MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

&

TAMIL NADU STATE COUNCIL FOR HIGHER EDUCATION

(TANSCHE)

B. Sc. Information Technology

(2023-2024 Onwards)

(As per TANSCHE Framework)

May, 2023

B.Sc. Information Technology

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.

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

The Students completing this programme will be able to present Software application clearly and precisely, make abstract ideas precise by formulating them in the Computer languages. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in software industry, banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME	
Duration:	**3 years [UG]**
Programme Outcomes:	**PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study **PO2: Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups. **PO3: Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development. **PO4: Problem solving: Capacity** to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations. **PO5: Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints. **PO6: Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation **PO7: Cooperation/Team work:**Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team **PO8: Scientific reasoning**: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective. **PO9: Reflective thinking**: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society. **PO10 Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of

	data. **PO 11 Self-directed learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion. **PO 12 Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups. **PO 13: Moral and ethical awareness/reasoning**: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demon starting the ability to identify ethical issues related to one‟s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work. **PO 14: Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way. **PO 15: Lifelong learning:** Ability to acquire knowledge and skills, including „learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.
Programme Specific Outcomes:	**PSO1**: To enable students to apply basic microeconomic, macroeconomic and monetary concepts and theories in real life and decision making. **PSO 2**: To sensitize students to various economic issues related to Development, Growth, International Economics, Sustainable Development and Environment. **PSO 3**: To familiarize students to the concepts and theories related to Finance, Investments and Modern Marketing. **PSO 4**: Evaluate various social and economic problems in the society and develop answer to the problems as global citizens. **PSO 5:** Enhance skills of analytical and critical thinking to analyze effectiveness of economic policies.

	PO 1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
PSO 1	Y	Y	Y	Y	Y	Y	Y	Y
PSO 2	Y	Y	Y	Y	Y	Y	Y	Y

PSO3	Y	Y	Y	Y	Y	Y	Y	Y
PSO 4	Y	Y	Y	Y	Y	Y	Y	Y
PSO 5	Y	Y	Y	Y	Y	Y	Y	Y

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics 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 - Artificial Intelligence.

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 Literature and analyzing the world through the literary lens Gives rise to a new perspective.	➢ Instill confidence among students ➢ Create interest for the subject
I,II,III,IV	**Skill Enhancement papers**(Discipline centric /Generic/Entrepreneurial)	➢ Industry ready graduates ➢ Skilled human resource ➢ Students are equipped with essential skills to make them employable
		➢ Training on language and communication skills enable the students gain knowledge and exposure in the competitive world.
		➢ Discipline centric skill will improve the Technical knowhow of solving reallife problems.
III,IV,V& VI	Elective papers	➢ Strengthening the domain knowledge ➢ Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and interdisciplinary nature ➢ Emerging topics in highereducation/industry/communicationnetwork/healthsectoretc.areintroducedwithhands-on-training.

IV	Elective Papers	➢ Exposure to industry moulds students into solution providers ➢ Generates Industry ready graduates ➢ Employment opportunities enhanced
V Semester	Elective papers	➢ Self-learning is enhanced ➢ Application of the concept to real situation is conceived resulting in tangible outcome
VI Semester	Elective papers	➢ Enriches the study beyond the course. ➢ Developing a research framework and presenting their independent and intellectual ideas effectively.

Extra Credits: 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

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.

Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	25 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks
Methods of Assessment		
Recall(K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend(K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or Overview	
Application (K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze(K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate	
	Between various ideas, Map knowledge	
Evaluate(K5)	Longer essay/Evaluation essay, Critique or justify with pros and cons	
Create(K6)	Check knowledge in specific, Discussion, Debating or Presentations	

SYLLABUS FRAMEWORK FOR B.Sc., INFORMATION TECHNOLOGY
(As per TANSCHE from 2023-24)

Part	Course Code	List of Courses	Credit	Hours per week	CIA	Ext.	Tot. Marks
SEMESTER - I							
Part – I	U23ITL11	Language – Tamil	3	6	25	75	100
Part – II	U23ITL21	Language – English	3	6	25	75	100
Part – III	U23ITCT11	Core 1 : Programming in C	5	5	25	75	100
	U23ITCP11	Core 2: Programming in C Lab	5	5	25	75	100
	U23ITDET11	Elective1 : Numerical Methods	3	4	25	75	100
Part – IV	U23ITSEC11	Skill Enhancement Course SEC-1 : Fundamentals of IT	2	2	25	75	100
	U23ITFC11	Foundation Course : Fundamentals of Computers	2	2	25	75	100
			23	30	25	75	100

SEMESTER – II							
Part-I	U23ITL12	Language – Tamil	3	6	25	75	100
Part-II	U23ITL22	English	3	6	25	75	100
Part-III	U23ITCT22	Core 3: JAVAPROGRAMMING	5	5	25	75	100
	U23ITCP22	Core 4: Java Programming & Data Structures Practical	5	5	25	75	100
	U23ITDET22	Elective Course 2: Human Computer Interaction	3	4	25	75	100
Part-IV	U23ITSEC22	Skill Enhancement Course -SEC-2 (Non Major Elective) - Office Automation	2	2	25	75	100
	U23ITSEC23	Skill Enhancement Course -SEC-3 – Introduction to HTML	2	2	25	75	100
			23	30			

FIRST YEAR – SEMESTER – I
CORE – I: PROGRAMMING IN C

Course Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
U23ITCT11	**5**	0	0	I	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To familiarize the students with the understanding of code organization
LO2	To improve the programming skills
LO3	Learning the basic programming constructs.

Prerequisites:

Unit	Contents	No. of Hours
I	**Studying Concepts of Programming Languages**- Language Evaluation Criteria - Language design - Language Categories - Implementation Methods – Programming Environments - Overview of C: History of C- Importance of C- Basic Structure of C Programs-Executing a C Program- Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations	**15**
II	**Decision Making and Branching**: Decision Making and Looping - Arrays - Character Arrays and Strings	**15**
III	**User Defined Functions:** Elements of User Defined Functions- Definition of Functions- Return Values and their Types- Function Call- Function Declaration- Categories of Functions- Nesting of Functions-Recursion	**15**
IV	**Structures and Unions:** Introduction- Defining a Structure- Declaring Structure Variables Accessing Structure Members- Structure Initialization- Arrays of Structures- Arrays within Structures- Unions- Size of Structures.	**15**
V	**Pointers:** Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initializing of Pointer Variables- Accessing a Variable through its Pointer- Chain of Pointers- Pointer Expressions- Pointer and Scale Factor- Pointer and Arrays- Pointers and Character Strings- Array of Pointers- Pointer as Function Arguments- Functions Returning Pointers- Pointers to Functions- **File Management in C**	**15**
TOTAL		**75**

CO	Course Outcomes
CO1	Outline the fundamental concepts of C programming languages, and its features
CO2	Demonstrate the programming methodology.
CO3	Identify suitable programming constructs for problem solving.

CO4	Select the appropriate data representation, control structures, functions and concepts based on the problem requirement.
CO5	Evaluate the program performance by fixing the errors.
Textbooks	
➢	Robert W. Sebesta, (2012), ―Concepts of Programming Languages‖, Fourth Edition, Addison Wesley (Unit I : Chapter – 1)
➢	E. Balaguruswamy, (2010), ―Programming in ANSI C‖, Fifth Edition, Tata McGraw Hill Publications
Reference Books	
1.	Ashok Kamthane, (2009), ―Programming with ANSI & Turbo C‖, Pearson Education
2.	Byron Gottfried, (2010), ―Programming with C‖, Schaums Outline Series, Tata McGraw Hill Publications
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1.	http://www.tutorialspoint.com/cprogramming/
2.	http://www.cprogramming.com/
3.	http://www.programmingsimplified.com/c-program-examples
4.	http://www.programiz.com/c-programming
5.	http://www.cs.cf.ac.uk/Dave/C/CE.html
6.	http://fresh2refresh.com/c-programming/c-function/

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

CORE – II: C Programming Practical

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

Learning Objectives	
LO1	The Course aims to provide exposure to problem-solving through C programming
LO2	It aims to train the student to the basic concepts of the C - Programming language
LO3	Apply different concepts of C language to solve the problem

Prerequisites:

Contents

1. Programs using Input/ Output functions
2. Programs on conditional structures
3. Command Line Arguments
4. Programs using Arrays
5. String Manipulations
6. Programs using Functions
7. Recursive Functions
8. Programs using Pointers
9. Files
10. Programs using Structures & Unions

CO	Course Outcomes
CO1	Demonstrate the understanding of syntax and semantics of C programs.
CO2	Identify the problem and solve using C programming techniques.
CO3	Identify suitable programming constructs for problem solving.
CO4	Analyze various concepts of C language to solve the problem in an efficient way.
CO5	Develop a C program for a given problem and test for its correctness.

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	11	10

ELECTIVE – I: NUMERICAL METHODS

Course Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
U23ITDET11	**4**	0	0	I	**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To familiarize the students with the understanding of various techniques
LO2	To improve the problem solving skills
LO3	Learning the basic numerical methods used frequently.

Prerequisites:

Unit	Contents	No. of Hours
I	Algebraic and transcendental equations : Errors in numerical computations – iteration methods – bisection methods – regular false methods – Newton Rap son method.	**15**
II	Simultaneous equations – back substitutions – gauss elimination method – gauss serial iteration method – comparison of direct and iterative method.	**15**
III	Interpolation – Newton's Formulae – gauss interpolation formulae Language's Interpolation formula – inverse interpolation.	**15**
IV	Numerical Differentiation: Newton]s formulae – Numerical integration – Simpson]s Rule – Gaussian Quadrature.	**15**
V	Numerical solution of differential equations: Euler]s method - Taylor series method – Range Kati methods – Predictor Corrector methods.	**15**
		75

CO	Course Outcomes
CO1	Describes about Numerical Computations
CO2	Describes comparison of direct and iterative method
CO3	Understanding about Newton‟s Formulae.
CO4	Understanding Gaussian Quadrature.
CO5	Understanding Euler‟s method.

Textbook

➢	Numerical methods by S.Arumugam and S.Thangapandi Issac, A.Somasundaram, Scitech publications LINU

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

Course Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
U23ITSEC11	**FUNDAMENTALS OF INFORMATION TECHNOLOGY**	Specific Elective	2	-	-	I	2	25	75	100

Learning Objectives	
LO1	Understand basic concepts and terminology of information technology.
LO2	Have a basic understanding of personal computers and their operation
LO3	Be able to identify data storage and its usage
LO4	Get great knowledge of software and its functionalities
LO5	Understand about operating system and their uses

UNIT	Contents	No. Of. Hours
I	**Introduction to Computers:** Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer	**6**
II	**Basic Computer Organization:** Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.	**6**
III	**Storage Fundamentals:** Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives	**6**
IV	**Software:** Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w	**6**

V	**Operating System:** Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.	**6**
	TOTAL HOURS	**30**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop organizational structure using for the devices present currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with different software, Write program in the software and applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks	
1	Anoop Mathew, S. Kavitha Murugeshan (2009), " Fundamental of Information Technology", Majestic Books.
2	Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2nd Edition.
3	S. K Bansal, "Fundamental of Information Technology".
Reference Books	
1.	Bhardwaj Sushil Puneet Kumar, "Fundamental of Information Technology"
2.	GG WILKINSON, "Fundamentals of Information Technology", Wiley-Blackwell
3.	A Ravichandran , "Fundamentals of Information Technology", Khanna Book Publishing
Web Resources	
1.	https://testbook.com/learn/computer-fundamentals
2.	https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html
3.	https://www.javatpoint.com/computer-fundamentals-tutorial
4.	https://www.tutorialspoint.com/computer_fundamentals/index.htm
5.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf

Mapping with Programme Outcomes:

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

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

FUNDAMENTALS OF COMPUTERS

Course Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
U23ITFC11	2	0	0	II	**2**	**2**	**25**	**75**	**100**

U23ITFC11

LO1	To analyze a problem with appropriate problem solving techniques
LO2	To understand the main principles of imperative, functional and logic oriented programming languages and
LO3	To increase the ability to learn new programming languages.

Prerequisites: Basic knowledge about programming concepts

Unit	Contents	No. of Hours
I	**Introduction:** Characteristics of Computers - Evolution of Computers **Basic Computer Organization:** I/O Unit - Storage Unit - Arithmetic Logic Unit - Control Unit - Central Processing Unit	**6**
II	**Computer Software:** Types of Software - System Architecture **Computer Languages:** Machine Language - Assembly Language - High Level Language - Object Oriented Languages	**6**
III	**Problem Solving Concepts:** Problem Solving in Everyday life - Types of Problems - Problem solving with computers - Difficulties with Problem Solving	**6**
IV	**Problem Solving concepts for the computer:** Constant Variables - Data Types - Functions -Operators - Expressions and Equations - **Organizing the Solution:** Analyzing the problem - Algorithm - Flowchart - Pseudo code	**6**
V	**Programming Structure:** Structuring a solution - Modules and their function - Local and Global variables - Parameters - Return values - Sequential Logic Structure - Problem solving with Decision - Problem Solving with Loops	**6**
	TOTAL	**30**

CO	Course Outcomes
CO1	Outline the Computer fundamentals and various problem solving concepts in Computers
CO2	Describe the basic computer organization, software, computer languages, software development life cycle and the need of structured programming in solving a computer problem
CO3	Identify the types of computer languages, software, computer problems and examine how to set up expressions and equations to solve the problem.
CO4	Choose most appropriate programming languages, constructs and features to solve the problems in diversified domains.
CO5	Analyze the design of modules and functions in structuring the solution and

	various Organizing tools in problem solving.
Textbooks	
➢	Pradeep K.Sinha and Priti Sinha, (2004) ―Computer Fundamentals‖, Sixth Edition, BPB Publications. (Unit I : Chapter 1 & 2, Unit II : Chapter 10 & 12)
➢	Maureen Sprankle and Jim Hubbard, (2009) ―Problem Solving and Programming Concept, Ninth Edition, Prentice Hall. (Unit III: Chapter 1,2 &3) Unit IV : Chapter 3, Unit V : Chapter 4,5 ,6,7 & 8)
Reference Books	
1.	R.G. Dromey, (2007), ―How to Solve it by Computer‖, Prentice Hall International Series in Computer Science.
2.	C. S. V. Murthy, (2009), ―Fundamentals of Computers‖, Third Edition, Himalaya Publishing House.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1.	http://www.tutorialspoint.com/computer_fundamentals/
2.	http://www.comptechdoc.org/basic/basictut/
3.	http://www.homeandlearn.co.uk/
4.	http://www.top-windows-tutorials.com/computer-basics/
5.	https://www.programiz.com/article/flowchart-programming (Algorithm and flow chart)

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	2	2	3
CO2	3	2	2	2	3	2
CO3	3	3	3	3	2	2
CO4	3	2	2	2	2	3
CO5	3	3	2	2	3	2
Weightage ofcoursecontributedtoeachPSO	15	12	11	11	12	12

SEMESTER – II
CORE – III: JAVA PROGRAMMING

Course Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
U23ITCT22	**5**	0	0	II	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To provide knowledge on fundamentals of object-oriented programming
LO2	To have the ability to use the SDK environment to create, debug and run servlet programs

Prerequisites: Basic knowledge about programming concepts

Unit	Contents	No. of Hours
I	FundamentalsofObject-OrientedProgramming:Introduction–ObjectOrientedParadigm–ConceptsofObject–OrientedProgramming–BenefitsofOOP–Evolution:JavaHistory-JavaFeatures-DiffersfromCandC++-OverviewofJavaLanguage:JavaProgram-Structure–Tokens–JavaStatements–JavaVirtualMachine–CommandLineArguments	**15**
II	Constants, Variables and Data Types–Operators and Expressions–Decision making and Branching–Looping– Arrays - Strings – Collection Interfaces and classes	**15**
III	Classes objects and methods: Introduction – Defining a class – Method Declaration –Constructors - Method Overloading – Static Members – Nesting of methods – Inheritance –Overriding– Final variables and methods– Abstract methods and classes	**15**
IV	MultipleInheritance:DefiningInterfaces–ExtendingInterfaces–ImplementingInterfaces – Packages: Creating Packages – Accessing Packages – Using a Package – Managing Errors and Exceptions-Multithreaded Programming	**15**
V	Layout Managers -JDBC – Java Servlet: - Servlet Environment Role – Servlet API – Servlet Life Cycle –Servlet Context–HTTP Support–HTMLtoServlet Communication	**15**
TOTAL		**75**

CO	Course Outcomes
CO1	Outline the basic terminologies of OOP, programming language techniques, JDBC and Internet programming concepts
CO2	Solve problems using basic constructs, mechanisms, techniques and technologies of Java
CO3	Analyse and explain the behaviour of simple programs involving different techniques such as Inheritance, Packages, Interfaces, Exception Handling and Thread and technologies such as JDBC and Servlets
CO4	Assess various problem – solving strategies involved in Java to develop a high-level application.
CO5	Design GUI based JDBC applications and able to develop Servlets using suitable OOP concepts and techniques

Textbooks

- E Balagurusamy(2010), "Programming with Java'', Tata Mc GrawHill Edition India Private Ltd, 4th Edition

➢	C Xavier, Java Programming – A Practical Approach", Tata Mc Graw Hill Edition Private Ltd
Reference Books	
1.	P.Naughton and H.Schildt (1999), "Java2 The Complete Reference", TMH, 3rdEdition
2.	Jaison Hunder & William Crawford(2002),"Java Servlet Programming", O'Reilly
3.	Jim Keogh (2002), "J2EE: The Complete Reference", Tata McGraw Hill Edition.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
	http://javabeginnerstutorial.com/core-java/
	http://www.tutorialspoint.com/java/
	http://beginnersbook.com/java-tutorial-for-beginners-with-examples/
	http://www.homeandlearn.co.uk/java/java.html
	http://www.journaldev.com/1877/servlet-tutorial-java(UnitV:ServletAPI)

CO/PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	3	2	2	2	2	2
CO2	2	3	2	2	2	2
CO3	2	3	3	3	2	2
CO4	2	3	2	2	2	2
CO5	3	3	2	2	2	2
Weightage of course contributed to each PSO	12	14	11	11	10	10

CORE – IV: Java Programming & Data Structures Practical

Course Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
U23ITCP22	0	0	5	II	4	5	**25**	**75**	**100**

Learning Objectives

LO1	To design and develop applications using different Java programming language techniques, JDBC & Servlets
LO2	To organize and manipulate the data with the help of fundamental data structures

Prerequisites:

Contents

1. Basic Programs
2. Arrays
3. Strings
4. ArrayList, HashSet and Vector collection classes
5. Classes and Objects
6. Interfaces
7. Inheritance
8. Packages
9. Exception Handling
10. Threads
11. Linked List
12. Stacks
13. Queue
14. Sorting
15. Binary Tree Representation
16. Working with Database using JDBC
17. Web application using Servlet

CO	Course Outcomes
CO1	Identify and explain the way of solving the simple problems
CO2	Use appropriate software development environment to write, compile and execute object-oriented Java programs
CO3	Analyze and identify necessary mechanisms of Java needed to solve real-world problem
CO4	Test for defects and validate a Java program with different inputs
CO5	Design, develop and compile Core Java , GUI , JDBC and servlet applications that utilize OOP and data structure concepts

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

Elective – Human Computer Interaction
Course Code: U23ITDET22

Course Objective		
C1	To learn about the foundations of Human Computer Interaction.	
C2	To learn the design and software process technologies.	
C3	To learn HCI models and theories.	
C4	To learn Mobile Ecosystem.	
C5	To learn the various types of Web Interface Design.	
UNIT	**Details**	**No. of Hours**
I	**FOUNDATIONS OF HCI :** • The Human: I/O channels – Memory • Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; • Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies	12
II	**DESIGN & SOFTWARE PROCESS:** • Interactive Design: • Basics – process – scenarios • Navigation: screen design Iteration and prototyping. • HCI in software process: • Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design	12
III	**MODELS AND THEORIES:** • HCI Models : Cognitive models:- Socio-Organizational issues and stakeholder requirements Communication and collaboration models-Hypertext, Multimedia and WWW.	12
IV	**Mobile HCI:** • Mobile Ecosystem: Platforms, Application frameworks • Types of Mobile Applications: Widgets, Applications, Games • Mobile Information Architecture, Mobile 2.0, • Mobile Design: Elements of Mobile Design, Tools. - Case Studies	12
V	**WEB INTERFACE DESIGN:** Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies	12
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Understand thefundamentals of HCI.	PO1

2	Understand the design and software process technologies.	PO1, PO2
3	Understand HCI models and theories.	PO4, PO6
4	Understand Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design.	PO4, PO5, PO6
5	Understand the various types of Web Interface Design.	PO3, PO8
Text Book		
1	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, ”Human -Computer Interaction‖”, III Edition, Pearson Education, 2004 (UNIT I, II & III)	
2	Brian Fling, ―”Mobile Design and Development”, I Edition, O‘Reilly Media Inc., 2009(UNIT–IV)	
3	Bill Scott and Theresa Neil, ―Designing Web Interfaces‖, First Edition, O‘Reilly, 2009. (UNIT-V)	
Reference Books		
1.	Shneiderman, “Designing the User Interface: Strategies for Effective Human-Computer Interaction”, V Edition, Pearson Education.	
Web Resources		
1.	https://www.interaction-design.org/literature/topics/human-computer-interaction	
2.	https://link.springer.com/10.1007/978-0-387-39940-9_192	
3.	https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction	

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	**S**							
CO 2	**S**	**S**						
CO 3				**S**		**S**		
CO 4				**S**	**S**	**S**		
CO 5			**S**					**S**

S-Strong M-Medium L-Low

Skill Enhancement Course – Office Automation
Course Code: U23ITSEC22

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 and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX–Windows. Introduction to Programming Languages.	6
II	**Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.	6
III	**Spreadsheets :** Excel–opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts–creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	6
IV	**Database Concepts:** The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS–Access).	6
V	**Power point:** Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.	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 components	PO1, PO2, PO3, PO6, PO8
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	Peter Norton, "Introduction to Computers"–Tata Mc Graw-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

CourseCode	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
U23ITSEC23	**INTRODUCTION TO HTML**	Specific Elective	2	-	-		2	25	75	100

Learning Objectives

LO1	Insert a graphic within a web page.
LO2	Create a link within a web page.
LO3	Create a table within a web page.
LO4	Insert heading levels within a web page.
LO5	Insert ordered and unordered lists within a web page. Create a web page.

UNIT	Contents	No. Of. Hours
I	Introduction : Web Basics: What is Internet–Web browsers–What is Webpage –HTML Basics: Understanding tags.	**6**
II	Tags for Document structure (HTML, Head, Body Tag). Block level text elements: Headings paragraph(<p> tag)–Font style elements:(bold, italic, font, small, strong, strike, big tags)	**6**
III	Lists: Types of lists: Ordered, Unordered – Nesting Lists–Other tags: Marquee, HR, BR – Using Images – Creating Hyperlinks.	**6**
IV	Tables: Creating basic Table, Table elements, Caption–Table and cell alignment – Rowspan, Colspan – Cell padding.	**6**
V	Frames: Frameset–Targeted Links–Noframe–Forms: Input, Text area, Select,Option.	**6**
	TOTAL HOURS	**30**

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

Textbooks

1	"Mastering HTML5 and CSS3 Made Easy", Teach UComp 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

***