# திருவள்ளுவர் பல்கலைக்கழகம்
## THIRUVALLUVAR UNIVERSITY
### SERKKADU, VELLORE–632115

# B.Sc. ARTIFICIAL INTELLIGENCE

# SYLLABUS

## FROM THE ACADEMIC YEAR

## 2023 - 2024

# 1. Introduction

**B.Sc.  Artificial Intelligence**

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

Artificial intelligence or AI is the science that deals with the development of machines capable of thinking like a human brain. It focuses on the stimulation of human thought and behaviour in machines including learning from data, reasoning, and self-correction. With the advent of technologies and applications (apps) that can gratify our wishes and cravings at the touch of our fingertips, BSc Artificial Intelligence has become a sought after course that offers excellent opportunities in the upcoming field of artificial intelligence and machine learning.

1. **Preamble**

In pursuit of the Higher Education Department Policy Note 2022-23 Demand 20, Section 1.4, Tamil Nādu State Council for Higher Education took initiative to revamp the curriculum. On 27 July 2022, a meeting was convened by the Member-Secretary Dr. S. Krishnasamy enlightening the need of the hour to restructure the curriculum of both Under-graduate and Post-graduate programmes based on the speeches at the Tamil Nādu Legislative Assembly Budget meeting by the Honourable Higher Education Minister Dr K. Ponmudy and Honourable Finance Minister     Dr. P. Thiagarajan. At present there are three different modes of imparting education in most of the educational institutions throughout the globe. Outcome Based Education, Problem Based Education, and Project Based Education.

Now our Honourable Higher Education Minister announced Industry Aligned Education. During discussion, Member Secretary announced the importance of question papers and evaluation as envisaged by the Honourable Chief Secretary to Government Dr, V. IraiAnbu. This is very well imbedded in Revised Bloom's

Taxonomy.

Taxonomy forms three learning domains: the cognitive (knowledge), affective(attitude), and psychomotor (skill). This classification enables to estimate the learning capabilities of students.

Briefly, it is aimed to restructure the curriculum as student-oriented, skill-based, and institution-industry-interaction curriculum with the various courses under

"Outcome Based Education with Problem Based Courses, Project Based Courses, and Industry Aligned Programmes" having revised Bloom's Taxonomy for evaluating students skills.

Three domains:

(i)Cognitive Domain

 (Lower levels: K1: Remembering ; K2: Understanding ;  K3: Applying;

 Higher levels: K4: Analysing ; K5: Evaluating; K6: Creating)

(ii)  Affective Domain

(iii) Psychomotor Domain

| | |
|---|---|
| **2. CHOICE BASED CREDIT SYSTEM AND LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK BASED B.Sc. ARTIFICIAL INTELLIGENCESYLLABUS** | |
| **Programme:** | **B.Sc. Artificial Intelligence** |
| **Programme Code:** | |
| **Duration:** | **3 Years(UG)** |
| **Programme Outcomes:** | Onsuccessfulcompletionoftheprogrammethe studentswillbeableto<br><br>**PO1: Disciplinary Knowledge:** Possess comprehensive knowledge and understanding of one or more disciplines that are part of a program of study, and apply it effectively.<br><br>**PO2: Critical Thinking:** Demonstrate critical thinking abilities to evaluate evidence, arguments, claims, beliefs, and policies based on empirical evidence, identify assumptions and implications, formulate coherent arguments, and assess theories using a scientific approach to knowledge development.<br><br>**PO3: Problem Solving:** Utilize competencies to solve non-familiar problems and apply learning to real-life situations instead of simply replicating curriculum content knowledge.<br><br>**PO4: Analytical & Scientific Reasoning:** Possess analytical and scientific reasoning skills to evaluate evidence reliability and relevance, identify logical flaws in others' arguments, synthesize data from various sources, draw valid conclusions supported by evidence, and address opposing viewpoints.<br><br>**PO5: Research related skills:** Possess research-related skills to analyze, interpret, and draw conclusions from quantitative/qualitative data, evaluate ideas, evidence, and experiences from an open-minded and reasoned research perspective, formulate hypotheses, test and analyze results, and derive conclusions.<br><br>**PO6: Self-directed & Lifelong Learning**: Possess the ability to work independently, identify and manage a project, acquire knowledge and skills through self-directed learning for personal development, and meet economic, social, and cultural objectives. Possess the ability to learn how to learn and engage in lifelong learning. |

| 3. | Programme Specific Outcomes: | On successful completion of Bachelor of Science in Computer Science with Cognitive Systems programme, the student should be able to: |
|---|---|---|
| | | **PSO1: Disciplinary Knowledge:**Develop fundamental knowledge in computing technology and the importance of programming with its different programming paradigms. |
| | | **PSO2: Critical Thinking**: Ability to interpret complex problems, evaluate and synthesize information, apply theoretical concepts to practical situations, formulate and provide rational solution to computer oriented solvable real time problems |
| | | **PSO3: Problem Solving:**Solve problems computationally by applying different mathematical and algorithmic methods and wide range of emerging and newly-adopted technologies to facilitate knowledge discovery |
| | | **PSO4: Analytical & Scientific Reasoning**: Apply scientific methods, collect and analyse data, test hypotheses, evaluate evidence, apply statistical techniques and use computational models |
| | | **PSO5: Research related skills:** Formulate research questions, conduct literature reviews, design and execute research studies, communicate research findings and collaborate in research projects |
| | | **PSO6: Self-directed & Lifelong Learning:** Set learning goals, Manage their own learning, Reflect on their learning, Adapt to new contexts, Seek out new knowledge, Collaborate with others and to continuously improve their skills and knowledge, through ongoing learning and professional development, contribute to the growth and development of their field and holisticallyenhance their Personality throughout their life. |

| PO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| PO1 | ✓ | | | | | |
| PO2 | | ✓ | | | | |
| PO3 | | | ✓ | | | |
| PO4 | | | | ✓ | | |
| PO5 | | | | | ✓ | |
| PO6 | | | | | | ✓ |

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### 4. Highlights of the Revamped Curriculum

➢ Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.

➢ The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also f4acilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.

➢ The General Studies and Computer Science based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.

➢ The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

➢ The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.

➢ The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.

➢ Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.

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

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**5. Value additions in the Revamped Curriculum:**

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

| | | introduced with hands-on-training, facilitates designing of mathematical models in the respective sectors |
|---|---|---|
| **IV** | Industrial Statistics | • Exposure to industry moulds students into solution providers<br>• Generates Industry ready graduates<br>• Employment opportunities enhanced |
| **II year Vacation activity** | Internship / Industrial Training | • Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens. |
| **V Semester** | Project with Viva – voce | • Self-learning is enhanced<br>• Application of the concept to real situation is conceived resulting in tangible outcome |
| **VI Semester** | Introduction of Professional Competency component | • Curriculum design accommodates all category of learners; 'Mathematics for Advanced Explain' component will comprise of advanced topics in Mathematics and allied fields, for those in the peer group / aspiring researchers;<br>• 'Training for Competitive Examinations' –caters to the needs of the aspirants towards most sought - after services of the nation viz, UPSC, CDS, NDA, Banking Services, CAT, TNPSC group services, etc. |
| **Extra Credits:**<br>**For Advanced Learners / Honors degree** | | • To cater to the needs of peer learners / research aspirants |

| **Skills acquired from the Courses** | Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill |
|---|---|

# Credit Distribution for UG Programmes

| Sem I | C | H | Sem II | C | H | Sem III | C | H | Sem IV | C | H | Sem V | C | H | Sem VI | C | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Part 1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | 5.1 Core Course – \CC IX | 4 | 5 | 6.1 Core Course – CC XIII | 4 | 6 |
| Part.2 English | 3 | 6 | Part..2 English | 3 | 6 | Part..2 English | 3 | 6 | Part..2 English | 3 | 6 | 5.2 Core Course – CC X | 4 | 5 | 6.2 Core Course – CC XIV | 4 | 6 |
| 1.3 Core Course – CC I | 5 | 5 | 2..3 Core Course – CC III | 5 | 5 | 3.3 Core Course – CC V | 5 | 5 | 4.3 Core Course – CC VII Core Industry Module | 5 | 5 | 5. 3.Core Course CC -XI | 4 | 5 | 6.3 Core Course – CC XV | 4 | 6 |
| 1.4 Core Course – CC II | 5 | 5 | 2.4 Core Course – CC IV | 5 | 5 | 3.4 Core Course – CC VI | 5 | 5 | 4.4 Core Course – CC VIII | 5 | 5 | 5. 4.Core Course –/ Project with viva-voce CC -XII | 4 | 5 | 6.4 Elective - VII Generic/ Discipline Specific | 3 | 5 |
| 1.5 Elective I Generic/ Discipline Specific | 3 | 4 | 2.5 Elective II Generic/ Discipline Specific | 3 | 4 | 3.5 Elective III Generic/ Discipline Specific | 3 | 4 | 4.5 Elective IV Generic/ Discipline Specific | 3 | 3 | 5.5 Elective V Generic/ Discipline Specific | 3 | 4 | 6.5 Elective VIII Generic/ Discipline Specific | 3 | 5 |
| 1.6 Skill Enhancement Course SEC-1 | 2 | 2 | 2.6 Skill Enhancement Course SEC-2 | 2 | 2 | 3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill) | 1 | 1 | 4.6 Skill Enhancement Course SEC-6 | 2 | 2 | 5.6 Elective VI Generic/ Discipline Specific | 3 | 4 | 6.6 Extension Activity | 1 | - |
| 1.7 Skill Enhancement - (Foundation Course) | 2 | 2 | 2.7 Skill Enhancement Course –SEC-3 | 2 | 2 | 3.7 Skill Enhancement Course SEC-5 | 2 | 2 | 4.7 Skill Enhancement Course SEC-7 | 2 | 2 | 5.7 Value Education | 2 | 2 | 6.7 Professional Competency Skill | 2 | 2 |
| | | | | | | 3.8 E.V.S. | - | 1 | 4.8 E.V.S | 2 | 1 | 5.8 Summer Internship /Industrial Training | 2 | | | | |
| | 23 | 30 | | 23 | 30 | | 22 | 30 | | 25 | 30 | | 26 | 30 | | 21 | 30 |
| Total – 140 Credits |

**Total – 140 Credits**

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# Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF) Guideline Based Credit and Hours Distribution System for all UG courses including Lab Hours

## First Year – Semester-I

| Part | List of Courses | Credit | No. of Hours |
|------|-----------------|--------|--------------|
| Part-1 | Language – Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses [in Total] | 13 | 14 |
| | Skill Enhancement Course SEC-1 | 2 | 2 |
| Part-4 | Foundation Course | 2 | 2 |
| | | **23** | **30** |

## Semester-II

| Part | List of Courses | Credit | No. of Hours |
|------|-----------------|--------|--------------|
| Part-1 | Language – Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 14 |
| Part-4 | Skill Enhancement Course -SEC-2 | 2 | 2 |
| | Skill Enhancement Course -SEC-3 (Discipline / Subject Specific) | 2 | 2 |
| | | **23** | **30** |

## Second Year – Semester-III

| Part | List of Courses | Credit | No. of Hours |
|------|-----------------|--------|--------------|
| Part-1 | Language - Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 14 |
| Part-4 | Skill Enhancement Course -SEC-4 (Entrepreneurial Based) | 1 | 1 |
| | Skill Enhancement Course -SEC-5 (Discipline / Subject Specific) | 2 | 2 |
| | E.V.S | - | 1 |
| | | **22** | **30** |

## Semester-IV

| Part | List of Courses | Credit | No. of Hours |
|------|-----------------|--------|--------------|
| Part-1 | Language - Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 13 |
| Part-4 | Skill Enhancement Course -SEC-6 (Discipline / Subject Specific) | 2 | 2 |

| | Skill Enhancement Course -SEC-7 (Discipline / Subject Specific) | 2 | 2 |
|---|---|---|---|
| | E.V.S | 2 | 1 |
| | | **25** | **30** |

## Third Year
## Semester-V

| Part | List of Courses | Credit | No. of Hours |
|---|---|---|---|
| **Part-3** | Core Courses including Project / Elective Based | 22 | 26 |
| **Part-4** | Value Education | 2 | 2 |
| | Internship / Industrial Visit / Field Visit | 2 | 2 |
| | | **26** | **30** |

## Semester-VI

| Part | List of Courses | Credit | No. of Hours |
|---|---|---|---|
| **Part-3** | Core Courses including Project / Elective Based & LAB | 18 | 28 |
| **Part-4** | Extension Activity | 1 | - |
| | Professional Competency Skill | 2 | 2 |
| | | **21** | **30** |

## Consolidated Semester wise and Component wise Credit distribution

| Parts | Sem I | Sem II | Sem III | Sem IV | Sem V | Sem VI | Total Credits |
|---|---|---|---|---|---|---|---|
| **Part I** | 3 | 3 | 3 | 3 | - | - | 12 |
| **Part II** | 3 | 3 | 3 | 3 | - | - | 12 |
| **Part III** | 13 | 13 | 13 | 13 | 22 | 18 | 92 |
| **Part IV** | 4 | 4 | 3 | 6 | 4 | 1 | 22 |
| **Part V** | - | - | - | - | - | 2 | 2 |
| **Total** | 23 | 23 | 22 | 25 | 26 | 21 | **140** |

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

# B.Sc Artificial IntelligenceCredit Distribution

| First Year - Semester - I | | | |
|---|---|---|---|
| **Part** | **List of courses** | **Credits** | **No. of Hrs** |
| **Part I** | Language – Tamil | 3 | 6 |
| **Part II** | English | 3 | 6 |
| **Part-III** | **Core Course- I** Programming for Problem Solving | 5 | 5 |
| | **Core Course – II** Problem Solving using C Lab– Practical | 5 | 5 |
| | **Elective Course I (Generic / Discipline Specific)** <br> 1. Statistical Methods and its applications <br> 2. Resource management Techniques | 3 | 4 |
| **Part-IV** | **Skill Enhancement Course SEC-I** <br> Introduction to HTML | 2 | 2 |
| | **Foundation Course -** Office Automation | 2 | 2 |
| **TOTAL** | | **23** | **30** |

**Generic Specific**

1. Discrete Mathematics – I
2. Discrete Mathematics-II
3. Statistical Methods and its Application-I
4. Statistical Methods and its Application-II
5. Optimization Techniques
6. Nano Technology
7. Introduction to Linear Algebra
8. Graph Theory and its Application
9. Financial Accounting
10. Cost and Management Accounting
11. Digital Logic Fundamentals
12. Numerical Methods

**Elective course – (1- 8)-Discipline Specific**

1. Pattern Recognition
2. Social Network Analysis
3. Natural Language Processing
4. Statistical Analytics using R
5. Resource Management Techniques
6. Big Data Analytics
7. IOT and its Applications
8. Software Project Management
9. Image Processing
10. Virtualization and Cloud
11. Human Computer Interaction
12. Fuzzy Logic
13. Artificial Intelligence
14. Data Mining
15. Introduction to Data Analytics
16. Robotics and its applications
17. Mobile Adhoc Network
18. Computational Intelligence
19. Grid Computing
20. Cloud Computing
21. Distributed Computing
22. Artificial Neural Network

23. Introduction to Data Science
24. Agile Project Management
25. Virtual Reality Technology

<center>Annexure II</center>

**Skill Enhancement Course**

1. Fundamentals of Information Technology
2. Introduction to HTML
3. Web Designing
4. Structured Programming Language
5. PHP Programming
6. Software Testing
7. Problem Solving Techniques
8. Introduction to Data Communication and Networking
9. Understanding Internet
10. Quantitative Aptitude
11. Multimedia Systems
12. Advanced Excel
13. Biometrics
14. Cyber Forensics
15. Enterprise Resource Planning
16. Simulation and Modelling
17. Ethical Hacking
18. Organization Behavior

## CORE – I: PROGRAMMING FOR PROBLEM SOLVING

| Subject Code | L | T | P | S | Credits | Inst. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | CIA | External | Total |
| CC1 | 5 | 0 | 0 | I | 4 | 5 | 25 | 75 | 100 |

| | Learning Objectives |
|---|---|
| LO1 | recognize the need for programming languages and problem solving techniques |
| LO2 | apply memory management concepts and function based modularization |
| LO3 | Recognize the bugs in the C program |
| LO4 | Develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions. |
| LO5 | develop programming skills to solve real time computational problems |

| Unit | Contents | No. of Hours |
|---|---|---|
| I | Introduction to Programming:Introduction to computers, Computer characteristics, Hardware vs software, Steps to develop a program, Software development life cycle, Structured programming, Types of programming languages, Introduction to c, Developing a c program, Console input and output functions, Error diagnostics, Debugging techniques. | 15 |
| II | Operators and Expressions:Identifiers and keywords, Data types, Constants, Variables, Declarations, Expressions, Statements, Arithmetic operators, Unary operators, Relational and logical operators, Assignment operators, Conditional operatorBranching, if-else statement, switch statement, goto statement, Looping, while statement, do- while statement, for statement, Nested control structures, break statement, continue statement. | 15 |
| III | Arrays andStrings:Defining an array, Processing an array, Multidimensional arrays, Searching algorithm, Linear search, Sorting algorithm, Bubble sort algorithm, Strings, Defining a string, Initialization of strings, Reading and writing a string, Processing the strings. | 15 |
| IV | Functions:Functions, Overview, Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Passing arrays to functions, Recursion. | 15 |
| V | Pointers andStructures:Fundamentals, Pointer declarations, Passing pointers to functions, Pointers and one dimensional arrays, Dynamic memory allocation, Operations on pointers, Defining a structure, Processing a structure, Array of structures, Structures and pointers, Self-referential structures. | 15 |
| TOTAL | | 75 |

| CO | Course Outcomes |
|---|---|
| CO1 | The Student can understand the fundamentals of computer and program development process. |

| | |
|---|---|
| CO2 | The Student can prepare innovative solution for the problem using branching and looping statements. |
| CO3 | The Student can decompose a problem into functions and synthesize a complete program using divide and conquer approach. |
| CO4 | The Student will be able toformulate algorithms and programs using arrays, pointers and structures |
| CO5 | The Student will be able tocreate a new application software to solve real world problems. |

## Textbooks

| | |
|---|---|
| 1. | Byron Gottfried, "Schaum's Outline of Programming with C", 3$^{rd}$ edition, 2016, McGraw Hill Education (India), ISBN: 9780070145900 |
| 2. | Balagurusamy, E "Programming in ANSI C", 7$^{th}$ edition, McGraw Higher Ed, 2016, ISBN: 9789339219666 |

## Reference Books

| | |
|---|---|
| 1. | Yashavant Kanetkar, "Let Us C", 15$^{th}$ edition, 2016, Bpb Publications, ISBN:9788183331630 |
| 2. | Herbert Schildit, "The Complete Reference C", 4$^{th}$ edition, 2017, McGraw Hill Education(India), 2017, ISBN:978007041183 |
| 3. | Beulah Christalin Latha, Anuja Beatrice, Carolin Jeeva & Anita Sofia, Fundamentals of Computing and Programming, 1$^{st}$ edition, Pearson, 2018 |
| 4. | Sumitabha Das, "Computer Fundamentals and C Programming", 18$^{th}$ edition, 2018, McGraw Hill Education (India), ISBN:9789387886070 |
| 5. | Stephen G. Kochan, "Programming in C", 4$^{th}$ edition, 2015, ISBN: 9789332554665, |

| MAPPING TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CO/PSO | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
| CO1 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 3 |
| Weightageof coursecontributedtoeachPSO | 15 | 15 | 10 | 10 | 10 | 15 |

| Subject Code | L | T | P | S | Credits | Inst. Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | CIA | External | Total |
| CC2 | 0 | 0 | 5 | I | 4 | 5 | 25 | 75 | 100 |

| Learning Objectives | |
|---|---|
| LO1 | understand the need for programming to solve computational problems. |
| LO2 | discover the basic programming constructs to prepare the program. |
| LO3 | Analyze and interpret data using array, functions and pointers |
| LO4 | Recognize the bugs in the C program. |
| LO5 | Apply problem-solving skills to real-world scenarios |

**List of Exercises**

1. Implementation of Basic C programs
2. Simple computational problems using arithmetic expressions and operators
3. Problem solving using branching and logical expressions
4. Iterative problems using Loops, while and for loops
5. Implementation of linear searching, bubble sort, and Matrix Manipulation using Arrays
6. Implementation of Text Processing using Strings
7. Find Square Root, numerical differentiation, numerical integration using functions and recursion.
8. Implementation of basic file operations

**Software Essentials: Code Block**

| TOTAL | |
|---|---|
| | 75 |

| CO | Course Outcomes |
|---|---|
| CO1 | translate given algorithms to a working and correct program |
| CO2 | identify and correct logical errors encountered at run time |
| CO3 | create iterative as well as recursive programs. |
| CO4 | represent data in arrays, strings and structures and manipulate them through a program. |
| CO5 | declare pointers of different types and use them in defining self-referential structures. |

**MAPPING TABLE**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 2 | 2 |
| CO2 | 3 | 2 | 2 | 2 | 2 | 2 |
| CO3 | 3 | 2 | 2 | 2 | 3 | 3 |
| CO4 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 2 | 3 | 2 | 2 |
| Weightageof course contributedtoeachPSO | 15 | 11 | 10 | 11 | 11 | 12 |

# Skill Enhancement Course SEC 1

| Subject Code | Subject Name | Category | L | T | P | S | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | CIA | External | Total |
| **SEC1** | **INTRODUCTION TO HTML** | Specific Elective | 2 | - | - | | 2 | 25 | 75 | 100 |

| | Learning Objectives | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LO1 | Knowledge of Internet medium | | | | | | | | | |
| LO2 | Internet as a mass medium | | | | | | | | | |
| LO3 | Features of Internet Technology, | | | | | | | | | |
| LO4 | Internetas sourceof infotainment | | | | | | | | | |
| LO5 | Studyofinternet audiences andabout cyber crime | | | | | | | | | |

| UNIT | Contents | No. Of. Hours |
|---|---|---|
| I | Theemergenceofinternet asamassmedium–theworld of'worldwideweb'. | 6 |
| II | Featuresofinternetasatechnology. | 6 |
| III | Internetas asourceofinfotainment – classificationbasedoncontentandstyle. | 6 |
| IV | Demographic and psychographic descriptions of internet 'audiences' – effect of internet onthevalues and life-styles. | 6 |
| V | Presentissuessuchascybercrime andfuturepossibilities. | 6 |
| | **TOTAL HOURS** | **30** |

| | Course Outcomes | Programme Outcomes |
|---|---|---|
| CO | On completion of this course, students will | |
| CO1 | Knows the basic concept in HTML<br>Concept of resources in HTML | PO1, PO2, PO3, PO4, PO5, PO6 |
| CO2 | Knows Design concept<br>Concept of Meta Data<br>Understand the concept of save the files. | PO1, PO2, PO3, PO4, PO5, PO6 |
| CO3 | Understand the page formatting<br>Concept of list | PO1, PO2, PO3, PO4, PO5, PO6 |
| CO4 | Creating Links<br>Know the concept of creating link to email address | PO1, PO2, PO3, PO4, PO5, PO6 |
| CO5 | Concept of adding images<br>Understand the table creation | PO1, PO2, PO3, PO4, PO5, PO6 |

| | Textbooks |
|---|---|
| 1 | "Mastering HTML5 and CSS3 Made Easy", TeachUComp Inc., 2014. |
| 2 | Thomas Michaud, "Foundations of Web Design: Introduction to HTML & CSS" |

**Web Resources**

| | |
|---|---|
| 1. | https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf |
| 2. | https://www.w3schools.com/html/default.asp |

**Mapping with Programme Outcomes:**

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

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

# Foundation Course

| Subject Code | Subject Name | Category | L | T | P | S | Credits | Inst. Hours | CIA | External | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **Marks** | | |
| FC | **OFFICE AUTOMATION** | Specific Elective | | 2 | - | - | 2 | 2 | 25 | 75 | 100 |

| | **Course Objective** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | Understand the basics of computer systems and its components. |
| C2 | Understand and apply the basic concepts of a word processing package. |
| C3 | Understand and apply the basic concepts of electronic spreadsheet software. |
| C4 | Understand and apply the basic concepts of database management system. |
| C5 | Understand and create a presentation using PowerPoint tool. |

| UNIT | Details | No. of Hours |
|---|---|---|
| I | **Introductory concepts:** Memory unit– CPU-Input Devices: Key board, Mouse andScanner.Outputdevices:Monitor,Printer.IntroductiontoOperatingsystems&itsfeatures:DOS– UNIX–Windows. IntroductiontoProgrammingLanguages. | 6 |
| II | **Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets;SpellChecker - Document formatting – Paragraph alignment, indentation, headers and footers,numbering;printingPreview,options,merge. | 6 |
| III | **Spreadsheets:**Excel– opening,enteringtextanddata,formatting,navigating;Formulas– entering,handlingand copying;Charts–creating,formatting and printing,analysistables,preparationoffinancialstatements,introductiontodataanalytics. | 6 |
| IV | **Database Concepts:** The concept of data base management system; Data field, records, and files,Sorting and indexing data; Searching records. Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS; Developing menu drive applicationsinquerylanguage(MS–Access). | 6 |
| V | **Power point:** Introduction to Power point - Features – Understanding slide typecasting & viewingslides – creating slide shows. Applying special object – including objects & pictures – Slidetransition– Animationeffects,audioinclusion,timers. | 6 |
| | **Total** | **30** |

| | **Course Outcomes** | **Programme Outcomes** |
|---|---|---|
| CO | On completion of this course, students will | |
| 1 | Possess the knowledge on the basics of computers and its | PO1,PO2,PO3,PO6,PO8 |

| | | |
|---|---|---|
| | components | |
| 2 | Gain knowledge on Creating Documents, spreadsheet and presentation. | PO1,PO2,PO3,PO6 |
| 3 | Learn the concepts of Database and implement the Query in Database. | PO3,PO5,PO7 |
| 4 | Demonstrate the understanding of different automation tools. | PO3,PO4,PO5,PO7 |
| 5 | Utilize the automation tools for documentation, calculation and presentation purpose. | PO4,PO6,PO7,PO8 |
| **Text Book** | | |
| 1 | PeterNorton,"IntroductiontoComputers"–TataMcGraw-Hill. | |
| **Reference Books** | | |
| 1. | Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill. | |
| **Web Resources** | | |
| 1. | https://www.udemy.com/course/office-automation-certificate-course/ | |
| 2. | https://www.javatpoint.com/automation-tools | |

**Mapping with Programme Outcomes:**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|---|---|---|---|---|---|---|---|---|
| **CO 1** | M | S | M | | | M | | L |
| **CO 2** | S | M | S | | | M | | |
| **CO 3** | | S | S | | M | | L | |
| **CO 4** | | | S | L | M | | M | |
| **CO 5** | | | | M | | S | M | S |

**S-Strong  M-Medium  L-Low**

**\*\*\*\*\*\*\*\*\*\*\***