

# **B.Sc. INFORMATION TECHNOLOGY**

## **Course Structure and Syllabus**

(For the candidates admitted from the academic year 2024-2025 onwards)

### **CHOICE BASED CREDIT SYSTEM- LEARNING OUTCOMES BASED CURRICULUM FRAME WORK (CBCS-LOCF)**



**THANTHAI HANS ROEVER COLLEGE (AUTONOMOUS)**



**(Nationally Re-Accredited by NAAC with A)**

**(Affiliated to Bharathidasan University, Tiruchirappalli)**

**ELAMBALUR, PERAMBALUR – 621 220**



**VISION:**

- To be a Centre of excellence in education and research in the frontier areas of Computer Science.

**MISSION:**

- To facilitate quality transformative education in Computer Science
- To promote quality research and innovation in technology for meeting global challenges
- To transform students to competent professionals to cater to the needs of the society.

**Programme Outcomes (POs):**

1. Students will acquire basic Practical skills & Technical knowledge along with domain knowledge of different subjects in the Computer Science & humanities stream.
2. The skills and knowledge gained leads to proficiency in analytical reasoning, which can be utilized in modelling and solving real life problems.
3. Utilize computer programming skills to solve theoretical and applied problems by critical understanding, analysis and synthesis.
4. To recognize patterns and to identify essential and relevant aspects of problems.
5. Mould the students into responsible citizens in a rapidly changing interdependent society.

**Program Specific Outcomes (PSOs)**

1. Think in a critical and logical based manner
2. Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real-time application related sciences.
3. Demonstrate and apply basic knowledge of information technology to the scientific issues and
  - Problems being faced in society and the industry.
4. Analyze critical problems and provide computer-based solutions by applying appropriate tools
  - and technology.
5. Design and develop solutions to problems in the areas related to web page design, Mobile
  - App development, cloud computing, IOT and data analytics of varying complexity.

**Thanthai Hans Roever College (Autonomous), Elambalur, Perambalur - 621 220**

**B.Sc. INFORMATION TECHNOLOGY**

**CHOICE BASED CREDIT SYSTEM–LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS- LOCF)**

**(For the candidates admitted from the academic year 2024 - 2025 onwards)**

Semester	Part	Course Code	Title of the Course	Ins. Hours/ Weeks	Credits	Exam Hours	CIA (Max)	ESE (Max)	Total (Max)
1	I	23UT1/H1/F1	Language	6	3	3	25	75	100
1	II	23UE1	English -1	6	3	3	25	75	100
1	III	23UIT1CC1	Programming in C	6	5	3	25	75	100
1	III	23UIT1CC2P	Programming in C Lab	5	5	3	40	60	100
1	III	23UMA1AC1	Numerical Methods	5	3	3	25	75	100
I	IV	23UIT1SE1	Office Task Management (NME-1)	2	2	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>21</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>600</b>
2	I	23UT2/H2/F2	Language	6	3	3	25	75	100
2	II	23UE2	English -2	6	3	3	25	75	100
2	III	23UIT2CC3	Java Programming	5	5	3	25	75	100
2	III	23UIT2CC4P	Java Programming Lab	5	5	3	40	60	100
2	III	23UMA2AC2	Operation Research	4	3	3	25	75	100
2	IV	23UIT2SE2	Introduction to Web Designing (NME-2)	2	2	3	25	75	100
2	IV	23UIT2SE3	Basic of HTML	2	2	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>23</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>700</b>
3	I	23UT3/H3/F3	Language	6	3	3	25	75	100
3	II	23UE3	English -3	6	3	3	25	75	100
3	III	23UIT3CC5	RDBMS	5	5	3	25	75	100
3	III	23UIT3CC6P	RDBMS Lab	3	3	3	40	60	100
3	III	23UIT3AC3	Microprocesor and Assembly Language Programming	3	2	3	25	75	100
3	III	23UIT3AP	Assembly Language Programming Lab	3	2	3	40	60	100
3	IV	23UIT3SE4	Software Testing	2	2	3	25	75	100
3	IV	23UWH	Health And Wealthness	1	1	3	25	75	100
3	IV	23UGS	Gender Studies	1	1	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>22</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>900</b>

4	I	23UT4/H4/F4	Language	6	3	3	25	75	100
4	II	23UE4	English -4	6	3	3	25	75	100
4	III	23UIT4CC7	.NET Programming	6	5	3	25	75	100
4	III	23UIT4CC8P	.NET Programming Lab	4	4	3	40	60	100
4	III	23UIT4AC4	Digital Logic Fundamentals	4	4	3	25	75	100
4	IV	23UIT4SE6	Soft skills	2	2	3	25	75	100
4	IV	23UES	Environmental Studies	2	2	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>23</b>	-	-	-	<b>700</b>
5	V	23UIT5CC9	Python Programming	5	5	3	25	75	100
5	V	23UIT5CC10	Operating Systems	5	4	3	25	60	100
5	V	23UIT5CC11	Data Communication Networks	5	4	3	25	60	100
5	V	23UIT5CC12P	Python Programming Lab	5	4	3	25	75	100
5	V	23UIT5DE11/ 23UIT5DE12	IoT and its Application / Robotics and Its Applications	4	4	3	25	75	100
5	V	23UIT5DE21/ 23UIT5DE22	Grid Computing / Trends in Computing	4	4	3	25	75	100
5	V	23UVE	Value Education	2	2	3	25	75	100
			Summer Internship**		2*				100*
			Value Added Course*		2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>27</b>	-	-	-	<b>700</b>
6	VI	23UIT6CC13PW	Project with Viva-Voce	6	3	3	20	80	100
6	VI	23UIT6CC14	Data Mining	6	5	3	25	75	100
6	VI	23UIT6CC15P	Data Mining Lab	3	2	3	25	75	100
6	VI	23UIT6CC16	Software Project Management	6	6	3	25	75	100
6	VI	23UIT6DE31/ 23UIT6DE32	PHP Programming/ Data Analytics using R	6	5	3	25	75	100
6	VI	23UIT6DE41/ 23UIT6DE42	PHP Programming Lab/ Data Analytics using R Lab	3	2	3	40	60	100
6			Extension Activity	-	1	-	-	-	-
			Value Added Course*	30	2*	2	50	50	100*
<b>Total</b>				<b>30</b>	<b>24</b>	-	-	-	<b>600</b>
<b>Grand Total</b>				<b>180</b>	<b>140</b>				<b>4200</b>

**\* Extra Credit Courses which will not be included in the total CGPA**

- Summer Internship after 4<sup>th</sup> semester during summer vacation -30 Hours

-Value added course (Outside Instruction hours: 30 hours)

***Credit Distribution for UG Information Technology***

<b>Course details:</b>	<b>No. of Courses &amp; Credits</b>	<b>Total Credits</b>
<b><u>Part I</u></b>		
Tamil	4 * 3	12
<b><u>Part II</u></b>		
English	4 * 3	12
<b><u>Part III</u></b>		
Core Course	11 * 5+3*4	67
Core Course: Project with Viva-Voce	1 * 3	3
Allied Course	4 * 3	12
Discipline Elective	4 * 4	16
<b><u>Part IV</u></b>		
Skill Enhancement Courses	6 * 2	12
Gender Studies	1 * 1	1
Environmental Studies	1 * 2	2
Value Education	1 * 2	2
<b><u>Part V</u></b>		
Extension Activity	1 (Credit Only)	1
	<b>TOTAL</b>	<b>141</b>

**List of Core Courses**

1. Programming in C
2. Programming in C Lab
3. Java Programming
4. Java Programming Lab
5. Web Application Development
6. Web Application Development Lab
7. Python Programming
8. Python Programming Lab
9. Computer Networks
10. Database Management System
11. Database Management System Lab
12. Project with Viva-Voce
13. Machine Learning
14. PHP Programming
15. PHP Programming Lab
16. Software Project Management

## List of Allied Courses

1. Numerical Methods
2. Industrial Statistics
3. Microprocessor Fundamentals
4. Microprocessor Lab
5. Digital Logic fundamentals

## List of Skill Enhancement Courses

1. Office Task Management (NME-1)
2. Introduction to Web designing (NME-2)
3. Programming in C ++
4. Essentials of Business
5. R Programming
6. E-Commerce
7. Bio metrics

## List of Elective Courses

1. Information Security
2. Cloud Computing
3. Enterprise Resource Planning
4. Software Testing

## Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60
3. Separate passing minimum is prescribed for Internal and External marks		

## FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for Semester Examinations shall be 40% out of 75 marks [i.e. 30 marks]

## FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for Semester Examinations shall be 40% out of 60 marks [i.e. 24 marks]

- Project : 100 Marks (The Project will be evaluated by an Internal and an External Examiner)  
Dissertation- 80 Marks  
Viva Voce - 20 Marks

## List of Value Added Courses

Course Code	Course Title
23UVAIT1	Fundamental of R programming
23UVAIT2	Basics of laptop maintenance and OS installation
23UVAIT3	Ethical hacking
23UVAIT4	Network programming
23UVAIT5	Cryptography
23UVAIT6	Ruby on rails

## Question Paper Pattern

UG Programme		
<b>Maximum Marks : 75</b>		<b>Duration: 3 Hours</b>
<b>Section - A</b>	<b>i) a-</b> (5 Questions for Multiple Choice) One question from each unit	5 x 1 = 5 Marks
	<b>b-</b> (5 Questions for Fill in the Blanks) One question from each unit	5 x 1 = 5 Marks
	<b>ii)</b> (5 short answer questions) One question from each unit	5 x 2 = 10 Marks
<b>Section - B</b>	<b>5 Questions</b> (Internal Choice: Either or) One set of questions from each unit	5 x 5 = 25 Marks
<b>Section - C</b>	<b>3 Questions</b> (Answer any 3 out of 5 Questions) One question from each unit	3 x 10 = 30 Marks

## SEMESTER – I

**Course Code: 23UIT1CC1**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE – III – PROGRAMMING IN C

#### OBJECTIVES:

1. To gain knowledge in C language.
2. To inculcate fundamental programming skills.

#### COURSE OUTCOMES:

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

CO1: Remember the program structure of C with its syntax and semantics

CO2: Understand the programming principles in C

CO3: Understand data types, operators, branching and looping, arrays

CO4: Understand functions, structures pointers and files

CO5: Apply the programming principles learnt in real-time problems

#### UNIT – I

**Studying Concepts of Programming Languages-** 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

#### UNIT – II

**Decision Making and Branching:** Decision Making and Looping - Arrays - Character Arrays and Strings

#### UNIT – 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

#### UNIT – 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.

#### UNIT– 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

#### TEXT BOOKS:

1. Robert W. Sebesta, (2012), —Concepts of Programming Languages, Fourth Edition, Addison Wesley (Unit I : Chapter – 1)
2. E. Balaguruswamy, (2010), —Programming in ANSI C, Fifth Edition, Tata McGraw Hill Publications

#### REFERENCES:

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

## Web Resources

1. <http://www.tutorialspoint.com/cprogramming/>
2. <http://www.cprogramming.com/>
3. <http://www.programmingsimplified.com/c-program-examples>
4. <http://www.cs.sunysb.edu/~skiena/214/lectures/>
5. <http://datastructures.itgo.com/graphs/dfsdfs.htm>

## Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
I	23UIT1CC1	PROGRAMMING IN C					6	5			
Course Outcomes (COs)	Programme Outcomes(Pos)					Programme Specific Outcomes(PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓				✓	
CO2			✓	✓	✓	✓	✓	✓	✓	✓	
CO3			✓				✓				
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of Matches (✓) = <b>36</b>					Relationship: <b>HIGH</b>						
Mapping	1-29%		30-59%		60-69%		70-89%		90-100%		
Matches	1-14		15-29		30-34		35-44		45-50		
Relationship	Very Poor		Poor		Moderate		High		Very High		

## SEMESTER – I

**Course Code: 23UIT1CC2P**

**Instruction Hours: 5**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### **CORE COURSE PRACTICAL –III PROGRAMMING IN C LAB**

#### **OBJECTIVES:**

1. To gain knowledge in C language.
2. To inculcate fundamental programming skills

#### **COURSE OUTCOMES:**

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

CO1:Read, understand and trace the execution of programs written in C language.

CO2:Write the C code for a given algorithm.

CO3:Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-Processor.

CO4:Write programs that perform operations using derived data types.

CO5:Able to develop applications

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

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
I	23UIT1CC2P	PROGRAMMING IN C LAB					5	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓		✓	✓		✓				✓	
CO2	✓		✓	✓		✓	✓		✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO4		✓			✓	✓	✓	✓	✓	✓	
CO5	✓	✓		✓	✓		✓	✓	✓		
Number of matches (✓) = 35, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER I

Course Code: 23UMA1AC1

Instruction Hours: 5

Credits: 3

Exam Hours: 3

Internal Marks:25

External Marks:60

### ALLIED COURSE - NUMERICAL METHODS

#### Learning Objectives:

LO1: To apply the numerical problem in efficiency with various methods.

LO2: To acquire the knowledge of problem solving ability.

LO3: To gain the knowledge about the numerical problems.

LO4: To obtain approximate solutions to mathematical problems.

LO5: To Derive numerical methods for various mathematical operations and tasks

#### Course Outcomes:

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

CO 1: Compute the Solution of Algebraic and Transcendental equation using Bisection, Method of false position and Newton- Raphson Method.

CO 2: Find the solution of linear system of equation by Gaussian Elimination, Gauss Jacobi, and Gauss Seidel Methods

CO 3: Solve Interpolation of Finite differences – Newton’s Forward, Central and Backward differences

CO 4: Obtain the Numerical differentiation and integration.

CO 5: Derive and compute the solution of Taylor series, Picard’s and Euler method and Runge–Kutta Methods

#### UNIT – I

**Algebraic & Transcendental Equations:** Finding a root of the given equation (Derivation of the formula not needed) using Bisection Method, Iteration Method, Method of False Position, Newton Raphson Method.

#### UNIT – II

**Solutions to Linear Systems:** Introduction- Gaussian Elimination Method- Gauss-Jordan Elimination Method- Iterative Methods-Gauss-Jacobi Method- Gauss Siedal Method of Iteration.

#### UNIT – III

**Finite Differences:** First Difference- Forward and Backward differences –Newton’s Forward & Backward difference interpolation formula – Divided differences and their properties – Lagrange’s Interpolation Formula. (Proof not needed).

#### UNIT – IV

**Numerical Differentiation and Integration:** Introduction – Newton’s Forward and Backward Differences to compute derivatives -Numerical Integration using Trapezoidal rule & Simpson’s one-third and three-eight rule.

#### UNIT – V

**Numerical Solution of ODE:** Solution by Taylor Series Method – Euler Method – Runge - Kutta 2<sup>nd</sup> and 4<sup>th</sup> order Methods.

#### TEXT BOOK:

1. Dr.P.Kandasamy, Dr.K.Thilagavty, Dr.K.Gunavathi, Numerical Methods, S.Chand& co., 2010

UNIT – I Chapter – 3 Sections 3.1 to 3.4

UNIT – II Chapter – 4 Sections 4.1, 4.2, 4.2.1, 4.7 to 4.9.

UNIT – III	Chapter – 5	Sections 5.1, 5.2.
	Chapter – 6 & 8	Sections 6.2, 6.3 & 8.2, 8.3, 8.7
UNIT –IV	Chapter – 9	Sections 9.1 to 9.3, 9.9, 9.13, 9.14.
UNIT – V	Chapter – 11	Sections 11.5, 11.8 to 11.13, 11.16 to 11.18.

**REFERENCE(S):**

1. S. Narayanan & Others, Numerical Analysis, S. Viswanathan Publishers, 1994.
2. A.Singaravelu, Numerical Methods, Meenachi Agency, June 2000.
3. S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt.Limited, 4<sup>th</sup> Edition, 2009.

**WEB RESOURCES:**

1. <https://www.youtube.com/watch?v=4cqdpHxWs9g>
2. <https://www.youtube.com/watch?v=82IDoaiYU0c>
3. <https://www.youtube.com/watch?v=nmlwSQJmX2M>

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
I	23UMA1AC1	NUMERICAL METHODS					5	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3		✓	✓	✓		✓		✓			
CO4		✓		✓			✓	✓			
CO5	✓	✓			✓	✓	✓		✓	✓	
Number of Matches (✓) = 36						Relationship: <b>HIGH</b>					

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## EMESTER-I

**Course Code: 23UIT1SE1**  
**Instruction Hours: 2**  
**Credits: 2**

**Exam Hours: 3**  
**Internal Marks: 25**  
**External Marks: 75**

### COURSE IV - OFFICE TASK MANAGEMENT (NME-1)

#### OBJECTIVES:

1. Understand the basics of computer systems and its components.
2. Understand and apply the basic concepts of a word processing package.

#### COURSE OUTCOMES:

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

- CO1: Possess the knowledge on the basics of computers and its components
- CO2: Gain knowledge on Creating Documents, spreadsheet and presentation.
- CO3: Learn the concepts of Database and implement the Query in Database.
- CO4: Demonstrate the understanding of different automation tools.
- CO5: Utilize the automation tools for documentation, calculation and presentation purpose.

#### UNIT I:

**Office management:** Office management – Meaning – Elements of office management – Functions of office management. Office organization – Definition, Characteristics and Steps – Types of Organization – Functions of an Office administrator

#### UNIT II:

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

#### UNIT III:

**Spreadsheets** – Excel-opening- entering text and data- formatting- navigating- Formulas-entering- handling and copying- Charts-creating- formatting and printing- analysis tables- preparation of financial statements- introduction to data analytics.

#### UNIT IV:

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

#### UNIT V:

Officer Appliances Accounting machine – Addressing machine – Envelope Sealing machine – Franking machine & other modern office gadgets

#### Text Book(s):

1. Peter Norton,“Introduction to Computers”–Tata Mc Graw-Hill.

**Reference Book:**

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGrawHill.

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
I	23UIT1SE1	OFFICE TASK MANAGEMENT					2	2			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓			✓				✓	
CO2	✓	✓	✓			✓	✓		✓	✓	
CO3		✓	✓		✓	✓	✓		✓	✓	
CO4			✓	✓	✓	✓	✓	✓	✓	✓	
CO5				✓			✓	✓	✓		
Number of matches (✓) = 35, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – I

**Course Code: 23UVAIT1**

**Credits: 2**

**Exam Hours: 3**

**External Marks: 50**

### FUNDAMENTALS OF R PROGRAMMING

#### OBJECTIVES:

1. The main goal of the computer network is Resource Sharing.
2. To create all the programs, data and hardware accessible to anyone on the network without considering the resource's physical area and the client.

#### COURSE OUTCOMES:

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

CO1: Acquire basic knowledge in R

CO2: Understand the various data types available in R

CO3: Evaluate the use of Decision making and Looping statements

CO4: Describe the concept of Vectors and Lists

CO5: Apply the features of R in problem solving

#### UNIT – I

**Overview:** Evolution of R – Features of R – **Environment Setup**– Installation –**Basic Syntax:** R Command Prompt - R Script File – Comments.

#### UNIT – II

**Data Types:** Vectors – Lists – Matrices – Arrays – Factors – Data Frames. **Variables:** Variable Assignment – Data Types of variable – Finding Variables – Deleting Variables **R – Operators:** Arithmetic – Relational – Logical – Assignment – Miscellaneous.

#### UNIT – III

**Decision Making:** If Statement – If...Else Statement – else if Statement – Switch Statement – **Loops:** Repeat – While – For – Break Statement – Next Statement.

#### UNIT – IV

**Functions:** Definition – Components – Built-in Function – User-defined Function – Calling a Function – **Strings:** Rules Applied in String Construction – String Manipulation – **Vectors:** Vector Creation – Accessing Vector Elements - Vector Manipulation – **Lists:** Creating – Naming – Accessing – Manipulating – Merging – Converting List to Vector.

#### UNIT – V

**Matrices:** Accessing Elements – Matrix Computations – **Arrays:** Naming Columns and Rows – Accessing and Manipulating – Calculations across Elements.

#### Text Books:

1. SandipRakshit, R for Beginners, McGraw Hill Education, 2017
2. A.K. Verma, R Programming, Cengage Publications, 2019

## SEMESTER – II

**Course Code: 23UIT2CC3**

**Instruction Hours: 5**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE – III – JAVA PROGRAMMING

#### OBJECTIVES:

1. To provide knowledge on fundamentals of object-oriented programming
2. To have the ability to use the SDK environment to create, debug and run servlet programs

#### COURSE OUTCOMES:

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

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 behavior 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

#### UNIT – I

Fundamentals of Object- Oriented Programming: Introduction – Object Oriented Paradigm – Concepts of Object – Oriented Programming – 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

#### UNIT – II

Constants, Variables and Data Types – Operators and Expressions – Decision making and Branching – Looping – Arrays - Strings – Collection Interfaces and classes

#### UNIT – 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

#### UNIT – IV

Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Packages: Creating Packages – Accessing Packages – Using a Package – Managing Errors and Exceptions - Multithreaded Programming

#### UNIT– V

AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar.

#### TEXT BOOKS:

1. E Balagurusamy(2010), “Programming with Java”, Tata McGraw Hill Edition India Private Ltd, 4th Edition
2. C Xavier,”Java Programming – A Practical Approach”, Tata McGraw Hill Edition Private Ltd

#### REFERENCES:

1. P.Naughton and H.Schildt (1999), “Java 2 The Complete Reference”, TMH, 3rd Edition
2. Jaison Hunder & William Crawford (2002),”Java Servlet Programming”, O'Reilly

3. Jim Keogh (2002), “J2EE: The Complete Reference”, Tata McGraw Hill Edition.

**WEB RESOURCES:**

1. <http://javabeginnerstutorial.com/core-java/>
2. <http://www.tutorialspoint.com/java/>
3. <http://beginnersbook.com/java-tutorial-for-beginners-with-examples/>
4. <http://www.homeandlearn.co.uk/java/java.html>
5. <http://www.journaldev.com/1877/servlet-tutorial-java> (Unit V : Servlet API)

**Relationship Matrix for COs, POs and PSOs**

Semester	Code	Title of the Course					Hours	Credits			
<b>II</b>	<b>23UIT2CC3</b>	<b>JAVA PROGRAMMING</b>					<b>5</b>	<b>5</b>			
Course Outcomes (COs)	Programme Outcomes(Pos)					Programme Specific Outcomes(PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓				✓	
CO2			✓	✓	✓	✓	✓	✓	✓	✓	
CO3			✓				✓				
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of Matches (✓) = <b>36</b>					Relationship: <b>HIGH</b>						
<b>Mapping</b>	1-29%		30-59%		60-69%		70-89%		90-100%		
<b>Matches</b>	1-14		15-29		30-34		35-44		45-50		
<b>Relationship</b>	Very Poor		Poor		Moderate		High		Very High		

## SEMESTER – II

**Course Code: 23UIT2CC4P**  
**Instruction Hours: 5**  
**Credits: 5**

**Exam Hours: 3**  
**Internal Marks: 40**  
**External Marks: 60**

### CORE COURSE – III – JAVA PROGRAMMING LAB

#### OBJECTIVES:

1. To provide knowledge on fundamentals of object-oriented programming
2. To have the ability to use the SDK environment to create, debug and run servlet programs

#### COURSE OUTCOMES:

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

CO1:To familiarize the students with language environment.

CO2:To implement various concepts related to language.

CO3:Learn the basic concepts& techniques of java.

CO4:Learn the advanced concepts of java.

CO5:Generate an application based upon the concepts of java

1. Define a class called Student with the attributes name, reg\_number and marks obtained in four subjects (m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by  
(i) Overloading Constructor (ii) Overloading Method.
3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student\_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details.
5. Derive another class Student from Student\_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
6. Write a java program to create a thread using Thread class.
7. Demonstrate Java inheritance using extends keyword.
8. Write a Java program to throw the following exception,  
1) Negative Array Size 2) Array Index out of Bounds
9. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.
10. Write a java programming to illustrate Mouse Event Handling

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Sem ester	Code	Title of the Course					Hours	Credits			
<b>II</b>	<b>23UIT2CC4P</b>	<b>JAVA PROGRAMMING LAB</b>					<b>5</b>	<b>5</b>			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>		✓				✓					
<b>CO2</b>	✓	✓	✓	✓	✓	✓	✓		✓	✓	
<b>CO3</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>CO4</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>CO5</b>	✓		✓				✓	✓	✓		
Number of matches (✓) = 36, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER II

Course Code: 23UMA2AC2  
Instruction Hours: 4  
Credits: 3

Exam Hours: 3  
Internal Marks: 25  
External Marks: 75

### ALLIED COURSE - OPERATION RESEARCH

#### LEARNING OBJECTIVES:

- LO1 : To study the methods used to solve assignment problems and transportation problems.
- LO2 : To train the students in network problems.
- LO3: To achieve the best performance under the given circumstances.
- LO4: To apply the scientific method to the conditions under which the research is conducted.
- LO5: To provide a more detailed and insightful analysis to decision-makers

#### COURSE OUTCOMES:

- CO 1: Recognize and relate LPP and solving LPP using graphical method.
- CO 2: Compute Simplex Algorithm, Two Phase Method and Big-M Method of LPP.
- CO 3: Explain Transportation problem and Evaluate its initial basic feasible solution.
- CO 4: Discuss and solve assignment problem using Hungarian algorithm.
- CO 5: Describe and Construct Network and compute PERT and CPM.

#### UNIT – I

**Linear Programming Problem:** Introduction - Graphical Solution Method – General Linear Programming Problem - Canonical and Standard forms of LPP.

#### UNIT – II

**Linear Programming Problem (Continued):** Introduction - Simplex Method for  $<$ ,  $=$ ,  $>$  constraints – Big-M Method.

#### UNIT – III

**Transportation Problem:** Introduction – LP formulation of the Transportation Problem – Finding an Initial Basic Feasible Solution - Transportation Algorithm (Modi Method) – Unbalanced Transportation Problem.

#### UNIT – IV

**Assignment Algorithm:** Introduction- Mathematical Formulation of the Problem – Solution Methods of Assignment Problem – Special Cases in Assignment Problems – Travelling salesman Problem.

#### UNIT – V

**Networks:** Introduction – Network (Basic Components) – Logical Sequencing – Rules of Networking Construction – Concurrent Activities - CPM computation- PERT computation.

#### TEXT BOOK:

1. KantiSwarup, P.K.Gupta and Man Mohan, Operations Research, Sultan Chand & Co.Ltd.2012

UNIT – I	Chapter – 3	Sections 3.1 to 3.5
UNIT – II	Chapter – 4	Sections 4.1, 4.3 & 4.4
UNIT – III	Chapter – 10	Sections 10.1, 10.2, 10.9 to 10.13 & 10.15
UNIT – IV	Chapter – 11	Sections 11.1 to 11.4 & 11.7
UNIT – V	Chapter – 25	Sections 25.1 to 25.7.

#### REFERENCE(S):

1. PremKumar, Gupta and D.S. Hira, “Operations Research”, An Introduction, S. Chand and Co., Ltd. New Delhi,
2. Hamdy.A.Taha, “Operations Research”, Seventh Edition, McMillan Publishing Company, New Delhi, 1982.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
II	22UMA2AC2	OPERATIONS RESEARCH					4	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓		✓	✓		✓	✓	✓	✓		
CO2	✓		✓	✓	✓	✓		✓	✓		
CO3		✓	✓		✓	✓		✓	✓	✓	
CO4		✓			✓		✓	✓		✓	
CO5	✓	✓		✓	✓		✓			✓	
Number of Matches (✓) = <b>32</b>						Relationship: <b>MODERATE</b>					

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – II

**Course Code: 23UIT2SE2**

**Instruction Hours: 2**

**Credits: 2**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### SKILL ENHANCEMENT-IV

#### INTRODUCTION TO WEB DESIGNING (NME-2)

##### OBJECTIVES:

1. To inculcate knowledge on Object-oriented concepts and programming using C++.
2. Demonstrate the use of various OOPs concepts with the help of programs

##### COURSE OUTCOMES:

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

- CO1: Understand the basics of HTML and its components
- CO2: To study about the Graphics in HTML
- CO3: Understand and apply the concepts of XML and DHTML
- CO4: Understand the concept of JavaScript
- CO5: To identify and understand the goals and objectives of the Ajax

##### UNIT – I

HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing text- heading and horizontal rules-list-font size, face and color-alignment links-tables-frames.

##### UNIT – II

Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page.

##### UNIT – III

XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML).

##### UNIT – IV

Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.

JavaScript: Client-side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition,

##### UNIT– V

Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations.

##### TEXTBOOKS

Pankaj Sharma, “Web Technology”, SkKataria& Sons Bangalore 2011.

Mike Mcgrath, “Java Script”, Dream Tech Press 2006, 1st Edition.

Achyut S Godbole&AtulKahate, “Web Technologies”, 2002, 2nd Edition.

## REFERENCE BOOKS

Laura Lemay, Rafe Colburn, Jennifer Kyrnin, "Mastering HTML, CSS & Javascript Web Publishing", 2016.

DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2nd Edition.

## WEB RESOURCES

1. <http://fahad.cprogramming.blogspot.com/p/c-simple-examples.html>
2. <http://www.sitesbay.com/cpp/cpp-polymorphism>

### Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits				
II	23UIT2SE2	INTRODUCTION TO WEB DESIGNING					2	2				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1		✓				✓						
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓		✓				✓	✓	✓			
Number of matches (✓) = 36, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – II

**Course Code: 23UIT2SE3**

**Instruction Hours: 2**

**Credits: 2**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### SKILL ENHANCEMENT-IV

#### BASIC OF HTML

#### OBJECTIVES:

1. Insert a graphic within a web page.
2. Create a link within a web page.
3. Create a table within a web page.
4. Insert heading levels within a web page.
5. Insert ordered and unordered lists within a web page. Create a web page.

#### COURSE OUTCOMES:

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

- CO1: Knows the basic concept in HTML ,Concept of resources in HTML  
CO2: Knows Design concept. Concept of Meta Data, Understand the concept of save the files.  
CO3: Understand the page formatting. Concept of list  
CO4: Creating Links. Know the concept of creating link to email address  
CO5: Concept of adding images Understand the table creation.

#### UNIT – I

Introduction :Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

#### UNIT – 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)

#### UNIT – III

Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, BR- Using Images – Creating Hyperlinks.

#### UNIT – IV

Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Rowspan, Colspan – Cell padding.

#### UNIT– V

Frames: Frameset – Targeted Links – No frame – Forms : Input, Textarea, Select, Option.

#### 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>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
II	23UIT2SE3	BASIC OF HTML					2	2			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1		✓				✓					
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓		✓				✓	✓	✓		
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – II

**Course Code: 23UVAIT2**

**Exam Hours: 3**

**Credits: 2**

**External Marks: 50**

### **BASICS OF LAPTOP MAINTENANCE AND OS INSTALLATION**

#### **OBJECTIVES:**

1. To provide users a convenient interface to use the computer system.
2. Detect issues early, before they become problems

#### **COURSE OUTCOMES:**

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

CO1: To describe the social and professional impact and importance of technology

CO2: Identify career opportunities related to technology

CO3: To understand everything from computer components,

CO4: To understand installation of OS, configuration,

CO5: And fixing laptop hardware and troubleshooting etc.

#### **UNIT – I**

The Essentials of a Computer and Its Components - Laptop Expansion Options.

#### **UNIT – II**

Various Motherboard Technologies and Identify Important Motherboard Parts - Configuration Changes to a Computer.

#### **UNIT – III**

Plan for a Memory Installation or Upgrade - Configuring Windows Operating Systems.

#### **UNIT – IV**

Wi-Fi and Windows Networks Hardware parts that connect to different ports of a computer and laptop

#### **UNIT – V**

Basic troubleshooting - Install, configure, and troubleshoot Windows, Android, and iOS operating systems.

#### **TEXT BOOK:**

1. IBM PC & Clones: Hardware Trouble Shooting and Maintenance by B.Govindarajalu, Tata McGraw Hill
2. PC Upgrade & Repair Bible , Wiley India.
3. PC Systems, Installation and Maintenance, Second Edition by R. P. Beales.
4. PC Upgrade & Repair Black Book by Ron Gilster.
5. Computer Installation and Servicing by D Balasubramanian

#### **WEB RESOURCES**

1. Software: Microsoft windows operating system from XP/vista/7/8 to latest version available in market, Windows server, linux/ubuntu/centos, server operating system
2. <http://www.gcflearnfree.org/computerbasics/15/print>
3. <http://www.more.net/sites/default/files/training/BTTmain.pdf>
4. <http://www.computerhope.com/issues/ch000248.htm>

## SEMESTER – III

**Course Code: 23UIT3CC5**

**Instruction Hours: 4**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE – III – RDBMS

#### OBJECTIVES:

1. To provide the students with the basics of Android Software Development tools and development of software on mobile platform.
2. To development of software on mobile platform

#### COURSE OUTCOMES:

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

- CO1: Outline the fundamental RDBMS concepts and PL/SQL
- CO2: Apply database operations, mapping, normalization, SQL and PL/SQL
- CO3: Analyze the requirements to implement relational database concepts
- CO4: Evaluate the database based on various models and normalization.
- CO5: Design and construct normalized tables and manipulate it effectively using SQL and PL/SQL database objects

#### UNIT – I

Introduction to Databases: Introduction Overview of database and Architectures: Data Models, Schemas, and Instances – Three-schema Architecture and Data Independence – Database languages & Interfaces – Database System Environment– Centralized & Client Server Architecture for DBMS - Classification of DBMS.

#### UNIT – II

Basic Relational Model: Relational Model Concepts – Relational Model Constraints and Relational Database Schemas – Update Operations, Tractions, Dealing with Constraint Violations – Formal Relational Languages: Unary Relational Operations: SELECT and PROJECT – Relational Algebra Operations from Set Theory – Binary Relational Operations: JOIN and DIVISION – Examples of Queries in Relational Algebra.

#### UNIT – III

Conceptual Data Modeling using the ER Model: Using High-Level Conceptual Data Models for Database Design – An example DB application – Entity Types, Entity Sets, Attributes, and Keys – Relationship Types, Relationship sets, Roles, and Structural Constraints – Weak entity types – Example- Mapping a Conceptual Design into Logical Design: Relational Database Design using ER- Relational Mapping – Mapping EER Model Constructs to Relations

#### UNIT – IV

Functional Dependencies and Normalization for Relational Database: Functional Dependencies – Definition of Functional Dependency – Normal Forms based on Primary Keys – Normalization of Relations – First Normal Form – Second Normal Form – Third Normal Form – BCNF- Fourth Normal Form- Fifth Normal Form.

#### UNIT– V

SQL: The Relational Database Standard: Data definition, Constraints, and schema changes in SQL – Basic Queries in SQL – More complex SQL Queries – Insert, delete and update statements in SQL – Views in SQL.PL/SQL: Introduction to PL/SQL .

## **TEXTBOOKS**

1. Ramez Elmasri, Shamkant B. Navathe (2014), —Database Systems, Sixth edition, Pearson Education, New Delhi.
2. Ivan Bayross (2003 Reprint), SQL, PL/SQL-The Programming Language of Oracle, Second Revised Edition, BPB Publications, New Delhi.

## **REFERENCE BOOKS**

1. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Database System Concepts, Tata McGraw Hill Publication, 4<sup>th</sup> Edition.

## **WEB RESOURCES**

1. <http://srikanthtechnologies.com/books/orabook/ch1.pdf>
2. [Http://www.tmv.edu.in/pdf/Distance\\_education/BCA%20Books/BCA%20IV%20SEM/BC A-428%20Oracle.pdf](Http://www.tmv.edu.in/pdf/Distance_education/BCA%20Books/BCA%20IV%20SEM/BC A-428%20Oracle.pdf)
3. <http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm>
4. <http://ecomputernotes.com/database-system/rdbms>
5. <http://www.mithunashok.com/2011/04/basics-of-rdbms.html>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
<b>III</b>	<b>23UIT3CC5</b>	<b>RDBMS</b>					<b>4</b>	<b>4</b>			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
<b>CO1</b>		✓				✓					
<b>CO2</b>	✓	✓	✓	✓	✓	✓	✓		✓	✓	
<b>CO3</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>CO4</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>CO5</b>	✓		✓				✓	✓	✓		
Number of matches (☐) = 36, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – III

**Course Code: 23UIT3CC6P**

**Instruction Hours: 3**

**Credits: 3**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### CORE COURSE – III – RDBMS LAB

#### OBJECTIVES:

1. To provide the students with the basics of Android Software Development tools and development of software on mobile platform.
2. To development of software on mobile platform

#### COURSE OUTCOMES:

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

- CO1: Choose appropriate SQL queries and PL/SQL blocks for the database.
- CO2: Implement SQL and PL/SQL blocks for the given problem effectively.
- CO3: Analyse the problem and Exceptions using queries and PL/SQL blocks.
- CO4: Validate the database for normalization using SQL and PL/SQL blocks.
- CO5: Design Database tables, create Procedures, user-defined functions and Triggers.

#### SQL:

1. DDL Commands
2. DML Commands
3. DCL Commands
4. SQL Built-in functions
5. Using Sub Queries

#### PL/SQL:

6. Simple programs using PL/SQL
7. Procedures
8. User-defined functions

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
III	23UIT3CC6P	RDBMS LAB					3	3			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1		✓				✓					
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓		✓				✓	✓	✓		
Number of matches (✓) = 36, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – III

Course Code: 23UIT3AC3

Instruction Hours: 3

Credits: 2

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

#### Learning Objectives

LO1: To introduce the internal organization of Intel 8085 Microprocessor.

LO2: To know about various instruction sets and classifications.

LO3: To enable the students to write assembly language programs using 8085.

LO4: To interface the peripheral devices to 8085 using Interrupt controller and DMA interface.

LO5: To provide real-life applications using microcontroller.

#### Course Outcomes:

CO1: On completion of this course, students will remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor.

CO2: Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic.

CO3: Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.

CO4: Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.

CO5: An exposure to create real time applications using microcontroller.

#### Unit I

Evaluation of Microprocessors – Single Chip Microcomputer Microprocessor Applications – Programming – Digital Computers – Memory – Buses – Memory addressing capacity of CPU –Processor Architecture – Intel 8085.

#### Unit II

Instruction set of Intel 8085 – Instruction and Data Formats – Addressing Modes – Intel 8085 Instructions: Arithmetical group, Data transfer group, Logical group, and Branch group.

#### Unit III

Programming of Microprocessors – Machine language – Assembly language – High level language – Assemblers – Stacks and Subroutines – System Software – Assembly language Programming –MACRO and Microprogramming.

#### Unit IV

Assembly language Programming - Simple examples – Addition and Subtraction of Binary and Decimal Numbers – Complements – Shift – Masking – Finding the largest and smallest numbers in an Array –Sum of a series of Numbers.

#### Unit V

Peripheral Devices and Interfacing – Address Space Partitioning – Memory and I/O Interfacing – Data transfer schemes – Interrupts of Intel 8085 – Interfacing memory and I/O devices – I/O ports – Programmable peripheral Interface.

#### Text Book:

1. Fundamentals of Microprocessors and Microcomputers – Badri Ram – Fourth Revised and Enlarged Edition – Dhanpat Rai and Sons – 1993.

#### Reference Book:

1. Microprocessor Architecture, Programming and Applications with the 8085 / 8080A – Romesh S.Gaonkar – Wiley Eastern – 1990

## Web Resources

1. E-content from open source libraries.
2. <https://www.bing.com/>, <https://theopennotes.in/>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	23UIT3AC3	MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING					3	2			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO2		✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓		✓	✓	✓			
CO4	✓		✓		✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓		
Number of matches (✓) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER-III

Course Code: 23UIT3AP  
Instruction Hours: 3  
Credits: 2

Exam Hours: 3  
Internal Marks:25  
External Marks:60

### ASSEMBLY LANGUAGE PROGRAMMING LAB

#### Learning Objectives

- LO1: To introduce the internal organization of Intel 8085 Microprocessor.
- LO2: To know about various instruction sets and classifications.
- LO3: To enable the students to write assembly language programs using 8085.
- LO4: To interface the peripheral devices to 8085 using Interrupt controller and DMA interface.
- LO5: To provide real-life applications using microcontroller.

#### Course Outcomes

- CO1: Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor.
- CO2: Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic.
- CO3: Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.
- CO4: Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller
- CO5: An exposure to create real time applications using microcontroller.

#### List of Exercises:

1. Addition and Subtraction
  1. 8 - bit addition
  2. 8 - bit subtraction
2. Complements
  1. 1's complement of 8 bit.
  2. 2's complement of 8 bit
3. Multiplication and Division
  1. 8 - bit multiplication
  2. 8 - bit division
4. Code Conversion
  1. BCD to Binary
  2. Binary to BCD
5. Sum of series
6. Arrays
  1. Largest number in an array
  2. Smallest number in an array.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	23UIT3AP	ASSEMBLY LANGUAGE PROGRAMMING LAB					3	2			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO2		✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓		✓	✓	✓			
CO4	✓		✓		✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓		
Number of matches (✓) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – III

Course Code: 23UIT3SE4  
Instruction Hours: 2  
Credits: 2

Exam Hours: 3  
Internal Marks: 25  
External Marks: 75

### SKILL ENHANCEMENT -IV – SOFTWARE TESTING

#### **OBJECTIVES:**

- 1.To define and highlight importance of software project management.
- 2.To formulate and define the software management metrics & strategy in managing projects
3. Understand to apply software testing techniques in commercial environment

#### **COURSE OUTCOMES:**

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

- CO1: Understand the principles and concepts of project management
- CO2: Knowledge gained to train software project managers
- CO3: Apply software project management methodologies.
- CO4: Able to create comprehensive project plans
- CO5: Evaluate and mitigate risks associated with software development process

#### **UNIT I**

Software testing Fundamentals Purpose of Software testing - Some Dichotomies - a model for testing - Playing pool and consulting oracles

#### **UNIT II**

Complete testing potential - The Consequence of bugs - Taxonomy of Bugs - Test case Design

#### **UNIT III**

Introduction of Black Box Testing and White Box testing - Flow Graphs and Path testing – Path testing Basics

#### **UNIT IV**

Predicates, Path Predicates and Achievable Paths – Path Sensitizing - Path Instrumentation - Implementation and Application of Path Testing.

#### **UNIT V**

Transaction Flow testing - Transaction Flows - techniques – Implementation Comments - Data Flow Testing - Basics - Strategies - Applications, Tools and Effectiveness

**Text Books:**

- 1 B.Beizer,“SoftwareTestingTechniques”,IIEdn.,DreamTechIndia,NewDelhi,2003.
- 2 K.V.K.Prasad,“SoftwareTestingTools”,DreamTech.India,NewDelhi,2005

**Reference Books:**

1. I.Burnstein,2003,“PracticalSoftwareTesting”,SpringerInternationalEdn.
2. E. Kit, 1995, “Software Testing in the Real World: Improving the Process”, PearsonEducation,Delhi.
3. R. Rajani,andP.P.Oak,2004,“SoftwareTesting”,TataMcgrawHill,New Delhi.

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
III	23UIT3SE4	SOFTWARE TESTING					2	2				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1		✓				✓						
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓		✓				✓	✓	✓			
Number of matches (✓) = 36, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER- III

Course Code: 23UGS  
Instruction Hours: 1  
Credits: 1

Exam Hours: 3  
Internal Marks:25  
External Marks:75

## GENDER STUDIES

### Objective:

- To make students to aware of Gender constructions and gendering Process and explore existing gender biases in the society and .-0to understand the need to work towards the inclusive society.

### Course Outcomes (COs):

- CO1: Students would have gained a perspective and understood the social reality of gender society understood the differences of gender and sex and may resort to building alternative perspectives and critical thinking.
- CO2: Gained knowledge on the various social institutions governing gender and the intersectionality.
- CO3: Exposed to the kind of initiatives of the State towards gender equality.
- CO4: To inculcate sensitivity and build gender perspectives.
- CO5: To use the course to bring attitudinal cum behavioral changes towards gender neutral ambience and promote the humanistic values.

### UNIT I

Introduction to Gender Studies Concepts: Gender Spectrum.-Sex – Gender distinction – Biological Determinism – Patriarchy – Feminism – Gender Socialization and Stereotyping - Gender Discrimination – Gender Division of Labour and Roles – Gender Sensitivity and Awareness – Gender Equity – Equality – Gender Main Streaming and Gender Analysis.

### UNIT II

UGC Initiatives On Women's Studie: Definition of Women's Studies –Gender Studies –UGC Initiatives and guidelines on Women's Studies - Beijing Conference, UN Initiatives – Convention on Elimination of All forms of Discrimination Against Women (CEDAW)- Sustainable Development Goals on Gender Equality (SDG 5) and targets.

### UNIT III

Areas of Gender Discrimination: Gender Socialization- Sex Ratio – Health and Nutrition– Literacy and Education - Employment- Governance – participation in decision making- politics- property rights and access to credit- gender based violence- Social institutions –Family, Caste, Class, religion, gender, State. Market – Media – Politics – Judiciary

### UNIT IV

Women Development and Gender Empowerment: Towards Equality Report of Status of Women in India 1974 – International Women's Decade – International Women's Year –National Policy for Empowerment of Women 2001

## **UNIT V**

**WOMEN'S MOVEMENTS AND SAFEGUARDING MECHANISM:** In India National/State Commission for Women(NCW) – All Women Police Station – Family Court Legislations safeguarding women –Transgender Policy— Constitutional amendments for women's Political Participation.

## **UNIT VI**

Current Contours: Tamil Nadu State Policy for Women 2021- National Policy for Women 2015 – Prevention of Sexual Harassment at Work places Act 2013-Protection of Children from Sexual Offences Act, 2012 - Analysis of Regressive and Progressive High Court and Supreme Court Judgments - Women Proactive Policies, Programmes, Interventions.

### **Reference Book(s):**

1. Bhasin Kamala, Understanding Gender : Gender Basics, New Delhi: Women Unlimited, 2004.
2. Bhasin Kamala, Exploring Masculinity: Gender Basics, New Delhi: Women Unlimited, 2004.
3. Bhasin Kamala, What is Patriarchy? Gender Basics, New Delhi: Women Unlimited, 1993.
4. Arya Sadhna Women ,Gender Equality and the State ,New Delhi: Deep &Deep Publication, 2000.
5. Mishra .O.P, Law Relating to Women & Child, Allahabad: Central Law Agency, 2001.
6. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication, 2003.
7. Bhattacharya Malini , Sexual Violence and Law, Kolkata; West Bengala Commission for Women, 2002.
8. Sexual Harassment at the Workplace – A Guide, New Delhi; Sakshi, 1999.
9. <https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	23UGS	GENDER STUDIES					1	1			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO2		✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓		✓	✓	✓			
CO4	✓		✓		✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓		
Number of matches (✓) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER III

### VALUE ADDED - ETHICAL HACKING

Course Code: 23UVAIT3  
Instruction Hours: 30

Exam Hours: 2  
Internal Marks: 50  
External Marks: 50

#### **COURSE OUTCOMES:**

Upon completion of the course students will be able to

CO1:Identify the risk factors in hacking.

CO2:Work with foot printing and scanning.

CO3:Hack the system.

CO4:Work with Trojan and Backdoor tools

CO5:Prevent Systems from attacks

#### **UNIT I**

INTRODUCTION: Introduction Ethical Hacking: Problem Definition – Need for Security – Essential Terminology – Elements of Security – Phases – Hactivism – Modes of Ethical Hacking – Security Testing – Computer Crimes and Implications – Perspective (US Federal Law).

#### **UNIT II**

FOOTPRINTING AND SCANNING: Defining Footprinting: Information Gathering Methodology – Unearthing Initial Information -Tool: Sam spade – Locate the Network Range – Tool: NeoTrace , Visual Route –Scanning: Detecting ‘Live’ Systems On Target. Network –Tools: War Dialers, Ping Utilities – Port Scanning – Tool: ipEye, IPsecScan, NetScan Tools Pro 2003,SuperScan 3.0,NMap(Network Mapper) – Active Stack Fingerprinting – Passive Fingerprinting - Proxy Servers – Anonymizers.

#### **UNIT III**

ENUMERATION AND SYSTEM HACKING: Introduction to Enumeration – Net Bios Null Sessions – NetBIOS Enumeration – Hacking Tool: DumpSec, NAT, - SNMP Enumeration- Hacking Tool: GetAcct - Active Directory Enumeration - AD Enumeration countermeasures – System Hacking: Administrator Password Guessing – Performing automated password guessing – Tool: Legion, NTInfoScan – Password Sniffing-Privilege Escalation Manual Password Cracking Algorithm - Automatic Password Cracking Algorithm - Password Types - Types of Password Attacks.

#### **UNIT IV**

TROJANS AND BACKDOORS: Trojans and Backdoors: Working of Trojans - Various Trojan Genre – Modes of Transmission – Tools: Donald Dick, SubSeven, Back Orifice 2000, NetBus, Beast.

#### **UNIT V**

SNIFFER AND DOS ATTACKS: Introduction to sniffers - Security Concern- Tool: Ethereal, Snort, Windump, Etherpeek – Passive Sniffing - Active Sniffing - EtherFloodsniff - ARP Spoofing – Sniffing HTTPS and SSH – Man in the Middle Attack - Macof, MailSnarf, URLSnarf,

WebSpy - Mac Changer- Iris – NetIntercept – DNS Sniffing and Spoofing – Denial Of Service Attack - Types of denial of service attacks - Distributed Denial of Service Attacks – Ping of Death –Hacking Tool: SSPing, Land Exploit, Smurf – DDOS Attack Sequence - Preventing DoS Attacks.

**REFERENCE BOOKS:**

1. Kimberly Graves, Certified Ethical Hacker STUDY GUIDE, Wiley publication, 2010.
2. Michael Gregg, Certified Ethical Hacker, Pearson publication, 2014.
3. Matt Walker, All-in-one Certified Ethical Hacker Exam Guide, McGraw Hill Edition, 2012.

**WEB REFERENCES:**

1. [http://index-of.es/Hacking-Webserver/Certified\\_Ethical\\_Hacker\\_3.0\\_Official\\_Course.pdf](http://index-of.es/Hacking-Webserver/Certified_Ethical_Hacker_3.0_Official_Course.pdf)
2. <http://ptgmedia.pearsoncmg.com/images/9780789751270/samplepages/9780789751270.pdf>
3. <https://cert.eccouncil.org/images/doc/CEH-Handbook-v2.0.pdf>

## SEMESTER – IV

**Course Code: 23UIT4CC7**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE – III – .NET PROGRAMMING

#### OBJECTIVES:

- 1.To provide sufficient knowledge in developing web applications using C# and ASP.NET
- 2.To manipulate data from SQL Server using Microsoft ADO.NET.

#### COURSE OUTCOMES:

**Upon completion of the course students will be able to**

- CO1 Outline the features of C# programming language and ASP.NET applications
- CO2 Demonstrate the salient properties of C# and ASP.NET applications
- CO3 Identify the various stages in developing a web forms
- CO4 Select the appropriate controls to create a web form.
- CO5 Recommend a data driven web application by connecting to the data sources

#### UNIT – I

**The Creation of C#:** C# Relates to the .Net Framework - Common Language Runtime - Managed vs unmanaged code - **An Overview of C#:** Object-Oriented Programming - First Simple Program-Handling Syntax errors - Using code blocks-semicolon, positioning and Indentation-The C# Keywords-Identifiers-The .Net Framework Class Library-Data Types, Literals and Variables- Operators.

#### UNIT – II

**Program Control Statements:** If Statement- switch Statement-For Loop- While loop do-while loop-foreach loop-using break to exit a loop-using continue- goto- **Introducing Classes and objects:** Class Fundamentals- objects creation-Methods-constructors-Garbage Collection and Destructors-Exception Handling.

#### UNIT – III

**Arrays and Strings:** Arrays-Multidimensional Arrays-Jagged Arrays- for each loop Strings- Methods and classes: Method overloading- Main Method-Recursion-static Classes Delegates,Events and Lambda Expressions: Delegates -Lambda Expressions-LINQ

#### UNIT – IV

**Developing ASP.NET Applications:** Visual Studio: Creating Websites- The Anatomy of a Web Form – Web Form Fundamentals: Converting HTML Page to an ASP.Net Page – Page Class – Web Controls. State Management: View State - Transferring Information between Pages – Cookies – Session State – Application State.

#### UNIT – V

Validation Controls – AdRotator Control. Working with Data: ADO.NET Fundamentals:– Direct Data Access – Disconnected Data Access - Data Binding: Data Binding with ADO.NET –Data Source Controls - The Data Controls: The GridView – Formatting the GridView – Selecting GridView Row – Editing, Sorting and Paging the GridView-Generating Crystal Reports.

**TEXTBOOKS**

1. Herbert Schildt (2010), C# 4.0 The Complete Reference, Tata McGraw-Hill Pvt Ltd
2. Mathew MacDonald, (2010), Beginning ASP.NET 4 in C# 2010, Second Edition, Apress.

**REFERENCE BOOKS**

1. Greg Buczek (2002), —ASP.NET – Developer’s guidel, Tata MaGraw Hill Publication
2. Jesse Liberty, (2002), —Programming C#, 3.0, O’Reilly Press
3. Christian Nagel et al. , —Professional C# 2005 with .NET 3.0, Wiley India, 2007

**WEB RESOURCES**

1. <http://ssw.jku.at/Teaching/Lectures/CSharp/Tutorial/>
2. <http://www.csharpkey.com/csharp/>
3. <http://www.w3schools.com/aspnet/default.asp>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
IV	23UIT4CC7	.NET PROGRAMMING					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1		✓				✓						
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓		✓				✓	✓	✓			
Number of matches (✓) = 36, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – IV

**Course Code: 23UIT4CC8**

**Instruction Hours: 4**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### CORE COURSE – III – .NET PROGRAMMING LAB

#### OBJECTIVES:

- To provide sufficient knowledge in developing web applications and to manipulate data from SQL Server using Microsoft ADO.NET.

#### COURSE OUTCOMES:

**Upon completion of the course students will be able to**

- CO1: Demonstrate MS Visual Studio.NET IDE to Create applications.
- CO2: Apply C# and ASP.NET concepts to design applications.
- CO3: Simplify the functionality of the web application in accordance to the user Requirement.
- CO4: Evaluate the web application to fix the errors.
- CO5: Build a web application using C# and ASP.NET concepts to solve the problem

1. C# Basics
2. Looping Constructs
3. Arrays & Jagged Array
4. Strings
5. Classes and Objects
6. Method overloading
7. Delegates
8. LINQ
9. Lambda Expressions

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
IV	23UIT4CC8P	.NET PROGRAMMING LAB					4	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											
Mapping	1-29%	30-59%	60-69%	70-89%	90-100%						
Matches	1-14	15-29	30-34	35-44	45-50						
Relationship	Very Poor	Poor	Moderate	High	Very High						

## SEMESTER – IV

Course Code: 23UIT4AC4  
Instruction Hours: 4  
Credits: 3

Exam Hours: 3  
Internal Marks: 25  
External Marks: 75

### DIGITAL LOGIC FUNDAMENTALS

#### Learning Objectives

LO1: Learn how to convert numbers between different bases.

LO2: Learn the fundamental concepts of Boolean algebra and DeMorgans theorems.

LO3: Learn methods for simplifying Boolean expressions, including SOP, POS Karnaugh maps for visual simplification of Boolean functions.

LO4: Learn design and functionality of basic combinational circuits.

LO5: Learn sequential circuits.

#### Course outcomes

After successfully completing this course the student will be able to

CO1: Understand the fundamentals of codes and number system

CO2: Understand the binary arithmetic, logic and Boolean functions.

CO3: Understand the Boolean expressions and Boolean Functions.

CO4: Understand and Analyze Combinational Circuits .

CO5: Understand Design and Implement Sequential Circuits.

#### Unit I:

Number Systems: Binary, Octal, Decimal and Hexadecimal number systems – Conversion from one base to another base – Use of complements – binary arithmetic – Binary codes-Logic gates.

#### Unit II:

Boolean algebra and Combinational Circuits: Fundamental concepts of Boolean Algebra – DeMorgan's theorems.

#### Unit III:

Simplification of expressions – Sum of products and products of sums – Karnaugh map simplification.

#### Unit IV:

Combinational Circuits: Half Adder – Full Adder – Subtractors – Decoders – Encoders – Multiplexers – Demultiplexer.

#### Unit V:

Sequential Circuits: Flip flops – Registers – Shift Registers – Binary Counters – BCD Counters.

#### Text book:

1.Principles of Digital Electronics, Dr K.Meena,PHI learning private Limited,New Delhi,2009.

#### Reference Book

1.Floyd, T. L. (2013). *Digital fundamentals* (10th ed.). Pearson Education.

2.Mano, M. M., & Ciletti, M. D. (2017). *Digital design* (6th ed.). Pearson Education.

#### Website:

<https://www.javatpoint.com/number-system-in-digital-electronics>

Semester	Code	Title of the Course					Hours	Credits			
IV	23UIT4AC4	DIGITAL LOGIC FUNDAMENTALS					4	2			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1		✓	✓	✓	✓	✓		✓	✓	✓	
CO2	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓	✓		✓	✓	✓			
CO4	✓		✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓		
Number of matches (□) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## NETWORK PROGRAMMING

Course Code: 23UCSVA4

Exam Hours: 2

Instruction Hours: 30

Internal Marks: 50

External Marks: 50

### Objective:

- This course highlights the basic concepts of networking
- This helps the student to gain knowledge of various networking protocols.
- The network security is also been focused.

### Unit I:

Introduction: Components of Computer (Motherboard, System Memory, Bios, Keyboard, Monitor, Serial Port, Parallel Port, Hard disk drive Modem, CDROM Drive).-Introduction to Networking-Types of Network (WAN, LAN, MAN )Peer to Peer & Client Server model- Network Topologies (BUS, STAR, Ring)- Network devices(Hub/Switch/Repeaters/Bridge/Router) - Network Cabling(Twisted Pair, Coaxial, Fiber Optic) - NIC Card.

### Unit II:

Network Reference Model: ISO-OSI Model (application, presentation Session, Transport, Network Data link, Physical) -TCP/IP Model (Application, Transport, internet work, Network interface). - Basic Concept of IP Address/MAC Address/Subnet mask-PING/TRACERT.

### Unit III:

Networking Protocols: Address Resolution Protocol (ARP) - Reverse Address Resolution Protocol (RARP).

### Unit IV:

Transport Layer-User datagram protocol (UDP)-Transmission Control Protocol –Congestion Control – Queuing Disciplines-Congestion Avoidance mechanism (DECbit Random Early Detection (RED) Source-Based Congestion Avoidance)

### Unit V:

Domain Name System (DNS) –E-mail (SMTP)-World Wide Web (HTTP)-Simple Network management protocol (SNMP)-File Transfer Protocol (FTP)-Network Security: Firewall-Encryption and Decryption.

### BOOK FOR STUDY:

1. Wendell Odom, "Introduction to CISCO Networking Technologies", Dorling Kindersley Publishing Inc., and Pearson Education, Inc., 2006
2. Larry L. Peterson, Bruce S.Davie,"Computer Networks: A System Approach", Third Edition, Morgan Kauffman Publishers Inc., 2003.
3. Andrew .S. Tanenbum, "Computer Networks", Fourth Edition, 2003

### REFERENCES

1. James F. Kuross, Keith W. Boss, "Computer Networking, A Top down Approach Featuring the internet", Third Edition, Addison Wesley, may13 2004.
2. Jain S, "Data Communication and Networking", BPB Publications .Second Edition.
3. Benhrom Frouzan, "Introduction to Data Communication", Fourth edition 2005

## SEMESTER – V

**Course Code: 23UIT5CC9**

**Instruction Hours: 5**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE V – PYTHON PROGRAMMING

#### Objective:

1. Understand the concepts of Python programming.
2. To apply the OOPs concept in PYTHON programming.
3. To impart knowledge on demand and supply concepts
4. Learn to solve basic programming problems.

#### Course Outcomes(CO):

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

CO1: Outline the basic concepts in python language.

CO2: Interpret different looping and conditional statements in python language

CO3: Apply the various data types and identify the usage of control statements, loops, functions and Modules in python for processing the data

CO4: Analyze and solve problems using basic constructs and techniques of python.

CO5: Assess the approaches used in the development of interactive application.

#### Unit-I:

**Basics of Python Programming:** History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. **Python Arrays:** Defining and Processing Arrays – Array methods.

#### Unit-II:

**Control Statements:** Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. **Jump Statements:** break, continue and pass statements.

#### Unit-III:

**Functions:** Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. **Function Arguments:** Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. **Python Strings:** String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. **Modules:** import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.

#### Unit-IV:

**Lists:** Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. **Tuples:** Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. **Dictionaries:** Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.

#### Unit-V:

**Python File Handling:** Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.

**TEXT BOOK:**

1. Reema Thareja, “Python Programming using problem solving approach”, First Edition, 2017, Oxford University Press.

1. Dr. R. Nageswara Rao, “Core Python Programming”, First Edition, 2017, Dream tech Publishers

**REFERENCE BOOKS:**

1. VamsiKurama, “Python Programming: A Modern Approach”, Pearson Education.
2. Mark Lutz, ”Learning Python”, Orielly.

**Web Resources**

1. <https://www.programiz.com/python-programming>
2. <https://www.guru99.com/python-tutorials.html>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
IV	23UIT5CC9	Python Programming					5	4				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (□) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – V

**Course Code: 23UIT5CC10**

**Instruction Hours: 5**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE V – OPERATING SYSTEM

#### Objective:

- 1.The objective of this course is to provide an introduction to the internal operation of modern operating systems
- 2.To focus on the core concepts such as processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

#### Course Outcomes(CO):

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

- CO1: Outline the fundamental concepts of an OS and their respective functionality
- CO2: Illustrate the importance of open source operating system commands
- CO3: Identify and stimulate management activities of operating system
- CO4: Analyze the various services provided by the operating system.
- CO5: Interpret different problems related to Process, Scheduling, Deadlock, memory and Files

#### Unit-I:

Introduction: Definition of Operating System - OS Structures - System Calls - Virtual Machines - Process Management: Process Concept - Process Scheduling - Operation on Processes - Co-operating Processes - Inter-process Communication

#### Unit-II:

CPU Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Process Synchronization: The Critical Section Problem - Semaphores - Classical Problems of Synchronization - Critical Regions

#### Unit-III:

Deadlocks: System Model - Deadlock characterization – Methods for Handling Deadlocks Deadlock Prevention - Deadlock avoidance- Deadlock Detection - Recovery from Deadlock.

#### Unit-IV:

Storage management: Memory management - Swapping – Contiguous Memory allocation. Paging – Segmentation –Segmentation with Paging –Virtual memory: Demand paging - Page replacement – Thrashing. Mass-Storage Structure: Disk Structure- Disk scheduling.

#### Unit-V:

File-System Interface: File Concept-File Attributes-File Operations – Access Methods: Sequential Access – Direct Access –Directory Structure: Single-Level Directory- Two –Level Directory-Tree-Structured Directories

**TEXT BOOK:**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2012), —Operating System Concepts, 9th edition, Wiley Student Edition.

2. B. Mohamed Ibrahim, (2005), —Linux Practical Approach, Firewall Media

**REFERENCE BOOKS:**

1. Milan Milenkovic (2003), —Operating System Concepts and Design, McGraw Hill.
2. Andrew S. Tanenbaum, (2001), —Modern Operating Systems, 2<sup>nd</sup> Edition, Prentice Hall of India.
3. Deital and Deital (1990), —Introduction to Operating System, Pearson Education.
4. William Stallings (1997), —Operating Systems, Prentice Hall of India.

**Web Resources**

1. [http://www.tutorialspoint.com/operating\\_system/](http://www.tutorialspoint.com/operating_system/)
2. <http://www.reallylinux.com/docs/files.shtml>
3. [http://www.tutorialspoint.com/operating\\_system/os\\_linux.htm](http://www.tutorialspoint.com/operating_system/os_linux.htm)

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
IV	23UIT5CC10	OPERATING SYSTEM					5	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (□) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT5CC11**

**Instruction Hours: 5**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### DATA COMMUNICATION NETWORK

#### Objective:

1. To identify the underlying concepts and the fundamental data mining methodologies with the ability to formulate and solve problems

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Outline the fundamentals and the principles of Data Mining
- CO2: Apply suitable different preprocessing for data mining
- CO3: Classify data-mining techniques based on the different applications
- CO4: Analyze the various data mining algorithms with respect to functionality
- CO5: Recommend appropriate data models for data mining techniques to solve real world problems

#### UNIT I:

Introduction: Data Communication-Networks: Distributed Processing-Network Criteria Physical Structures – Network Models-Categories of Network-Internetwork - The Internet Protocols and Standards – Network Models: Layers in the OSI Model - TCP/IP Protocol Suite.

#### UNIT II:

Data and Signals: Analog and Digital Data - Analog and Digital Signals – Performance - Digital Transmission: Transmission Modes – Multiplexing: FDM – WDM - Synchronous TDM -Statistical TDM - Transmission Media: Guided media - Unguided Media.

#### UNIT III:

Switching: Circuit Switched Networks - Datagram Networks-Virtual Circuit Network - Error Detection and Correction: Introduction - Block Coding - Linear Block Codes - Cyclic Codes: Cyclic Redundancy Check - Checksum. Data Link Control: Framing - Flow Control and Error Control - Noiseless Channel: Stop-and-wait Protocol.

#### UNIT IV:

Wired LANs: Standard Ethernet-GIGABIT Ethernet-Wireless LAN: Bluetooth Connecting LANs: Connecting Devices: Passive Hubs-Repeaters-Active Hubs-Bridges-Two Layer Switches-Routers-Three layer Switches-Gateway-Network Layer: Internet Protocol: IPv4 –Ipv6-Transition from IPv4 to IPv6.

#### UNIT V:

Network Layer: Delivery, Forwarding and Routing- Unicast Routing Protocols: Distance Vector Routing-Link state routing- Future & Current Trends in Computer Networks: 5G Network: Salient Features-Technology-Applications-Advanced Features-Advantages & Disadvantages-Internet of Things: key Features -Advantages & Disadvantages-IOT Hardware- IOT Technology and Protocols-IOT Common Uses-Applications-WiFi-WiMax Lifi- Lifi vs Wifi.

**TEXT BOOKS:**

1. Behrouz and Forouzan,(2006), Data Communication and Networking, 4th Edition, TMH.
2. Ajit Pal,(2014), Data Communication and Computer Networks, PHI.

**REFERENCE BOOKS:**

- 1 Jean Walrand (1998), —Communication Networks,Second Edition, TataMcGraw Hill.

**Web Resources**

1. [http://www.tutorialspoint.com/data\\_communication\\_computer\\_network/](http://www.tutorialspoint.com/data_communication_computer_network/)
2. [http://www.slideshare.net/zafar\\_ayub/data-communication-and-network-11903853](http://www.slideshare.net/zafar_ayub/data-communication-and-network-11903853)
3. <http://www.freetechbooks.com/data-communication-and-networks-f31.html>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
VI	23UIT5CC11	DATA COMMUNICATION NETWORKS					5	4				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – IV

**Course Code: 23UIT5CC12P**

**Instruction Hours: 5**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### PYTHON PROGRAMMING LAB

#### OBJECTIVES

1. Understand the fundamentals of programming using Python, such as variables, data types, control structures, and functions.
2. Learn how to use Python libraries and modules to solve problems.
3. Practice writing Python code to solve real-world problems and build basic applications.
4. Gain experience with common programming paradigms, such as object-oriented programming and functional programming.
5. Understand best practices for debugging and testing code.

#### COURSE OUTCOMES

##### On completion of this course, students will

- Understand the significance of control statements, loops and functions in creating
- CO1: Simple programs.
  - CO2: Interpret the core data structures available in python to store, process and sort the data.
  - CO3: Develop the real time applications using python programming language.
  - CO4: Analyze the real time problem using suitable python concepts.
  - CO5: Assess the complex problems using appropriate concepts in python.

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

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
IV	23UIT5CC12P	PYTHON PROGRAMMING LAB					5	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – V

**Course Code: 23UIT5DE11**  
**Instruction Hours: 4**  
**Credits: 4**

**Exam Hours: 3**  
**Internal Marks: 25**  
**External Marks: 75**

### CORE COURSE – IOT AND ITS APPLICATIONS

#### Objective:

Students will be explored to the interconnection and integration of the physical world and the cyber space

#### Course Outcomes (COs):

- Upon completion of the course, the student should be able to:
- To understand overview of IoT and Internet principles.
- To learn about the concepts of IoT and various IoT related protocols
- Analyze various protocols for IoT.
- Apply data analytics and use embedded code related to IoT.
- Analyze applications of IoT in real time scenario

#### UNIT I:

The Internet of Things- An Overview- The Flavour of the Internet of Things, The “Internet” of “Things”-The Technology of the Internet of Things - Enchanted Object - Who is Making the Internet of Things?-Design Principles for Connected Devices- Calm and Ambient Technology - Magic as Metaphor,-Privacy- Keeping Secrets- Whose Data Is It Anyway? - Web Thinking for Connected Devices- Small Pieces- Loosely Joined-First-Class Citizens On The Internet-Graceful Degradation and Affordances.

#### UNIT II:

Internet Principles: Internet Communications- An Overview- IP- TCP-The IP Protocol Suite (TCP/IP)- UDP-IP Addresses-DN- Static IP Address Assignment-Dynamic IP Address Assignment-IPv- MAC Addresses- TCP and UDP Ports- An Example: HTTP Ports-Other Common Ports- Application Layer Protocol- HTTP. HTTPS- Encrypted HTTP- Other Application Layer Protocols-Thinking About Prototyping- Sketching- Familiarity- Costs versus Ease of Prototyping- Prototypes and Production-Changing Embedded Platform- Physical Prototypes and Mass Personalization-Climbing into the Cloud-Open Source versus Closed Source- Why Closed? Why Open? Mixing Open and Closed Source-Closed Source for Mass Market Projects-Tapping into the Community.

#### UNIT III:

Prototyping Embedded Devices- Electronics- Sensors- Actuators- Scaling Up the Electronics- Embedded Computing Basics-Microcontrollers- System-on-Chips- Choosing Your Platform-Adriano-Developing on the Adriano- Some Notes on the Hardware- Openness- Raspberry Pi- Cases and Extension Boards- Developing on the Raspberry Pi- Some Notes on the Hardware- Openness-Prototyping the Physical .

#### UNIT IV:

Prototyping Online Components: Getting Started with an API- Mashing Up APIs- Scraping- Legalities-Writing a New API- Clockodillo- Security- Implementing the API- Using Curl to Test- Going Further Real-Time Reactions- Polling- Comet- Other Protocols- MQ Telemetry Transport- Extensible Messaging and Presence Protocol- Constrained Application Protocol-Techniques for Writing

#### UNIT V:

Business Models-A Short History of Business Models- Space and Time- From Craft to Mass Production- The Long Tail of the Internet- Learning from History- The Business Model Canvas- Who Is the Business Model For? - Models- Make Thing- Sell Thing- Subscription- Customization-Be a Key Resource-

**TEXT BOOKS:**

1. “Designing the Internet of Things” by Adrian McEwen, Hakim Cassimally, WILEY Publisher, 1<sup>st</sup> Edition, 2014.

**REFERENCE BOOKS:**

1. “Rethinking the Internet of Things-A scalable approach to connecting everything”, by Francis DaCosta, Apress open publication, 2013.
2. “Learning Internet of Things” by Peter Waher, PACKT Publishing-Birmingham-mumbai-2015.
3. “Internet of Things: A Hands on Approach”, by Arhdeep Bahga and Vijay Madisetti (<http://www.internet-of-things-book.com/>).

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
IV	23UIT5DE11	IOT AND ITS APPLICATIONS					4	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – V

**Course Code: 23UIT5DE12**

**Instruction Hours: 4**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### CORE COURSE – ROBOTICS AND ITS APPLICATIONS

#### Objective:

- 1.To understand the robotics fundamentals
- 2.Understand the sensors and matrix methods
- 3.Understand the Localization: Self-localizations and mapping
- 4.To study about the concept of Path Planning, Vision system
- 5.To learn about the concept of robot artificial intelligence

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Describe the different physical forms of robot architectures.
- CO2: Kinematically model simple manipulator and mobile robots.
- CO3: Mathematically describe a kinematic robot system
- CO4: Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty.
- CO5: Program robotics algorithms related to kinematics, control, optimization, and uncertainty.

#### UNIT I:

Introduction: Introduction, brief history, components of robotics, classification, workspace, work-envelop, motion of robotic arm, end-effectors and its types, service robot and its application, Artificial Intelligence in Robotics.

#### UNIT II:

Actuators and sensors :Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor- types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors

Kinematics of robots: Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot

#### UNIT III:

Localization: Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.

#### UNIT IV:

Path Planning: Introduction, path planning-overview-road map path planning-cell decomposition path planning potential field path planning-obstacle avoidance-case studies

Vision system: Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations

#### UNIT V:

Application: Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space Applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.

#### TEXT BOOKS:

1. RicharedD.Klafter. Thomas Achmielewski and MickaelNegin, Robotic Engineering and Integrated Approach, Prentice Hall India-Newdelhi-2001
2. SaeedB.Nikku, Introduction to robotics, analysis, control and applications, Wiley-India, 2 nd edition 2011

#### REFERENCE BOOKS:

1. Industrial robotic technology-programming and application by M.P.Groover et.al, McGrawhill2008
2. Robotics technology and flexible automation by S.R.Deb, THH-2009

#### Web Resources

1. [https://www.tutorialspoint.com/artificial\\_intelligence/artificial\\_intelligence\\_robotics.html](https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.html)
2. <https://www.geeksforgeeks.org/robotics-introduction/>

#### Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits				
IV	23UIT5DE12	ROBOTICS AND ITS APPLICATIONS					4	4				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – V

**Course Code: 23UIT5DE21**

**Instruction Hours: 4**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### GRID COMPUTING

#### Objective:

1. To learn the basic construction and application of Grid computing.
2. To learn grid computing organization and their Role.
3. To learn Grid Computing Anatomy.
4. To learn Grid Computing road map.
5. To learn various type of Grid Architecture.

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: To understand the basic elements and concepts of Grid computing.
- CO2: To understand the Grid computing toolkits and Framework.
- CO3: To understand the concepts of Anatomy of Grid Computing.
- CO4: To understand the concept of service oriented architecture.
- CO5: To Gain knowledge on grid and web service architecture.

#### UNIT I:

Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.

#### UNIT II:

Grid Computing organization and their Roles: Organizations Developing Grid Standards, and Best Practice Guidelines, Global Grid Forum (GCF), #Organization Developing Grid Computing Toolkits and Framework#, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.

#### UNIT III:

Grid Computing Anatomy: The Grid Problem, The conceptual of virtual organizations, # Grid Architecture # and relationship to other distributed technology.

#### UNIT IV:

The Grid Computing Road Map: Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.

#### UNIT V:

Merging the Grid services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, #XML messages and Enveloping#, Service message description Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I Organization.

#### TEXT BOOKS:

**REFERENCE BOOKS:**

1. Ahmer Abbas and Graig computing, A Practical Guide to technology and applications, Charles River Media, 2003.

**Web Resources**

1. [https://en.wikipedia.org/wiki/Grid\\_computing](https://en.wikipedia.org/wiki/Grid_computing)
2. [https://link.springer.com/chapter/10.1007/978-1-84882-409-6\\_4](https://link.springer.com/chapter/10.1007/978-1-84882-409-6_4)
3. <https://www.redbooks.ibm.com/redbooks/pdfs/sg246778.pdf>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
V	23UIT5DE21	GRID COMPUTING					4	4				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – V

**Course Code: 23UIT5DE22**

**Instruction Hours: 4**

**Credits: 4**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### TRENDS IN COMPUTING

#### Objective:

1. Learning current trends in various computer science and information technology fields.
2. Learning various fields of Cloud computing, Green computing, the Edge and Fog computing technology.
3. To learn about Architecture and Application design of Cloud, Edge & fog computing.
4. To know computing and to improve security services of computing technologies.
5. To learn the various Case Studies in Cloud, Edge & fog Computing.

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Outline the concepts, applications, benefits and limitations of various computing paradigms.
- CO2: Classify the computing technologies based on its architecture and infrastructure and identify its strategies.
- CO3: Examine various cloud services, Security threat exposure within a cloud computing infrastructure.
- CO4: Asses the problems and solutions involved in various stages of different computing environments.
- CO5: Discuss the importance of cloud, edge and Fog technology and implement innovative ideas and practices for regulating green IT.

#### UNIT I:

**Era of Cloud Computing:** Introduction – Components of Cloud Computing – Cloud Types: Private, Public and Hybrid clouds – Limitations of the Cloud - **Virtualization:** Structure and Mechanisms.

#### UNIT II:

**Cloud computing Services:** Software as a Service(SaaS) – Platform as a Service(PaaS)- Infrastructure as a Service(IaaS)-Database as a Service (DBaaS)- Recent Trends in cloud computing and Standards-**Data Security in Cloud** – Risks and Challenges with Cloud Data- Security as a Service.

#### UNIT III:

**Edge Computing:** Edge Computing and Its Essentials: Introduction- Edge Computing Architecture- Advantages and Limitations of Edge Computing Systems- Edge Computing Interfaces and Devices - Edge Analytics: Edge Data Analytics – Potential of Edge Analytics – Architecture of Edge Analytics – Case study

#### UNIT IV:

**Edge Data storage Security:** Edge-Based Attack Detection and Prevention-Edge Computing Use Cases and Case Studies: Edge Computing High- Potential Use Cases.

**Introduction to green computing**–Calculating carbon footprint-**Choosing Green PC path:** A green make over – Buying green computer- Choosing Earth Friendly peripherals

#### **UNIT V:**

Fog Computing: Introduction to Fog computing – Architecture - Characteristics - Fog Computing Services – Fog Resource Estimation and Its Challenges-Fog computing on 5G networks – Fog computing Use cases and Case studies.

#### **TEXT BOOKS:**

1. Kailas Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Dr. Devan Shah “ Cloud Computing – Black Book” Edition :2020 (UNIT I & II : CHAPTER 1,2,3,9,11)
2. K. Anitha Kumari G. Sudha Sadasivam D. Dharani M. Niranjanamurthy, “EDGE COMPUTING Fundamentals, Advances and Applications”, First Edition 2022, CRC Press. ( UNIT III & IV : CHAPTER 1, 2 , 3, 4,5,6 )
3. Woody Leonhard and Katherine Murray (2009) ,Green Home Computing for Dummies, Willey Publishing Inc. (UNIT IV : CHAPTER 2 ,5,6,7)
4. Evangelos Markakis, George Mastorakis, Constandinos X.Mavromoutakis and Evangelos pallis “Cloud and Fog computing in 5G mobile Networks” ,First edition 2017. ( UNIT V: CHAPTER 2 )

#### **REFERENCE BOOKS:**

1. RajKumar Buyya, Christian Vecchiola, S.ThamaraiSelvi, (2013), Mastering Cloud Computing, McGraw Hill Education.
2. Michael Miller, (2009), Cloud Computing, Pearson Education.
3. Shijun Liu Bedir Tekinerdogan Mikio Aoyama Liang-Jie Zhang” Edge Computing – EDGE “ 2018.
4. Flavio Bonomi, Rodolfo Milito, Jiang Zhu, Sateesh Addepalli, —Fog Computing and Its Role in the Internet of Things, MCC’12, August 17, 2012, Helsinki, Finland. Copyright 2012.
5. Amir M. Rahmani · Pasi Liljeberg Jürgo-Sören Preden “Fog Computing in the Internet of Things” Springer, 2018. ( UNIT V: PART/CHAPTER (1.4,2.5)

#### **Web Resources**

1. <https://static.googleusercontent.com/media/www.google.com/en//green/pdfs/google-green-computing.pdf> ( Case Study)
2. [http://whatiscloud.com/basic\\_concepts\\_and\\_terminology/cloud](http://whatiscloud.com/basic_concepts_and_terminology/cloud)
3. <http://www.computerweekly.com/guides/Using-green-computing-for-improving-energy->

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
V	23UIT5DE22	TRENDS IN COMPUTING					4	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

# CRYPTOGRAPHY

Course Code: 23UVAIT5

Exam Hours: 2

Instruction Hours: 30

Internal Marks: 50

External Marks: 50

## COURSE OBJECTIVES

- Explain the objectives of information security
- Explain the importance
- Application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks

## UNIT -I

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

## UNIT II

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks.

## UNIT – III

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Crypt analysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution

## UNIT IV

**Asymmetric key Ciphers:** Principles of public key crypto systems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

## UNIT – V

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm

**TEXT BOOKS:**

1. Cryptography and Network Security : William Stallings,  
Pearson Education,4<sup>th</sup> Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill Edition

**REFERENCE BOOKS**

1. Cryptography and Network Security: C K Shyamala, N Harin i,  
Dr T R Padmanabhan, Wiley India, 1<sup>st</sup>
2. Cryptography and Network Security : Forouzan Mukhopadhyay,  
MC Graw Hill, 2<sup>nd</sup> Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

## SEMESTER VI

Course Code: 23IT5CC13PW  
Instruction Hours: 6  
Credits: 5

Exam Hours: 3  
Internal Marks: 40  
ExternalMarks:60

### CORE COURSE - PROJECT WITH VIVA-VOCE

Objective:

- Mini project is to let the students apply the programming knowledge into a real- world situation/problem.

Course Outcomes (COs):

On successful completion of the course the students will be able to:

- Identify the requirements for the real world problems.
  - Conduct a survey of several available literatures in the preferred field of study.
  - Study and enhance software/ hardware skills
  - Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.
  - To report and present the findings of the study conducted in the preferred domain
- 
- Students do Mini Project in their respective Colleges.
  - The objective of the Mini Project is to enable the students to work in convenient groups of not more than four members on a project with a Latest Software.

## SEMESTER – VI

**Course Code: 23UIT6CC14**  
**Instruction Hours: 6**  
**Credits: 5**

**Exam Hours: 3**  
**Internal Marks: 25**  
**External Marks: 75**

## DATA MINING

### Objective:

1. To identify the underlying concepts and the fundamental data mining methodologies with the ability to formulate and solve problems

### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Outline the fundamentals and the principles of Data Mining
- CO2: Apply suitable different preprocessing for data mining
- CO3: Classify data-mining techniques based on the different applications
- CO4: Analyze the various data mining algorithms with respect to functionality
- CO5: Recommend appropriate data models for data mining techniques to solve real world problems

### UNIT I:

**Introduction:** Data Mining – Kinds of Data and Patterns to be Mined – Technologies used –Kinds of Applications are Targeted - Major Issues –Data objects and Attribute types – Basic statistical Descriptions of Data- **Data Preprocessing** : Data Cleaning – Data Integration - Data Reduction - Data Transformation.

### UNIT II:

**Association Rules Mining:** Introduction – Frequent Itemset Mining Methods: Apriori Algorithm-Generating Association Rules from Frequent Itemsets-Improving the efficiency of Apriori-A Pattern –Growth Approach for mining Frequent Itemsets-Pattern Evaluation Methods.

### UNIT III:

**Classification:** Introduction –Basic concepts – Logistic regression - Decision tree induction–Bayesian classification, Rule–based classification-Model Evaluation and selection.

### UNIT IV:

**Cluster Analysis:** Introduction-Requirements for Cluster Analysis - **Partitioning Methods:** The K-Means method - **Hierarchical Method:** Agglomerative method - **Density based methods:** DBSCAN-**Evaluation of Clustering:** Determining the Number of Clusters – Measuring Clustering Quality.

### UNIT V:

**Outlier Detection:** Outliers and Outlier Analysis – Outlier Detection Methods - **Data Visualization:** Pixel-oriented visualization – Geometric Projection visualization technique-

Icon-based-Hierarchical visualization-Visualizing complex data and relations.

**TEXT BOOKS:**

1. Jiawei Han, Micheline Kamber, Jian Pei, “Data Mining concepts and techniques”, 3<sup>rd</sup> Edition, Elsevier publication, 2012.

**REFERENCE BOOKS:**

1. Ian H. Witten and Eibe Frank, (2005), “Data Mining: Practical Machine Learning Tools and Techniques (Second Edition)”, Morgan Kaufmann.
2. Arun K Pujari, “Data Mining Techniques”, 10 impression, University Press, 2008.
3. Daniel T. Larose , Chantal D. Larose, "Data mining and Predictive analytics," Second Ed., Wiley Publication, 2015.
4. G.K. Gupta, “Introduction to Data mining with case studies”, 2<sup>nd</sup> Edition, PHI Private limited, New Delhi, 2011.

**Web Resources**

1. <http://csed.sggs.ac.in/csedsites/default/files/WEKA%20Explorer%20Tutorial.pdf>
2. <https://www.cs.auckland.ac.nz/courses/compsci367s1c/tutorials/IntroductionToWeka.pdf>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
VI	23UIT5CC13	DATA MINING					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT6CC15P**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### DATA MINING LAB

#### Objective:

1. Understand the data sets, data preprocessing and demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression.

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

CO1: Understand the real time datasets for analysis

CO2: Apply suitable preprocessing for data mining task

CO3: Demonstrate data-mining techniques based on the different applications

CO4: Analyze the performance evaluation of various data mining algorithms

CO5: Prescribe appropriate data models for data mining techniques to solve real world problems

1. Understanding the data
2. Visualization Techniques
3. Data Preprocessing
4. Handling Missing Values
5. Data Reduction-Principal Component Analysis
6. Data Normalization-Min-Max, Z-score, Decimal Scaling
7. Association Rule Mining-Apriori Algorithm
8. Classification
9. Logistic Regression
10. Decision Tree

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
VI	23UIT5CC15P	DATA MINING LAB					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER-VI

Course Code: 23UIT6CC16

Instruction Hours: 6

Credits: 6

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### SOFTWARE PROJECT MANAGEMENT

#### Learning Objectives (LO):

LO1: To learn the basics of software engineering and software processes.

LO2: To understand software design principles and modular design.

LO3: To learn different software testing methods and debugging.

LO4: To understand configuration management, quality assurance, and project Planning.

LO5: To learn requirement gathering, estimation, and software maintenance Concepts.

#### Course Outcomes (CO):

On completion of this course, students will:

CO1: Students will understand software engineering concepts and process models.

CO2: Students will be able to design modular and user-friendly software.

CO3: Students will apply software testing and debugging techniques.

CO4: Students will use configuration management and quality assurance practices.

CO5: Students will gather requirements, estimate projects, and manage software development tasks.

#### Unit I

Introduction –Software Engineering Technology – Software process – Software process models – The prototyping. Requirement Engineering - System modeling– Requirements analysis and elicitation for software - software prototyping – data dictionary–elements of analysis model–data modeling–functional modeling and information flow.

#### Unit II

The system design process–software design and software engineering–The design process – Design principles – Design concepts – Effective modular design – Design heuristics for effective modularity-User interface Design

#### Unit III

Software testing techniques–Software testing fundamentals–White box testing– Basis path testing–Control structure testing–Black box testing. Software testing strategies – A strategic approach to s/w testing – Validation testing – System testing – The Art of debugging.

#### Unit IV

Software Configuration Management–Definition sand terminology–processes and activities Software Quality assurance – definitions –quality control and assurance – Organization of Structures – Risk Management – Risk Identification, quantification Monitoring – Mitigation. Project initiation – Project Planning and tracking–organizational processes–assigning resources–project tracking– project closure.

#### Unit V

Software requirements gathering – steps to be followed – skills sets required – challenges.Estimation:Threephasesofestimation.DesignandDevelopment phases – reusability, Technology choices, Standards, Portability user interface – testability–diagnosisability– Maintainability–Installability-The Effect of Internet on Project Management.

**Text Book:**

1. Roger S. Pressman, “Software Engineering”,5<sup>th</sup> Edition, Tata McGraw Hill Publication Company Pvt. Ltd., 2014

**Reference Books:**

1. Gopaldaswamy Ramesh,“Managing Globle Software Projects” Tata McGraw Hill Publishing Company Ltd, New Delhi, 2002.
2. Watts S Humbhrey: A Discipline for Software Engineering, Pearson education Publ., 2001.
3. Bob Hughes and Mike Cotterell “Software Project Management” 2<sup>nd</sup> edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2002
4. Hodges, Jason Lee.Software Engineering from Scratch: A Comprehensive Introduction Using Scala, Apress, 2019.

**Web Resources**

1. <https://www.javatpoint.com/software-project-management>
2. [https://en.wikipedia.org/wiki/Software\\_project\\_management](https://en.wikipedia.org/wiki/Software_project_management)

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
VI	23UIT6CC16	Software Project Management					6	6			
Course Outcomes (Cos)	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO2		✓	✓	✓	✓	✓		✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓			
CO4	✓		✓		✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Number of matches(✓)=40,Relationship:High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT6DE31**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### PHP PROGRAMMING

#### Objective:

1. To identify the underlying concepts and the fundamental data mining methodologies with the ability to formulate and solve problems

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Outline the fundamentals and the principles of Data Mining
- CO2: Apply suitable different preprocessing for data mining
- CO3: Classify data-mining techniques based on the different applications
- CO4: Analyze the various data mining algorithms with respect to functionality
- CO5: Recommend appropriate data models for data mining techniques to solve real world problems

#### UNIT I:

Introduction to PHP : Language Basics : Lexical Structure – Data Types – Variables - Expressions and Operators – Flow – Control statements – Embedding PHP in Web Pages

#### UNIT II:

Functions : Defining a function – Variable Scope - Function Parameters – Strings : Encoding and Escaping – Comparing Strings – Manipulating and Searching Strings – Arrays: Single and Multidimensional Arrays – Traversing Arrays – Sorting

#### UNIT III:

Classes and Objects – Introspection – Serialization – Web Techniques: Processing Forms – Setting Response Headers – Maintaining State : Cookies and Session-Graphics

#### UNIT IV:

Working with MySQL Database: Select data from a single table – Select data from multiple tables- Performing DML operations

#### UNIT V:

jQuery Fundamentals: Requirements of jQuery- JavaScript Premier – jQuery Core – DOM Selection and Manipulation – Event Handling – HTML Forms and Data – jQuery with PHP

**TEXT BOOK:**

1. Kevin Tatroe, Peter MacIntyre, Rasmus Lerdorf, “Programming PHP”, O’Reilly Publications, Third Edition
2. Joel Murach, Ray Harris (2010), “PHP and MySQL”, Shroff Publishers & Distributors
3. Cesar Otero, Rob Lorscheid (2012), “Professional jQuery”, John Wiley Sons & Inc

**REFERENCE BOOKS:**

1. W. Jason Gilmore (2010), “Beginning PHP & MySQL”, Apress
2. Larry Ullman (2008), “PHP 6 and MySQL 5”, Pearson Education
3. John Coggeshall (2006), “PHP 5”, Pearson Education
4. Michale C. Glass (2004), “Beginning PHP, Apache, MySQL Web Development”, Wiley DreamTech Press
5. Robin Nixon (2013), “Learning PHP, MySQL, JavaScript & CSS”, O’Reilly, 2<sup>nd</sup> Edition
6. Jack Franlin (2013), “Beginning jQuery”, Apress, Springer Science

**Web Resources**

1. <http://www.w3schools.com/jquery/>
2. <http://www.ccc.commnet.edu/faculty/sfreeman/cst%20250/jqueryNotes.pdf>
3. <http://www.w3schools.com/php/>
4. <http://www.tutorialspoint.com/php/>
5. <http://www.tutorialspoint.com/mysql/>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
VI	23UIT5CC31	PHP PROGRAMMING					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT6DE32**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 25**

**External Marks: 75**

### DATA ANALYTICS USING R

#### Objective:

1. Understand the Big Data Platform and its Use cases, Map Reduce Jobs
2. To identify and understand the basics of cluster and decision tree
3. To study about the Association Rules, Recommendation System
4. To learn about the concept of stream
5. Understand the concepts of NoSQL Databases

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Work with big data tools and its analysis techniques.
- CO2: Analyze data by utilizing clustering and classification algorithms.
- CO3: Learn and apply different mining algorithms and recommendation systems for large volumes of data.
- O4: Perform analytics on data streams.
- CO5: Learn NoSQL databases and management.

#### UNIT I:

Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating — The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value -Understanding Big Data Storage — A General Overview of High-Performance Architecture — HDFS — MapReduce and YARN — Map Reduce Programming Model

#### UNIT II:

Advanced Analytical Theory and Methods: Overview of Clustering — K-means — Use Cases — Overview of the Method — Determining the Number of Clusters — Diagnostics — Reasons to Choose and Cautions .- Classification: Decision Trees — Overview of a Decision Tree — The General Algorithm — Decision Tree Algorithms — Evaluating a Decision Tree — Decision Trees in R — Naïve Bayes — Bayes? Theorem — Naïve Bayes Classifier.

#### UNIT III:

Advanced Analytical Theory and Methods: Association Rules — Overview — Apriori Algorithm — Evaluation of Candidate Rules — Applications of Association Rules — Finding Association & finding similarity — Recommendation System: Collaborative Recommendation- Content Based Recommendation — Knowledge Based Recommendation- Hybrid Recommendation Approaches.

#### UNIT IV:

Introduction to Streams Concepts — Stream Data Model and Architecture — Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics

**UNIT V:**

NoSQL Databases : Schema-less Models?: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores — Tabular Stores — Object Data Stores — Graph Databases Hive — Sharding —Hbase — Analyzing big data with twitter — Big data for E-Commerce Big data for blogs — Review of Basic Data Analytic Methods using R.

**TEXT BOOKS:**

- 1 AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

**REFERENCE BOOKS:**

1. David Loshin, “Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph”, Morgan Kaufmann/El sevier Publishers, 2013
2. EMC Education Services, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley publishers, 2015.

**Web Resources**

1. <https://www.simplilearn.com>
2. [https://www.sas.com/en\\_us/insights/analytics/big-data-analytics.html](https://www.sas.com/en_us/insights/analytics/big-data-analytics.html)

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
VI	23UIT5CC32	<b>DATA ANALYTICS USING R</b>					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT6DE41**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### PHP PROGRAMMING LAB

#### Objective:

1. To enable the students to understand, analyze and build dynamic webpages using PHP and jQuery with MySQL database

#### Course Outcomes (COs):

Upon completion of the course, the student should be able to:

- CO1: Demonstrate simple programs using PHP and jQuery
- CO2: Apply the interface setup, styles & themes for the given application
- CO3: Analyze the problem and add necessary user interface components, multimedia components and web data source into the application
- CO4: Evaluate the results by implementing the correct techniques on the web form
- CO5: Construct web applications with the facilitated components in PHP and jQuery

1. Control Structures
2. Working with Forms.
3. String Manipulations
4. Arrays
5. Functions
6. Sorting
7. Classes and Objects
8. Cookies and Sessions
9. Graphics
10. Working with single table
11. Working with multiple tables
12. Event Handling

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits				
VI	23UIT5DE41	PHP PROGRAMMING LAB					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓		✓			
CO3	✓	✓	✓	✓			✓	✓				
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High												

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## SEMESTER – VI

**Course Code: 23UIT6DE42**

**Instruction Hours: 6**

**Credits: 5**

**Exam Hours: 3**

**Internal Marks: 40**

**External Marks: 60**

### DATA ANALYTICS USING R LAB

#### Objective:

1. To identify the underlying concepts and the fundamental data mining methodologies with the ability to formulate and solve problems

#### Course Outcomes:

**At the end of the Course, the Student will be able to:**

- CO 1: Show the installation of R Programming Environment.
- CO 2: Utilize and R Data types for developing programs.
- CO 3: Make use of different R Data Structures.
- CO 4: Develop programming logic using R Packages.
- CO 5: Analyze the datasets using R programming capabilities.

#### LIST OF PROGRAMS:

1. Download and install R-Programming environment and install basic packages using `install.packages()` command in R.
2. Learn all the basics of R-Programming (Data types, Variables, Operators etc.)
3. Implement R-Loops with different examples.
4. Learn the basics of functions in R and implement with examples.
5. Implement data frames in R. Write a program to join columns and rows in a data frame using `cbind()` and `rbind()` in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, Data Frames)
8. Write a program to read a csv file and analyze the data in the file in R
9. Create pie charts and bar charts using R.
10. Create a data set and do statistical analysis on the data using R.

#### REFERENCES:

1. Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, 2 nd Edition, Pearson Education, 2018.
2. S. R. Mani Sekhar and T. V. Suresh Kumar, Programming with R, 1 st Edition,, CENGAGE, 2017.

#### WEB REFERENCE:

1. <https://www.r-project.org/>
2. <https://www.tutorialspoint.com/r/index.html>

**Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:**

Semester	Code	Title of the Course					Hours	Credits			
VI	23UIT5CC42	DATA ANALYTICS AND R LAB					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓			✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

<b>Mapping</b>	1-29%	30-59%	60-69%	70-89%	90-100%
<b>Matches</b>	1-14	15-29	30-34	35-44	45-50
<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High

## **RUBY ON RAILS**

Course Code: 23UVAIT6

Exam Hours: 2

Instruction Hours: 30

Internal Marks: 50

External Marks: 50

### **COURSE OBJECTIVES:**

- To learn the basic Concepts of the Ruby Language
- To use Ruby in developing Web based applications
- To apply the MVC architecture with Rails
- To Develop Applications using Ruby on Rails

### **UNIT I**

INTRODUCTION TO RUBY: Introduction to Ruby: Data types - Simple input and output - Control statements - Fundamentals of arrays – Hashes – Methods – Classes - Code blocks and Iterations – Date and Time – File I/O

### **UNIT II**

RUBY ADVANCED: Class – Objects – Inheritance – Polymorphism – Regular Expressions – Database Access – Web Applications – CGI – Form Processing – Session Management

### **UNIT III**

INTRODUCTION TO RAILS: Introduction – MVC Architecture - Environmental Setup – Creating Rails Application – Database Setup – Active Records

### **UNIT IV**

MODULES: Migrations - Creating – Editing – Running Migrations – Controllers - Implementing the methods – Additional Methods– Routes - Views – Layouts

### **UNIT V**

APPLICATION DEVELOPMENT - Validation - Scaffolding – Working with AJAX – File Uploading – Sending E-mails – Creating a Sample Application

**REFERENCE BOOKS:**

1. Sam Ruby, Dave Thomas, David Heinemeier Hansson, "Agile Web Development with Rails", The Pragmatic Programmers, Fourth Edition, 2011
2. P.J.Deitel, H.M.Deitel, "Internet and World Wide Web – How to program", Pearson Education Publishers, Fifth Edition, 2009.
3. Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, Fourth Edition, 2007

**WEB REFERENCES:**

1. <http://guides.rubyonrails.org>
2. <http://www.tutorialspoint.com>