration method - Newton Raphson's method for simultaneous equations. (12 hours)

**UNIT III**

**Interpolation**

Introduction - Newton's interpolation Formula - Central difference Interpolation Formulae- Gauss Forward Interpolation Formula, Gauss Backward Interpolation Formula, Lagrange's Interpolation Formula - Divided Differences - Newton's Divided Difference Formula- Inverse Interpolation. (12 hours)

**UNIT IV**

**Numerical Differentiation and Integration:**

Introduction - Derivatives using Newton's forward difference Formula - Derivatives using Newton's backward difference Formula - Numerical Integration - Newton-cotes quadrature - Trapezoidal Rule-Simpson's one third rule - Simpson's 3/8th rule. (12 hours)

**UNIT V**

**Numerical Solution of Ordinary Differential Equations:**

Introduction - Taylor series method - Picard's method - Euler's method - Runge-kutta method of second, third, fourth order - Predictor & corrector methods - Milne's method.

(12 hours)

**TEXT BOOK:**

Arumugam. S, A.Thangapandi lssac.A, Somasundaram.A, *Numerical Methods*, Second Edition, SCITECH publications. Reprint, December 2013.

**REFERENCE BOOK:**

Mathews J.H. Numerical Method for Maths, Science and Engineering: PHI, New Delhi, 2001.

**WEB RESOURCES**

https://27x37.files.wordpress.com/2011/05/mcgraw-hill-numerical-methods-using-matlab.pdf

| **Course Code 23UCSA31** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO 6** | **PO7** |
|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | 3 | 1 | 1 | - |
| **CO2** | 3 | 2 | 1 | 3 | 2 | 1 | - |
| **CO3** | 3 | 1 | 1 | 3 | 2 | 1 | - |
| **CO4** | 3 | 2 | 1 | 3 | 2 | 1 | - |
| **CO5** | 2 | 2 | 1 | 3 | 2 | 1 | - |

**Strong(3) Medium(2) Low(1)**

Dr.M.C. Maheswari — **Head of the Department**

Dr.M.Uma Maheswari — **Course Designer**

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**(for those who join in 2023 - 2024)**

| | | |
|---|---|---|
| Semester III | **DTP PRACTICAL** | Hours/Week: 1 |
| SEC – 3<br>Practical – I | | Credit: 1 |
| Course Code<br>**23UCSS31P** | | Internal<br>100 |

**COURSE OUTCOMES**

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

CO1: write steps for basic Photoshop Techniques.[K2]

CO2: write steps to edit photos and animate with Photoshop tools. [K2]

CO3: show the skill of working with multiple layers in Photoshop. [K3]

CO4: demonstrate various Filtering Effects, Techniques and complete the record work. [K3]

CO5: use creative thought processes to create professional designs. [K3]

**Design the following Exercises:**

1. using filters
2. using lasso tool
3. for cloning and transformation
4. using paint bucket , color picker and brush tools
5. for animation creation
6. for blur effect
7. using text and transform tools
8. for color balance
9. using clone stamp and smudge tools
10. for 3D object creation

| Course Code 23UCSS31P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | - |
| CO2 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | - |
| CO3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 |

**Strong (3)  Medium (2)  Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. M. Chamundeeswari
Ms. A. Dhivya
**Course Designers**

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**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester III | **WEB DESIGNING PRACTICAL** | Hours/Week: 2 | |
| SEC – 4<br>Practical – II | | Credits: 2 | |
| Course Code<br>**23UCSS32P** | | Internal<br>40 | External<br>60 |

**COURSE OUTCOMES**

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

CO1: write program using various HTML and CSS elements.[K2]

CO2: write program using conditional and looping statements in JS [K2]

CO3: demonstrate appropriate transition and animation effects on objects in web page **.** [K3]

CO4: prepare record with outputs of different Java Script and HTML programs. [K3]

CO5: create forms in a neat format using HTML and CSS.[K3]

**Write HTML Programs**

1. to display a simple table
2. to design any application form
3. to demonstrate Image Map
4. to design a website with 5 pages and navigate using tabs

**CSS Exercises:**

5. To demonstrate the use of various selectors
6. To demonstrate the use of transforms
7. To demonstrate the use of animation
8. To demonstrate the use of gradient
9. To design web pages using inline style sheet
10. To design web pages using internal style sheet
11. To design web pages using external style sheet

**Java Script Exercises:**

12. To get input from the user and perform number manipulation.
13. To implement if statement
14. To implement for and while statements
15. To create slideshow.

| Course Code 23UCSS32P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | - | - | 2 | - | - | 1 | - | - |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | - | - |
| CO3 | 3 | 3 | - | - | - | - | - | 3 | 1 | 1 |
| CO4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| CO5 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 1 | 1 |

**Strong (3) Medium (2) Low(1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. M. Chamundeeswari
Mrs. M. Sangeetha Alias Sheeba
**Course Designers**

**V.V.VANNIAPERUMAL COLLEGE FOR WOMEN**
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**VIRUDHUNAGAR**
**Quality Education with Wisdom and Values**

**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester IV | **JAVA PROGRAMMING** | Hours/Week: 5 | |
| Core Course – 7 | | Credits: 5 | |
| Course Code **23UCSC41** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

CO1: understand the Object-oriented concepts and constructs in Java. [K1]

CO2: infer packages, inheritance, interface, multi-threads, and exceptions. [K2]

CO3: describe the usage of IO streams, AWT controls, Swing components and event handling mechanisms. [K2]

CO4: implement inheritance, packages, interfaces, exception handling, multi-threading, I/O streams. [K3]

CO5: employ event handling mechanisms with AWT controls and Swing components to create GUI. [K3]

**UNIT I**

**Introducing Classes:** Class Fundamentals – Declaring Objects – Assigning Object Reference variables – Introducing Methods – Constructors – The this keyword. **Inheritance**: Inheritance basics – Using super – Creating a Multilevel hierarchy – When Constructors are called - Method Overriding - Dynamic method dispatch – using Abstract classes - using final with Inheritance – The Object class. (15 Hours)

**UNIT II**

**Packages and Interfaces**: Packages - Access Protection – Importing Packages - Interfaces. **Exception Handling**: Exception Handling Fundamentals - Using try and catch – Multiple catch Clauses – Nested try statements - throw - throws – finally – Built-in exceptions - Creating own Exception subclasses. **Multithreaded Programming**: Thread Class and the Runnable interface – Creating a Thread – Creating Multiple Threads - Synchronization - Inter thread Communication. (15 Hours)

**UNIT III**

**Input/Output: Exploring java.io:** The Java I/O Classes and Interfaces – File – The Stream Classes – The Byte Streams – The Character Streams. **Event Handling:** Two Event Handling mechanisms – The Delegation Event Model - The Event Classes – Sources of Events – Event Listener Interfaces – Using the Delegation Event Model. (15 Hours)

**UNIT IV**

**Introducing the AWT:** The AWT Classes – window fundamentals - Working with Frame windows – Working with Color – Working with Fonts - **Using AWT Controls, Layout Managers and Menus:** Labels – Using Buttons – Applying Check Boxes – CheckBox Group – Choice Controls – Using Lists – Managing Scroll bars – Using a TextField – Using a TextArea – Understanding Layout managers – Menu Bars and Menus.

(15 Hours)

**UNIT V**

**Introducing Swing:** The Origin of Swing – Components and Containers – A simple Swing Application – The Swing Packages – **Exploring Swing:** Jlabel and ImageIcon - JTextField – The Swing Buttons - JScrollPane - JList – JcomboBox. (15 Hours)

**SELF-STUDY: (Not included for Examination)**

Java Evolution – Page Nos.: 13, 14

**TEXT BOOK**

Herbert Schildt (2010), *Java The Complete Reference*, 7th Edition, Tata McGraw Hill, New Delhi.

| UNIT | CHAPTER | PAGES |
|---|---|---|
| I | 6 | 105 - 121 |
| | 8 | 157 - 181 |
| II | 9 | 183 – 202 |
| | 10 | 205, 207 – 221 |
| | 11 | 228 - 233, 238 - 249 |
| III | 19 | 555 - 586 |
| | 22 | 637 - 658 |
| IV | 23 | 663 – 668, 682 – 684, 686 - 690 |
| | 24 | 702 – 741 |
| V | 29 | 859, 862, 863 - 867 |
| | 30 | 879 – 890, 893 - 899 |

**REFERENCE BOOKS**

1. Debasish Jana (2008), *Java and Object-Oriented Programming Paradigm*, Prentice Hall of India Private Limited, New Delhi.

2. Y. Daniel Liang (2010.), *Introduction to Java Programming*, 7th Edition, Pearson Education India
3. Dr. Somasundaram (2013), *Introduction to Java Programming*, 1st Edition, Jaico Publishing House, India.

**WEB RESOURCES**

1. https://javabeginnerstutorial.com/core-java-tutorial
2. http://docs.oracle.com/javase/tutorial/
3. https://www.coursera.org/

| Course Code 23UCSC41 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | - | - |
| CO2 | 3 | 3 | 1 | 3 | 2 | 3 | 3 | 3 | - | - |
| CO3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | - | - |
| CO4 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | - | 2 |
| CO5 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 3 | - | 2 |

**Strong (3) Medium (2) Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. M. Chamundeeswari
Mrs. T. Chitra
**Course Designers**

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**VIRUDHUNAGAR**
**Quality Education with Wisdom and Values**

**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester IV | **JAVA PROGRAMMING PRACTICAL** | Hours/Week: 4 | |
| Core Course – 8<br>Practical – IV | | Credits: 3 | |
| Course Code<br>**23UCSC41P** | | Internal<br>40 | External<br>60 |

## COURSE OUTCOMES

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

CO1: write Java programs using arrays, strings, methods, inheritance, interface and threads. [K2]

CO2: write Java programs using packages, exceptions, AWT Controls and Swing Components. [K2]

CO3: execute Java programs for various inputs. [K3]

CO4: prepare record with Java programs using basic object oriented programming concepts, packages, multi-threads and exception concepts. [K3]

CO5: implement simple graphical methods using AWT Controls and Swing Components. [K3]

**Write Java programs to implement the following concepts**

1. Arrays
2. Constructors
3. Method Overloading
4. Method Overriding
5. Inheritance
6. Interface
7. Packages
8. String Manipulation
9. Multi-thread

10. Built-in exceptions.
11. User defined exceptions
12. Frames and Controls
13. AWT Layouts
14. Swing Components

| Course Code 23UCSC41P | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | - | - |
| CO2 | 3 | 2 | 3 | 2 | 3 | 2 | 1 | 2 | - | 1 |
| CO3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | - |
| CO4 | 3 | 2 | 3 | 1 | 2 | 2 | 1 | 2 | - | - |
| CO5 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 |

**Strong (3)** **Medium (2)** **Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

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**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester IV | **RESOURCE MANAGEMENT TECHNIQUES** | Hours/Week: 4 | |
| Elective Course | | Credits: 4 | |
| Course Code **23UCSA41** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

On completion of the course the students will be able to

CO1: define the basic concepts in OR, LPP and Transportation Problems. [K1]

CO2: explain various methodologies involved in resource management techniques. [K2]

CO3: find the optimal solutions to various problems using optimization techniques. [K2]

CO4: apply the acquired computational skills to formulate the problems in real life situations. [K3]

CO5: use various transportation techniques in various domains. [K3]

**UNIT I**

**Development of OR :** Definition of OR- Modelling-Characteristics and Phases-Tools,Techniques & Methods-scope of OR. (12 hours)

**UNIT II**

**Linear Programming Problem :** Formulation-Slack & surplus variables- Graphical solution of LPP. (12 hours)

**UNIT III**

**Simplex Method :** Computational Procedure-Big M method-Concept of duality in LPP-Definition of primal and dual problems-General rules for converting any primal into its dual. (12 hours)

**UNIT IV**

**Duality:** Theorems (without proof)- Primal and dual correspondence-Duality and simplex method –Mathematical formulation of assignment problem-Method for solving assignment problem. (12 hours)

**Unit V**

**Mathematical Formulation of Transportation Problem :** Methods for finding Initial Basic Feasible Solution for the Transportation Problems, Optimal Solution (Excluding Unbalanced, Degeneracy and Non-Degeneracy). (12 hours)

**TEXT BOOK:**

1. Sharma.S.D, *Operations Research*, Kedar Nath Ram Nath & Co.

**REFERENCE BOOKS:**

1. Operation Research, R.Sivarethinamohan, Tata McGraw Hill, 2005.

2. Operation Research, Nita H.Shah, Ravi M.Gor and Hardiksoni, Prentice-Hall of India Pvt. Ltd., New Delhi 2008.

**Web Resources:**

Web resources from NDL Library, E-content from open-source libraries

| Course Code 23UCSA41 | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO7 |
|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | 3 | 2 | 1 | - |
| **CO2** | 3 | 2 | - | 3 | 2 | 1 | - |
| **CO3** | 3 | 2 | 1 | 3 | 2 | 1 | - |
| **CO4** | 3 | 2 | 1 | 3 | 2 | 1 | - |
| **CO5** | 3 | 2 | 1 | 3 | 1 | 1 | - |

**Strong(3) Medium(2) Low(1)**

Dr.M.C. Maheswari
**Head of the Department**

Dr.M.Uma Maheswari
**Course Designer**

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## B.Sc. COMPUTER SCIENCE
## (for those who join in 2023 - 2024)

| | | | |
|---|---|---|---|
| Semester IV | **COMPUTER ORGANIZATION** | Hours/Week: 2 | |
| SEC - 5 | | Credits: 2 | |
| Course Code **23UCSS41** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

CO1: outline the basic components and architecture of basic computing system. [K1]

CO2: realize the working of functional units simple computer. [K1]

CO3: infer the relationship between central processing, input/output and memory units. [K2]

CO4: summarise the various types of instructions, addressing modes, arithmetic algorithms and memories. [K2]

CO5: experiment the different addressing modes and arithmetic algorithms with various input data and memories for various sizes. [K3]

**UNIT I**

**Basic Computer Organization and Design**: Instruction Codes – Computer Registers – Computer Instructions – Instruction Cycle (6 Hours)

**UNIT II**

**Central Processing Unit:** General Register Organization – Stack Organization – Addressing Modes. (6 Hours)

**UNIT III**

**Central Processing Unit:** Data Transfer and Manipulation - **Computer Arithmetic:** Introduction – Addition and Subtraction (6 Hours)

**UNIT IV**

**Input-Output Organization:** Input-Output Interface – Asynchronous Data Transfer – Direct Memory Access. (6 Hours)

**UNIT V**

**Memory Organization:** Main Memory – Associative Memory – Cache Memory – Virtual Memory (6 Hours)

**SELF-STUDY: (Not included for Examination)**

**Basic Computer Organization and Design**: Timing and Control (Page Nos. 137 -141)

**TEXT BOOK**

M. Morris Mano (2003). *Computer System Architecture*, 3rd Edition, Prentice Hall of India., India.

| UNIT | CHAPTER | SECTIONS |
|---|---|---|
| **I** | **5** | **5.1- 5.3, 5.5** |
| **II** | **8** | **8.2, 8.3, 8.5** |
| **III** | **8** | **8.6** |
| | **10** | **10.1-10.3** |
| **IV** | **11** | **11.2, 11.3, 11.6** |
| **V** | **12** | **12.2, 12.4-12.6** |

**REFERENCE BOOKS**


1. V.Carl Hamacher, Zronko G Vranesic, S, Softwat G. Zaky (2014). *Computer Organization*, 5th Edition, McGraw Hill International Standard Edition, New York, USA.
2. William Stallings (2016). *Computer Organization and Architecture Designing for Performance*, 10th Edition, Pearson Education, India.
3. Mostafa Abd-El-Barr, Hesham El-Rewini (2005). *Fundamentals of Computer Organization and Architecture*, John Wiley & Sons, Inc. Publication, New Jersey, Canada.


| Course Code 23UCSS41 | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | - | - | - | - | 1 | 3 | 3 | - | - |
| CO2 | 3 | - | 2 | 2 | 2 | 1 | 2 | 2 | 1 | - |
| CO3 | 3 | 1 | 1 | - | 3 | 3 | 2 | 2 | 2 | - |
| CO4 | 3 | - | 2 | 1 | 1 | 2 | 2 | 2 | 1 | - |
| CO5 | 3 | - | 1 | - | - | 2 | 3 | 3 | 1 | - |

**Strong (3) Medium (2) Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr.R.Barani
Mrs.R.Sabitha
**Course Designers**

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**B.Sc. COMPUTER SCIENCE**
**(for those who join in 2023 - 2024)**

| | | | |
|---|---|---|---|
| Semester IV | **PHP PROGRAMMING PRACTICAL** | Hours/Week: 2 | |
| SEC – 6<br>Practical – III | | Credits: 2 | |
| Course Code<br>**23UCSS41P** | | Internal<br>40 | External<br>60 |

**COURSE OUTCOMES**

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

CO1: formulate the web pages that communicates information effectively to the user. [K2]

CO2: design the web pages by identifying the proper tools and techniques. [K2]

CO3: develop the interactive web page through the source code with the help of appropriate editor. [K3]

CO4: demonstrate the webpages using various real-time inputs. [K3]

CO5: construct the webpages for the necessary data validation and for web ethics.[K3]

**Write PHP Program for the following:**

1. Design a webpage with various menu options.
2. Design a webpage with sidebars.
3. Design a website with slideshow.
4. Design a website with multiple frames.
5. Design a website to display form responses in another page.
6. Design a website to display form responses within the same page.
7. Store the current date and time in a COOKIE and display the information about the 'Last Visit'.
8. Store the number of visits on a web page in SESSION and to show it on the webpage.
9. Create table dynamically in a Database.
10. Insert, update and delete records into the table in Database.
11. Display entire information from a table in Database.

12. Display selective information from more than one table in Database.
13. Apply join query in the Database.
14. Validate user login.
15. Upload image.
16. Import excel file contents into database.
17. Export data from database into excel format.
18. Export data from database into PDF format.
19. Design home page for department website. (include social media icons in it)
20. Develop admin dashboard.

| Course Code | PO1 | | PO2 | | PO3 | PO4 | PO5 | | PO6 | PO7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 23UCSS41P | PSO 1.a | PSO 1.b | PSO 2.a | PSO 2.b | PSO 3 | PSO 4 | PSO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 |
| CO3 | 2 | 2 | 2 | 1 | 2 | - | - | - | 2 | 2 |
| CO4 | 1 | 1 | 2 | 1 | 1 | - | - | - | 1 | - |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 3 |

**Strong (3) Medium (2) Low (1)**

Dr. K. Annbuselvi
Mrs. P. Aruna Devi
**Heads of the Departments**

Dr. R. Barani
Mrs. R. Sabitha
**Course Designers**