

**J.J. College of Arts and Science (Autonomous)**  
Sivapuram, Pudukkottai - 622 422

**Department of Information Technology**



**B.Sc., Information Technology**

**Syllabus based on**



**TANSICHE Regulations on Learning Outcomes - Based Curriculum  
Frame Work for Under Graduate Education**

**[Those who Join 2023 - 2024 Onwards]**

**B.Sc. – Information Technology (Course Structure under CBCS)  
Proposed Course Structure based on TANSCHÉ and UGC-LOCF  
(For the Candidates admitted from academic year 2023 - 2024 onwards)**

SEM	Part	Course Code	Course Title	Hrs/Week	Credit	Exam Hrs	Marks		Total Marks
							Int.	Ext	
<b>I</b>	Part - I	U1R3TL1	Language Course – I	6	3	3	25	75	100
	Part - II	U1R3EL1	English Language Course – I	6	3	3	25	75	100
	Part - III	U1R3ITCC1	Core Course – 1 Programming in C	5	5	3	25	75	100
		U1R3ITCC2P	Core Course – 2 C Programming Practical	5	5	3	40	60	100
		U1R3ITDSE1:1/ 1:2	Elective – 1 Numerical Methods/ Multimedia Systems Any one from the list	4	3	3	25	75	100
	Part - IV	U1R3ITSEC1 (NME)	Skill Enhancement Course -1 - to be taken from other department	2	2	3	25	75	100
		U1R3ITFC	Foundation Course FC- Fundamentals of Computers	2	2	3	25	75	100
<b>TOTAL</b>				<b>30</b>	<b>23</b>	-	-	-	<b>700</b>
<b>II</b>	Part - I	U2R3TL2	Language - I (Tamil/Hindi/French)	3	6	25	75	100	Part - I
	Part - II	U2R3EL2	Language - II (English)	3	6	25	75	100	Part - II
	Part - III	U2R3ITCC3	JAVA Programming	5	5	25	75	100	Part - III
		U2R3ITCC4P	Practical II - JAVA Programming and Data Structures Practical	5	5	40	60	100	
		U2R3ITDSE 2:1/ 2:2	Digital Logic Fundamentals / Discrete Structures	3	4	25	75	100	
	Part - IV	U2R3ITSEC2 (NME2)	To be opted from other Department	2	2	25	75	100	Part - IV
		U2R3ITSEC3	Quantitative Aptitude	2	2	25	75	100	
<b>TOTAL</b>				<b>30</b>	<b>23</b>	-	-	-	<b>700</b>

## CORE COURSE – 1 PROGRAMMING IN C (U1R3ITCC1)

Hours/Week: 05

Max. Marks : 100 (CIA:25+Ext:75)

Total Hours: 75

Credits : 5

Nature of the Course: Skill Development

### Learning Objectives :

1. To gain knowledge in C language.
2. To inculcate fundamental programming skills.
3. To know the Array concepts
4. To develop knowledge in Structure
5. To gain knowledge in **Pointer**

### Unit I

**Overview of C:** Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and **Data Types:** Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables-**Assignment statement, declaring a variable as constant, as volatile. Operators and Expressions -Managing Input and Output Operations.**

### Unit II

**Decision Making and Branching:** **Decision making** with If, simple IF, IF ELSE, nested IF ELSE , ELSE IF ladder, switch, GOTO statement. Decision Making and **Looping:** While, Do-While, For, Jumps in loops.

### Unit III

**Arrays:** Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. **Functions:** The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions.

### Unit IV

**Structure and Unions:** Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, **arrays within structures, structures within structures, structures and functions, unions.**

### Unit V

**Pointers:** definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays.

**File Management in C:** Opening, closing and I/O operations on files, random access to files, command line arguments.

**TEXT BOOKS:** E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

**BOOKS FOR REFERENCE :**

1. Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998.

Yashavant Kanetkar, Let Us C, Eighteenth Edition, BPB Publications, 2021

**Course Outcomes**

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Remember the program structure of C with its syntax and semantics	K3
CO 2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	K2
CO 3	Apply the programming principles learnt in real-time problems	K1
CO 4	Analyze the various methods of solving a problem and choose the best method	K4
CO 5	Code, debug and test the programs with appropriate test cases	K5

### Relationship Matrix for CO, PO, PSO

Course Name – Programming in C						Course Code – U1R3ITCC1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	2	2	2	2	3	2	2	2	2.2
<b>CO2</b>	2	2	2	2	3	2	3	2	3	2	2.3
<b>CO3</b>	2	2	2	2	2	3	2	2	2	3	2.2
<b>CO4</b>	2	3	2	3	2	2	2	2	2	2	2.2
<b>CO5</b>	2	3	2	3	2	2	2	3	2	2	2.3
	<b>Mean Overall Score</b>										2.24
	<b>Result</b>										<b>High</b>

## **CORE COURSE - 2: C PROGRAMMING PRACTICAL (U1R3ITCC2P)**

Hours/Week: 05

Max. Marks : 100(CIA:40+Ext:60)

Total Hours: 75

Credits : 3

Nature of the Course : Skill Development

### **OBJECTIVES**

1. To train the student to the basic concepts of the C-programming language.
2. To improve the programming skills through C language.
3. To get the knowledge in summation of series, string manipulation.
4. To gather the knowledge in recursion and matrix manipulation.
5. To improve the skill of sorting and searching techniques.

#### **I Summation of Series**

1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

#### **II String Manipulation**

1. Counting the number of vowels, consonants, words, white spaces in a line of text and array of lines.
2. Reverse a string and check for palindrome.
3. Sub string detection, count and removal.
4. Finding and replacing substrings.

#### **III Recursion**

1. GCD of two numbers
2. Fibonacci sequence
3. Maximum & Minimum

#### **IV Matrix Manipulation**

1. Addition and Subtraction
2. Multiplication
3. Transpose, and trace of a matrix
4. Determinant of a Matrix

#### **V Sorting and Searching**

1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

**TEXT BOOKS :** E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

**BOOKS FOR REFERENCE :**

- 1 Byron Gottfried, Schaum’s Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
1. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998.
2. Yashavant Kanetkar, Let Us C, Eighteenth Edition, BPB Publications, 2021

**Web References**

1. <https://www.tutorialspoint.com/cprogramming>
2. <https://www.javatpoint.com/c-programming-language-tutorial>

**Course Outcomes**

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Remember and understand how to write programs using the basic syntax and semantics in C	K 2
CO 2	Apply the concepts of functions, macros, arrays, structures, pointers and files in programs to solve problems	K1
CO 3	Analyze and understand programs written in C language	K5
CO 4	Evaluate the program execution flow with test cases and apply debugging	K4
CO 5	Design algorithms and write programs in C language for the given problems.	K3

**Relationship Matrix for CO, PO, PSO**

Course Name – C Programming Practical						Course Code – U1R3ITCC2P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	2	2	3	3	2	2	2	2	2	2.2
<b>CO2</b>	3	2	3	2	3	2	3	2	3	2	2.5
<b>CO3</b>	2	2	3	2	2	3	2	2	2	3	2.3
<b>CO4</b>	2	2	2	3	2	3	2	2	2	2	2.2
<b>CO5</b>	2	2	2	3	2	3	2	3	2	2	2.3
	<b>Mean Overall Score</b>										2.3
	<b>Result</b>										<b>High</b>

**DISCIPLINE SPECIFIC ELECTIVE COURSE - 1**

**NUMERICAL METHODS (U1R3ITDSE1:1)**

**Hours/Week: 04**

**Max. Marks : 100(CIA:25+Ext:75)**

**Total Hours:60**

**Credits : 3**

**Nature of the Course: Skill Development**

**Objectives:**

1. To introduce the various topics in Numerical methods.
2. To make understand the fundamentals of algebraic equations.
3. To apply interpolation and approximation on examples.
4. To solve problems using numerical differentiation and integration.
5. To solve linear systems, numerical solution of ordinary differential equations.

**Unit I: Fundamentals of Algebraic Equations (12 Hours)**

Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method .

**Unit II: Iterative and Interpolation (12 Hours)**

Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices. Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation(Proof no needed)

**Unit III: Interpolation with Equal interval (12 Hours)**

Difference operators and relations. -Interpolation with equal intervals – Newton's forward and backward difference formulae. (Problems only).

**UnitIV: Numerical Differentiation and Integration (12 Hours)**

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule

**Unit V: Initial Value Problems For ODE (12 Hours)**

Single step methods – Taylor's series method – Euler's method – Runge Kutta method for solving( first, second , Third and 4th) order equations.

**Text books:**

1. **Introductory methods of numerical analysis**, S.S. Sastry, Prentical Hall India, 1994.
2. **Numerical Methods**, N. Subramaniam, Scm Publishers, Erode.

**e – Resources:**

1. <https://youtu.be/pUDeeE-ugyc>
2. <https://www.maths.dur.ac.uk/users/anthony.yeates/na17.pdf>

**Reference Books:**

1. **Numerical Methods**, P.Kandasamy, S.Chand & Co., New Delhi, .1998
2. **Statistics**, R.S.N. Pillai and Bagavathi S, Chand & Co Ltd., New Delhi, 1999.

**Course Outcomes**

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Know how to solve various problems on numerical methods	<b>K2</b>
<b>CO 2</b>	Use approximation to solve problems	<b>K3</b>
<b>CO 3</b>	Differentiation and integration concept are applied	<b>K2</b>
<b>CO 4</b>	Know about numerical methods to solve Numerical differentiation and Integration.	<b>K1</b>
<b>CO 5</b>	Numerical solution of ordinary differential equations	<b>K5</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;  
K6 - Create**

## CO-PO Relationship Matrix

Course Name – Numerical Methods						Course Code – U1R3ITDSE1:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	2	2	3	2	3	3	2	2	2.4
<b>CO2</b>	3	2	3	3	2	2	2	3	2	2	2.4
<b>CO3</b>	3	2	2	2	2	2	2	3	2	2	2.2
<b>CO4</b>	3	2	2	2	2	2	3	2	2	2	2.2
<b>CO5</b>	3	2	2	3	2	2	3	3	2	2	2.4
	<b>Mean Overall Score</b>										2.32
	<b>Result</b>										<b>High</b>

**DISCIPLINE SPECIFIC ELECTIVE COURSE - 1**

**MULTIMEDIA SYSTEMS (U1R3ITDSE1:2)**

**Hours/Week: 04**

**Max. Marks : 100(CIA:25+Ext:75)**

**Total Hours: 60**

**Credits : 3**

**Nature of the Course: Skill Development**

**OBJECTIVES**

1. To teach the basic concepts of multimedia..
2. Educating the students how to work in images
3. To teach the concept of animation.
4. Provides the details in making multimedia.
5. Improve the knowledge in planning and costing .

**UNIT I Introduction:**

**12 Hours**

Multimedia Definition - **Use Of Multimedia** - Delivering Multimedia - **Text:** About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools(**ICT Class**) - **Hypermedia and Hypertext(Assignment)**.

**UNIT II Images:**

**12 Hours**

Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats(**Seminar**). Sound: The Power of Sound - Digital Audio - Midi Audio - Midi vs. Digital Audio(**ICT Class**) - Multimedia System Sounds - **Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.**

**UNIT III Animation:**

**13 Hours**

**Animation:** The Power of Motion - Principles of Animation - Animation by Computer - Making Animations that Work. Video(**Assignment**): Using Video - Working with Video and Displays - **Digital Video Containers** - Obtaining Video(**ICT Class**) Clips - Shooting and **Editing Video.**

**UNIT IV Multimedia:****13 Hours**

**Making Multimedia:** The Stage of Multimedia Project - The Intangible Needs - The Hardware Needs(**ICT Class**) - The Software Needs - An Authoring Systems Needs(**Seminar**)- Multimedia Production Team.

**UNIT V Planning and Costing:****10 Hours**

**Planning and Costing:** The Process of Making Multimedia - Scheduling - Estimating - RFPs and Bid Proposals. **Designing and Producing(ICT Class)** - Content and Talent: **Acquiring Content - Ownership of Content Created for Project - Acquiring Talent.**

**TEXT BOOK**

1. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2001.

**REFERENCE BOOK**

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

**Course Outcomes**

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Understand the concept of multimedia.	K2
<b>CO 2</b>	Gather the knowledge of multimedia images.	K4
<b>CO 3</b>	Gather the strong ideas in animation.	K5
<b>CO 4</b>	Improve the knowledge in making multimedia.	K3
<b>CO 5</b>	Improve the knowledge in planning and costing.	K6

### Relationship Matrix for CO, PO, PSO

Course Name – Multimedia Systems						Course Code – U1R3ITDSE2:3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	3	2	2	2	2	3	3	2	2.4
<b>CO2</b>	2	2	2	2	2	3	2	2	2	2	2.1
<b>CO3</b>	3	2	3	3	2	2	3	2	3	2	2.5
<b>CO4</b>	2	3	2	3	2	2	2	2	2	2	2.2
<b>CO5</b>	2	2	2	3	2	3	2	3	3	2	2.4
	<b>Mean Overall Score</b>										2.32
	<b>Result</b>										<b>High</b>

## Non Major Elective I

### OFFICE AUTOMATION (U1R3ITSEC1)

**Hours/Week: 02**

**Max. Marks : 100(CIA:25+Ext:75)**

**Total Hours: 30**

**Credits : 2**

**Nature of the Course: Skill Development**

<b>Course Objective</b>		
1.	Understand the basics of computer systems and its components.	
2.	Understand and apply the basic concepts of a word processing package.	
3.	Understand and apply the basic concepts of electronic spreadsheet software.	
4.	Understand and apply the basic concepts of database management system.	
5.	Understand and create a presentation using PowerPoint tool.	
<b>UNIT</b>	<b>Details</b>	<b>No. of Hours</b>
I	<b>Introductory concepts:</b> 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	<b>Word Processing:</b> 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	<b>Spreadsheets :</b> 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	<b>Database Concepts:</b> 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;	6

	Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS–Access).	
V	<b>Power point:</b> 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
	<b>Total</b>	<b>30</b>
<b>Text Book</b>		
1	Peter Norton,“Introduction to Computers”–Tata Mc Graw-Hill.	
<b>Reference Books</b>		
1.	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGrawHill.	
<b>Web Resources</b>		
1.	<a href="https://www.udemy.com/course/office-automation-certificate-course/">https://www.udemy.com/course/office-automation-certificate-course/</a>	
2.	<a href="https://www.javatpoint.com/automation-tools">https://www.javatpoint.com/automation-tools</a>	

### Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Possess the knowledge on the basics of computers and its components	K2
<b>CO 2</b>	Gain knowledge on Creating Documents, spreadsheet and presentation.	K2
<b>CO 3</b>	Learn the concepts of Database and implement the Query in Database.	K2
<b>CO 4</b>	Demonstrate the understanding of different automation tools.	K2
<b>CO 5</b>	Utilize the automation tools for documentation, calculation and presentation purpose.	K2

### Relationship Matrix for CO, PO, PSO

Course Name – Office Automation						Course Code – U1R3ITSEC1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	2	3	2	3	2	2	2	2	2	2.2
<b>CO2</b>	3	2	2	3	2	2	3	2	3	2	2.4
<b>CO3</b>	2	2	2	3	2	2	2	3	3	2	2.3
<b>CO4</b>	3	2	2	3	2	2	2	3	2	2	2.3
<b>CO5</b>	2	2	2	3	2	3	2	2	2	2	2.2
	<b>Mean Overall Score</b>										2.28
	<b>Result</b>										<b>High</b>

## FOUNDATION COURSE

### FUNDAMENTALS OF COMPUTERS (U1R3ITFC)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: **Skill Development**

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	2	0	0	II	2	2	25	75	100
<b>Learning Objectives</b>									
1.	To analyze a problem with appropriate problem solving techniques								
2.	To understand the main principles of imperative, functional and logic oriented programming languages and								
3.	To increase the ability to learn new programming languages.								
4.	To Understand the basic concepts functions								
5.	To analyze a <b>Programming Structure</b>								
<b>Prerequisites:</b> Basic knowledge about programming concepts									
Unit	Contents								No. of Hours
I	<b>Introduction:</b> Characteristics of Computers - Evolution of Computers <b>Basic Computer Organization:</b> I/O Unit - Storage Unit - Arithmetic Logic Unit - Control Unit - Central Processing Unit								6
II	<b>Computer Software:</b> Types of Software - System Architecture <b>Computer Languages:</b> Machine Language - Assembly Language - High Level Language - Object Oriented Languages								6
III	<b>Problem Solving Concepts:</b> Problem Solving in Everyday life - Types of Problems - Problem solving with computers - Difficulties with Problem Solving								6
IV	<b>Problem Solving concepts for the computer:</b> Constant Variables - Data Types - Functions -Operators - Expressions and Equations - <b>Organizing the Solution:</b> Analyzing the problem - Algorithm - Flowchart - Pseudo code								6

V	<b>Programming Structure:</b> 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
<b>TOTAL</b>		<b>30</b>
<b>Textbooks</b>		
➤	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)	
<b>Reference Books</b>		
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.	
<b>NOTE: Latest Edition of Textbooks May be Used</b>		
<b>Web Resources</b>		
1.	<a href="http://www.tutorialspoint.com/computer_fundamentals/">http://www.tutorialspoint.com/computer_fundamentals/</a>	
2.	<a href="http://www.comptechdoc.org/basic/basicut/">http://www.comptechdoc.org/basic/basicut/</a>	
3.	<a href="http://www.homeandlearn.co.uk/">http://www.homeandlearn.co.uk/</a>	
4.	<a href="http://www.top-windows-tutorials.com/computer-basics/">http://www.top-windows-tutorials.com/computer-basics/</a>	
5.	<a href="https://www.programiz.com/article/flowchart-programming">https://www.programiz.com/article/flowchart-programming</a> (Algorithm and flow chart)	

## Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Outline the Computer fundamentals and various problem solving concepts in Computers	<b>K 1</b>
<b>CO 2</b>	Describe the basic computer organization, software, computer languages, software development life cycle and the need of structured programming in solving a computer problem	<b>K2</b>
<b>CO 3</b>	Identify the types of computer languages, software, computer problems and examine how to set up expressions and equations to solve the problem.	<b>K4</b>
<b>CO 4</b>	Choose most appropriate programming languages, constructs and features to solve the problems in diversified domains.	<b>K5</b>
<b>CO 5</b>	Analyze the design of modules and functions in structuring the solution and various Organizing tools in problem solving.	<b>K3</b>

### Relationship Matrix for CO, PO, PSO

Course Name Fundamentals of Computers						Course Code – U1R3ITFC					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	3	2	2	2	3	2	2	3	2	2	2.3
<b>CO2</b>	2	2	2	2	2	2	2	2	3	2	2.1
<b>CO3</b>	2	3	2	3	2	3	2	2	3	2	2.4
<b>CO4</b>	3	2	2	3	2	2	3	2	3	2	2.4
<b>CO5</b>	2	2	3	3	2	2	2	3	3	2	2.4
<b>Mean Overall Score</b>											2.32
<b>Result</b>											<b>High</b>

**SEMESTER II****CORE COURSE – 3: JAVAPROGRAMMING(U2R3ITCC3)**

Hours/Week: 05

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 75

Credits : 5

Nature of the Course: **Employability**

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	5	0	0	II	5	5	25	75	100
<b>Learning Objectives</b>									
<b>LO1</b>	To provide knowledge on fundamentals of object-oriented programming.								
<b>LO2</b>	To improve the knowledge in constant, variable and data types.								
<b>LO3</b>	To understand the concept of class objects and methods.								
<b>LO4</b>	To gain the knowledge in inheritance and interfaces.								
<b>LO5</b>	to have the ability to use the SDK environment to create, debug and run servlet programs								
<b>Prerequisites:</b> Basic knowledge about programming concepts									
Unit	Contents								No. of Hours
I	Fundamentals of Object- Oriented Programming: Introduction – Object Oriented Paradigm – Concepts of Object – Oriented Programming – <b>Benefits of OOP – Evolution: Java History- Java Features - Differs from C and C++ - Overview of Java Language: Java Program- Structure – Tokens – Java Statements – Java Virtual Machine – Command Line Arguments</b>								15
II	<b>Constants, Variables and Data Types – Operators and Expressions – Decision making and Branching – Looping – Arrays</b> - Strings – Collection Interfaces and classes								15
III	Classes objects and methods: Introduction – Defining a class – Method Declaration – <b>Constructors - Method Overloading – Static Members – Nesting of methods – Inheritance – Overriding</b> – Final variables and methods – Abstract methods and classes								15
IV	<b>Multiple Inheritance:</b> Defining Interfaces – Extending Interfaces – Implementing Interfaces – Packages: Creating Packages – Accessing Packages – Using a Package – Managing Errors and Exceptions - Multithreaded Programming								15
V	Layout Managers - <b>JDBC – Java Servlet: - Servlet Environment Role – Servlet API – Servlet Life Cycle – Servlet Context</b> – HTTP Support – HTML to Servlet Communication								15
<b>TOTAL</b>								<b>75</b>	
<b>Textbooks</b>									
➤	E Balagurusamy(2010), “Programming with Java”, Tata McGraw Hill Edition India Private Ltd,								

	4th Edition
➤	C Xavier,"Java Programming – A Practical Approach", Tata McGraw Hill Edition Private Ltd
<b>Reference Books</b>	
3.	P.Naughton and H.Schildt (1999), "Java 2 The Complete Reference", TMH, 3rd Edition
4.	Jaison Hunder & William Crawford (2002),"Java Servlet Programming", O'Reilly
5.	Jim Keogh (2002), "J2EE: The Complete Reference", Tata McGraw Hill Edition.
<b>NOTE: Latest Edition of Textbooks May be Used</b>	
<b>Web Resources</b>	
6.	<a href="http://javabeginnerstutorial.com/core-java/">http://javabeginnerstutorial.com/core-java/</a>
7.	<a href="http://www.tutorialspoint.com/java/">http://www.tutorialspoint.com/java/</a>
8.	<a href="http://beginnersbook.com/java-tutorial-for-beginners-with-examples/">http://beginnersbook.com/java-tutorial-for-beginners-with-examples/</a>
9.	<a href="http://www.homeandlearn.co.uk/java/java.html">http://www.homeandlearn.co.uk/java/java.html</a>
10.	<a href="http://www.journaldev.com/1877/servlet-tutorial-java">http://www.journaldev.com/1877/servlet-tutorial-java</a> (Unit V : Servlet API)

### Course Outcomes

	<b>Upon Completion of the course students would be able to</b>	<b>Knowledge Level</b>
<b>CO 1</b>	Outline the basic terminologies of OOP, programming language techniques, JDBC and Internet programming concepts	<b>K 2</b>
<b>CO 2</b>	Solve problems using basic constructs, mechanisms, techniques and technologies of Java	<b>K1</b>
<b>CO 3</b>	Analyse and explain the behavior of simple programs involving different techniques such as Inheritance, Packages, Interfaces, Exception Handling and Thread and technologies such as JDBC and Servlets	<b>K5</b>
<b>CO 4</b>	Assess various problem-solving strategies involved in Java to develop a high-level application.	<b>K4</b>
<b>CO 5</b>	Design GUI based JDBC applications and able to develop Servlets using suitable OOP concepts and techniques	<b>K3</b>

### Relationship Matrix for CO, PO, PSO

Course Name – JAVA Programming						Course Code – U2R3ITCC3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	2	2	3	2	3	3	2	2	2.4
<b>CO2</b>	3	2	3	3	2	2	2	3	2	2	2.4
<b>CO3</b>	3	2	2	2	2	2	2	3	2	2	2.2
<b>CO4</b>	3	2	2	2	2	2	3	2	2	2	2.2
<b>CO5</b>	3	2	2	3	2	2	3	3	2	2	2.4
	<b>Mean Overall Score</b>										2.32
	<b>Result</b>										<b>High</b>

## CORE COURSE – 4 **JAVA PROGRAMMING AND DATA STRUCTURES**

### **PRACTICAL (U2R3ITCC4P)**

**Hours/Week: 05**

**Max. Marks : 100(CIA:40+Ext:60)**

**Total Hours: 75**

**Credits : 5**

**Nature of the Course: Skill Development**

#### **Course Objectives:**

1. To improve the knowledge about Basic JAVA programs
2. To provide the knowledge in Class and Objects.
3. To gain practical expertise in coding Core Java programs.
4. To gain the knowledge in inheritance and interfaces.
5. To become proficient in the use of AWT, Event Handling and Swing.

#### **General Objective:**

To enable the student to code, debug and execute programs in Java.

#### **Course Objectives:**

- To gain practical expertise in coding Core Java programs
- To become proficient in the use of AWT, Event Handling and Swing.

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

## Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Code, debug and execute Javaprogramstosolvethегivenproblems.	K 2
<b>CO 2</b>	Implement multi-threading and exception-handling	K1
<b>CO 3</b>	Implement functionality using String and String Buffer classes.	K5
<b>CO 4</b>	Demonstrate Event Handling.	K4
<b>CO 5</b>	Create applications using Swing and AWT	K3

### Relationship Matrix for CO, PO, PSO

Course Name – JAVA Programming & Data Structures Practical						Course Code – U2R3ITCC4P					Mean Score of Cos
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	2	2	2	3	3	2	3	2	2.4
<b>CO2</b>	2	2	2	2	2	2	2	2	2	3	2.1
<b>CO3</b>	2	2	2	2	2	2	3	2	2	2	2.1
<b>CO4</b>	2	2	2	3	2	2	2	2	2	2	2.1
<b>CO5</b>	2	2	3	2	3	2	3	2	2	2	2.3
<b>Mean Overall Score</b>											2.20
<b>Result</b>											<b>High</b>

**DISCIPLINE SPECIFIC ELECTIVE COURSE - 2**

**DIGITAL LOGIC FUNDAMENTALS (U2R3ITDSE2:1)**

**Hours/Week: 04**

**Max. Marks : 100(CIA:25+Ext:75)**

**Total Hours: 60**

**Credits : 3**

**Nature of the Course: Skill Development**

**Objective:**

1. To provide the knowledge about numbering systems.
2. To gain the knowledge about Boolean algebra and logic gates.
3. To provide the knowledge about combinational logic circuit.
4. To understand the concept about Sequential logic circuit.
5. To understand the concept of Processor Logic Design.

**Unit I: Binary Systems**

**12 Hours**

Binary Systems: Digital Computers and Digital Systems- Binary Numbers-Number base Conversion- Octal and Hexa decimal numbers-Complements-Binary codes-Binary logic.

**Unit II: Boolean Algebra and Logic gates**

**12 Hours**

Boolean Algebra and Logic gates: Basic definitions-Axiomatic definition of Boolean algebra -Basic theorems and properties of Boolean algebra-Digital logic gates. Simplification of Boolean function: The Map method-Up to four variables.

**Unit III: Combinational logic**

**12 Hours**

Combinational logic: Introduction-Design procedure- Adders-Subtractors. Combinational logic with MSI and LSI: Decoders-Multiplexers.

**Unit IV: Sequential logic**

**12 Hours**

Sequential logic: Introduction-Flip-Flops-Trigerring of Flip-Flops-Design of Counters. Registers, Counters and the memory unit: Introduction-Registers-Shift registers- ripple counters-Synchronous counters.

**Unit V: Processor Logic Design**

**12 Hours**

Processor Logic Design: Design of Arithmetic logic unit-Status register-Design of Accumulator.

**Text Book:**

1. Logic and computer design fundamentals, M.M.Mano, 5<sup>th</sup> Edition, 2016, PHI

**Reference Book:**

1. T.C. Bartee-1997, Computer Architecture and logic design, International Edition, Mc Graw Hill.

**Web References:**

1. [www.asic-Worl.com/digital/tutorial.html](http://www.asic-Worl.com/digital/tutorial.html)
2. [https://course.ie.cuhk.edu.hk/~ieg2810/.../Lab\\_tutorial1\\_08.pdf](https://course.ie.cuhk.edu.hk/~ieg2810/.../Lab_tutorial1_08.pdf)

**Course Outcomes**

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Understand the fundamental concepts and techniques of digital logic.	<b>K 2</b>
<b>CO 2</b>	Apply arithmetic operations in number system and various methods to	<b>K1</b>
<b>CO 3</b>	Implement simplification of Boolean functions.	<b>K5</b>
<b>CO 4</b>	Analyze the design of various combinational and sequential circuits.	<b>K4</b>
<b>CO 5</b>	Ability to identify requirements for a design application using logic gates,	<b>K3</b>

**Relationship Matrix for CO, PO, PSO**

Course Name – Digital Logic Fundamentals						Course Code – U2R3ITDSE2:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	3	2	3	2	3	3	3	2	2	2.5
<b>CO2</b>	2	3	2	2	2	3	2	2	3	2	2.3
<b>CO3</b>	2	2	2	2	2	2	2	2	2	2	2
<b>CO4</b>	2	3	3	2	2	3	2	3	3	2	2.5
<b>CO5</b>	2	3	3	3	3	2	2	2	2	2	2.4
<b>Mean Overall Score</b>											2.34
<b>Result</b>											<b>High</b>

**DISCIPLINE SPECIFIC ELECTIVE COURSE - 2**  
**DISCRETE STRUCTURE (U2R3ITDSE2:2)**

**Hours/Week: 04**

**Max. Marks : 100(CIA:25+Ext:75)**

**Total Hours:60**

**Credits : 3**

**Nature of the Course: Skill Development**

**COURSE OBJECTIVES**

1. To understand the logic, functions and reasoning.
2. To learn relations and probability
3. To educate the Mathematical reasoning
4. To improve the Set and Relations concepts
5. To provides the ideas about Sequence and Summations

**UNIT I Logic**

**12 Hours**

Logic: propositional logic, logical equivalence, predicates & quantifiers, and logical reasoning. Sets: basics, set operatios

**UNIT II Functions**

**12 Hours**

Functions: one-to-one, onto, inverse, composition, graphs Integers: greatest common divisor, Euclidean algorithm.

**UNIT III Sequence and Summations**

**12 Hours**

Sequences and Summations, Mathematical reasoning and induction: Proof strategies, Mathematical Induction, Recursive definitions, Structural Induction

**UNIT IV Counting**

**12 Hours**

Counting: basic rules, Pigeonhole principle, Permutations and Combinations, Binomial coefficients and Pascal triangle. Probability: Discrete probability. Expected values and variance

**UNIT V Relations**

**12 Hours**

Relations: Properties, Combining relations, Closures, Equivalence, Partial ordering, Graphs: directed, undirected graphs.

**TEXT BOOK**

1.Kenneth H. Rosen. Discrete Mathematics and Its Applications, 7th Edition,McGraw Hill, 2012

## Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Understand the concept of Relations.	K3
<b>CO 2</b>	Gather the knowledge of Sets.	K4
<b>CO 3</b>	Gather the strong ideas in Sequence.	K2
<b>CO 4</b>	Improve the knowledge in Summations.	K6
<b>CO 5</b>	Improve the knowledge in Functions.	K5

### Relationship Matrix for CO, PO, PSO

Course Name – Discrete Structure						Course Code – U2R3ITDSE2:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	3	2	2	3	3	3	3	3	2	2	2.6
<b>CO2</b>	2	3	2	3	3	2	3	2	2	2	2.4
<b>CO3</b>	3	2	3	3	3	3	2	2	2	2	2.5
<b>CO4</b>	2	2	2	3	2	2	3	3	2	2	2.3
<b>CO5</b>	2	2	2	3	2	2	2	2	2	2	2.1
<b>Mean Overall Score</b>											2.38
<b>Result</b>											<b>High</b>

## Non Major Elective II

### ADVANCED EXCEL (U2R3ITSEC2)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

#### Course Objectives:

1. To understand the concept of basics of Excel.
2. To gain the knowledge about data validations.
3. To improve the knowledge about sorting and filtering data.
4. To understand the concept of functions.
5. To understand the concept of charts, formatting charts and 3D graphs.

The objective of this course is to help the students learn the advanced features of Excel, to summarise, analyse, explore, and present visualisations of data in the form of charts, graphs.

#### UNIT I: Basics of Excel

6 Hours

Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and unprotecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions.

#### UNIT II: Data Validations

6 Hours

Data Validations - Specifying a valid range of values - Specifying a list of valid values- Specifying custom validations based on formula - Working with Templates Designing the structure of a template- templates for standardization of worksheets.

#### UNIT III: Sorting and Filtering Data

6 Hours

Sorting and Filtering Data -Sorting tables- multiple-level sorting- custom sorting- Filtering data for selected view - advanced filter options- Working with Reports Creating subtotals- Multiple-level subtotal.

#### UNIT IV: More Functions

6 Hours

More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- What If Analysis - Goal Seek- Data Tables- Scenario Manager.

#### UNIT V Charts

6 Hours

Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically- New Features Of Excel Sparklines, Inline Charts, data Charts- Overview of all the new features.

#### PRESCRIBED TEXT:

1. Excel 2019 All-in-One For Dummies – 2018- [Greg Harvey](#)
2. Microsoft Excel 2019 Pivot Table Data Crunching-2019,[Bill Jelen](#) and [Michael Alexander](#).

## Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Handle large amounts of data	K2
<b>CO 2</b>	Aggregate numeric data and summarise into categories and subcategories	K2
<b>CO 3</b>	Filtering, sorting, and grouping data or subsets of data	K2
<b>CO 4</b>	Create pivot tables to consolidate data from multiple files	K2
<b>CO 5</b>	Presenting data in the form of charts and graphs	K2

### Relationship Matrix for CO, PO, PSO

Course Name – Advanced Excel						Course Code – U2R3ITSEC2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	2	3	2	3	2	2	2	2	2	2.2
<b>CO2</b>	3	2	2	3	2	2	3	2	3	2	2.4
<b>CO3</b>	2	2	2	3	2	2	2	3	3	2	2.3
<b>CO4</b>	3	2	2	3	3	2	2	3	2	2	2.3
<b>CO5</b>	2	2	2	3	2	3	2	2	2	2	2.2
	<b>Mean Overall Score</b>										2.34
	<b>Result</b>										<b>High</b>

## SKILL ENHANCEMENT COURSE III

### QUANTITATIVE APTITUDE (U2R3ITSEC3)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

#### Course Objectives:

1. To improve the skill in numbering systems
  2. To understand the concept of problem solving techniques.
  3. To enhance the problem-solving skills of the students.
  4. To prepare the students for the competitive exams.
  5. To prepare the students for the campus recruitments.
- The primary objective of this course is to enhance the problem-solving skills of the students.
  - To prepare the students for the competitive exams and campus recruitments.

#### UNIT I

6 Hours

Numbers- HCF and LCM of numbers-Decimal fractions-Simplification-Square roots and cube roots-Average-problems on Numbers.

#### UNIT II

6 Hours

Problems on Ages - Surds and Indices - percentage - profits and loss - ratio and proportion-partnership-Chain rule.

#### UNIT III

6 Hours

Time and work - pipes and cisterns - Time and Distance - problems on trains -Boats and streams - simple interest - compound interest - Logarithms - Area -Volume and surface area-coding and decoding.

#### UNIT IV

6 Hours

Permutation and combination-probability-Analytical reasoning – verbal reasoning- puzzles-Odd man out and Series.

#### UNIT V

6 Hours

Calendar - Clocks - stocks and shares - Data representation - Tabulation – Bar Graphs- Pie charts- Line graphs.

#### TEXTBOOK

1. "Quantitative Aptitude", R.S. AGGARWAL., S.Chand & Company Ltd.,

## Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
<b>CO 1</b>	Understand the concept of Number System	K2
<b>CO 2</b>	Gather the knowledge of LCM	K4
<b>CO 3</b>	Gather the strong ideas in Multiplication	K5
<b>CO 4</b>	Improve the knowledge in Verbal Reasoning	K6
<b>CO 5</b>	Improve the knowledge in Tables and Graph.	K1

### Relationship Matrix for CO, PO, PSO

Course Name – Quantitative Aptitude						Course Code – U2R3ITSEC3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>	2	2	3	2	3	2	2	2	2	2	2.2
<b>CO2</b>	3	2	2	3	2	2	3	2	3	2	2.4
<b>CO3</b>	2	2	2	3	2	2	2	3	3	2	2.3
<b>CO4</b>	3	2	2	3	2	2	2	3	2	2	2.3
<b>CO5</b>	2	2	2	3	2	3	2	2	2	2	2.2
<b>Mean Overall Score</b>											2.28
<b>Result</b>											<b>High</b>