

# **B.Sc INFORMATION TECHNOLOGY**

## **Course Structure and Syllabus**

(For the candidates admitted from the academic year 2021-2022 onwards)

# **CHOICE BASED CREDIT SYSTEM (CBCS)**



**THANTHAI HANS ROEVER COLLEGE(AUTONOMOUS)**

(Approved by NAAC, Affiliated to Bharathidasan University)

**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):**

Undergraduate Programmes

Upon completion of the programme, the undergraduate will be able to

- Acquire knowledge, understand concepts and apply new ideas which enable them to be employable or self employed.
- Demonstrate motivation in advancing to higher learning programmes.
- Engage in socially responsible behaviour and have value added education.
- Have exposure to technical proficiency, analytical capability, soft skills and life skills development.
- Develop broad understanding in the basic concepts of Languages/ Commerce/ Management Studies/ Physical Sciences/ Computing Sciences/ Biological Sciences/ Life Sciences.

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

Our graduates of B.Sc(IT) students will have

1. Acquire the knowledge of basic computing and IT concepts that is used to adopt perfectly with the net world.
2. Learn and develop the programming and technical skills to meets the requirements of the IT based industries.
3. Analyze the problems and provide solutions in IT, which increase the critical thinking.
4. Adopt the concept of IT to apply and implement real time applications for the society enhancement and that increase the entrepreneurship skills.
5. Score the comprehensive knowledge of system concept for higher studies and active participation in research.

Semester	Part	Course Code	Title of the Course	Ins. Hours/ Weeks	Credits	Exam Hours	CIA (Max)	ESE (Max)	Total (Max)
1	I	20UT1	Tamil-I (Ilakiyam-Kavithai, Sirukathai, Urainadai, IlakkiyaVaralaru)	6	3	3	25	75	100
1	II	20UEN1	English-I (Communicative English)	6	3	3	25	75	100
1	III	20UIT1CC1	Principles of Information Technology	5	4	3	25	75	100
1	III	20UIT1CP1	MS Office Lab	4	3	3	40	60	100
1	III	20UMA1AC1	Mathematics-I (Numerical Methods and Statistics)	5	3	3	25	75	100
1	III	20UIT1PE1	Professional English for Physical Science - I	2	2	3	25	75	100
1	IV	20UVE	Value Education	2	2	3	25	75	100
Total				<b>30</b>	<b>20</b>	-	-	-	<b>700</b>
2	I	20UT2	Tamil-II (Idaikkala Ilakkiyam, Nadagam, Puthinam, IlakkiyaVaralaru)	6	3	3	25	75	100
2	II	20UEN2	English-II (Communicative English)	6	3	3	25	75	100
2	III	20UIT2CC2	Programming in C	5	4	3	25	75	100
2	III	20UIT2CP2	C Programming Lab	4	3	3	40	60	100
2	III	20UMA2AC2	Mathematics-II (Operation Research)	5	3	3	25	75	100
2	III	20UIT2PE2	Professional English for Physical Science -II	2	2	3	25	75	100
2	IV	20UES	Environmental Studies	2	2	3	25	75	100
Total				<b>30</b>	<b>20</b>	-	-	-	<b>700</b>
3	I	20UT3	Tamil-III (Kappiya Ilakkiyam , Nadagam, IlakiyaVaralaru)	6	3	3	25	75	100
3	II	20UEN3	English-III(Language Through Literature and Communicative Skills-I)	6	3	3	25	75	100
3	III	20UIT3CC3	Programming in C++	5	4	3	25	75	100
3	III	20UIT3CP3	C++ Programming Lab	4	3	3	40	60	100
3	III	20UCM3AC3:1	Principles of Management	4	3	3	25	75	100
3	III	20UIT3AC3:2	Programming in Python	3	3	3	25	75	100
3	IV	20UIT3NME1	Office Automation	2	2	3	25	75	100
Total				<b>30</b>	<b>21</b>	-	-	-	<b>700</b>
4	I	20UT4	Tamil-IV (Pazhanthamizh Ilakkiyam, Ilakkiya Varalaru & Pothukkatturai)	6	3	3	25	75	100

4	II	20UEN4	English-IV(Language Through Literature and Communicative Skills-II)	6	3	3	25	75	100
4	III	20UIT4CC4	Programming in Java	4	4	3	25	75	100
4	III	20UIT4CP4	Java Programming Lab	3	3	3	40	60	100
4	III	20UCM4AC4:1	Organizational Behavior	4	3	3	25	75	100
4	III	20UIT4AP1	Python Programming Lab	3	3	3	40	60	100
4	IV	20UIT4NME2	Desktop Publishing	2	2	3	25	75	100
4	IV	20UIT4SBE1	Quantitative Aptitude	2	2	3	25	75	100
<b>Total</b>				<b>30</b>	<b>23</b>	-	-	-	<b>800</b>
5	III	20UIT5CC5	Computer Networks	5	5	3	25	75	100
5	III	20UIT5CC6	Operating Systems	5	5	3	25	75	100
5	III	20UIT5CC7	Web Technology	5	5	3	25	75	100
5	III	20UIT5CP5	Web Technology Lab	4	4	3	40	60	100
5	III	20UIT5MBE1:1/ 20UIT5MBE1:2/ 20UIT5MBE1:3	Digital Computer Fundamentals / Internet Programming/ Data Structure and Algorithms	5	4	3	25	75	100
5	IV	20UIT5SBE2	Android Programming	2	2	3	25	75	100
5	IV	20UIT5SBE3	Distributed Programming	2	2	3	25	75	100
5	IV	20USSD	Soft Skill Development	2	2	3	25	75	100
<b>Total</b>				<b>30</b>	<b>29</b>	-	-	-	<b>800</b>
6	III	20UIT6CC8	Relational Database Management Systems	6	5	3	25	75	100
6	III	20UIT6CC9	Internet of Things	6	5	3	25	75	100
6	III	20UIT6CP6	SQL & PLSQL Lab	5	5	3	40	60	100
6	III	20UIT6MBE2:1/ 20UIT6MBE2:2/ 20UIT6MBE2:3	Software Engineering/ Linux and Shell Programming/ Multimedia Systems	6	5	3	25	75	100
6	III	20UIT6PW/ 20UIT6MBE3:1/ 20UIT6MBE3:2	Mini Project(Students to do it in their respective Colleges)/ Shell Programming Lab/ Computer Graphics & Animation Lab	6	5	3	40	60	100
6	V	20UGS	Gender Studies	1	1	3	25	75	100
6	V	*****	Extension Activities	-	1	-	-	-	-
<b>Total</b>				<b>30</b>	<b>27</b>	-	-	-	<b>600</b>
<b>Grand Total</b>				<b>180</b>	<b>140</b>				<b>4300</b>

### List of Allied Courses

Allied Course I

Allied Course II

**Paper Details:**

Tamil Paper-Part I	- 4
English Paper-Part II	- 4
Core Course Paper	- 9
Core Course Practical	- 6
Allied Course Paper	- 5
Allied Course Practical	- 1
Non-Major Elective	- 2
Skill Based Elective	- 3
Major Based Elective	- 3
Environmental Studies	- 1
Value Education	- 1
Professional English	- 2
Soft Skill Development	- 1
Gender Studies	- 1
Extension Activities	- 1 (Credit Only)

- For those who studied Tamil up to 10th +2 (Regular Stream)
- Syllabus for other Languages should be on par with Tamil at degree level
- those who studied Tamil up to 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV
- Extension Activities shall be outside instruction hours

Non Major Elective I & II - for those who studied Tamil under Part- I

i) Basic Tamil I & II for other language students

ii) Special Tamil I & II for those who studied Tamil up to 10th or +2 but opt for other languages in degree programme

**Note:**

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

**NME Papers offered to Other Department**

20UIT3NME1 - Office Automation (Theory)

20UIT4NME2 - Desk Top Publishing (Theory)

**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]

**SEMESTER-I**

Course Code: 20UIT1CC1

Instruction Hours: 5

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

## **CORE COURSE I - PRINCIPLES OF INFORMATION TECHNOLOGY**

### **Objectives:**

- To understand the Principles of Information Technology
- To define various strategies of computer
- To state the working principle of Database Management System

### **Course Outcomes (COs):**

- CO1:** Students will develop computer literacy skills to adapt to emerging technologies used in the global marketplace.
- CO2:** Help students implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment.
- CO3:** Help students enhance reading, writing, computing, communication, and reasoning skills and apply them to the information technology environment.
- CO4:** Install technical hardware and software including network, database and security components.
- CO5:** Analyze and select application and operating system settings to create an optimal user environment.

### **UNIT I:**

Introduction to Computer – Categories of Digital Computer System – Computer Architecture – Memory Units – Primary Memory– Classification of Memory – Auxiliary Storage Devices – Input and Output Devices.

### **UNIT II:**

Introduction to Computer Software – Types of Software – System Software – Application Software – Operating System – Types of Operating System – Programming Languages – Types of Programming Language – High Level Language – Assembly Language – General Software Features and Trends.

### **UNIT III:**

Database Management Systems – Data Processing – Introduction to Database Management System – Database Design – Normalization – Normalization Types.

### **UNIT IV:**

Introduction to Telecommunication – Networking – Evaluation of Networking – Types of Network – Networking Devices– Communication System – Distributed System – Internet – Intranet– Telecom Network System.

### **UNIT V:**

Multimedia Tools – Classification of Media Types – Virtual Reality – Applications of Virtual Reality – E Commerce – Features of E Commerce – Data Warehousing – Data Mining – Applications: Geographical Information System – Computer in Business , Industry, Home, Education and Training.

### **Text Book(s):**

1. Alexis Leon. Mathews Leon, Fundamentals of Information Technology, Leon Tech World.

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

1. Henry C.Lucas, Jr., “Information Technology for Management”, McGraw Hill (Part - III)
2. Williams, Sawyer, Hutchinson, “Using Information Technology”, McGraw Hill.
3. “Information Technology - The Breaking Wave”, Dennis P. Curtin, Kim Foley, KunalSen and Cathleen Morin, Tata-McGraw Hill Publications, 2005

Total Number of Topics Present in the course: 45

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	03	06.67%
2.	Regional	01	02.22%
3.	National	01	02.22%
4.	Global	40	88.90%

**Local – Green, Regional – Pink, National – Blue, Global – Brown**

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

Semester	Code	Title of the Course					Hours	Credits			
I	20UIT1CC1	PRINCIPLES OF INFORMATION TECHNOLOGY					5	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 (✓) = 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

Prepared by:

Checked by:

HOD:

SEMESTER-I

Course Code: 20UIT1CP1

Instruction Hours: 4

Credits: 3

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### CORE COURSE PRACTICAL I - MS OFFICE LAB

**Objective:**

- To impart practical training in Word Processing Software.

**Course Outcomes (COs):**

By learning the course, the students will be able

- CO1: To perform documentation
- CO2: To perform accounting operations
- CO3: To analyses the data using graph for decision making.
- CO4: To perform presentation for effective teaching
- CO5: Enhance the ability of information management using system.

**MS – WORD:**

1. **Text Manipulation:** Changing the Font Size and Type, Aligning, Justifying, Underlining, Indenting the Text:
  - [a] Prepare a Bio – Data
  - [b] Prepare a Letter
2. **Picture Insertion and Alignment:**
  - [a] Prepare a Greeting Card
  - [b] Prepare a Handout
3. **Creating Documents using Templates:**
  - [a] Prepare a Letter
4. **Mail Merge:**
  - [a] Prepare a Business Letter
  - [b] Prepare an Invitation
5. Prepare the WordArt work in document

**MS – EXCEL:**

1. Usage of Formulae and Built – in Functions.
2. Editing Cells, using Commands and Functions.
3. Moving and Copying, Inserting and Deleting Rows and Columns.
4. Mark List Preparation.
5. Pay Bill Preparation.
6. Invoice and Inventory Preparation.
7. Use wrap text and merge cells as desired.

**MS – POWERPOINT:**

1. A Presentation that shows five different Greeting Cards with Pictures.
2. Prepare Slides that helps you to teach about “Computer Networks”.
3. A Presentation with different Animation Effects.
4. Create a table on the slide and insert the chart.
5. Formatting by creating a table with details

Total Number of Topics Present in the course: 17

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	10	58.80%
2.	Regional	02	11.80%
3.	National	02	11.80%
4.	Global	03	17.60%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
I	20UIT1CP1	MS OFFICE LAB					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 (✓) = 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

Prepared by:

Checked by:

HOD:

## SEMESTER - II

Course Code: 20UIT2CC2

Instruction Hours: 5

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### CORE COURSE II - PROGRAMMING IN C

**Objectives:**

- To Know the basic terminology used in structured programming
- To understand various features in C
- To develop the programming skills using C language

**Course Outcomes (COs):**

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

CO1: Demonstrate an understanding of computer programming language concepts.

- CO2: Able to define data types and use them in simple data processing applications
- CO3: Able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.
- CO4: Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
- CO5: Develop confidence for self-education and ability for life-long learning needed for Computer language.

### UNIT I

C Fundamentals Character Set - Identifier - Keywords - Data Types - Constants - Variables - Declarations - Expressions - Statements - Arithmetic – Unary - Relational - Logical, Assignment - Conditional Operators - Library Functions.

### UNIT II

Data Input Output Functions - Simple C programs - Flow of Control - if and if else, while and do while - for Loop and Nested Control Structures - Switch, break and continue - go to Statements - Comma Operator.

### UNIT III

Functions - Definition - ProtoTypes - Passing Arguments - Recursions - Storage Classes - Automatic - External - Static - Register Variables - Multi File Programs.

### UNIT IV

Arrays - Defining and Processing - Two dimensional array - Passing Arrays to Functions - Multi Dimension Arrays - Arrays and String - Structures - User Defined Data Types - Passing Structures to Functions - Recursions, categories of function - Storage Classes - Self Referential Structures - Unions - Bitwise Operations.

### UNIT V

Pointers - Declarations - Passing Pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Pointer Expression - Structures, String and Pointers - Files: Creating Processing - Opening and Closing a Data File - Preprocessor.

#### Text Book(s):

1. E.Balagurusamy, “Programming in ANSI C”, Fifth Edition, Tata McGraw Hill.

#### Reference Book(s):

1. B.W. Kernighan and D M.Ritchie, “The C Programming Language”, 2nd Edition, PHI, 1988.
2. H. Schildt, “C: The Complete Reference”, 4th Edition. TMH Edition, 2000.
3. Gottfried B.S, “Programming with C”, Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.

Total Number of Topics Present in the course: 58

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	07	12.10%
2.	Regional	-	-
3.	National	-	-

4.	Global	51	87.90%
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Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
II	20UIT2CC2	PROGRAMMING IN C					5	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 (✓) = 38, 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

Prepared by:

Checked by:

HOD:

## SEMESTER II

Course Code: 20UIT2CP2

Instruction Hours: 4

Credits: 3

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### CORE COURSE PRACTICAL II - C PROGRAMMING LAB

**Objective:**

- To impart practical training in structured programming in C.

**Course Outcomes (COs):**

On successful completion of the course the students 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 algorithms.

CO3: Implement programs with pointers and arrays.

CO4: Using pointer to perform arithmetic operation.

CO5: Write programs that perform operations using derived data types.

### I Summation of Series

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

## II String Manipulation

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

## III Recursion

1. nPr, nCr
2. GCD of two numbers
3. Fibonacci sequence
4. Maximum & Minimum

## IV Sorting and Searching

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

Total Number of Topics Present in the course: 04

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	25
2.	Regional	-	-
3.	National	-	-
4.	Global	03	75

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
II	20UIT2CP2	C PROGRAMMING LAB					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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - III

Course Code: 20UIT3CC3

Instruction Hours: 5

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **CORE COURSE III -PROGRAMMING IN C++**

#### **Objectives:**

- To understand of Object Oriented Programming and define the classes and objects of C++
- To describe the working principle of Inheritance and I/O operations

#### **Course Outcomes (COs):**

After completion of this course, student will be able to

- CO1: Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- CO2: Able to make use of objects and classes for developing programs.
- CO3: Able to use various object oriented concepts to solve different problems.
- CO4: To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- CO5: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

## Unit I

Principles of Object Oriented Programming 3 Beginning with C++ - Tokens - Expressions - Control Structures - Using Nested Statements - Functions in C++.

## Unit II

Classes and Objects - Constructors - Destructors - Operator Overloading - Type Conversions - New Operator.

## Unit III

Inheritance: Single - Multiple - Multilevel - Hierarchical and Hybrid Inheritance - Extending Classes - Pointers - Virtual Functions - Polymorphism: Compile Time Polymorphism - Run Time Polymorphism - Abstract Classes.

## Unit IV

Managing Console I/O Operations - Working with Files - Creating Files - Opening Files -Access Data from Files - Closing File.

## Unit V

Standard Template Library - Manipulating Strings Using Build in Functions - Templates - Exception Handling - Object Oriented System Development.

### Text Book(s):

1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013

### Reference Book(s):

1. Ashok Kamthane, Programming in C++, Pearson Education, 2013.
2. Steve Oualline, "Practical C++ programming", O'Reilly/Shroff publishers & distributors.
3. "C++ primer", Stanley B. Lippman, Josee Lajoie, Barbara E. Moo. - 5th ed...

Total Number of Topics Present in the course: 32

S.No	Category()	No. of Topics covered	Percentage
1.	Local	05	31.25%
2.	Regional	01	03.03%
3.	National	01	09.09%
4.	Global	25	71.87%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
III	20UIT3CC3	PROGRAMMING IN C++					5	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 (✓) = 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

Prepared by:

Checked by:

HOD:

### SEMESTER III

Course Code: 20UIT3CP3

Instruction Hours: 4

Credits: 3

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### CORE PRACTICAL III - C++ PROGRAMMING LAB

#### Objective:

- To impart practical training in object oriented programming in C++.

#### Course Outcomes (COs):

After successfully completed course, students will be able to:

CO1: To implement various concepts related to language.

CO2: Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.

CO3: Able to make use of objects and classes for developing programs.

CO4: Able to use various object oriented concepts to solve different problems.

CO5: Ability to develop computing based applications.

#### 1. Classes

Write A Program Using A Class To Represent A Bank Account With Data Members - Name Of Depositor, Account Number, Type Of Account And Balance And Member Functions - Deposit Amount - Withdrawal Amount. Show Name And Balance. Check The Program With Own Data.

#### 2. Constructor & Destructor

Write a Program to Read an Integer and Find the Sum of All the Digits Until It Reduces To A Single Digit Using Constructor, Destructor and Default Constructor.

3. Default & Reference Argument

Write A Program Using Function Overloading To Read Two Matrices Of Different Data Types Such As Integers And Floating Point Numbers. Find Out The Sum Of The Above Matrices Separately And Display The Total Sum Of These Arrays Individually.

4. Operator Overloading

- A. Addition Of Two Complex Numbers.
- B. Matrix Multiplication

5. Inheritance

Prepare Pay Roll Of An Employee Using Inheritance.

6. Pointers

- A. Write a Program to Find the Number of Vowels in a Given Text

7. Files

Prepare Students Mark List In A File With Student Number, Mark In Four Subjects And Mark Total. Write A Program To Arrange These Records In The Ascending Order Of Mark Total And Write Them In The Same File Overwriting The Earlier Records.

8. Exception Handling

Prepare Electricity Bill For Customers Generating And Handling Any Two Exceptions.

9. Sorting and Searching

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

Total Number of Topics Present in the course: 09

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	11.11%
2.	Regional	-	-
3.	National	01	11.11%
4.	Global	07	77.78%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
III	20UIT3CP3	C++ PROGRAMMING LAB					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 (✓) = 41, 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - III

Course Code: 20UCM3AC3:1

Instruction Hours: 4

Credits: 3

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### ALLIED COURSE III - PRINCIPLES OF MANAGEMENT

**Objective:**

- To define the management concept, explain the planning process and to distinguish centralization vs. decentralization, identify the source of recruitment, explain the selection process and state the various techniques of budgetary control.

**Course Outcomes(COs):**

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

CO1: Understand the concepts related to Business.

CO2: Demonstrate the roles, skills and functions of management.

CO3: To study the system and process of effective controlling in the organization.

CO4: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.

CO5: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

**UNIT I**

Management – Concept – Evolution – Nature – Management as a Science, an Art and Profession – Process – Levels of Management – F.W. Taylor’s Scientific Management – Fayol’s Theory of Management – Modern Management – Recent Trends in Management – Evolution of Management thought.

**UNIT II**

Nature and Purpose of Planning – Planning Process – Types of Plans – Objectives – Managing by Objective (MBO) – Strategies – Types of Strategies – Strategic Management – Policies – Decision Making – Types of Decision – Decision Making Process – Decision Making Under Different Conditions.

### UNIT III

Organizing – Concept – Organisation as a Process – Components of Organization Process – Formal and Informal organization – Organization Chart – Organization Structure – Types of Business Organization – Delegation – Departmentation – Span of Control – Centralization – Decentralisation – Human Resource Management.

### UNIT IV

Staffing – Functions – Process – Selection – Recruitment – Training – Direction – Components of Direction – Principles of Direction – Process of Direction.

### UNIT V

Controlling – Concept – Need and Importance – Process – Characteristics of an Ideal Control System – Types of Control – Budgetary and Non Budgetary Control Techniques – Managing Productivity – Cost Control – Purchase Control – Maintenance Control – Quality Control – Planning operations.

#### Text Book(s):

1. Prasad L.M. Principles and Practice of Management, New Delhi, Sultan Chand & Sons.
2. Tripathy P.C, Reddy P.N. Principles of Management, New Delhi, Mc - Graw Hill Publishing company Ltd.

#### Reference Book(s):

1. Harold Koontz, Heinz wehrich, ramachandraAryasri, Principles of Management, New Delhi, Mc - Graw Hill Publishing company Ltd.,
2. Govindharajan. M. Natarajan S. Principles of Management, New Delhi, PHI Learning Private Limited.
3. Rao V.S.P., Narayana P.S. Principles and Practice of Management, Delhi, KonarkPublishsers Private Ltd.

Total Number of Topics Present in the course: 62

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	05	08.06%
2.	Regional	43	69.40%
3.	National	07	11.30%
4.	Global	07	11.30%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course	Hours	Credits
III	20UCM3AC3:1	PRINCIPLES OF MANAGEMENT	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 (✓) = 42, 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

**Prepared by:**

**Checked by:**  
SEMESTER - III

**HOD:**

Course Code: 20UIT3AC3:2

Instruction Hours: 3

Credits: 3

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **ALLIED COURSE IV - PROGRAMMING IN PYTHON**

**Objective:**

- Able to build Python programs using fundamental programming constructs like variables, conditional logic, looping, and functions.

**Course Outcomes (COs):**

CO1: Understand why Python is a useful scripting language for developers.

CO2: Understand the basic programming language concepts in the Python.

CO3: Demonstrate the use of functions, lists, tuples and dictionaries and write control statements in Python.

CO4: Understand the design of object-oriented programs with Python classes.

CO5: Identify the tools support for Python program development environment.

**UNIT I**

Introduction to Python - Needs of Python - Installing in Various Operating Systems - Implementations of Python - Basic Programming Concepts - Variables - Expressions and Statements - Input/ Output - Operators.

**UNIT II**

Conditions - Functions - Arguments - Return Values - Iteration - Loops - Write & Execute Python Programs - Strings - Data Structures - Lists - Dictionaries - Tuples - Sequences - Exception Handling.

**UNIT III**

File Handling - Modules - Regular Expressions - Text Handling - Object Oriented Programming - Classes - Objects - Inheritance - Overloading - Polymorphism Interacting with Databases -

Introduction to MySQL - Python Identifiers – Interacting with MySQL - Building a Address Book with add/edit/delete/search Features.

#### UNIT IV

Introduction to Graphics Programming - Introduction to GTK - PyGTK - Developing GUI Applications Using pyGTK - Scientific Programming Using NumPy / SciPy - Image Processing - Processing Multimedia Files - Network Programming - Web Services Using SOAP - Introduction to Graphics Programming - PyGame

#### UNIT V

Introduction to Version Control Systems - Subversion/Git - Writing Unit Tests - Creating Documentation - Contributing to Open Source Projects.

#### Text Book(s):

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 1st Edition 2012, O'Reilly.

#### Reference Book(s):

1. Jeff McNeil, "Python 2.6 Text Processing: Beginners Guide", 2010, Packet Publications
2. Mark Pilgrim, "Dive Into Python", 2nd edition 2009, Apress
3. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013.
4. The Python Tutorial, <https://docs.python.org/2.7/tutorial/>

Total Number of Topics Present in the course: 52

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	08	15.38%
2.	Regional	04	07.69%
3.	National	04	07.69%
4.	Global	36	69.23%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
III	20UIT3AC3:2	PROGRAMMING IN PYTHON					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 (✓) = 42, 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
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**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - III

Course Code: 20UIT3NME1  
Instruction Hours: 2  
Credits: 2

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

#### **PRAT - IV - NON MAJOR ELECETIVE 1 - OFFICE AUTOMATION**

**Objective:**

- It is used to digitally create, store, manipulate, and relay office information and data, needed for accomplishing basic tasks and goals.

**Course Outcomes (COs):**

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

- CO1: To understand the office automation work and multimedia concepts.
- CO2: To perform documentation using MS Word.
- CO3: To perform accounting operations using MS Excel and analyses the data using graphs for decision making.
- CO4: To perform presentation for effective teaching.
- CO5: Enhance the ability of information management using system.

**UNIT I:**

**Computer Fundamentals: Computer Introduction - Operating System Fundamentals - Components of a Computer System - Input and Output Devices - Memory Devices - Hardware & Software.**

**UNIT II:**

**MS Word: Working with Documents - Opening and Saving Files - Finding & replacing text - Editing Text Documents and Formatting Documents - Header and Footer - Creating Tables - Inserting Clip Arts - Tools.**

**UNIT III:**

**MS Excel: Spreadsheet - Formatting Cells/Worksheet - Working with Formula - Function and Charts - Entering & Deleting Data - Sorting and Filtering Data - Graphs.**



<b>CO5</b>	✓	✓	✓				✓		✓	✓
Number of matches (✓) = 40, 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - IV

Course Code: 20UIT4CC4

Instruction Hours: 4

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### CORE COURSE IV - PROGRAMMING IN JAVA

**Objectives:**

- To understand the basic concepts of object oriented programming with Java language
- To state fundamentals of Inheritance, Exception Handling and define Java I/O and Applets.

**Course Outcomes (COs):**

After successful completion of this course, students will be able to:

- CO1: Understand the basic concepts of object oriented programming with Java language
- CO2: Knowledge of the structure and model of the Java programming language.
- CO3: Able to understand the use of Packages and Interface in java.
- CO4: Able to understand the exception handling and develop applets for web applications with I/O streams.
- CO5: Able to design window based applications with event handling.

**UNIT I**

Genesis of Java: Creation of Java - Java is Important to Internet - The Java Buzz Words - An Overview of Java Object Oriented Programming - Data Types - Variables - Type Conversion and Casting - Automatic Type Promotion in Expressions - Strings - Arrays: One Dimensional Array - Multi Dimensional Array - Operators - Control Statements.

**UNIT II**

Class Fundamentals - Declaring Objects - Assigning Object Reference Variables - Introducing Methods - Constructors - Garbage Collection - Finalize() Method - Stack Class. A Closer Look at Methods and Classes: Overloading Methods - Argument Passing - Nested and Inner Classes - String Class - Using Command Line Arguments - Inheritance Basics & Types - Method Overriding - Dynamic Method Dispatch - Using Abstract Class - Using final with Inheritance - Member Access in Inheritance.

**UNIT III**

Packages & Interface - Exception Handling - Creating your own Exception Subclasses - Multithreaded Programming: Java Thread Model - Main Thread - Extending Thread - Creating a Thread - Creating

Multiple Threads - Using is Alive() and join() - Thread Priorities - Synchronization - Inter Thread Communication.

#### UNIT IV

I/O & Applets : I/O Basics Reading Console Input - Writing Console Output - The Print Writer Class - Reading and Writing Files. The Applet class: - Applet Architecture - Applet Skeleton - Applet Display Method - Requesting Repainting - HTML APPLET Tag - Passing Parameters to Applet - Audio Clip Interface - Event Handling Mechanisms - Applying check Boxes - Delegation Event Model - Event Classes - Sources of Events - Event Listener Interfaces - Adapter Classes.

#### UNIT V

AWT Classes - Window Fundamentals - Working with Frame Windows - Working with Graphic Using AWT Controls: Controls Fundamentals - Labels - Using Buttons - Applying Check Boxes - Check Box Group - Choice Controls - Using a Text Field - Using a Text Area - Understanding Layout Managers (Flow Layout only) - Menu Bars and Menus.

#### Text Book(s):

1. Herbert Schildt, "Java - The Complete Reference", Ninth Edition, McGraw - Hill Education, 2014

#### Reference Book(s):

1. E. Balagurusamy, "Programming with Java", Tata McGraw - Hill Education India, 2014
2. Sachin Malhotra & Saurabh Choudhary, "Programming in JAVA", 2nd Ed, Oxford Press
3. Sagayaraj, Denis, Karthik and Gajalakshmi, "JAVA Programming for Core and Advanced Learners", 2018

Total Number of Topics Present in the course: 74

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	08	10.81%
2.	Regional	-	-
3.	National	-	-
4.	Global	66	89.19%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UIT4CC4	PROGRAMMING IN JAVA					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 (✓) = 41, 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

**Prepared by:**

**Checked by:**  
SEMESTER - IV

**HOD:**

Course Code: 20UIT4CP4  
Instruction Hours: 3  
Credits: 3

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

### **CORE PRACTICAL IV - JAVA PROGRAMMING LAB**

**Objective:**

- To impart Practical Training in Java Programming Language

**Course Outcomes (COs):**

After successful completion of this course, students will be able to:

- CO1: To familiarize the students with Java environment.
- CO2: To implement various concepts related to Java 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
3. Overloading Constructor (ii) Overloading Method.
4. Write a java program to add two complex numbers. [Use passing objects as argument and return object.
5. 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.
6. 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].
7. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
8. Write a java program to create a thread using Thread class.
9. Demonstrate Java inheritance using extends keyword.
10. Create an applet with four Checkboxes with labels MARUTI - 800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
11. Write a Java program to throw the following exception,  
(a) Negative Array Size                      (b) Array Index out of Bounds

12. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.
13. Write a java programming to illustrate Mouse Event Handling
14. To find the sum of any number of integers entered as command line arguments

Total Number of Topics Present in the course: 14

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	04	28.57%
2.	Regional	-	-
3.	National	-	-
4.	Global	10	71.43%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UIT4CP4	JAVA PROGRAMMING 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 (✓) = 39, 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

Prepared by:

Checked by:

HOD:

## SEMESTER - IV

Course Code: 20UCM4AC4:1  
Instruction Hours: 4  
Credits: 3

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

### ALLIED COURSE IV - ORGANISATIONAL BEHAVIOUR

#### Objectives:

- To understand the human interactions in an organization.
- To find what is driving it and influence it for getting better results for attaining business goals.

#### Course Outcomes(COs):

- CO1: Identify personal dimensions of personality job satisfaction, motivation and learning.
- CO2: Examine group types and team working techniques.
- CO3: Evaluate the developments of basic conflict resolutions.
- CO4: Discuss the main problems about stress, power and politics and ethics.
- CO5: Improve and develop strategies about organizational change and development.

#### UNIT I:

Definition – Nature and Scope of Organizational Behaviour – Frame work – Need for Studying Organizational Behaviour – Organizational Behaviour Models.

#### UNIT II:

Foundation of Individual Behaviour – Human Behaviour and Causation – Effects on Work Behavior – Theories of Personality and Perceptions.

#### UNIT III:

Concept of Attitude – Concept of Value – Concept of Job Satisfaction – Learning Theories.

#### UNIT IV:

Foundation of Group Behaviour – Reasons for Group Formation by People – Group Cohesion – Job Frustration – Job Stress – Stress Management – Group dynamics – Emergence of Informal Leaders and Working Norms – Group Decision Making Techniques.

#### UNIT V:

Leadership Concept – Functions and Styles – Meaning of Power and Politics – Power and Politics Meaning – Distinction Between Power and Politics – Organisational Politics.

#### Text Book(s):

1. Organisational Behaviour - S.S. Khanka - S. Chand & Co.
2. Organisational Behaviour - J. Jayasankar- Margham Publications Book.

#### Reference Book(s):

1. Organisational Behaviour - L.M. Prasad Sultanchand & sons
2. Organisational Behaviour - Dr. P.C. Sekar

Total Number of Topics Present in the course: 28

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	02	07.14%
2.	Regional	04	14.30%
3.	National	19	67.90%
4.	Global	03	10.70%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UCM4AC4:1	ORGANISATIONAL BEHAVIOUR					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 (✓) = 42, 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

Prepared by:

Checked by:

HOD:

## SEMESTER - IV

Course Code: 20UIT4AP1  
Instruction Hours: 3  
Credits: 3

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

### **ALLIED PRACTICAL I - PYTHON PROGRAMMING LAB**

#### **Objectives:**

- To acquire programming and Object Oriented skills in core Python.
- To develop the skill of designing Graphical user Interfaces in Python.
- To develop the ability to write database applications in Python.

#### **Course Outcomes (COs):**

- CO1: To understand the programming basics in Python for writing - testing and debugging it's programs.
- CO2: To understand the object - oriented program design for develop and using it in Python programs
- CO3: Implement Conditionals and Loops statements for Python programs
- CO4: Use functions and represent Compound data using Lists - Tuples and Dictionaries
- CO5: Read and write data from & to the files in Python

1. Create a simple calculator to do all the arithmetic operations
2. Write a program to use control flow tools like if.
3. Write a program to use for loop
4. Data structures
  - use list as stack
  - use list as queue
  - tuple - sequence
5. Create new module for mathematical operations and use in your program
6. Write a program to read and write files - create and delete directories
7. Write a program with exception handling
8. Write a program using classes
9. Connect with MySQL and create address book
10. Write a program using string handling.
11. Write a program using regular expressions
12. Program to parse apache log file
13. Create a GUI program using pygtk

Total Number of Topics Present in the course: 13

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	02	23.10%
2.	Regional	2	-
3.	National	1	-
4.	Global	8	76.90%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UIT4AP1	PYTHON PROGRAMMING 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 (✓) = 39, 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

Prepared by:

Checked by:

HOD:

## SEMESTER - IV

Course Code: 20UIT4NME2  
Instruction Hours: 2  
Credits: 2

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

### **PRAT - IV NON MAJOR ELECETIVE 2 - DESK TOP PUBLISHING**

#### **Objectives:**

- Desktop publishing allows an individual to combine text, numerical data, photographs, charts, and other visual elements in a document that can be printed on a laser printer or more advanced typesetting machine.

#### **Course Outcomes (COs):**

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

- CO1: To understand the desktop publishing software concepts.
- CO2: To perform documentation using PageMaker.
- CO3: To perform image editing process using Photoshop.
- CO4: To perform drawing shapes in Corel draw.
- CO5: Enhance the ability to work in Corel draw environment.

#### **UNIT I:**

Page Maker: Introduction to Page Maker - Page Maker Screen Layout – Basics Menus & Tools - Guides & Rulers - Drawing Tools - Fills & Outlines.

#### **UNIT II:**

Page Maker Control Palettes: Working with Text - Paragraphs - Graphics - Tables.

#### **UNIT III:**

Photoshop: Introduction to Photoshop -The File menu - The Tools - Drawing Lines & Shapes - Inserting Picture and Shapes - Filling Colors - Text Effects - Working with Layers - Filters.

#### **UNIT IV:**

Corel Draw: Corel draw Introduction - Working Environment of CorelDraw – Menus and Tools - Drawing Lines and Shapes - Inserting Pictures (objects, tables, templates) - Inserting Symbols & Clip Arts.

#### **UNIT V:**

Working with Text and Images in Corel draw - Page Layout and Background.

#### **Text Book(s):**

1. Comdex Multimedia and Web Design Course Kit - Vikas Gupta & Kogent Solutions Inc. Dream Tech. Press - 2008.
2. Carolyn M Connally - Pagemaker7 - Dream Tech - New Delhi - 2005.

#### **ReferenceBook(s):**

1. Adobe PageMaker 7.0, Kevin Proot, Cengage Learning
2. Adobe Photoshop CS6 Bible, Brad Dayley, DaNae Dayley, 1st Edition, 2012.
3. DTP Course Kit, Vikas Gupta, Dreamtech Press, 2009.

Total Number of Topics Present in the course: 24

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	06	25.00%
2.	Regional	04	16.70%
3.	National	-	-
4.	Global	14	58.30%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UIT4NME2	DESK TOP PUBLISHING					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 (✓) = 42, 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

Prepared by:

Checked by:

HOD:

SEMESTER -IV

Course Code: 20UIT4SBE1

Exam Hours: 3

Instruction Hours: 2  
Credits: 2

Internal Marks: 25  
External Marks: 75

### **SKILL BASED ELECTIVE I - QUANTITATIVE APTITUDE**

#### **Objectives:**

- To develop skill to meet the competitive examinations for better job opportunity.
- To accommodate fundamental, mathematical aspects to instill confidence among students.

#### **Course Outcomes (COs):**

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

CO1: Understand the basic concepts of quantitative ability

CO2: Understand the basic concepts of logical reasoning skills

CO3: Acquire satisfactory competency in use of verbal reasoning

CO4: Solve campus placements aptitude papers covering Quantitative Ability - Logical Reasoning and Verbal Ability

CO5: Compete in various competitive exams like TNPSC - UPSC - GPSC - CAT - CMAT - GRE - GATE - etc.

#### **UNIT I**

Numbers HCF and LCM of Numbers - Decimal Fractions - Simplification - Square Roots and Cube Roots - Average - Problems on Numbers.

#### **UNIT II**

Problems on Ages - Surds and Indices - Percentage - Profits and Loss - Ratio and Proportion - Partnership - Chain Rule.

#### **UNIT III**

Time and Work - Pipes and Cisterns - Time and Distance - Problems on Trains - Boats and Streams - Simple Interest - Compound Interest - Logarithms - Area - Volume and Surface Area - Races and Games of Skill.

#### **UNIT IV**

Permutation and Combination - Probability - True Discount - Bankers Discount - Height and Distances - Odd Man Out & Series.

#### **UNIT V**

Calendar - Clocks - Stocks and Shares - Data Representation - Tabulation - Bar Graphs - Pie Charts - Line Graphs.

#### **Text Book(s):**

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

#### **ReferenceBook(s):**

1. "Teach Yourself Quantitative Aptitude", Arun Sharma, McGraw Hill, Second Edition, 2019.

Total Number of Topics Present in the course: 38

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	-	-

2.	Regional	-	-
3.	National	-	-
4.	Global	38	100.00%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20UIT4SBE1	QUANTITATIVE APITUDE					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 (✓) = 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

Prepared by:

Checked by:

HOD:

SEMESTER - V

Course Code: 20UIT5CC5  
 Instruction Hours: 5  
 Credits: 5

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

## CORE COURSE V - COMPUTER NETWORKS

### Objectives:

- To understand the security aspects of networks.
- To learn the concepts of data communication technologies and networks.
- To define working principles various layers of Data Communication

### Course Outcomes (COs):

After successful completion of this course - students will be able to:

- CO1: To make students to understand basic computer network technology and aware about various types of cables used in guided media like coaxial cable - optical fiber cable - twisted pair cables and its categories.
- CO2: To study transmission media and realization.
- CO3: To explain the role of protocols in networking and to analyze the services and features of the protocol stack.
- CO4: Able to understand network layer techniques for designing subnets and supernets and analyze packet flow on basis of routing protocols.
- CO5: To understand design issues in Network Security and to understand security threats - security services

### UNIT I

Introduction - Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet - ATM - Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media – Functions of the OSI Layer.

### UNIT II

Wireless Transmission - Communication Satellites - Telephone System: Structure - Local Loop - Trunks and Multiplexing and Switching - Data Link Layer: Design Issues - Error Detection and Correction.

### UNIT III

Elementary Data Link Protocols - TCP/IP Protocol Suites – Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.

### UNIT IV

Network Layer - Design Issues - Routing Algorithms - Routers and Switches – Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.

### UNIT V

Transport Layer - Services - Connection Management - Addressing Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

### Text Book(s):

1. A. S. Tanenbaum - “Computer Networks” - 4th Edition - Prentice - Hall of India - 2008.

Total Number of Topics Present in the course: 40

S.No	Category ()	No. of Topics covered
1.	Local	02

2.	Regional	02
3.	National	04
4.	Global	32

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5CC5	COMPUTER NETWORKS					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											

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

Prepared by:

Checked by:

HOD:

SEMESTER - V

Course Code: 20UIT5CC6

Instruction Hours: 5

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### CORE COURSE VI - OPERATING SYSTEMS

Objectives:

- To comprehend Operating Systems
- To provide the fundamental concepts of all managements in an operating system.
- To state memory and process management for handling Operating System

## Course Outcomes (COs):

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

- CO1: Understand what is an operating system and the role it plays
- CO2: Describe and explain the fundamental components of a computer operating system.
- CO3: Define - restate - discuss - and explain the policies for scheduling - deadlocks - memory management - synchronization - system calls - and file systems
- CO4: Describe and extrapolate the interactions among the various components of computing systems.
- CO5: A high - level understanding of the structure of operating systems - applications - and the Relationship between them.

## UNIT I

Introduction - History of Operating System - Operating System Zoo - Operating System Concepts - Interrupt Structure & Processing - System calls - Operating System Structure.

## UNIT II

Processes and Threads: Processes - Threads - Processor and user modes - Thread Model and Usage - Inter Process Communication.

## UNIT III

Scheduling - Job Scheduling - Memory Management: Memory Abstraction - Virtual Memory- Page Replacement Algorithms.

## UNIT IV

Deadlocks: Resources - Deadlocks Occurance - Deadlock Detection and Recovery - Deadlocks Avoidance - Deadlock Prevention - Multiple Processor System: Multiprocessors - Multi Computers.

## UNIT V

Input/Output: Principles of I/O Hardware - Principles of I/O Software - Files Systems: Files - Directories - Files Systems Implementation - File System Management and Optimization.

## Text Book(s):

1. Andrew S. Tanenbaum - "Modern Operating Systems" - 2nd Edition - PHI private Limited - New Delhi - 2008.

## Reference Book(s):

1. William Stallings, "Operating Systems - Internals & Design Principles", 5th Edition, Prentice - Hall of India private Ltd, New Delhi, 2004.
2. Sridhar Vaidyanathan, "Operating System", 1st Edition, Vijay Nicole Publications, 2014.
3. System Programming and Operating Systems – D.M. Dhamdhere, Tata McGraw Hill Publishing Co., Limited.

Total Number of Topics Present in the course: 30

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	03	10.00%
2.	Regional	0	-
3.	National	02	06.67%

4.	Global	25	80.00%
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Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5CC6	OPERATING SYSTEMS					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 (✓) = 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

Prepared by:

Checked by:

HOD:

SEMESTER - V

Course Code: 20UIT5CC7

Instruction Hours: 5

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### CORE COURSE VII - WEB TECHNOLOGY

**Objectives:**

- To learn techniques of responsive web design, including media queries.
- To develop skills in digital imaging.
- To develop basic programming skills using JavaScript.

**Course Outcomes (COs):**

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

CO1: To understand the concept of static web designing using HTML.

CO2: To understand the concept of dynamic web designing using JavaScript and XML.

CO3: To understand the concept of server - side web designing using PHP.

CO4: To develop the different technologies used in the World Wide Web including XML - Perl - Rails and PHP.

CO5: To enhance the technical skills for creating new web based applications.

### UNIT I

Structuring Documents for the Web: Introducing HTML and XHTML - Basic Text Formatting - Presentational Elements - Phrase Elements - Lists - Editing Text - Core Elements and Attributes - Attribute Groups. Links and Navigation: Basic Links - Creating Links with the <a> Element - Advanced E Mail Links. Images - Audio - and Video: Adding Images Using the <img> Element - Using Images as Links Image Maps - Choosing the Right Image Format - Adding Flash - Video and Audio to your web pages.

### UNIT II

Tables: Introducing Tables - Grouping Section of a Table - Nested Tables - Accessing Tables - Forms: Introducing Forms - Form Controls - Sending Form Data to the Server. Frames: Introducing Frameset - <frame> Element - Creating Links Between Frames - Setting a Default Target Frame Using <base> Element - Nested Framesets - Inline or Floating Frames with <iframe>.

### UNIT III

Cascading Style Sheets: Introducing CSS - Where you can Add CSS Rules - CSS Properties: Controlling Text - Text Formatting - Text Pseudo Classes - Selectors - Lengths - Introducing the Box Model - More Cascading Style Sheets: Links - Lists - Tables - Outlines - Background Images - The :focus and :activate Pseudo Classes Generated Content - Miscellaneous Properties - Additional Rules - Positioning and Layout Wit - Page Layout CSS - Design Issues.

### UNIT IV

JavaScript: How to Add Script to Your Pages - Variables and Data Types - Statements and Operators - Control Structures - Conditional Statements - Client side scripting - Loop Statements - Functions - Message box - Dialog Boxes - Alert Boxes - Confirm Boxes - Prompt Boxes.

### UNIT V

Working with JavaScript: Practical Tips for Writing Scripts - JavaScript Objects: Window Object - Document Object - Browser Object - Form Object - Navigator Object Screen Object - DOM and web browser environments - Events - Event Handlers - Forms - Validations Checking - Form Enhancements - JavaScript Libraries.

### Text Book(s):

1. Jon Duckett, “Beginning HTML, XHTML, CSS and Java script”, Wiley Publishing

### Reference Book(s):

1. Chris Bates - “Web Programming” - Wiley Publishing 3d Edition.
2. M. Srinivasan - “Web Technology: Theory and Practice” - Pearson Publication
3. Gopalan N.P. and Akilandeswari J. - —Web Technology - Prentice Hall of India - 2011.

Total Number of Topics Present in the course: 72

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	07	09.72%
2.	Regional	05	06.94%

3.	National	54	75.00%
4.	Global	04	05.56%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5CC7	WEB TECHNOLOGY					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 (✓) = 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

**Prepared by:**

**Checked by:**  
SEMESTER -V

**HOD:**

Course Code: 20UIT5CP5

Instruction Hours: 4

Credits: 4

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### **CORE PRACTICAL V - WEB TECHNOLOGY LAB**

**Objectives:**

- Design and develop static and dynamic web pages.
- Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.
- Learn Database Connectivity to web applications.

**Course Outcomes (COs):**

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

CO1: Develop web pages using basic HTML and apply XML techniques in web design

CO2: Implement CGI using Perl.

CO3: Implement PHP & MySQL database connectivity for real world applications

CO4: Use AJAX with Rails.

CO5: Develop web pages using JavaScript concept.

1. Create a form having number of elements (Textboxes - Radio buttons - Checkboxes - and so on). Write JavaScript code to count the number of elements in a form.

2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty - popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user - defined function)
6. Write a JavaScript code block using arrays and generate the current date in words - this should include the day - month and year.
7. Create a form for Student information. Write JavaScript code to find Total - Average - Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA - HRA - PF - TAX - Gross pay - Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list
  - (a)The first multiple choice list - displays the Major dishes available
  - (b)The second multiple choice list - displays the Starters available.
  - (c)The single choice list - displays the Soft drinks available.
10. Create a web page using two image files - which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

Total Number of Topics Present in the course: 10

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	02	20.00%
2.	Regional	-	-
3.	National	-	-
4.	Global	08	80.00%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5CP5	WEB TECHNOLOGY LAB					4	4			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			

<b>CO2</b>	✓	✓				✓	✓	✓	✓	
<b>CO3</b>	✓	✓	✓	✓		✓	✓	✓	✓	
<b>CO4</b>	✓	✓	✓		✓	✓	✓	✓	✓	✓
<b>CO5</b>	✓	✓	✓	✓	✓	✓		✓	✓	✓
Number of matches (✓) = 38, 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - V

Course Code: 20UIT5MBE1:1

Instruction Hours: 5

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **MAJOR BASED ELECTIVE I - 1. DIGITAL COMPUTER FUNDAMENTALS**

**Objectives:**

- Develop and understanding of digital circuit design and analysis.
- Learn design techniques for working with digital electronic devices, and their application to solving problems.

**Course Outcomes (COs):**

- CO1: Bridge the fundamental concepts of computers with the present level of knowledge of the students.
- CO2: Familiarise operating systems - programming languages - peripheral devices - networking - multimedia and internet
- CO3: Understand binary - hexadecimal and octal number systems and their arithmetic.
- CO4: Understand how logic circuits and Boolean algebra forms as the basics of digital computer.
- CO5: Demonstrate the building up of Sequential and combinational logic from basic gates.

**UNIT I**

Number Systems and Codes: Number System - Base Conversion - Binary Codes - Code Conversion - Digital Logic: Logic Gates - Truth Tables - Universal Gates - Error Detection Codes.

**UNIT II**

Boolean Algebra: Laws and Theorems - SOP - POS Methods - Simplification of Boolean Functions - Using Theorems - K Map - Prime - Implicant Method - Binary Arithmetic: Binary Addition - Subtraction - Various Representations of Binary Numbers - Arithmetic Building Blocks - Adder - Subtractor.

### UNIT III

Combinational Logic: Multiplexers - Demultiplexers - Decoders - Encoders - Code Converters - Parity Generators and Checkers – Functions of Combinational Logic.

### UNIT IV

Sequential Logic: RS, JK, D and T Flip Flops - Flip Flop Applications - Master Slave Flip Flops - Registers: Shift Registers - Types of Shift Registers.

### UNIT V

Counters: Asynchronous and Synchronous Counters - Ripple - Mod - Up & Down Counters- Ring Counters - Memory: Basic Terms and Ideas - Types of ROMs - Types of RAMs.

#### Text Book(s):

1. V.Rajaraman and T.Radhakrishnan - *Digital Computer Design* - Prentice Hall of India - 2001
2. D.P.Leach and A.P.Malvino - *Digital Principles and Applications* - TMH - Fifth Edition - 2002.
3. M. Moris Mano - *Digital Logic and Computer Design* - PHI - 2001.
4. T.C.Bartee - *Digital Computer Fundamentals* - 6th Edition - Tata McGraw Hill - 1991.

Total Number of Topics Present in the course: 41

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	02.44%
2.	Regional	03	07.32%
3.	National	02	04.88%
4.	Global	35	85.40%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits		
V	20UIT5MBE1:1	DIGITAL COMPUTER FUNDAMENTALS					5	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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - V

Course Code: 20UIT5MBE1:2  
 Instruction Hours: 5  
 Credits: 4

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

### **MAJOR BASED ELECTIVE I - 2. INTERNET PROGRAMMING**

#### **Objectives:**

- To develop the ability to logically plan and develop web pages. To learn to write, test, and debug web pages using HTML and JavaScript.

#### **Course Outcomes (COs):**

- CO1: Students will gain deep understanding of the use and implementation of HTML tags.  
 CO2: Students will apply their knowledge to create different purpose websites.  
 CO3: Students will apply their knowledge to create interactive websites.  
 CO4: Students will have the ability to function and communicate effectively as ethically and social responsible computer science professionals.  
 CO5: Students will develop applications using Java Servlet and PHP.

#### **UNIT I**

Web Essentials: Clients - Servers and Communication - The Internet - Basic Internet Protocols - World Wide Web - HTTP Request Message - HTTP Response Message - Web Clients - Web Servers - HTML5 - Tables - Lists - Image - Introduction to SGML - HTML5 Control Elements - Semantic Elements - Drag and Drop - Audio - Video Controls - CSS3 - **Inline Embedded and External Style Sheets** - Rule Cascading - Inheritance - Backgrounds - Border Images - Colors - Shadows - Text - Transformations - **Transitions - Animations.**

#### **UNIT II**

Java Script: An Introduction to JavaScript - JavaScript DOM Model - Date and Objects - **Regular Expressions** - **Simple Web Applications** - **Exception Handling** - **Validation** - Built in Objects - Event Handling - DHTML with JavaScript - JSON Introduction - Syntax - Function Files - Http Request - SQL.

#### **UNIT III**

Servlets: Java Servlet Architecture - Deployment of Simple Servlets - Servlet Life Cycle - Form GET and POST Actions - Session Handling - Understanding Cookies - Installing and Configuring Apache Tomcat Web Server - Database Connectivity: JDBC Perspectives - [JDBC Program Example](#) - JSP: Understanding Java Server Pages - JSP Standard Tag Library (JSTL) - Creating HTML Forms by Embedding JSP Code.

#### UNIT IV

An Introduction to PHP: PHP - Using PHP - Variables - Program Control - Built in Functions - Form Validation - Regular Expressions - File Handling - Cookies - Connecting to Database. XML: Basic XML - [Document Type Definition](#) - [XML Schema DOM and Presenting XML](#) - XML Parsers and Validation - XSL and XSLT Transformation - News Feed (RSS and ATOM).

#### UNIT V

AJAX: Ajax Client Server Architecture - XML Http Request Object - Call Back Methods; Web Services: Introduction - [Java Web Services Basics and Applications](#) - [Creating](#) - [Publishing](#) - [Testing and Describing a Web Services \(WSDL\)](#) - [Consuming a Web Service](#) - Database Driven Web Service from an Application -SOAP.

#### Text Book(s):

1. Deitel and Deitel and Nieto - Internet and World Wide Web - How to Program - Prentice Hall - 5th Edition - 2011.

#### Reference Book(s):

1. Stephen Wynkoop and John Burke —Running a Perfect Website - QUE - 2nd Edition - 1999.
2. Chris Bates - Web Programming - Building Intranet Applications - 3rd Edition - Wiley Publications - 2009.
3. Jeffrey C and Jackson - —Web Technologies A Computer Science Perspective - Pearson Education - 2011.

Total Number of Topics Present in the course: 84

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	03	03.57
2.	Regional	05	05.95
3.	National	05	05.95
4.	Global	70	84.50

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5MBE1:2	INTERNET PROGRAMMING					5	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	✓	✓	✓		✓	✓	✓	✓	✓	✓	

<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

**Prepared by:**

**Checked by:**  
SEMESTER - V

**HOD:**

Course Code: 20UIT5MBE1:3  
Instruction Hours: 5  
Credits: 4

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

### **MAJOR BASED ELECTIVE I - 3. DATA STRUCTURES AND ALGORITHMS**

**Objectives:**

- To provide an introduction to basic data Structures and algorithms for manipulating them.

**Course Outcomes (COs):**

After completing this course satisfactorily - a student will be able to

- CO1: Describe how arrays - linked structures - stacks - queues - trees - and graphs are represented in memory and used by algorithms.
- CO2: Compare alternative implementations of data structures with respect to performance.
- CO3: Compare and contrast the benefits of dynamic and static data structures implementations
- CO4: Discuss the computational efficiency of the principal algorithms for sorting - searching - and merging.
- CO5: Describe the divide - and - conquer paradigm and explain when an algorithmic design situation calls for it.

**UNIT I**

Introduction of Algorithms - Analyzing Algorithms - Arrays: Representation of Arrays - Implementation of Stacks and Queues - Application of Stack: Evaluation of Expression - Infix to Postfix Conversion - Storage Structures for Arrays – Multiple Stacks and Queues - Sparse Matrices.

**UNIT II**

Linked list : Singly Linked List - Linked Stacks – Linked Queues - Polynomial Addition - Polynomial Multiplication – More on Linked Lists - Singly Linked List - Doubly Linked List - Dynamic Storage Management - Garbage Collection and Compaction.

**UNIT III**

Trees: Basic Terminology - Binary Trees - Binary Tree Representations - Binary Trees - Traversal - More on Binary Trees - Height Balanced Trees - Threaded Binary trees - Counting Binary Trees - Graphs: Terminology and Representations - Traversals - Connected Components and Spanning Trees - Single Source Shortest Path Problem and It's Applications.

**UNIT IV**

Symbol Tables : Static Tree Tables - Dynamic Tree Tables - Hash Tables : Hashing Functions - Overflow Handling. External Sorting: Storage Devices - Sorting with Disks : K Way Merging - Sorting with Tapes.

**UNIT V**

Internal Sorting : Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort - Selection Sort - Shell Sort - Sorting on Keys. Files: Files - Queries and Sequential Organizations - Index Techniques - File Organization.

**Text Book(s):**

1. Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia Publication.

**Reference Book(s):**

1. Data structures Using C Aaron M. Tenenbaum, Yedidiah Langsam, Moshe J. Augenstein - Kindersley (India) Pvt. Ltd. -
2. Data structure and Algorithms - Alfred V. Aho - John E. Hopcroft - Jeffrey D. Ullman - Pearson Education Pvt. Ltd.
3. "Data Structures" - Lipschuta - Tata Mcgraw Hill - Schaum's Outline Series - 2006.

Total Number of Topics Present in the course: 47

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	03	06.38%
2.	Regional	01	02.13%
3.	National	03	06.38%
4.	Global	40	85.10%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5MBE1:3	DATA STRUCTURE AND ALGORITHMS					5	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 (✓) = 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

<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High
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**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - V

Course Code: 20UIT5SBE2

Instruction Hours: 2

Credits: 2

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **SKILL BASED ELECTIVE II - ANDROID PROGRAMMING**

#### **Objectives:**

- To provide concepts to enable the students for creating applications for smart devices using Android.

#### **Course Outcomes (COs):**

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

- CO1: Understand the basic concepts of Android programming
- CO2: Install and configure Android application development tools.
- CO3: Design and develop user Interfaces for the Android platform.
- CO4: Save state information across important operating system events.
- CO5: Apply Java programming concepts to Android application development.

#### **Unit I**

Introduction to Android: History of Android – Versions of Android – Android Architecture – App Architecture – Components – Intents – Manifest – App Package – Activities – Services –Broadcast Receivers – Layout Attributes – Creating a project – Content Providers – Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Creating Android Emulator – Android Layout Types – Starting the AVD – Introducing UC – Creating UC – Installing and Running UC – Preparing UC for Publishing – Migrating to Eclipse –Developing UC with Eclipse – Applications of Eclipse – Installing Android Development Tools.

#### **Unit II**

User Interface: Customizing the Window – Building Blocks of User Interface – Creating and Displaying Views – Monitoring Click Actions – Resolution Independent Assets – Locking Activity Orientation – Dynamic Orientation Locking – Manually Handling Rotation – Creating Popup Menu Actions – Customizing Options Menu & Back Button – Implementing the Home Button –Monitoring TextView Changes – Scrolling TextView Ticker – Animating a View – Creating – Drawables as Backgrounds – Creating Custom State Drawables – Applying Masks to Image – Android Switch Button – Creating Dialogs that Persist – Implementing Situation – Specific Layouts – Supporting multiple screen sizes – Customizing Keyboard Actions – Dismissing Soft Keyboard – AdapterView – Empty View – ListView Rows – Making ListView – Section Headers – Creating Compound Controls.

#### **Unit III**

Interacting with Device Hardware and Media – Interacting Device Location – Mapping Locations & Annotating Maps – Capturing Images and Videos – Text controls – Making a Custom Camera Overlay – Recording Audio – Adding Speech Recognition – Playing Back Audio/Video – Creating a Tit Monitor – Monitoring Compass Orientation.

#### Unit IV

Persisting Data: Marking a Preference Screen – Persisting Simple Data – Reading and Writing Files – Using Files as Resources – Managing a Database – Querying a Database – Backing Up Data – Menu Activity – DataBase Applications – Sharing Your Database – Sharing Your Other Data and Application.

#### Unit V

Interacting with the Systems: Notifying from the Background – Creating Timed and Periodic Tasks – Scheduling a Periodic Task – Creating Sticky Operations – Running Persistent Background Operations – Launching Other Applications – Implementing System Application – Other Applications – Interacting with Contacts – Picking Device Media – Saving to the MediaStore. Working with Libraries: Creating Java Library JARs – Using Java Library JARs – Android Library Projects – Android Services – Charting and Messaging – Practical Push Messaging.

#### Text Book(s):

1. Dave Smith and Jeff Friesen - “Android Recipes: A Problem - Solution Approach” - RakmoPress Pvt. - Ltd - New Delhi - 2011.

#### Reference Book(s):

1. Web Reference: <http://developer.android.com/Android Developer's Guides>.
2. “The Wireless Application Protocol: Writing Applications for the Mobile Internet” - Sandeep Singhal - et al.
3. “Learning Android: Develop Mobile Apps Using Java and Eclipse” - Marko Gargenta - Masumi Nakamura - O'Reilly - Second Edition - 2014.

Total Number of Topics Present in the course: 97

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	08	08.25%
2.	Regional	07	07.22%
3.	National	04	04.12%
4.	Global	78	80.40%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5SBE2	ANDROID PROGRAMMING					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	✓	✓	✓	✓		✓	✓	✓	✓		

<b>CO4</b>	✓	✓	✓		✓	✓	✓		✓	✓
<b>CO5</b>	✓	✓		✓	✓	✓	✓	✓	✓	✓
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

**Prepared by:**

**Checked by:**

**HOD:**

SEMESTER - V

Course Code: 20UIT5SBE3

Instruction Hours: 2

Credits: 2

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **SKILL BASED ELECTIVE III - DISTRIBUTED PROGRAMMING**

**Objectives:**

- To make it easy for users to access remote resources, and to share them with other users in a controlled manner.

**Course Outcomes (COs):**

CO1: Study software components of distributed computing systems.

CO2: Know about the communication and interconnection architecture of multiple computer systems.

CO3: Recognize the inherent difficulties that arise due to distributed - nests of computing resources.

CO4: Understanding of networks & protocols - mobile & wireless computing and their applications to real world problems.

CO5: At the end students will be familiar with the design - implementation and security issues of distributed system

**UNIT I**

Introduction to Distributed Computing - Examples of Distributed Systems - Challenges Involved in establishing remote connection - Strategies involved in remote computation - Current Distributed computing practices through Dot Net and Java technologies.

**UNIT II**

Advanced ADO.NET - Disconnected Data Access - Gridview - Details View - Form View controls - Crystal Reports - Role of ADO. NET in Distributed Application

**UNIT III**

Advanced ASP.NET - AdRotator - Multiview - Wizard and Image Map Controls - Master Pages - Features of Master Pages - Site Navigation - Web Parts - Uses of these controls and features in Website development

**UNIT IV**

Advanced Features of ASP.NET - Security in ASP.NET - State Management in ASP.NET - Mobile Application Development in ASP.NET - Critical usage of these features in Website Development.

## UNIT V

Web Services - Features of Web Services - Role of Web services in Distributed Computing - WSDL - UDDI - SOAP Concepts Involved in Web Services - Connected a Web Service to a Data Base - Accessing a Web Service through ASP.NET Application.

### Text Book(s):

1. Walther - "ASP.NET 3.5" - SAMS Publication - 2005.

### Reference Book(s):

1. Designing Microsoft ASP.NET Applications - Douglas J. Reilly - Microsoft Press.
2. Introduction to Reliable and Secure Distributed Programming - Christian Cachin - Rachid Guerraoui - Luís Rodrigues - Kindle Edition - 2011.

Total Number of Topics Present in the course: 34

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	02.94%
2.	Regional	03	08.82%
3.	National	02	05.88%
4.	Global	28	82.40%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
V	20UIT5SBE3	DISTRIBUTED PROGRAMMING					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 (✓) = 38, 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

Prepared by:

Checked by:

HOD:

## SEMESTER - VI

Course Code: 20UIT6CC8  
Instruction Hours: 6  
Credits: 5

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

### **CORE COURSE VIII - RELATIONAL DATABASE MANAGEMENT SYSTEMS**

Objectives:

- To understand Database Systems and to provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL

#### **Course Outcomes (COs):**

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

- CO1: Understand database concepts and structures in relational algebra - ER model and relational model.
- CO2: To design and build a simple database system with the fundamental tasks of modelling - designing - and implementing a DBMS.
- CO3: Understand functional dependency and functional decomposition and apply various normalization techniques.
- CO4: Perform PL/SQL programming using concept of cursor management - error handling - Package and triggers.
- CO5: Execute various advance SQL queries related to transaction processing and locking using concept of concurrency control.

#### **UNIT I**

Introduction: Database System Applications - DBMS Vs. File System - View of Data - Data Model - Database Languages - Database users and Administrators - Database System Architecture - Transaction Management - Database System Structure - Application Architecture. Data Models: Basic Concepts - Constraint - Keys - ER Diagram - Weak Entity - Extended ER Features - UML; Relational Model: Structure of Relational Databases - Relational Algebra - Views.

#### **UNIT II**

SQL: Background - Basic Structure - Set Operation - Aggregate Function - Null Values - Nested Sub Queries - Views - Modification of the Database - Data Definition Language - Basic Concepts of Files - Embedded SQL - Dynamic SQL.

#### **UNIT III**

Advance SQL : Integrity and Security - Domain - Constraint - Referential Integrity - Assertions - Triggers - Security and Authorization - Authorization in SQL - Encryption and Authentication.

#### **UNIT IV**

Relational Database Design: First Normal Form - Pitfalls in Relational Database Design - Closures of a Set of Functional Dependencies - Functional Dependencies (Second Normal Form) - Boyce Codd Normal Form - Third Normal Form - Fourth Normal Form - Overall Database Design Process.

#### **UNIT V**

Transaction Management: Transaction concepts - States - Serializability. Lock based concurrency control: Locks - Granting - Two Phase Locking Protocol. Time stamp based protocol: Timestamps - Timestamp ordering protocol - Dead Lock Handling.

**Text Book(s):**

1. A Silberschatz - H Korth - S Sudarshan - "Database System and Concepts" - 5th Edition McGraw - Hill - 2005.

**Reference Book(s):**

1. Alexix Leon & Mathews Leon - "Essential of DBMS" - 2nd reprint - Vijay Nicole Publications - 2009.
2. Alexix Leon & Mathews Leon - "Fundamentals of DBMS" - 2nd Edition - Vijay Nicole Publications - 2014.
3. Database Systems: Models - Languages - Design and Application - Ramez Elmasri - Pearson Education - 2014.

Total Number of Topics Present in the course: 53

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	01.89%
2.	Regional	01	01.89%
3.	National	02	03.77%
4.	Global	49	92.50%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course								Hours	Credits
VI	20UIT6CC8	RELATIONAL DATABASE MANAGEMENT SYSTEMS								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 (✓) = 41, 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

**Prepared by:**

**Checked by:**  
SEMESTER - VI

**HOD:**

Course Code: 20UIT6CC9  
Instruction Hours: 6  
Credits: 5

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

## CORE COURSE IX - INTERNET OF THINGS

### Objectives:

- To have devices that self report in real-time, improving efficiency and bringing important information to the surface more quickly than a system depending on human intervention.

### Course Outcomes (COs):

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

- CO1: To understand overview of IoT and Internet principles.
- CO2: To learn about the concepts of IoT and various IoT related protocols
- CO3: Analyze various protocols for IoT.
- CO4: Apply data analytics and use embeded code related to IoT.
- CO5: 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” – Technology of Internet of Things – Enchanted Objects – Making of the Internet of Things – Design Principles for Connected Devices: Calm and Ambient Technology – Magic as Metaphor, Privacy, Keeping Secrets – Web Thinking for Connected Devices – Small Pieces – Loosely Joined – Best Citizens On The Internet – Optimized Degradation and Affordances.

### UNIT II:

Internet Principles: Internet Communications – An Overview – IP – TCP – The IP Protocol Suite (TCP/IP) – UDP – IP Addresses – DNS – Static IP Address Assignment – Dynamic IP Address Assignment – IPv6 – MAC Addresses – TCP and UDP Ports – An Example: HTTP Ports – Other Common Ports – Application Layer Protocols – 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 Personalisation – Climbing into the Cloud – Open Source versus Closed Source – Closed/Open and Mixing Open – 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 Arduino – Developing on the Arduino – 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 Design: Preparation, Sketch, Iterate, and Explore, Nondigital Methods – Laser Cutting – Choosing a Laser Cutter – Software, Hinges and Joints, 3D Printing – Types of 3D Printing – Software – CNC Milling – Repurposing/Recycling.

### UNIT IV:

Prototyping Online Components: Creating 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 and Applications – Polling, Comet, Other Protocols, MQ Telemetry Transport – Extensible Messaging and Presence Protocol – Constrained Application Protocol – Techniques for

Writing Embedded Code: Memory Management – Types of Memory – Making the Most of Your RAM – Performance and Battery Life – Libraries – Debugging.

**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 – User of Business Model – Models, Make Thing, Sell Thing – Subscriptions – Customisation – Be a Key Resource – Provide Infrastructure: Sensor Networks – Take a Percentage – Funding an Internet of Things Startup – Hobby Projects and Open Source – Venture Capital – Government Funding – Crowd Funding – Lean Startups.

**Text Book(s):**

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

**Reference Book(s):**

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 ArhdeepBahga and Vijay Madiseti (<http://www.internet-of-things-book.com/>).

Total Number of Topics Present in the course: 94

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	11	11.70%
2.	Regional	02	02.13%
3.	National	09	09.57%
4.	Global	72	76.60%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits				
VI	20UIT6CC9	INTERNET OF THINGS					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 (✓) = 40, 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - VI

Course Code: 20UIT6CP6

Instruction Hours: 5

Credits: 5

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### CORE PRACTICAL VI - SQL & PLSQL LAB

**Objective:**

- To Impart Practical Training in SQL.

**Course Outcomes (COs):**

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

CO1: Enhance the knowledge and understanding of database analysis and design.

CO2: Enhance the knowledge of the processes of database development and administration using SQL and PL/SQL.

CO3: Solve Database problems using Oracle 9i SQL and PL/SQL.

CO4: To improve and enhance programming skills and techniques using SQL and PL/SQL.

CO5: Implement the software background using SQL and PL/SQL.

Demonstrate the following SQL commands and can take any back end RDBMS system for implementation purpose.

1. Data Definition of Base Tables.

2. Write DDL statement with Primary key and Foreign key constraints.

3. DDL with constraints and verification by insert command

4. Data Manipulation of Base Tables and Views



<b>CO5</b>		✓	✓			✓	✓	✓		✓
Number of matches (✓) = 40, 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER - VI

Course Code: 20UIT6MBE2:1

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### MAJOR BASED ELECTIVE II - 1.SOFTWARE ENGINEERING

**Objectives:**

- Have the ability to design and construct the system.
- To understand the professional and ethical responsibility software development.

**Course Outcomes (COs):**

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

- CO1: An ability to identify - formulate - and solve complex engineering problems by applying principles of engineering - science - and mathematics
- CO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public Needs -
- CO3: An ability to communicate effectively with a range of audiences to the software products.
- CO4: An ability to recognize ethical and professional responsibilities in engineering based on the software testing.
- CO5: To understand how to manage the software reliability and quality.

**UNIT I**

Introduction - Software Engineering Discipline - Systems engineering & software Engineering - Evolution and Impact - Characteristics of Software - Programs Vs Software Products - Software Life Cycle Models: Use of a Life Cycle Models - Classical Waterfall Model - Iterative Waterfall Model - Prototyping Model - Evolutionary Model - Spiral Model. Software Project Management: Responsibilities of a Software Project Manager - Project Planning - Metrics for Project Size Estimation - Project Estimation Techniques - Features of Estimation Techniques – Risk Management.

**UNIT II**

Requirements Analysis and Specification: Requirements Gathering and Analysis - Software Requirements Specification (SRS) - Functional and non functional requirements - Formal System Development Techniques - Software Design: Characteristics of a Good Software Design - Cohesion and Coupling - Neat Arrangement - Software Design Approaches and Scope of Software Engineering.

### UNIT III

Function Oriented Software Design: Overview of SA/SD Methodology - Structured Analysis - Data Flow Diagrams (DFDs). Object Modeling Using UML: Overview of Object - Oriented Concepts - UML Diagrams - Use Case Model - Class Diagrams - Interaction Diagrams - Activity Diagrams - State Chart Diagram.

### UNIT IV

User Interface Design: Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces - Component - Based GUI Development; Coding and Testing: Coding - Testing - Unit Testing - Black Box Testing - White Box Testing - Debugging and Testing - Integration Testing - System Testing.

### UNIT V

Software Reliability and Quality Management: Software Reliability - Features of Software Reliability - Statistical Testing - Software Quality - Software Quality Management System - ISO 9000 - Computer Aided Software Engineering: CASE Environment - CASE support in Software Life Cycle - Characteristics of CASE Tools - Architecture of a CASE Environment - Software Maintenance: Characteristics of Software Maintenance - Software Reverse Engineering - Software Maintenance Process Models - Estimation of Maintenance Cost - Software Reuse: Issues in any Reuse Program - Reuse Approach.

#### Text Book(s):

1. Rajib Mall - "Fundamentals of Software Engineering" - 3rd Edition - Prentice Hall of India Private Limited - 2008.

#### Reference Book(s):

1. Rajib Mall - "Fundamentals of Software Engineering" - 4th Edition - Prentice Hall of India Private Limited - 2014.
2. Richard Fairley - "Software Engineering Concepts" - TMGH Publications - 2004.
3. Software Engineering for Internet Applications - Eve Anderson - Philip Greenspun - Andrew Grumet - 2006 - PHI.

Total Number of Topics Present in the course: 62

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	07	11.50%
2.	Regional	03	04.92%
3.	National	04	06.56%
4.	Global	48	77.00%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course	Hours	Credits
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VI	20UIT6MBE2:1	SOFTWARE ENGINEERING				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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - VI

Course Code: 20UIT6MBE2:2  
 Instruction Hours: 6  
 Credits: 5

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

### MAJOR BASED ELECTIVE II - 2. LINUX & SHELL PROGRAMMING

**Objectives:**

- To understand the basic utilities of Unix file.
- To learn the basic components in constructing a Shell Script

**Course Outcomes (COs):**

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

- CO1: To understand the Linux OS and study the shell programming concepts.
- CO2: To Simulate the file commands.
- CO3: To write shell program for handling files.
- CO4: To write programs for familiarizing control statements.
- CO5: To write programs for handling strings.

## UNIT I

Introduction to Linux: operating system and Linux - History of Linux and Unix - Linux overview - Linux Distributions - Vi editors – Linux commands.

## UNIT II

Shell - comparison of Shells - working in the shell - Learning Basic Commands - Compiler and interpreter differences - various directories - Drilling deep into process management - job control and Automation.

## UNIT III

Text Processing - Process identifiers – Text filtering Tools - working with commands - Logical operators - local variables and its scope - working with arrays.

## UNIT IV

Tricks with shell scripting - interactive shell scripts - The here document and << operator - sort command - WC command - file handling - Debugging

## UNIT V

Automating Decision - Making in scripts - Automating repetitive tasks - working with Functions.

### Text Book(s):

1. The Complete Reference LINUX - Richard L. Petersen - McGraw Hill -
2. LINUX shell scripting by Ganesh Naik - Packt Publishing Ltd. -

### Reference Book(s):

1. Learning the Unix Operating System - Jerry Peek - Grace Todino & John Strang - Fourth Edition - O'Reilly - 1998.
2. Sumitabha Das “Unix Concepts and Applications” - Tata McGraw Hill Education.
3. Graham Steven - Shah Steve - Linux Administration - A beginner’s guide - Third edition - Dreamtech press - 2003.

Total Number of Topics Present in the course: 30

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	01	03.33%
2.	Regional	01	03.33%
3.	National	03	10.00%
4.	Global	25	83.30%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits				
VI	20UIT6MBE2:2	LINUX & SHELL 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 (✓) = 39, 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - VI

Course Code: 20UIT6MBE2:3

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### MAJOR BASED ELECTIVE II - 3. MULTIMEDIA SYSTEMS

**Objective:**

- The purpose of multimedia is to combine all of these so that the benefits of each can be used in a desktop environment.

**Course Outcomes (COs):**

After successfully completed course - students will be able to:

CO1: Describe the types of media and define multimedia system.

CO2: Describe the process of digitizing (quantization) of different analog signals (text - graphics - sound and video).

CO3: Use and apply tools for image processing - video - sound and animation.

CO4: Apply methodology to develop a multimedia system.

CO5: Apply acquired knowledge in the field of multimedia in practice and independently continue to expand knowledge in this field.

**UNIT I**

Multimedia Definition - Use Of Multimedia - Delivering Multimedia - Text: About Fonts and Faces - Using Text in Multimedia - Multimedia Applications - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

## UNIT II

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

## UNIT III

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

## UNIT IV

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs - Overview of Multimedia Software Tools - The Hardware Needs - The Software Needs - An Authoring Systems Needs - Multimedia Production Team.

## UNIT V

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

### Text Book(s):

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

### Reference Book(s):

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing - Communication & Applications" - Pearson Education - 2012.
2. David Hillman - Multimedia Technology and Applications - Galgotia Publications Pvt. Ltd.
3. V.K. Jain - Introduction to Multimedia and its applications - Khanna Publishing - 2012.

Total Number of Topics Present in the course: 48

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	04	08.33%
2.	Regional	02	04.17%
3.	National	05	10.40%
4.	Global	37	77.10%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course	Hours	Credits
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VI	20UIT6MBE2:3	MULTIMEDIA SYSTEMS				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 (✓) = 39, 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

**Prepared by:**

**Checked by:**  
SEMESTER - VI

**HOD:**

Course Code: 20UIT6MBE3:1  
Instruction Hours: 6  
Credits: 5

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

### MAJOR BASED ELECTIVE III - 1. SHELL PROGRAMMING LAB

**Objectives:**

- Understand the concepts of control structure, loops, case and functions in shell programming and apply them to create shell scripts.

**Course Outcomes (COs):**

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

- CO1: Possess good knowledge in script writing
- CO2: Process the text in the Linux environment
- CO3: Solve the practical issues in Linux shell scripting
- CO4: To understand the concept of file handling
- CO5: Able to write scripts with functions.

1. Write a shell script to stimulate the file commands: rm - cp - cat - mv - cmp - wc - split - diff.
2. Write a shell script to show the following system configuration:
  - a. currently logged user and his log name.
  - b. current shell– home directory– Operating System type– current Path setting– current working directory.
  - c. show currently logged number of users– show all available shells

3. Write a Shell Script to implement the following: pipes - Redirection and tee commands.
4. Write a shell script for displaying current date - user name - file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files which has file size as zero bytes.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table of the given argument using for - loop.

Total Number of Topics Present in the course: 10

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	05	50.00%
2.	Regional	02	20.00%
3.	National	01	10.00%
4.	Global	02	20.00%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits			
VI	20UIT6MBE3:1	SHELL PROGRAMMING LAB					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 (✓) = 41, 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER - VI

Course Code: 20UIT6MBE3:2  
 Instruction Hours: 6  
 Credits: 5

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

### MAJOR BASED ELECTIVE III 2.COMPUTER GRAPHICS AND ANIMATION LAB

#### Objectives:

- To understand graphics concepts and develop, design and implement two and three dimensional graphical structures.
- To understand multimedia compression techniques and applications of multimedia.

#### Course Outcomes (COs):

- CO1: To understand graphics concepts using different algorithms.  
 CO2: To develop - design and implement two and three dimensional graphical structures using OpenGL.  
 CO3: To understand multimedia compression techniques and applications of multimedia.  
 CO4: Enhance the technical skills using graphics techniques.  
 CO5: Develop real time applications graphics and multimedia concepts.

1. Write a program to draw a hut or other geometrical figures.
2. Write a program to draw a line through Bresenham's Algorithm.
3. Write a program to draw a line using DDA Algorithm.
4. Write a program to draw a line using Mid - Point Algorithm.
5. Write a program to draw a circle using Mid - Point Algorithm.

6. Write a program to draw a ellipse using Mid - Point Algorithm.
7. Write a program to rotate a circle around any arbitrary point
8. Write a program to perform line clipping.
9. Write a program to implement reflection of a point - line.
10. Write a program to perform shearing on a line.

Total Number of Topics Present in the course: 10

S.No	Category ()	No. of Topics covered	Percentage
1.	Local	02	20.00%
2.	Regional	05	50.00%
3.	National	02	20.00%
4.	Global	01	10.00%

Local – Green, Regional – Pink, National – Blue, Global – Brown

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

Semester	Code	Title of the Course					Hours	Credits		
VI	20UIT6MBE3:2	<b>COMPUTER GRAPHICS AND ANIMATION LAB</b>					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 (✓) = 39, 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

**Prepared by:**

**Checked by:**

**HOD:**

**2020**

# **M.Sc INFORMATION TECHNOLOGY**

## **Course Structure and Syllabus**

(For the candidates admitted from the academic year 2020-2021 onwards)

## **CHOICE BASED CREDIT SYSTEM (CBCS)**

# THANTHAI HANS ROEVER COLLEGE(AUTONOMOUS)



(Approved by NAAC, Affiliated to Bharathidasan University)

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):

### Postgraduate Programmes

Upon completion of the programme, the postgraduate will be able to

- ✓ Gain advanced knowledge resulting in entrepreneurship; innovation and newer opportunities for being employable in public and private sectors, research and development organizations.
- ✓ Apply enhanced new techniques and adopt new technologies needed in the respective disciplines.
- ✓ Appreciate the diversity of the behavior in professional practice and act in accordance with the core values of chosen profession.
- ✓ Demonstrate the knowledge, values and skills to be critical consumer of research practice and possess investigative skills to evaluate the practice.
- ✓ Engage in lifelong learning process, have the ability to communicate the findings of language / Commerce / Management Studies / Social Work / Computer Sciences / Physical Sciences / Biological Sciences / Life Sciences with the current knowledge.

**Program Specific Outcomes (PSOs):**

- ✓ At the end of the programme, the student should be able to understand the concepts and applications in the field of Information Technology.
- ✓ Apply the learning from the courses and develop applications for real world problems.
- ✓ Understand the technological developments in the usage of modern design and development tools to analyze and design for a variety of applications.
- ✓ Competent and complete software professional to meet the requirement of corporate world and Industry standard to provide solutions to industry, society and business.
- ✓ A thorough and practical expert in the use of state of the art techniques for developing Software based systems.

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

**M.Sc., INFORMATION TECHNOLOGY - Course Structure Under CBCS**

(For the candidates admitted from the academic year 2020-2021 onwards)

Semester	Course Code	Title of the Course	Ins. Hours/Weeks	Credits	Exam Hours	CIA (Max)	ESE (Max)	Total (Max)
1	20PIT1CC1	Distributed Technologies	6	4	3	25	75	100
1	20PIT1CC2	Advanced Database Management System	6	4	3	25	75	100
1	20PIT1CC3	OOAD and UML	6	4	3	25	75	100
1	20PIT1CC4	Organizational Behaviour	6	4	3	25	75	100
1	20PIT1CP1	Distributed Technologies Lab	6	4	3	40	60	100
<b>Total</b>			<b>30</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>500</b>
2	20PIT2CC5	Mobile Computing	6	5	3	25	75	100
2	20PIT2CC6	Design and Analysis of Algorithms	6	5	3	25	75	100
2	20PIT2EC1:1/ 20PIT2EC1:2/ 20PIT2EC1:3	Cloud Computing / Grid Computing / Parallel Computing	6	5	3	25	75	100
2	20PIT2EC2:1/ 20PIT2EC2:2/ 20PIT2EC2:3	Management Information System / E-Commerce / Marketing Management	6	5	3	25	75	100
2	20PIT2CP2	Mobile Computing Lab	6	4	3	40	60	100
<b>Total</b>			<b>30</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>500</b>
3	20PIT3CC7	J2EE Technologies	6	5	3	25	75	100
3	20PIT3CC8	Machine Learning	6	5	3	25	75	100
3	20PIT3EC3:1/ 20PIT3EC3:2/ 20PIT3EC3:3	Big Data Analytics / Digital Image Processing / Pattern Recognition	6	5	3	25	75	100
3	20PIT3EC4:1/ 20PIT3EC4:2/ 20PIT3EC4:3	Software Engineering / Software Testing / Software Metrics	6	5	3	25	75	100
3	20PIT3CP3	J2EE Technologies Lab	6	4	3	40	60	100
<b>Total</b>			<b>30</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>500</b>
4	20PIT4CC9	Internet of Things	6	5	3	25	75	100
4	20PIT4CC10	Open Source Web Application Development	6	5	3	25	75	100
4	20PIT4EC5:1/ 20PIT4EC5:2/ 20PIT4EC5:3	Pervasive Computing / Human Computer Interaction / Soft Computing	6	4	3	25	75	100
4	20PIT4CP4	Open Source Technologies Lab	6	4	3	40	60	100
4	20PIT4PW	Project Work	6	4	-	-	-	100
<b>Total</b>			<b>30</b>	<b>22</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>500</b>
<b>Grand Total</b>			<b>120</b>	<b>90</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2000</b>

### List of Elective Courses

Elective	Course Code	Title of the Course
Elective -1	20PIT2EC1:1 20PIT2EC1:2 20PIT2EC1:3	Cloud Computing / Grid Computing / Parallel Computing
Elective -2	20PIT2EC2:1 20PIT2EC2:2 20PIT2EC2:3	Management Information System / E-Commerce / Marketing Management
Elective - 3	20PIT3EC3:1 20PIT3EC3:2 20PIT3EC3:3	Big Data Analytics / Digital Image Processing / Pattern Recognition
Elective - 4	20PIT3EC4:1 20PIT3EC4:2 20PIT3EC4:3	Software Engineering / Software Testing / Software Metrics
Elective -5	20PIT4EC5:1 20PIT4EC5:2 20PIT4EC5:3	Pervasive Computing / Human Computer Interaction / Soft Computing

**Note:**

Project : 100 Marks  
Dissertation : 80 Marks  
Viva Voce : 20 Marks

Core Papers - 10

Core Practical - 4

Elective Papers - 5

Project - 1

1. Theory Internal 25 marks External 75 marks
2. Practical Internal 25 marks 60 marks 40 marks
3. Separate passing minimum is prescribed for Internal and External
  - a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
  - b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
  - c) The passing minimum not less than 50% in the aggregate.

## SEMESTER – I

Course Code: 20PIT1CC1  
Instruction Hours: 6  
Credits: 4

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

### CORE COURSE-I - **DISTRIBUTED TECHNOLOGIES**

#### Objectives:

- This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed operating system concepts are covered.

#### Course Outcomes:

- CO1: Recognize the architecture of various distributed technologies
- CO2: Understand the software components of distributed programming
- CO3: Understand the ASP .NET environment and how to develop small programs
- CO4: Understand ADO .NET and develop database applications
- CO5: Performing Database operations for Windows Form and web applications.

#### Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies– Distributed Vs Parallel technology

#### Unit II

Advanced ADO.NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO.NET in Distributed Applications– ADO.NET provider for SQL server.

#### Unit III

ASP.NET : Introduction– architecture – ASP.NET Runtime– Advanced ASP.NET – AdRotator, Multiview, Wizard and Image Map Controls– Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development.

#### Unit IV

Advanced features of ASP.NET – Security in ASP.NET – State Management in ASP.NET – Mobile Application development in ASP.NET– Validation Controls – Security Management– Critical usage of these features in Website development

#### Unit V

Web services in Distributed Computing – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through in ASP.NET application – SQL Connection Management.

#### Text Book(s):

1. Walther, “ASP.NET 3.5”, SAMS Publication, 2005.

#### Reference Book(s):

1. “ASP. NET Black Book”, Dream Tech.

2. Dave Mercer, “ASP.NET: A Beginner’s Guide”, Tata Mcgraw Hill Publishing Company Limited, New Delhi.
3. Dino Esposito, “Introducing Microsoft ASP.NET 2.0”, Prentice Hall of India Private Limited.
4. Rebecca M. Riorden, “Microsoft ADO.NET Step by Step”, Prentice Hall of India Private Limited.

Total Number of Topics Present in the course: 33

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	6.06
2.	Regional	6	18.18
3.	National	6	18.18
4.	Global	19	57.57

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CC1	DISTRIBUTED TECHNOLOGIES					6	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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

## **SEMESTER – I**

Course Code: 20PIT1CC2  
Instruction Hours: 6  
Credits: 4

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

### **CORE COURSE II - ADVANCED DATABASE MANAGEMENT SYSTEM**

#### **Objective**

- To understand the basic concepts and terminology related to DBMS and Relational Database Design. To the design and implement Distributed Databases. To understand advanced DBMS techniques to construct tables and write effective queries, forms, and reports

#### **Course Outcomes:**

- CO1: Design ER-models to represent simple database application scenarios and improve the database design by normalization.
- CO2: Acquire Knowledge of Database Models,
- CO3: Applications of Database Models and Emerging Trends
- CO4: Analyze and Select storage and recovery techniques of database system.
- CO5: Familiar with various (Parallel, Distributed, Spatial and Multimedia) database storage structures and access techniques.

#### **Unit-I**

Relational and parallel Database Design: Basics Entity Types– Relationship Types– ERModel–ER to Relational Mapping algorithm– Normalization: Functional Dependency– 1NF– 2NF– 3NF and BCNF– 4NF and 5NF. Architecture I/O Parallelism–InterqueryParallelism– Intraquery Parallelism– Intraoperation Parallelism– Interoperation Parallelism.

#### **Unit-II**

Distributed and Object based Databases: Architecture– Distributed data storage– Distributed transactions– Commit protocols– Concurrency control– Query Processing. Complex Data Types– Structured Types and Inheritance– Table Inheritance– array and Multiset– Object Identity and Reference Types– Object Oriented versus Object Relational.

#### **Unit-III**

Spatial Database: Spatial Database Characteristics – Spatial Data Model – Spatial Database Queries– Techniques of Spatial Database Query– Logic based Databases: Introduction – Overview– Propositional Calculus– Predicate Calculus– Deductive Database Systems– Recursive Query Processing.

#### Unit-IV

XML Databases: XML Hierarchical data model – XML Documents– DTD– XML Schema– XML Querying– XHTML– and Illustrative Experiments – XML Applications.

#### Unit-V

Temporal Databases: Introduction– Intervals– Packing and Unpacking Relations– Generalizing the relational Operators– Database Design– Integrity Constraints– Multimedia Databases: Multimedia Sources– Multimedia Database Queries– Multimedia Database Applications.

#### Text Book(s):

1. Abraham Silberschatz- Henry F Korth - S Sudarshan- “Database System Concepts”- 6th edition - McGraw-Hill International Edition - 2011
2. C.J.Date- A.Kannan- S.Swamynathan- “An Introduction to Database Systems”- 8th Edition- Pearson Education Reprint 2016.

#### Reference Book(s):

1. Ramez Elmasri- Shamkant B Navathe- “Fundamental of Database Systems”- Pearson- 7th edition 2016.
2. Thomas Connolly- Carolyn Begg.- “Database Systems a practical approach to Design- Implementation and Management“- Pearson Education- 2014.
3. S K Singh- “Database Systems Concepts- Design and Applications”- Pearson Education- 2006.

Total Number of Topics Present in the course: 51

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	6
2.	Regional	7	13.7
3.	National	3	5.8
4.	Global	38	74.5

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
I	20PIT1CC2	ADVANCED DATABASE MANAGEMENT SYSTEM					6	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										

<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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – I

Course Code: 20PIT1CC3  
 Instruction Hours: 6  
 Credits: 4

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

### CORE COURSE III - OOAD AND UML

**Objective**

- It helps to visualize, specify, construct, and document the artifacts of an object-oriented system. It is used to depict the structures and the relationships in a complex system.

**Course Outcomes:**

- CO1: Ability to analyze and model software specifications.
- CO2: Ability to abstract object-based views for generic software systems.
- CO3: Explain OOAD concepts and various UML diagrams
- CO4: Select an appropriate design pattern
- CO5: Illustrate about domain models and conceptual classes

**UNIT I**

Structured approach to system construction: SSADM/SADT – An overview of object oriented systems development & Life cycle. –Software– Development Process – Building High Quality Software.

**UNIT II**

Various object oriented methodologies – Introduction to UML– UML Diagram – Class diagram – Dynamic modeling – Analysis and design.

**UNIT III**

Object oriented analysis – Use cases– Object classification– relationships– attributes– methods.

**UNIT IV**

Object oriented design – Design axioms – Designing classes – Layering the software design: – data access layer, User interface layer , Control layer– business logic layer.

## UNIT - V

UML Examples on: Behavioural models – UML Features– Structural models – Architectural models from real world problems – UML and programming.

### Text Book(s):

1. Bahrami Ali- Object oriented systems development- Irwin McGrawHill- 2005 (First 4 units covered here).
2. Booch Grady- Rumbaugh James- Jacobson Ivar- The Unified modeling language – User Guide- Pearson education- 2006 (ISBN 81-7758-372-7) IT -5 covered here).

### Reference Book(s):

1. Grady Booch- “Object – Oriented Analysis and Design with Applications“- Pearson Education- 9th Indian Reprint- 2002.
2. Tom Pender- “UML 2 Bible“- Wiley Publishing Inc.- USA.
3. Hans-Erik Eriksson and Magnus Penker- “UML Toolkit“- Wiley Computer Publishing- New York.

Total Number of Topics Present in the course: 28

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	10.7
2.	Regional	4	14.2
3.	National	15	53.5
4.	Global	6	21.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
I	20PIT1CC3	OOAD and UML					6	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 (✓) = 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

**Prepared by:**

**Checked by:**  
**SEMESTER – I**

**HOD:**

Course Code: 20PIT1CC4

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

## **CORE COURSE IV - ORGANIZATIONAL BEHAVIOUR**

### **Objective**

- To understand the human interactions in an organization, find what is driving it and influence it for getting better results in attaining business goals. The organizations in which people work affect their thoughts, feelings, and actions

### **Course Outcomes:**

- CO1: Analyze individual and group behaviour- and understand the implications Of organizational behaviour on the process of management.
- CO1: Identify different motivational theories and evaluate motivational strategies used in a variety of organizational settings.
- CO1: Evaluate the appropriateness of various leadership styles and conflict Management strategies used in organizations.
- CO1: Describe and assess the basic design elements of organizational structure and evaluate their impact on employees.
- CO1: Explain how organizational change and culture affect working relationships within organizations.

### **UNIT I**

**Introduction: Elements of OB – Nature and Scope of OB – Contributing Disciplines to OB. Organisational Behaviour in Historical Perspective – Foundations of Individual Behaviour: Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.**

### **UNIT II**

**Personality – Perception – Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. Values: Concept of Value – Types of Values – Formation of Values – Values and Behavior –Job Satisfaction.**

### **UNIT III**

**Learning: Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour–Motivation: Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process– Need for Motivation – Theories of Motivation – Motivation and morale.**

### **UNIT IV**

Organisational Conflicts: Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management – Job Frustration – Stress Management.

## UNIT V

Communication: Nature and Need for Communication – Communication Process – Means of Communication – Structure of Communication – Communication Channel – Communication Networks – Communication Barriers – Effective Communication – Leadership – Organizational Structure – Organizational Culture.

### Text Book(s):

1. S.S Khanka- “Organizational Behaviour”- S.Chand and Company Ltd- 2002.

### Reference Book(s):

1. John W Newstorm and Keith Davis- “Organizational Behaviour”- TMH- 2001.
2. Dwivedi- R. S.- “Human Behaviour and Organisational Behaviour” (Oxford &IBH).
3. Stephen P. Robins- “Organisational Behaviour”- Prentice Hall of India Ltd- New Delhi- 2000.
4. Fred Luthans- “Organisational Behaviour”- Tata McGraw Hill Com. Ltd- New Delhi- 1999.

Total Number of Topics Present in the course: 51

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	5.8
2.	Regional	5	9.8
3.	National	4	7.8
4.	Global	39	76.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
I	20PIT1CC4	ORAGANIZATIONAL BEHAVIOUR					6	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										

<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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – I

Course Code: 20PIT1CP1  
 Instruction Hours: 6  
 Credits: 4

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

### CORE COURSE PRACTICALS I - **DISTRIBUTED TECHNOLOGIES LAB**

**Objectives :**

- To provide fundamental concept of Internet, ASP .NET, JavaScript, XML, JSP, ASP with a view to developing professional software development skills.

**Course Outcomes:**

- CO1: Understand the ASP .NET environment and how to develop small programs
- CO2: Develop menu based program for text manipulation
- CO3: Understand ADO .NET and develop database applications
- CO4: Develop the applications using Data Grid for displaying records
- CO5: Develop applications for distributed environments.

- 1) Create a table and insert a few records using **Disconnected Access**.
- 2) Develop a project to update few records using **Disconnected Access**.
- 3) Develop a project to view the records using **GridView- DetailsView- FormView Controls**.
- 4) Develop a project to generate a crystal report from an existing database.
- 5) Design a web page that makes uses of **Ad Rotator Control**.
- 6) Design a web page involving **Multi View or Wizard Control**.
- 7) Make use of **Image Control** involving two hot spots in a web page.
- 8) Design a simple web site that makes use of **Master Pages**.
- 9) Establish the security features in a simple web site with five pages.
- 10) Use state management concepts in a mobile web application.

- 11) Develop a web service that has an ASP.NET client.
- 12) Develop a web service to fetch a data from a table and send it across to the client.
- 13) Develop the application of fetch data from server.

Total Number of Topics Present in the course: 13

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	1	7.6
2.	Regional	4	30.7
3.	National	2	15.3
4.	Global	6	46.1

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CP1	DISTRIBUTED TECHNOLOGIES LAB					6	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 (✓) = 38, 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER – II

Course Code: 20PIT2CC5  
 Instruction Hours: 6  
 Credits: 5

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

### CORE COURSE V - **MOBILE COMPUTING**

**Objectives :**

- Define Mobile Computing and look at current trends. Distinguish between types of Mobility Examine Theory Research in Mobility. Examine Systems Research in Mobility

**Course Outcomes:**

After completion of this course- student will be able to

- CO1: Understand fundamentals of wireless communications.
- CO2: Analyze security- energy efficiency- mobility- scalability- and their unique characteristics in wireless networks.
- CO3: Demonstrate basic skills for cellular networks design.
- CO4: Apply knowledge of TCP/IP extensions for mobile and wireless networking.
- CO5: Understand the concepts of GSM and GPRS

**UNIT I**

Introduction: Mobile Computing– Features of Mobile Computing – Networks – Middleware and Gateways – Developing Mobile Computing Applications – Mobile Computing Architecture: History of Internet – The Internet Qbiquitous Internet – Architecture for Mobile Computing – Three Tier Architecture –Emerging Technologies: Bluetooth ,Rfid –Wireless Broadband (WiMax) –Mobile IP – IPV6 –Java Card.

**UNIT II**

Global System for Mobile Communications: GSM Architecture – GSM Entities – Call Routing in GSM – GSM Addresses and Identifiers, Network Aspects in GSM – GSM Frequency Allocation – Authentication and Security–Short Message Service (SMS): Mobile Computing Over SMS – Value Added Services through SMS.

### UNIT III

GPRS: GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations –Data Services in GPRS Applications for GPRS – Limitations of GPRS. CDMA and 3G: Spread Spectrum Technology– CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G.

### UNIT IV

Getting Started with Android – Activities–Fragments and Intents – Android User Interface– Understanding the Components of a screen –Adapting to Display Orientation – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

### UNIT V

Content Providers – Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.

#### Text Book(s):

1. Ashok K Talukder- Hasan Ahmed- Roopa R Yavagal- “Mobile Computing”- 2nd Edition- Tata McGraw Hill Publishing Company Limited- 2010.
2. Wei Meng Lee- “Beginning Android 4 Application Development”- Wiley India Pvt. Ltd.- 2012.

#### Reference Book(s):

1. Prasant Kumar Pattnaik- Rajib Mall- “Fundamentals of Mobile Computing”- PHI Learning.
2. Jochen Schiller- “Mobile Communications”- Pearson Education- 2008.
3. Reto Meir- “Professional Android 4 Application Development”- Wiley India Pvt. Ltd.- 2012.
4. Pradeep Kotari- “Android Application Development Black Book”- Dreamtech Press- 2014.

Total Number of Topics Present in the course: 46

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	4	8.6
2.	Regional	6	13
3.	National	5	10.8
4.	Global	31	67.3

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course	Hours	Credits
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II	20PIT2CC5	MOBILE COMPUTING				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 (✓) = 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

**Prepared by:**

**Checked by:**  
**SEMESTER – II**

**HOD:**

Course Code: 20PIT2CC6  
Instruction Hours: 6  
Credits: 5

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

## **CORE COURSE VI - DESIGN AND ANALYSIS OF ALGORITHMS**

### **Objectives :**

- To Introduce various designing techniques and methods for algorithms. Performance analysis of Algorithms using asymptotic and empirical approaches. Demonstrate a familiarity with major algorithms and data structures. To give clear idea on algorithmic design paradigms like Divide-and-Conquer, Dynamic Programming, Greedy, Branch and Bound etc.

### **Course Outcomes:**

CO1: Understanding of cloud computing basic concepts.  
CO2: Systematic knowledge of the fundamental technologies- architecture- and security.  
CO3: Explain the core issues of cloud computing such as security- privacy- and interoperability.  
CO4: Choose the appropriate technologies- algorithms- and approaches for the related issues.  
CO5: Identify problems- and explain- analyze- and evaluate various cloud computing solutions.

### **Unit I**

**Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis– Asymptotic Notations. Elementary Data Structures: Stacks and Queues –Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs**

## Unit II

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection – A Worst Case Optimal Algorithm – Implementation of Selection – Strassen’s Matrix Multiplication.

## Unit III

The Greedy Method: General Method – Container Loading –Knapsack Problem – Tree Vertex Splitting – Job Sequencing With Deadlines – Minimum Cost Spanning Trees – Optimal Storage On Tapes – Optimal Merge Patterns – Single Source Shortest Paths.

## Unit IV

Dynamic Programming: The General Method – Multistage Graphs – All Pairs Shortest Paths – Single-Source Shortest Paths – Optimal Binary Search Trees – String Editing –0/1 Knapsack – Reliability Design – The Traveling Salesperson Problem – Flow Shop Scheduling. Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Disconnected Components and DFS.

## Unit V

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: Least Cost searched – 0/1 Knapsack Problem.

### Text Book(s):

1. Ellis Horowitz- Satraj Sahni and Sanguthevar Rajasekaran- Fundamentals of Computer Algorithms- Universities Press- Second Edition- Reprint 2009.

### References Book(s):

1. “Data Structures Using C”- Langsam- Augenstien- Tenenbaum- PHI.
2. “Data structures and Algorithms”- V.Aho- Hopcroft- Ullman- LPE.
3. “Introduction to design and Analysis of Algorithms”- S.E.Goodman- ST.Hedetniem- TMH.
4. Carlos A.Coello Coello- Gary B.Lamont- David A.Van Veldhuizen- “Evolutionary Algorithms for Solving Multi-Objective Problems”- Springer 2<sup>nd</sup> Edition- 2007.

Total Number of Topics Present in the course: 48

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	4.1

2.	Regional	5	10.4
3.	National	4	8.3
4.	Global	37	77

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2CC6	DESIGN AND ANALYSIS OF ALGORITHMS					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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – II**

Course Code: 20PIT2EC1:1  
 Instruction Hours: 6  
 Credits: 5

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

**ELECTIVE COURSE I - 1. CLOUD COMPUTING**

**Objectives:**

- Identify the technical foundations of cloud systems architectures. Analyze the problems and solutions to cloud application problems. Apply principles of best practice in cloud application design and management. Identify and define technical challenges for cloud applications and assess their importance.

## Course Outcomes:

- CO1: Understanding of cloud computing basic concepts.
- CO2: Systematic knowledge of the fundamental technologies- architecture- and security.
- CO3: Explain the core issues of cloud computing such as security- privacy- and interoperability.
- CO4: Choose the appropriate technologies- algorithms- and approaches for the related issues.
- CO5: Identify problems- and explain- analyze- and evaluate various cloud computing solutions.

### UNIT I

FOUNDATIONS: Introduction to Cloud Computing : Cloud Computing in a Nutshell – Roots of Cloud Computing – Features of Cloud Computing – Layers and types of Clouds – Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks – Migrating into a Cloud: – Introduction – Broad Approaches – The Seven step model – Enriching the ‘Integration as a Services’ Paradigm for the Cloud Era: – Introduction – The Evolution of SaaS. The Challenges of SaaS Paradigm – Approaching the SaaS Integration Enigma–New Integration Scenarios – The Integration Methodologies – SaaS Integration Services – The Enterprise Cloud Computing Paradigm: – Introduction – Background – Issues – Transition Challenges – The Cloud Supply Chain.

### UNIT II

INFRASTRUCTURE AS A SERVICE: Virtual Machine Provisioning and Migration Services: Introduction – Background – Manageability – Migration Services – Management of Virtual Machines for Cloud Infrastructures: – Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – Enhancing Cloud Computing Environments Using a Cluster as a Service: – Introduction – Related Work – RVWS Design – The Logical Design – Secure Distributed Data Storage in Cloud Computing: – Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security – Challenges.

### UNIT III

PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) Aneka: Integration of Private and Public Clouds: Introduction– Technologies and Tools – Aneka Cloud Platform – Aneka Resource Provisioning Service – Hybrid Cloud Implementation – CometCloud: An Autonomic Cloud Engine: – Introduction – CometCloud – Architecture – Autonomic Behavior of CometCloud – Overview of CometCloud based Applications – Implementation and Evaluation.

### UNIT IV

PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS)T: Systems Cloud based Solutions for Business Applications: Introduction Enterprise Demand of Cloud Computing – Dynamic ICT Service-Importance of Quality and Security in Clouds – Dynamic Data Centre–Producing Business-ready; Dynamic ICT Services – The MapReduce Programming Model and Implementations: – Introduction – MapReduce Programming Model – MapReduce implementations for the Cloud.

### UNIT V

MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing Introduction – A typical Use case – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – Service Providers Perspective of SLA Management in Cloud Computing: –Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA,SLA Management in Cloud –Automated Policy-based Management – Performance Prediction for HPC on Clouds: – Introduction – Background – Grid and Cloud – Performance related issues of HPC in the Cloud.

**Text Book(s):**

1. Rajkumar Buyya- James Broberg- Andrzej Goscinsky- “Cloud Computing Principles and Paradigms”- Wiley India Pvt. Ltd.- 2011.

**Reference Book(s):**

1. Barrie Sosinsky- “Cloud Computing Bible”- 1<sup>st</sup> Edition- Wiley India Pvt. Ltd.- New Delhi- 2011.
2. Michael Miller- “Cloud Computing”- 1<sup>st</sup> Edition- Pearson Education Inc.- New Delhi- 2008.
3. RajkumarBuyya- Christian Vecchiola- S. ThamaraiSelvi- “Mastering Cloud Computing”- McGraw Hill Education (India) Private Limited Publications- First Reprint- 2013.

Total Number of Topics Present in the course: 77

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	3.8
2.	Regional	8	10.3
3.	National	6	7.7
4.	Global	60	77

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC1:1	CLOUD COMPUTING					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 (✓) = 40, 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

Prepared by:

Checked by:

HOD:

## SEMESTER – II

Course Code: 20PIT2EC1:2  
Instruction Hours: 6  
Credits: 5

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

### ELECTIVE COURSE I – 2.GRID COMPUTING

#### Objective:

- Grid computing allows several users to simultaneously access, change, or transfer distributed data. For instance, a data grid can be used as a large data store where each website stores its own data on the grid. Here, the grid enables coordinated data sharing across all grid users

#### Course Outcomes:

- CO1: Understand and explain the basic concepts of Grid Computing.
- CO2: Explain the advantages of using Grid Computing within a given environment.
- CO3: Understand Data management and transfer in Grid environments.
- CO4: Use of distribution techniques for grid and cloud environments.
- CO5: Deployment and exploitation of the developed software in clusters- grids and clouds.

#### UNIT I

Introduction: Early Grid Activities – Current Grid Activities – An Overview of Grid Business Areas – Grid Applications–Grid Infrastructure. Grid Computing Organizations and Their Roles: Organizations Developing Grid Standards and Best Practice Guidelines – Organizations Developing Grid Computing Toolkits and the Framework –Organizations Building and Using Grid Based Solutions to Solve Computing– Data and Network Requirements – The Grid Computing Anatomy: The Grid problem.

#### UNIT II

The Grid Computing Road Map: Autonomic Computing – Business on Demand and Infrastructure Virtualization – Service-Oriented Architecture and Grid – Semantic Grids. Merging the Grid Services Architecture with the Web Services Architecture: Service-Oriented Architecture – XML Related Technologies and their Relevance to Web Services – XML Messages and Enveloping – Service Message Description Mechanisms –Relationship between Web Service and Grid Service.

#### UNIT III

Open Grid Services Architecture (OGSA): Introduction – OGSA Architecture and Goal – Some Sample Use Cases that Drive the OGSA: – Commercial Data Center (CDC) – National Fusion Collaborator (NFS) – Online Media and Entertainment – The OGSA Platform Components: Native Platform Services and Transport Mechanisms – OGSA Hosting Environment – Core Networking Services Transport and Security – Open Grid Services Infrastructure (OGSI): Introduction – Grid Services – A High Level Introduction to OGSI –Technical Details of OGSI Specification– Introduction to Service Data Concepts.

#### UNIT IV

OGSA Basic Service: Common Management Model (CMM) – Service Domains – Policy Architecture – Security Architecture – Metering and Accounting – Common Distributed Logging – Distributed Data Access and Replication – GLOBUS GT3 Toolkit: Architecture: GT3 Software Architecture Model.

## UNIT V

GLOBUS GT3 Toolkit: Programming Model: Introduction–Service Programming Model – Grid Service Behaviour Implementation – Operation Providers – Grid Service Lifecycle Callbacks and Lifecycle Management – Client Programming Model – GLOBUS GT3 Toolkit – High Level Services: Introduction – Resource Discovery and Monitoring – Resource Allocation – Data Management – Information Services – Index Services – Resource Information Provider Service – Resource Management Services – Data Management Services.

### Text Book(s):

1. Joshy Joseph- Craig Fellenstein- “Grid Computing”- Pearson Education- 2004.

### Reference Book(s):

1. Rawel Plaszczall- Richard Wellner Jr. “Grid Computing”- Pearson Education- 2006.
2. Daniel Minoli- “A Networking Approach to Grid Computing”- Wiley Publication- 2004.
3. Frederic Megoules- “Fundamentals of Grid Computing”- Publisher CRC Press- Taylor & Francis groups- 2009.

Total Number of Topics Present in the course: 57

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	5.2
2.	Regional	6	10.5
3.	National	4	7
4.	Global	44	77.1

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2EC1:1	CLOUD COMPUTING					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 (✓) = 40, 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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER – II

Course Code: 20PIT2EC1:3

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### ELECTIVE COURSE I - 3. PARALLEL COMPUTING

#### Objective:

- The primary goal of parallel computing is to increase available computation power for faster application processing and problem solving. To introduce you to the major concepts and ideas in parallel computing and its applications. To help you understand various models of parallelism

#### Course Outcomes:

- CO1: To develop an understanding of various basic concepts associated with parallel computing environments.
- CO1: To understand the effects that issues of synchronization- latency and bandwidth have on the efficiency and effectiveness of parallel computing applications
- CO1: To gain experience in a number of different parallel computing paradigms including memory passing- memory sharing- data-parallel and other approaches
- CO1: To earn experience in designing and testing parallel computing solutions to programming problems.
- CO1: To develop improved communication and collaborative skills.

#### UNIT I

Introduction to Parallel Computing – Motivating Parallelism – Scope of Parallel Computing – parallel programming platforms: Implicit parallelism trend in microprocessor architecture – Limitations of memory system performances – Dichotomy of parallel platforms – Physical organization of platforms Communication cost in parallel machines – Routing mechanism for interconnection networks

#### UNIT II

Principles of parallel algorithm Design – Preliminaries – Decomposition techniques – Characteristics of task and interactions – Mapping techniques for load balancing – Parallel Algorithm Models – All toAll Personalized Communication – Circular Shift – Improving the Speed of Some Communication Operations

### UNIT III

Methods for containing interaction overhead – Parallel Algorithm models – one to All Broadcast and All to One Reduction – All to All Broadcast and Reduction.

### UNIT IV

Analytical Modeling of Parallel Programs – Sources of overhead in parallel programs – Performance metrics for parallel systems – The effect of Granularity on performances – Scalability of parallel systems – Minimum execution time and minimum cost – optimal execution time – Asymptotic analysis of parallel programs.

### UNIT V

Sorting – Issues in sorting on parallel computers – Sorting Networks – Bubble sort and its variables – Quicksort – Bucket and sample sort – Others sorting algorithms.

#### Text Book(s):

1. “Introduction to Parallel Computing”- Second edition- Ananth Grama- Anshul Gupta- George Karypis- Vipin Kumar- Pearson Education-

#### Reference Book(s):

1. “Introduction to Parallel Processing Algorithms and Architecture”- Bchrooz Parhami- Plenum Series- 2002.
2. Michael J.Quinn- “Parallel Computing- Theory and Practice”- McGrawHill- International Edition- Singapore- 1994.
3. “Algorithms and Parallel Computing”- Fayez Gebali- University of Victoria- John Willey & Sons- Inc Publications- 2011.

Total Number of Topics Present in the course: 36

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	8.3
2.	Regional	3	8.3
3.	National	2	5.5
4.	Global	28	77.7

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2EC1:3	PARALLEL COMPUTING					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

**Prepared by:**

**Checked by:**

**HOD:**

## SEMESTER – II

Course Code: 20PIT2EC2:1

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### ELECTIVE COURSE II - 1. MANAGEMENT INFORMATION SYSTEMS

**Objective:**

- Describes information required by the different levels of management. To provide information for planning, organizing and controlling purposes. To store and manage data efficiently from all the functional areas of the business. To process the collected data and derive information out of them.

**Course Outcomes:**

- CO1: Evaluate the role of information systems in today's competitive business environment.
- CO2: Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy.
- CO3: Assess the relationship between the digital firm- electronic commerce- electronic business and internet technology.
- CO4: Identify the major management challenges to building and using information systems in organizations and identify managerial risks related to information system organization processing and utilizing.
- CO5: To inculcate the principles and use of computer based information systems for Management of
- CO6: Businesses and Organizations.

## UNIT I

Introduction to Information Systems: Why study Information System? – Why Business need Information Technology? –Fundamentals of Information Systems – Overview of Information Systems.

## UNIT II

Solving Business Problems with Information Systems: System Approach to Problem Solving – Developing Information System Solution. Database Management: Managing Data Resources – Technical Foundation of Database Management.

## UNIT III

Information Systems for Strategic Advantage: Fundamentals – Strategic Advantage – Strategic Applications and Issues in IT – Managing: Enterprise and Global Management.

## UNIT IV

Business Applications of Information Technology: The Internet Electronic Commerce – Fundamentals of Electronic Commerce – Information System for Business Operations – Business Information System – Transaction Processing Systems – Sales and Marketing Systems – Manufacturing and Production Systems – Finance and Accounting Systems –Human Resources Systems.

## UNIT V

Information Systems for Managerial Decision Support: Executive Support System – Decision Support Systems – Artificial Intelligence Technology in Business – Management IT – Planning for Business Change with IT – Implementing Business Changes with IT – Security and Control Issues in I/S – Ethical and Societal Challenge of Information Technology.

### Text Book(s):

1. James A. O'Brien- "Management Information Systems"- Galgotia Publications- Fourth Edition- 1999.

### Reference Book(s):

1. Gordon B. Davis- Margrethe H. Olson- "Management Information Systems"- McGraw Hill- 2000.
2. Ravi Kalakota and Marcia Robinson- "E-Business Roadmap for Success"- Addison-Wesley- New Delhi- 2000.
3. W.S. Jaswadekar- "Management Information Systems"- Tata McGraw Hill- New Delhi- 1998.

Total Number of Topics Present in the course: 28

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	7.1
2.	Regional	4	14.2
3.	National	2	7.1
4.	Global	20	71.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC2:1	MANAGEMENT INFORMATION SYSTEM					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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – II**

Course Code: 20PIT2EC2:2

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

**ELECTIVE COURSE II - 2. E-COMMERCE**

**Objective:**

The primary goal of e-commerce is to reach maximum customers at the right time to increase sales and profitability of the business. Functions of e-commerce include buying and selling goods, transmitting funds or data over the internet

**Course Outcomes:**

CO1: Demonstrate an understanding of the foundations and importance of E-commerce.

CO2: Demonstrate an understanding of retailing in E-commerce by:

- Analyzing- branding and pricing strategies.
- Using and determining the effectiveness of market research
- Assessing the effects of disintermediation.

CO3: Analyze the impact of E-commerce on business models and strategy.

CO4: Describe Internet trading relationships including Business to Consumer- Business-to-Business- Intra-organizational.

CO5: Describe the infrastructure for E-commerce and describe the key features of Internet-Intranets and Extranets and explain how they relate to each other.

## **UNIT I**

Electronic Commerce Framework – Traditional commerce Vs. E-Commerce – Electronic Commerce and Media Convergence– Features of Electronic Commerce – The Anatomy of ECommerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the High way – Network Access Equipment – Global information Distribution Networks–Produce a generic framework for ECommerce– Architectural framework of Electronic Commerce– Web based E Commerce Architecture.

## **UNIT II**

The Internet as a Network Infrastructure: The Internet Terminology - NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/On-Line Companies – National Independent ISPs – Regional Level ISPs – Local –level ISPs – Internet Connectivity options.

## **UNIT III**

Electronic Commerce and the World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web–Consumer Oriented Electronic Commerce: Consumer Oriented Applications – mercantile process model – mercantile models from the consumer’s perspective– Analyzes a business and designs – ECommerce plan to achieve targets.

## **UNIT IV**

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems– Dimensions of Electronic Payment System – Traditional Payment Systems vs Electronic Payment Systems – Electronic Payments and Protocols – Credit Card – Based Electronic Payment Systems–Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange – EDI Applications in Business – EDI: Legal,Security and Privacy issues – Managerial Issues in Electronic Payment Systems – Electronic Payment Systems in India –Future of Electronic Payment Systems.

## **UNIT V**

Advertising and the Marketing on the Internet: The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer – Data Interface – Emerging Tools. On Demand Education and Digital Copyrights: Computer based Education –Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets–Browsers and Software Agents.

### **Text Book(s):**

1. “Frontiers of Electronic Commerce”- Ravikalakota & Andrew Whinston- Adison Wesley- 2000.

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

1. “Electronic Commerce”- Pete Loshin & Paul A.Murphy- Second edition- Jaico Publishing House- 2000.
2. David Whiteley- "E-Commerce Strategy- Technologies and Applications"- 1st Edition- Tata Mc-Graw-Hill- 2001.

3. Kamalesh K Bajaj and Debjani Nag- "E-Commerce - The cutting edge of Business"- 2nd Edition- Tata McGraw-Hill Education- 2005.

Total Number of Topics Present in the course: 55

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	4	8.1
2.	Regional	7	18.1
3.	National	8	18.1
4.	Global	36	65.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2EC2:2	E-COMMERCE					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 (✓) = 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

**Prepared by:**

**Checked by:**  
**SEMESTER – II**

**HOD:**

Course Code: 20PIT2EC2:3

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

**ELECTIVE COURSE II - 3. MARKETING MANAGEMENT**

**Objective:**

- Marketing Management discusses how to manage the marketing sight of a company or business. It works with the keeping of some goal or objectives. The marketing management department will implement those in their regular activities.

**Course Outcomes:**

- CO1: Formulate a marketing plan that will meet the needs or goals of a business or organization.
- CO2: Develop an integrated marketing communications plan for a product- concept- good and/or service based on an identified market need or target.
- CO3: Evaluate the impact of using different marketing strategies for a product- concept- good and/or service- on the finances- Return on Investment (ROI) and business goals of an organization.
- CO4: Apply the principles of business ethics and corporate social responsibility to business decisions.
- CO5: Employ the management techniques of planning- organizing- directing- and controlling of marketing functions and activities in response to the business needs of the organization.

## UNIT I

Meaning of Market – Marketing and Marketing Management – Marketing Functions – E-Business – Marketing Concepts – Marketing Environment – Approaches to Study of Marketing – Market Segmentation – Brand Positioning – Factors Influencing Buyer’s Behaviour – Functional area of Management – Concept, objectives – Marketing – Planning: Identification of market– Market Segmentation– MIS– MR– Consumer Behaviour and Demand Forecasting.

## UNIT II

New Product Development –Meaning of Product– Idea Screening – Concept Development and Testing – Strategy Development – Market Testing – Commercialization – Consumer Adoption Process – Product Life Cycle – Product Mix Decisions – Product Line Decisions – Individual Product Decision – Product Positioning.

## UNIT III

Managing Marketing Channels – Nature of Marketing –Analyzing Customer Needs and Wants – Establishing Objectives and Constraints–Identifying Major Channel Alternatives – channels ,Evaluating Major Channel Alternatives– Channel Management Decisions– Selecting Channel Members – Training and Motivating Channel Members – Evaluating Channel Members – Modifying Channel Design and Arrangements – Channel Modification Decisions – Global Channel Considerations – Channel Design Decisions – Channel Management ,Decisions – Channel Dynamics – Retailing – Types and Decisions – Trends – Channel functions – Functions of Distribution Channel – Structure and Design of Marketing Channels Wholesaling Types – Decision Trends – Physical Distribution – Objective – Order Processing – Warehousing – Inventory – Transportation – Distribution Cost Analysis – Packing–Features of Marketing Management.

## UNIT IV

Advertising and Sales Promotion – Advertising – Setting and Objectives – Deciding on the Message – Deciding on the Media – Evaluating the Effectiveness – Sales Promotion – Purpose of Sales Promotion – Decision in Sales Promotion – Objectives of Sales Promotion – Developing Sales and Promotion Programme – Pretesting Sales Promotion Programme –

Implementing Sales Promotion Programme – Evaluating Sales Promotion Programme –  
Management of Sales Force.

## UNIT V

Setting the Price – Adopting the Price – Product Service–Methods of Pricing – ANOVA.

### **Text Book(s):**

1. Philip Kotler- “Marketing Management”- Dorling Kindersley Pvt Ltd.- 2009.

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

1. Gordon B. Davis Margrethene H. Olson- “Management Information Systems”- McGraw Hill- 2000.
2. Edward W. Cundiff- Richard Ralph Still- Norman A. P. Govoni- “Fundamentals of Modern Marketing”- Prentice Hall of India-1980.
3. Philip Kotler- Kevin Lane Keller- Abraham koshy- Mithileshwar Jha (2013)- “Marketing Management”- Pearson Education- New Delhi.

Total Number of Topics Present in the course: 84

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	3.5
2.	Regional	13	15.4
3.	National	40	47.6
4.	Global	28	33.3

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2EC2:3	MARKETING MANAGEMENT					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

Prepared by:

Checked by:

HOD:

## SEMESTER – II

Course Code: 20PIT2CP2  
Instruction Hours: 6  
Credits: 4

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

### CORE PRACTICALS II - **MOBILE COMPUTING LAB**

#### Objective:

- To explore the practical issues of mobile computing using network simulation tools.
- To develop skills of developing and simulating various mobile applications.

#### Course Outcomes:

- CO1: To demonstrate critical thinking skills in the field of computer science.
- CO2: To demonstrate the ability to solve problems related to the program content.
- CO3: To demonstrate an understanding of the concepts and principles of software systems.
- CO4: To analyze- design and document a system component using appropriate computer science techniques and models.
- CO5: To make a formal presentation of software system project including the demonstration of a working application.

1. Create an Application which deals with the Android Content Providers.
2. Develop an android app which displays “Hello, welcome to Android Lab” message.
3. Create Application using Android Layouts- Views and Events
4. Using Android, Create a login Activity. It asks “username” and “password” from user.  
If username and password are valid, it displays Welcome message using new activity.
5. Create an application which uses Files- Preferences and Notifications
6. Create Application to Create- Modify and Query an SQLite Database

7. Create an application for Querying web services and Parsing response
8. Create Application which uses the concept of Services and Background Threats
9. Creating Android Audio Video Application
10. Create an Application which uses Map Activity and points the locations onto the Map Locations
11. Create an Application with One-Time- Repeating Alarms- and Long- Running Background Task as Service.
12. Create an Application for Simple Mobile Game.

Total Number of Topics Present in the course: 12

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	1	8.3
2.	Regional	2	16.6
3.	National	2	16.6
4.	Global	7	58.3

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2CP2	MOBILE COMPUTING LAB					6	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 (✓) = 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

<b>Relationship</b>	Very Poor	Poor	Moderate	High	Very High
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**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – III

Course Code: 20PIT3CC7

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### CORE COURSE VII – **J2EE TECHNOLOGIES**

#### Objective:

- It is designed for enterprise applications that run on servers. J2EE provides APIs that let developers create workflows and make use of resources such as databases or web services.

#### Course Outcomes:

- CO1: Understand the architecture of client/server systems and able to develop applications using client/server communication.
- CO2: you will learn the basics and history of XML-CORBA-RMI-JMS and how to write your own XML documents.
- CO3: Develop JSP applications using JSP Tags- JSP Scriptlets and JavaBeans
- CO4: Understand the role of EJB in the broader Java EE platform.
- CO5: To learn basics of programming with a modern programming language- Java.

#### UNIT I

Client – Server Architecture: Two Tier Model – 3 Tier Model – n Tier Model – J2EE Architecture –net Architecture – MPC Architecture.

#### UNIT II

Interaction Services: RMI – CORBA – XML – Generating an XML Documents – Parsing XML – JMS – Fundamentals of JMS – Components of JMS Program.

### UNIT III

Presentation Services: JSP – Javamail – Servlet.

### UNIT IV

Component Model: EJB: Session beans: Stateless and Statefull – Entity beans – CMP and BMP – Message Driven Beans.

### UNIT V

Struts Framework: Introduction – Building a simple struts – Model layers –View layer – controller layer – Validator – Tiles –Declarative Exception Handling –Struts Modules.

#### Text Books:

1. Jim Keogh “The Complete Reference J2EE “Tata McGraw – Hill Edition 2002.
2. James Holmes “The Complete References Struts Second Edition “Tata McGraw Hill Edition-2007.

#### Reference Books:

1. Jusin Couch- Daniel H. Steinberg- “J2EE Bible” Wily India (P) Ltd- New Delhi 2002.
2. Paul Tremblett- “Instant Enterprise Java Y-Beans”- Tata McGraw Hill Publishing Company- New Delhi- 20

Total Number of Topics Present in the course: 31

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	9.6
2.	Regional	2	6.4
3.	National	2	6.4
4.	Global	24	77.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3CC7	J2EE TECHNOLOGIES					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 (✓) = 39, 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

Prepared by:

Checked by:

HOD:

### SEMESTER – III

Course Code: 20PIT3CC8  
 Instruction Hours: 6  
 Credits: 5

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

### CORE COURSE VIII – MACHINE LEARNING

**Objective:**

- The goal of machine learning is often though not always to train a model on historical, labelled data in order to predict the value of some quantity on the basis of a new data item for which the target value or classification is unknown.

**Course Outcomes:**

On completion of the course students will be expected to:

CO1: To Learn about Machine Intelligence and Machine Learning applications

CO2: Have a good understanding of the fundamental issues and challenges of machine learning: data- model selection- model complexity- etc.

CO3: Have an understanding of the strengths and weaknesses of many popular

machine learning approaches.

CO4: Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and unsupervised learning.

CO5: Be able to design and implement various machine learning algorithms in a range of real-world applications

### **Unit- I**

**INTRODUCTION:** Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

### **Unit- II**

**NEURAL NETWORKS AND GENETIC ALGORITHMS:** Neural Network Representation – Problems – Perceptions – Multilayer Networks and Back Propagation Algorithms – Advanced Topics– Regression and Classification– Genetic Algorithms– Hypothesis Space Search– Genetic Programming – Models of Evaluation and Learning.

### **Unit - III**

**BAYESIAN AND COMPUTATIONAL LEARNING:** Bayes Theorem –Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

### **Unit - IV**

**INSTANT BASED LEARNING:** K Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

### **Unit - V**

**ADVANCED LEARNING:** Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

### **Text Book(s):**

1. Tom M.Mitchell—Machine Learning- McGraw-Hill Education (India) Private Limited- 2013

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

1. Ethem Alpaydin- —Introduction to Machine Learning (Adaptive Computation and Machine Learning)- The MIT Press 2004.
2. Stephen Marsland- —Machine Learning: An Algorithmic Perspective- CRC Press- 2009.
3. Michael Affenzeller- Stephan Winkler- Stefan Wagner- Andreas Beham- “Genetic Algorithms and Genetic Programming”- CRC Press Taylor and Francis Group.

Total Number of Topics Present in the course: 51

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	5.8
2.	Regional	6	11.7
3.	National	4	7.8
4.	Global	38	74.5

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
III	20PIT3CC8	MACHINE LEARNING					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 (✓) = 40, 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

Prepared by:

Checked by:

HOD:

**SEMESTER – III**

Course Code: 20PIT3EC3:1

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

**ELECTIVE COURSE III – 1. BIG DATA ANALYTICS**

Objective:

- Big data analytics helps organizations harness their data and use it to identify new opportunities. That, in turn, leads to smarter business moves, more efficient operations, higher profits and happier customers. Businesses that use big data with advanced analytics gain value in many ways, such as: Reducing cost.

### **Course Outcomes:**

CO1: Identify big data and its business implications.

CO2: List the components of hadoop and hadoop eco-system.

CO3: Access and process data on distributed file system.

CO4: Manage job execution in hadoop environment.

CO5: Develop big data solutions using hadoop eco system.

### **Unit I**

Introduction to big data: Data– Characteristics of data and Types of digital data: Unstructured– Semi structured and Structured– Sources of data–Working with unstructured data–Evolution and Definition of big data– Characteristics and Need of big data–Challenges of big data– Data environment versus big data environment

### **Unit II**

Big data analytics: Overview of business intelligence– Data science and Analytics–Meaning and Characteristics of big data analytics–Need of big data analytics– Classification of analytics– Challenges to big data analytics– Importance of big data analytics–Basic terminologies in big data environment – Data Analytics Life Cycle.

### **Unit III**

Big data technologies and Databases: Introduction to NoSQL–Uses and Features and Types–Need– Advantages– Disadvantages and Application of NoSQL– Overview of NewSQL– Comparing SQL– NoSQL and NewSQL– Introduction to MongoDB and its needs– Characteristics of MongoDB– Introduction of apache cassandra and its needs– Characteristics of Cassandra

### **Unit IV**

Hadoop foundation for analytics: History– Needs– Features –Key advantage and Versions of Hadoop– Essential of Hadoop ecosystems– RDBMS versus Hadoop– Key aspects and Components of Hadoop– Hadoop architectures – Working with Distributed Computation.

### **Unit V**

HadoopMapReduce and YARN framework: Introduction to MapReduce– Processing data with Hadoop using MapReduce–Introduction to YARN– Components– Need and Challenges of YARN–Dissecting YARN–MapReduce application– Data serialization and Working with common serialization formats– Big data serialization formats

### **Text Book**

1. Seema Acharya and Subhashini Chellappan- “Big Data and Analytics”- Wiley India Pvt. Ltd.- 2016

### **Reference Books**

1. “Big Data” by Judith Hurwitz- Alan Nugent- Dr. Fern Halper and Marcia Kaufman- Wiley Publications- 2014.

2. “Big Data Imperatives : Enterprise Big Data Warehouse- BI Implementations and Analytics” by Soumendra Mohanty- Madhu Jagadeesh and Harsha Srivatsa- Apress Media- Springer Science + Business Media New York- 2013
3. “Mining of Massive Datasets”- Anand Rajaraman- Jure Leskovec- Jeffery D. Ullman- Springer- July 2013.
4. “Hadoop: The definitive Guide”- Tom White- O'Reilly Media- 2010.

Total Number of Topics Present in the course: 48

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	4.1
2.	Regional	4	8.3
3.	National	4	8.3
4.	Global	38	79.1

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC3:1	BIG DATA ANALYTICS					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 (✓) = 39, 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

Prepared by:

Checked by:

HOD:

## SEMESTER – III

Course Code: 20PIT3EC3:2  
Instruction Hours: 6  
Credits: 5

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

### ELECTIVE COURSE III – 2. DIGITAL IMAGE PROCESSING

#### Objective:

- To study the image fundamentals and mathematical transforms necessary for image processing. To study the image enhancement techniques. To study image restoration procedures.

#### Course Outcomes:

CO1: Review the fundamental concepts of a digital image processing system.

CO2: Analyze images in the frequency domain using various transforms.

CO3: Evaluate the techniques for image enhancement and image restoration.

CO4: Categorize various compression techniques and interpret image compression standards.

CO5: Interpret image segmentation and representation techniques.

#### Unit I

Images and Digital Processing – Digitizing Images – Digital Image Display – Image Processing Software.

#### Unit II

The Gray Level Histogram – Point Operations – Algebraic Operations – Geometric Operations.

#### Unit III

Linear System Theory – Harmonic Signals and Complex Signal Analysis – The Fourier Transform : – Filter Design – Processing Sampled Data.

#### Unit IV

Discrete Image Transforms – Wavelet Transforms Optics and System Analysis– Image Restoration – Image Compression – Huffman Coding – Golomb Coding – Arithmetic Coding – LZW Coding.

#### Unit V

Pattern Recognition: Image Segmentation – Object Measurement – Classification and Estimation – Color and Multispectral Image Processing – Three Dimensional Image Processing.

#### Text Book:

1. Kenneth R. Castelman- “Digital Image Processing”- Pearson Education Inc. New Delhi- 2007.

#### Reference Book:

1. Rafael C. Gonzalez- Richard E. Woods- “Digital Image Processing” 3<sup>rd</sup> Edition- PHI Publications- New Delhi- 2008.

Total Number of Topics Present in the course: 26

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
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1.	Local	2	7.6
2.	Regional	2	7.6
3.	National	2	7.6
4.	Global	20	76.9

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC3:2	DIGITAL IMAGE PROCESSING					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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – III**

Course Code: 20PIT3EC3:3  
 Instruction Hours: 6  
 Credits: 5

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

## ELECTIVE COURSE III – 3.PATTERN RECONGNITION

### Objective:

- The objective of pattern Recognition is the recognisable proof of verifiable items and relations, i.e. the extraction of patterns from the input data. These procedures are mostly related with image analysis despite the fact that this isn't the main sort of application.

### Course Outcomes:

- CO1: Explain and compare a variety of pattern classification- structural pattern recognition- and pattern classifier combination techniques.
- CO2: Summarize- analyze- and relate research in the pattern recognition area verbally and in writing.
- CO3: Apply performance evaluation methods for pattern recognition- and critique comparisons of techniques made in the research literature.
- CO4: Apply pattern recognition techniques to real-world problems such as document analysis and recognition.
- CO5: Implement simple pattern classifiers- classifier combinations- and structural pattern recognizers.

### Unit I

Introduction and Bayesian Decision Theory: Introduction to pattern recognition– Systems– design cycles– learning and adaptation – Supervised Learning – Unsupervised Learning – Reinforcement Learning – Bayesian decision theory– minimum error rate classification– classifiers– discriminant functions and decisions surfaces.

### Unit II

Maximum – Likelihood and Bayesian parameter estimation: Maximum – Likelihood estimation– Bayesian estimation– Bayesian parameter estimation– Gaussian case and general theory– problems of dimensionality– Hidden marker models.

### Unit III

Nonparametric Techniques: Density estimation– Parzen windows  $K_n$  – Nearest neighbor estimation– The nearest neighbor rule– metrics and nearest – neighbor classification– fuzzy classification– approximations by series expansions.

### Unit IV

Linear discriminant functions and decision surfaces– generalized linear discriminant functions– The two category linearly separable case– minimizing the perception criterion function– relaxation procedures– nonseparable behaviour– Minimum squared– error procedures– The Ho Kashyap Procedures– support vector machines– multicategory generalizations.

### Unit V

Multilayer Neural Networks: Feedforward operation and classification– back propagation algorithm–error surfaces– back propagation as feature mapping– back propagation– Bayes theory and probability–practical techniques for improving backpropagation– regularization– complexity adjustment and pruning.

### Text Book:

1. Richard O. Duda- Peter E. Hart and David G. Stork- “Pattern Classification”- 2nd Edition- John Wiley & Sons- 2012.

**Reference Book:**

1. John Hertz- Andres Krogh & Richard G. Palmer- "Introduction to the theory of Neural Computation"- Addison Wesley- 1991.

Total Number of Topics Present in the course: 47

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	6.3
2.	Regional	4	8.5
3.	National	4	8.5
4.	Global	36	76.5

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
III	20PIT3EC3:3	PATTERN RECOGNITION					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

Prepared by:

Checked by:

HOD:

## SEMESTER – III

Course Code: 20PIT3EC4:1

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### ELECTIVE COURSE IV – 1. SOFTWARE ENGINEERING

#### Objective:

- To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. To provide an idea of using various process models in the software industry according to given circumstances. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

#### Course Outcomes:

CO1: Understanding Basic knowledge of the analysis and design of complex systems.

CO2: Ability to apply software engineering principles and techniques.

CO3: Ability to develop- maintain and evaluate large-scale software systems.

CO4: To produce efficient- reliable- robust and cost-effective software solutions.

CO5: Ability to perform independent research and analysis.

#### UNIT I

Need for S/w Engineering: Need for S/w engineering – About software and S/w engineering – A systems approach– Engineering approach – Members of the development team – Change in S/w engineering. – Modeling the process and Life cycle: The meaning of process – S/w process models – Tools and techniques for professional modeling – Practical process modeling.

#### UNIT II

Planning and Managing the project: Tracking progress – Project personnel – Effort estimation – Risk management – The project plan – Process models and project management.

#### UNIT III

Capturing the requirements : The requirement process – Types of Requirements – Characteristics of requirements – Expressing requirements – Additional requirements notations – Prototyping requirements – Requirements Documentation – Participants in the requirements process – Requirements validation – Measuring requirements – Choosing a requirements specification Techniques.

#### UNIT IV

Designing the system : Design Introduction – Decomposition and Modularity – Architectural styles and strategies – Architectural Design Decisions – Architectural Views – Architectural Patterns –Application Architectures – Characteristics of good design – Techniques for improving design – Design evaluation and validation – Documenting the design – Programming standards and procedures – Programming guidelines – Documentation.

## UNIT V

Testing Strategies : Testing strategic issues – Test strategies for conventional S/w – Test strategies for object oriented S/w – Validation testing – system testing – S/w testing. Fundamentals – Black-box and White-box testing – White box testing – Black box testing – McCall’s Quality factors – ISO 9126 –QF – S/w Engineering – S/w Maintenance – S/w engineering process model.

### Text Books:

- 1.Shari Lawrence P. Fleeger- “Software Engineering Theory and Practice”- 2<sup>nd</sup> Edition- Pearson Education- Delhi- 2001. [(for Units 1–4) Chapters 1- 2- 3- 4- 5-7]
2. Roger S. Pressman- “Software Engineering A Practitioner’s Approach”- 6<sup>th</sup> Edition- Tata McGraw Hill Publication- [(for Unit 5) Chapters : 13- 14- 15-31]

### Reference Books:

- 1.Ian Sommerville- “Software Engineering”- 6<sup>th</sup> Edition- Pearson Education- Delhi- 2005.
- 2.Douglas Bell- “Software Engineering for Students-A Programming Approach”- 4<sup>th</sup> Edition- Pearson Education- Delhi 2007.

Total Number of Topics Present in the course: 56

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	3.5
2.	Regional	4	7.1
3.	National	7	12.5
4.	Global	43	76.7

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC4:1	SOFTWARE ENGINEERING					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	✓	✓	✓	✓	✓	✓	✓		✓	✓	

<b>CO5</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Number of matches (✓) = 38, 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – III

Course Code: 20PIT3EC4:2  
 Instruction Hours: 6  
 Credits: 5

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

### ELECTIVE COURSE IV – 2. SOFTWARE TESTING

#### Objective:

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.

#### Course Outcomes:

- CO1: Understand the students various test processes and continuous quality improvement and types of errors and fault models
- CO1: Methods of test generation from requirements and Behavior modeling using UML: Finite state machines (FSM)
- CO1: Test generation from FSM models and Input space modeling using combinatorial designs
- CO1: Understand the Combinatorial test generation and test adequacy assessment using: control flow- data flow- and program mutations
- CO1: Understand the use of various test tools and Application of software testing techniques in commercial environments

#### UNIT I

Software Development Life Cycle Models: Phases of Software Project: Requirements Gathering and Analysis – Planning – Design – Development or Coding – Testing – Deployment and Maintenance – Quality- Quality Assurance and Quality control – Testing-Verification & Validation – Process Model – Life Cycle Models -White Box Testing: What is White Box Testing? – Static Testing – Structural Testing – Challenges – Black Box Testing: What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

#### UNIT II

Integration Testing: What is Integration Testing? – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash –System and Acceptance Testing: Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of

Testing Phases.

### UNIT III

Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing – Regression Testing: – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

### UNIT IV

Internationalization (I<sub>18n</sub>) Testing: Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – Ad hoc Testing: – Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: – What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – ToolsLab Setup – Test Roles

### UNIT V

Test Planning– Management– Execution and Reporting: Test Planning –Test Management – Test Process – Test Reporting – Best Practices – Software Test Automation: What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate– Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

#### Text Book:

1. Srinivasan Desikan- Gopaldaswamy Ramesh- Software Testing – Principle & Practices- Pearson Education- New Delhi- 2006.

#### Reference Books:

1. Ron Patton- “Software Testing”- 2<sup>nd</sup> Edition- Pearson Education- New Delhi- 2006.
2. William E. Perry- “Effective Methods for Software Testing”- 3<sup>rd</sup> Ed.- Wiley India- 2006.
3. Renu Rajani- Pradeep Oak- “Software Testing – Effective Methods- Tools and Techniques”- TMH Publishing Company Limited- New Delhi- 2004.

Total Number of Topics Present in the course: 88

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	3.4
2.	Regional	8	9
3.	National	8	9
4.	Global	69	78.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course				Hours	Credits				
III	20PIT3EC4:2	SOFTWARE TESTING				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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – III

Course Code: 20PIT3EC4:3

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### ELECTIVE COURSE IV – 3. SOFTWARE METRICS

**Objective:**

Course Educational Objectives: The main objective of the course is to expose the students to different software metrics used in projects and their Management. Upon completion of this course, the student should be able to:

- Analyze basics of Measurement.
- Learn about different Methods of Data Collection.
- Learn about measuring Internal and External Product Attributes.

**Course Outcomes:**

CO1: Understand the students identify and apply various software metrics- which determines the quality level of software

CO2: Identify and evaluate the quality level of internal and external attributes of the software product

CO3: Compare and Pick out the right reliability model for evaluating the software

CO4: Evaluate the reliability of any given software product

CO5: Design new metrics and reliability models for evaluating the quality level of the software based on the requirement

**UNIT I**

Measurement – measurement in everyday life – measurement in software engineering – the scope software metrics –Basics of measurement – The representational theory of measurement –

measurement and models – measurement scales and scale types – meaningfulness in measurement –A goalbased framework for software measurement– classifying software measures– determining what to measure– applying the framework– software measurement validation–software measurement validation in practice

## UNIT II

Empirical Investigation – four principles of investigation – planning formal experiments planning case studies – Software metrics data collection–what is good data – how to define data – how to collect data– how to store and extract data– Analyzing software measurement data – Introduction – analyzing the results of experiments – examples of simple analysis techniques – more advanced methods – overview of statistical tests

## UNIT III

Software Engineering Measurement – Measuring internal product attributes : size – Aspect of software size – length – reuse – functionality – complexity – Measuring internal product attributes – structure –Types of structural measures – control flow structure – modularity and information flow attributes – object oriented metrics– data structure – difficulties with general complexity measures –Measuring external product attributes – modelling software quality – measuring aspects of quality

## UNIT IV

Software Reliability : Measurement and Prediction – basics of reliability theory – the software reliability problem – parametric reliability growth models – predictive accuracy – the recalibration of software – reliability growth predictions – the importance of operational environment – wider aspect of software reliability – Resource measurement : Productivity– teams and tools – the meaning of productivity productivity of what? – Measuring productivity – teams– tools– methods – Making process predictions – Good estimates – cost estimation problems and approaches – models of effort and cost – problems with existing modelling methods – dealing with problems of current estimation methods – implication for process prediction

## UNIT V

Measurement and Management : Planning a measurement program – what is a metrics plan – Why and What : developing goals–questions and metrics – Where and When: mapping measures to activities – How: measurement tools – Who: measurers –analysts and audience – revising the plan – Measurement in Practice – Success criteria – Measurement in the small – Measurement in large – lessons learned – Empirical Research in Software Engineering – Problem with empirical research – investigating products – investigating resources – investigating processes – measurement today and tomorrow – future enhancement.

### Text Book:

1. “Software Metrics”- Norman E. Fenton- Shari Lawrence Pfleeger A Rigorous & Practical Approach Second Edition 2010- International Thomson Publishing

Total Number of Topics Present in the course: 90

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	3.3
2.	Regional	9	10

3.	National	6	6.6
4.	Global	72	80

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC4:3	SOFTWARE METRICS					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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – III**

Course Code: 20PIT3CP3  
 Instruction Hours: 6  
 Credits: 4

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

**CORE COURSE RACTICAL III – J2EE TECHNOLOGIES LAB**

**Objective:**

- The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven application using J2EE. Students will learn how to connect to any JDBC-compliant database, and

perform hands on practice with a database to create database-driven connectivity.

**Course Outcomes:**

**CO1:** Understand the students how to create dynamic web pages- using Servlets and JSP.

**CO2:** understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).

**CO3:** invoke the remote methods in an application using Remote Method Invocation (RMI)

**CO4:** learn to access database through Java programs- using Java Data Base Connectivity (JDBC).

**CO5:** make a reusable software component- using Java Bean.

1. To find the marks of the students using Remote Method Invocations.
2. To write a Servlet program to calculate the bonus of an employee
3. To write a Servlet program to implement Session Tracking.
4. To write a Servlet program to check authentication for user using Cookies.
5. To write a Servlet program and use JDBC in it.
6. To write a simple program for JSP.
7. To write a JSP program that works with JDBC.
8. To write a JSP Program with Bean Class.
9. To write a EJB Stateless Program to create bonus of an employee.
10. Implement a JAVA Servlet Program to implement sessions using HTTP Session Interface.

Total Number of Topics Present in the course: 10

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	1	10
2.	Regional	1	10
3.	National	1	10
4.	Global	7	70

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

#### Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3CP3	J2EE TECHNOLOGIES LAB					6	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 (✓) = 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

Prepared by:

Checked by:

HOD:

## SEMESTER – IV

Course Code: 20PIT4CC9  
Instruction Hours: 6  
Credits: 5

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

### CORE COURSE IX – INTERNET OF THINGS

#### Objectives:

- Describe what IoT is and how it works today. Recognise the factors that contributed to the emergence of IoT. Design and program IoT devices. Use real IoT protocols for communication. Secure the elements of an IoT device.

#### Course Outcomes:

- CO1: Gain the basic knowledge about IoT
- CO2: Able to use IoT related products in real life
- CO3: It helps to rely less on physical resources
- CO4: To start their work smarter
- CO5: Able to understand building blocks of Internet of Things

#### UNIT I

Requirements of IoT: The definition of the Internet of Things, main assumptions and perspectives–Functional Requirements – Platform for IoT devices. Economics and Technology of the IoT –Issues in IoT and solutions–Architecture of IoT. Anatomy of IoT: Traditional Internet Protocol Vs Chirps –Applying network intelligence at propagator nodes–Transport and functional architectures–Features of IOT.

#### UNIT II

IoT Devices–Temporary and Adhoc devices–Addressing issues–End devices in dedicated networks– Converting states to chirps–RFID integration in the IoT–End devices with higher demands– Small data Building a web of things–Autonomy and co ordination–Structuring a tree–Housekeeping message–Role of integrator function–Degrees of functionality– Aggregating end points–Packaging options– IoT Development Boards: Arduino IDE and Board Types,

RasberrPi Development Kit, RFID Principles and components – Interfacing of Actuators with Arduino –Analog and Digital Sensors.

### UNIT III

Data and Human Interaction: Functions of IoT–Analysis and control–Neighborhood and affinities– Public private and other kinds of data– Publishing agent– Searching for and managing agents– High and low level loops– Human interface and control points–Collaborative scheduling tools–Packaging and provisioning– Distributed integrator functions, Filtering the streams – IP Alternative–Protocol based on category classification–Skeletal architecture of chirp packets–Pattern driven–Propagator node networks and operation–Power of local agents and integrator functions–High level interchange.

### UNIT IV

Moore’s Law –Intelligence near the edge– Incorporating legacy devices– Staying in the loop – Social machines–Applications of IoT–Agriculture– IoT in Education, – Home healthcare– Efficient process control–Factory application– Home automation– Natural sciences –Living applications– Origin of IoT– Open source networking solutions–Shared software and business process vocabularies.

### UNIT V

Creating the IoT projects: Examples and working principles of sensors and actuators –Sensor project–Actuator project – Controller Camera,Using an IoT service platform– Selecting an IoT. Platform– The clayerplatform– Interfacing ourdevices using XMPP– Creating control application– Arduino device in IoT– Federating for Global Scalability – Providing a Global Identity – Authorizing Communication –Sensing Online Presence – Creating control application.

Setup the IDE– Writing Arduino Software.

#### Text 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.

#### Reference Books:

- 1.“Internet of Things: A Hands on Approach”- by Arhdeep Bahga and Vijay Madiseti-  
<http://www.internet-of-things-book.com/>.
- 2.“Getting started with the internet of things”- by Cuno Pfister-O’Rielly Publication.

Total Number of Topics Present in the course: 74

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	4.3
2.	Regional	10	14.4
3.	National	14	20.2
4.	Global	48	64.8

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4CC9	INTERNET OF THINGS					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 (✓) = 40, 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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – IV**

Course Code: 20PIT4CC10

Instruction Hours: 6

Credits: 5

Exam Hours: 3

Internal Marks: 25

External Marks: 75

**CORE COURSE X – OPEN SOURCE WEB APPLICATION DEVELOPMENT**

**Objective:**

- Upon completion of this program, the successful student will have reliably demonstrated the ability to apply theoretical and practical skills in Content Management Systems, Perl and Python and Ruby on Rails.

**Course Outcomes:**

CO1: Ability to install Operating Systems and able to run open-source operating systems

CO2: Ability to gather information about Free and Open Source Software projects from software

CO3: Releases and from sites on the internet

CO4: Ability to build software

CO5: Ability to modify Open Source Software packages.

**UNIT-I**

Installing LAMP stack (Linux- Apache- MySQL- PHP suite) – Configuring installation – Creating PHP pages – Overview of PHP Structure and Syntax – Passing Variables between Pages – Using if/else Arguments – All About Arrays – ingenerating MySQL with PHP.

**UNIT-II**

Web forms and user data manipulation – Basic data manipulation using PHP/MySQL forms

### UNIT-III

Validating user inputs – Handling errors in form – How the Apache Web Server Deals with Errors – Error Handling and Creating Error Handling Pages with PHP – Other Methods of Error Handling.

### UNIT-IV

Case study: Building content management system using LAMP stack

### UNIT-V

Configuring log files to improve LAMP stack based web site – Troubleshooting web site.

### TEXT BOOK:

1. Naramore Elizabeth- Gerner Jason- et aln.- Beginning PHP5- Apache- MySQL web development- Wrox press/Wiley Dreamtech press- 2005 edition. (ISBN 81-265-0581-8) [Unit-1 :(Chapters 1-2); Unit-2 : (Chapters 3-4-5-6); Unit-3 (Chapters 8-9); Unit-4 (Chapters 13)- Unit-5 (Chapters 17-18)]
2. Bayross Ivan- Web enabled commercial application development using HTML-DHTML- JavaScript- Perl CGI.- BPB publications- 2nd revised edition- 2002.

Total Number of Topics Present in the course: 18

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	16.6
2.	Regional	1	5.5
3.	National	3	16.6
4.	Global	11	61.1

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4CC10	OPEN SOURCE WEB APPLICATION DEVELOPMENT					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		

<b>CO3</b>	✓		✓	✓		✓	✓	✓	✓	
<b>CO4</b>	✓	✓	✓		✓		✓	✓	✓	✓
<b>CO5</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – IV

Course Code: 20PIT4EC5:1  
 Instruction Hours: 6  
 Credits: 4

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

### ELECTIVE COURSE IV – 1. PERVASIVE COMPUTING

**Objective:**

- To study the pervasive computing and its applications. To study the pervasive computing web based applications. To study voice enabling pervasive computing
- To study PDA in pervasive computing. To study user interface issues in pervasive computing.

**Course Outcomes:**

- CO1: Understand the fundamental theoretical concepts in pervasive computing.
- CO2: Understand the aspects of context awareness
- CO3: Study the methods for efficient resource allocation and task migration
- CO4: Learn and Analyze the HCI Service Selection and HCI migration framework
- CO5: Design and implement pervasive application systems.

**UNIT I**

Pervasive Computing: Past–Present and Future Pervasive Computing–Pervasive Computing–Market-m-Business – Middleware for Pervasive Computing Systems–Pervasive Computing Environments – Application examples: Retail– Airline check-in and booking–Sales force automation–Health care–Tracking–Car information system–E-mail access via WAP

**UNIT II**

Device Technology: Hardware–Human Machine Interfaces–Biometrics–Operating Systems–Java for Pervasive devices

**UNIT III**

Device Connectivity: Protocols–Security–Device Management Web Application Concepts: WWW architecture–Protocols–Transcoding–Client authentication via internet

**UNIT IV**

WAP and Beyond: Components of the WAP architecture–WAP infrastructure–WAP security issues–WML–WAP push–Products-i-Mode Voice Technology: Basics of Speech recognition–Voice Standards–Speech applications–Speech and Pervasive Computing

**UNIT V**

PDA: Device Categories–PDA operation Systems–Device Characteristics–Software Components–Standards–Mobile Applications–PDA Browsers Pervasive Web Application architecture: Background–Scalability and availability–Development of Pervasive Computing web applications–Pervasive application architecture

**Text Book:**

1. Pervasive Computing- Technology and Architecture of Mobile Internet Applications- Jochen Burkhardt- Horst Henn- Stefan Hepper- Thomas Schaech & Klaus Rindtorff- Pearson Education- 2006

**Reference Book:**

1. Fundamentals of Mobile and Pervasive Computing- Frank Adelstein- Sandeep KS Gupta- Golden Richard III- Loren Schwiebert- McGraw Hill edition- 2006

Total Number of Topics Present in the course: 43

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	2	4.6

2.	Regional	4	9.3
3.	National	5	11.6
4.	Global	32	74.4

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4EC5:1	PERVASIVE COMPUTING					6	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											

<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

**Prepared by:**

**Checked by:**

**HOD:**

**SEMESTER – IV**

Course Code: 20PIT4EC5:2

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

**ELECTIVE COURSE IV – 2. HUMAN COMPUTER INTERACTION**

**Objective:**

- The course introduces students to analysis, design, and evaluation of the interaction between people and information and communication technologies. The aim is to give students an adequate understanding of the concepts of usability, user experience, and user-centered design.

## **Course Outcomes:**

CO1: Identify the basic concepts of HCI and evolution of HCI

CO2: Discuss the design issues and interaction design processes

CO3: Use different models of interaction design principles /rules

CO4: To understand the concepts and techniques for effective interaction between Human and Computers.

CO5: Ability to develop HCI technique based applications.

## **UNIT I**

Cognitive Psychology and Computer Science – Capabilities of Human–Computer Interaction– Goals of Human–Computer Interaction–Roles of Human– Computer and Interaction in HCI– Basic User Interfaces – Advanced User Interfaces – Justification of Interdisciplinary Nature– Standard Framework of HCI – HCI Design Principles– Interface Levels in HCI – Steps in Designing HCI Applications – Graphical User Interface Design – Popular HCI Tools – Architecture of HCI Systems– Advances in HCI– Overview – HCI Sample Exercises – HCI and Usability Engineering– Usability Engineering Attributes – Process of Usability– Need for Prototyping.

## **UNIT II**

Understanding Process Modelling:Goals– Operators– Methods– Selection Rules– Cognitive Complexity Theory– Adaptive Control of Thought– Rational– State– Operator– and Result– Belief– Desire– Intention– ICARUS– Connectionist Learning with Adaptive Rule Induction On– line (CLARION) – Subsumption Architecture– Spoken Dialogue System– Factors Defining Dialogue System – General Architecture of Spoken Dialogue System– Dialogue Management Strategies– Computational Models for Dialogue Management– Statistical Approaches to Dialogue Management– Learning Automata as Reinforcement Learners.

## **UNIT III**

Recommender Systems: HCI Study Based on Personalisation – Personalisation in Recommender Systems – Application Areas of Recommender Systems– Recommender System Field as an Interdisciplinary Area of Research – Phases of Recommender Systems – User Profiling Approaches– Classification of Recommendation Techniques – Advantages and Disadvantages of Recommender System Approaches – Need of Software Agent– based Approach in Recommender Systems – Evaluating Recommender Systems– Integrated Framework for Recommender Systems – Case Study.

## **UNIT IV**

Advanced Visualisation Methods: Ontology Definition – Need of Ontology Analysis – Types of Ontology – Components of Ontology – Ontology Life Cycle – Ontology Development Process – Multiple Inheritance Ontology – Ontology Visualisation Method – Space Dimensions of Ontology Visualisation – Ontology Languages – Microformats – RDFa– RDF – RDF Schema– OIL – Ontology Visualisation Tools – Ontology Reasoning –Reasoner.

## **UNIT V**

Ambient Intelligence: The New Dimension of Human–Computer Interaction – Ambient Intelligence Definition–Context aware Systems and Human–Computer Interaction –Middleware – Modelling Data for AmI Environment –Development of Context–awareness Feature in Smart Class Room– A Case Study –Context– aware Agents for Developing AmI Applications–A Case Study.

**Text Book:**

1. K. Meena- R. Sivakumar- “Human–Computer Interaction”- PHP Learning Private limited Delhi-110092- 2015.

**Reference Books:**

1. JohnM. Carroll-“HumanComputerInteraction–intheNew Millennium”- Pearson Education- 2007.
2. Lan Dix- Janet Finlay- Gregory D. Abowd- Russell Beale- “Human-Computer Interaction”- Pearson Education- 2009.

Total Number of Topics Present in the course: 92

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	3.2
2.	Regional	13	14.1
3.	National	8	8.6
4.	Global	68	73.9

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
IV	20PIT4EC5:2	HUMAN COMPUTER INTERACTION					6	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 (✓) = 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

**Prepared by:**

**Checked by:**  
**SEMESTER – IV**

**HOD:**

Course Code: 20PIT4EC5:3

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 25

External Marks: 75

### **ELECTIVE COURSE IV – 3. SOFT COMPUTING**

#### **Objective:**

- Upon successful completion of the course, students will have an understanding of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms. Provide the mathematical background for carrying out the optimization associated with neural network learning.

#### **Course Outcomes:**

CO1: Learn about soft computing techniques and their applications

CO2: Analyze various neural network architectures

CO3: Understand perception and counter propagation networks.

CO4: Define the fuzzy systems

CO5: Analyze the genetic algorithms and their applications

#### **UNIT I**

**FUZZY SET THEORY:** Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

#### **UNIT II**

**OPTIMIZATION:** Derivative based Optimization – Descent Methods – Gradient Based Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

#### **UNIT III**

**NEURAL NETWORKS:** Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

#### **UNIT IV**

**NEURO FUZZY MODELING:** Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

#### **UNIT V**

**APPLICATION OF COMPUTATIONAL INTELLIGENCE: Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.**

**TEXT BOOK**

1. J. S. R. Jang- C.T. Sun and E. Mizutani- “Neuro Fuzzy and Soft Computing”- PHI- Pearson Education- 2004.

**REFERENCE BOOKS**

1. Timothy J. Ross- “Fuzzy Logic with Engineering Application- “ Mc Graw Hill- 1977.
2. Davis E. Goldberg- “Genetic Algorithms Search- Optimization and Machine Learning”- Addison Wesley- 1989.
3. S. Rajasekaran and G.A.V. Pai- “Neural Networks- Fuzzy Logic and Genetic Algorithms”- PHI- 2003.Emereo Pty Limited- July 2008

Total Number of Topics Present in the course: 49

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	3	6.1
2.	Regional	8	16.3
3.	National	4	8.1
4.	Global	34	69.3

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4EC5:3	SOFT COMPUTING					6	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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

### SEMESTER – IV

Course Code: 20PIT4CP4

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 40

External Marks: 60

### CORE COURSE RACTICAL IV – OPEN SOURCE TECHNOLOGY LAB

#### Objective:

- The course aims to introduce open source software concept to students. Students will study and learn to setup open source account, OSS license, understand Project structure and enhance open source projects.

#### Course Outcomes:

CO1: Understand the installation of various packages in open source operating systems

CO2: Create simple GUI applications using PHP function to develop program.

CO3: Understand various versions of control system

CO4: Understand the kernel configuration and virtual environment

CO5: Implement various applications using build systems

1. Write a server side PHP program that displays marks- total- grade of a student in tabular format by accepting user inputs for name- number and marks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a mysql table.
4. Write a PHP program interface to create a database and to insert a table into it.
  - i). Write a PHP program using classes to create a table.
  - ii). Write a PHP program to upload a file to the server.
5. Write a PHP program to create a directory- and to read contents from the directory.
6. Write a shell program to find the details of an user session.
7. Write a shell program to change the extension of a given file.
8. Create a mysql table and execute queries to read- add- remove and modify a record

from that table.

9. Write a shell program to change the extension of a given file.
10. Create a mysql table and execute queries to read, add, remove and modify a record from that table-

Total Number of Topics Present in the course: 10

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local	1	10
2.	Regional	1	10
3.	National	1	10
4.	Global	7	70

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits				
IV	20PIT4CP4	OPEN SOURCE TECHNOLOGIES LAB					6	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 (✓) = 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

**Prepared by:**

**Checked by:**

**HOD:**

#### **SEMESTER – IV**

Course Code: 20PIT4PW

Instruction Hours: 6

Credits: 4

Exam Hours: 3

Internal Marks: 0

External Marks: 0

#### **DISSERTATION AND VIVA VOCE (INDUSTRY/RESEARCH)**

##### **Course Outcomes:**

CO1: Interpret literature with the purpose of formulating a project proposal

CO2: Planning- analyzing- designing and implementing a software project using SDLC model

CO3: Finding the solution of identified problem with help of modern technology

CO4: Giving priority to real life problem

CO5: Learning to work as a team and to focus on getting a working project done within a stipulated period of time.

S.No	Work Description	Maximum Marks
1	Dissertation	80
2	Viva voce	20
Total		100

**Note: PASSING MINIMUM – 50 MARKS**

##### **I Review –December last week**

- Confirmation letter from the company
- Project type & title
- Company profile
- Synopsis

- Contact number &mail\_id of the external guide
- S/w selection

## II Review – January 3<sup>rd</sup> week

- Data or System flow diagram
- Documentation of first three chapters
- Database design
- Input design – Forms
- Output design – Reports

## III Review – February 3<sup>rd</sup> week

- Complete coding
- Test plan with demo
- Rough documentation of the entire project

## IV Review – March 1<sup>st</sup> week

- Corrected rough draft
- Explanation of the entire project
- Execution of Implementation Work

### Note:

- ✚ Attending all the review is compulsory
- ✚ PPT and necessary Documentation should be brought for each Review
- ✚ Font size in documentation has to be 12- Times New Roman- Space 1.5
- ✚ Document should be neatly aligned and justified
- ✚ No change can be made in the review marks later
- ✚ Internal mark will be submitted at the same day of review to controller section.

Total Number of Topics Present in the course:

S.No	Category (Local/ Regional/ National/ Global)	No. of Topics covered	Percentage
1.	Local		
2.	National		
3.	Regional		
4.	Global		

Local – Green, Regional – Pink, National – Blue, Global – Brown.

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

Semester	Code	Title of the Course					Hours	Credits			
Iv	20PIT4PW	PROJECT WORK					6	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 (✓) = 39, 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

**Prepared by:**

**Checked by:**

**HOD:**