THIRUVALLUVAR UNIVERSITY
MASTER OF COMPUTER SCIENCE
(CBCS PATTERN)
(With effect from 2022 - 2023)

I. PROGRAMME OBJECTIVES

1. To impart a sound understanding of the advanced principles of Computer Science and up-to-date methodologies.
2. To significantly advance a student's career prospects within the IT industry.
3. To edify technical and soft skills for the students to become competent personnel in Information Technology and / or related industries.
4. To identify and develop technocrats, industrialists and business stalwarts from potential students.
5. To conduct research and development in cutting-edge technologies towards the proliferation of education, governance, social and rural development.

II. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To build successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms.

PEO2: To educate them to contribute to the society as expressive, ethical and responsible citizens with proven expertise.

PEO3: To achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills.

PEO4: To adapt rapidly changing technologies, tools and industrial environments.

PEO5: To thrive in order to pursue life-long learning to fulfil their goals.

III. PROGRAMME OUTCOMES (POs)

Upon completion of the programme, the students are expected to have acquired

PO1: Basic fundamental knowledge in problem solving and in depth knowledge in computer science.

PO2: Ability to identify, analyze, design, optimize and implement systems and solutions using appropriate algorithms with acceptable complexity.

PO3: Capacity to produce cost effective, quality and maintainable software products and solutions meeting the global standards and requirements with the knowledge acquired and using the emerging techniques, tools and software engineering methodologies and principles.

PO4: Ability to understand the intricacies of a various process across the globe, by extracting facts and build models for marketing and business strategies.

PO5: Capable to work with multidisciplinary teams in small and large scale projects by utilizing modern software engineering tools and emerging technologies to develop complex products for the societal and engineering needs with skills to communicate effectively in group discussions and report writing.

PO6: Enriched knowledge toplan, develop and managesoftware tools and/or become an entrepreneur with the due consideration of the public health and safety, in the context of cultural, societal, and environmental situations.

PO7: Provide socially acceptable technical solutions to complex computer science engineering problems with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

PO8: Responsibility towards societal issues and environmental sustainability with an orientation to optimize resource utilization and conservations.

PO9: Apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PO10: Ability to communicate within the computing community to interpret, produce, and present clear instructions, as well as design and create good documentation.

IV. PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of this programme, students should be able to:

PSO1: Apply the knowledge gained during program from Mathematics and Computing Sciences to identify, formulate and solve real life complex problems and R&D problems with an orientation to lifelong learning.

PSO2: Ability to design and develop hardware and software in emerging technology environments like cloud computing embedded products, real-time systems, Internet of Things etc.

PSO3: Acquaintance in data management systems in association with cloud and distributed computing so as to solve problems using the relevant techniques.

PSO4: Comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

PSO5: Sound knowledge base and skill sets to develop and expand professional careers in fields related to human-computer interaction and management of industrial processes for the design and implementation of intelligent systems

V. THE COURSE OF STUDY AND SCHEME OF EXAMINATION

S.No	Study Components		Ins.	Credit	Title of the Paper	Maximum Marks		
	Course Title		Hrs./ week			CIA	Uni. Exam	Total
SEMESTER 1								
1.	Core	Paper -1	5	3	Relational Database Management System	25	75	100
2.	Core	Paper -2	5	3	Enterprise Java Programming	25	75	100
3.	Core	Paper -3	5	3	Programming using C#.NET	25	75	100
4.	Practical	Paper -1	3	2	Practical 1:Relational Database Management System	25	75	100
5.	Practical	Paper -2	3	2	Practical 2: Enterprise Java Programming	25	75	100
6.	Practical	Paper -3	3	2	Practical 3: Programming using C#.NET	25	75	100
Internal Elective for same major students								
7.	Core Elective	Paper-1	3	3	**(to choose one out of 3)** A. Computer Organization B. Parallel Computing C. Embedded System	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
8.	Open Elective	Paper - 1	3	3	**(to choose one out of 3)** A. E-Commerce B. Introduction to Computer Applications C. Principles of Internet	25	75	100
			30	21				800

	SEMESTER II					CIA	Uni. Exam	Total
9.	Core	Paper -4	5	3	Advanced Enterprise Java Programming	25	75	100
10.	Core	Paper -5	4	3	Design and Analysis of Algorithm	25	75	100
11.	Core	Paper -6	4	3	Web Application using C#.NET	25	75	100
12.	Practical	Paper -4	3	2	Practical 4: Advanced Enterprises Java Programming	25	75	100
13.	Practical	Paper -5	3	2	Practical 5: Design and Analysis of Algorithm	25	75	100
14.	Practical	Paper -6	3	2	Practical 6: Web Application using C#.NET	25	75	100
Internal Elective for same major students (Choose any one)								
15.	Core Elective	Paper -2	3	3	**(To choose one out of 3)** A. Human Computer Interaction B. Social Information Networks C. Cloud Computing	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
16.	Open Elective	Paper –2	3	3	**(To choose one out of 3)** A. Principles of Web Design B. Open Source Applications C. Problem Solving Techniques	25	75	100
17.	Field Study		-	2	Field Work	100	-	100
18.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	**25**				**1000**

	SEMESTER III					CIA	Uni. Exam	Total
19.	Core	Paper -7	5	4	Distributed Operating System	25	75	100
20.	Core	Paper -8	5	4	XML and Web Services	25	75	100
21.	Core	Paper -9	5	3	Programming using Python	25	75	100
22.	Practical	Paper -7	3	2	Practical 7: Distributed Operating System	25	75	100
23.	Practical	Paper -8	3	2	Practical 8: XML and Web Services	25	75	100
24.	Practical	Paper -9	3	2	Practical 9: Programming using Python	25	75	100
Internal Elective for same major students								
25.	Core Elective	Paper -3	3	3	**(To choose one out of 3)** A. Blockchain Technology B. Internet of Things C. Network Security	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
26.	Open Elective	Paper -3	3	3	**(To choose one out of 3)** A. Programming using C B. Programming using C++ C. Programming using Python	25	75	100
27.	MOOC Courses		-	2				100
			30	25		200	600	900

	SEMESTER IV					CIA	Uni. Exam	Total
28.	Core	Paper-10	5	4	Mobile Application Development	25	75	100
29.	Core	Paper-11	6	4	Software Project Management	25	75	100
30.	Practical	Paper-10	3	2	Practical 1: Mobile Application Development	25	75	100
31.	Core	Project Work with Viva-Voce	10	5	Project Work (Compulsory)	100 (75 Project + 25 viva)		100
Internal Elective for same major students (Choose any one)								
32.	Core Elective	Paper -4	3	3	**(To choose one out of 3)** A. Big Data Analytics B. Artificial Intelligence C. Machine Learning	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
33.	Open Elective	Paper -4	3	3	**(To choose one out of 3)** A. Cyber Security B. Decision Support System C. Research Methods and Ethics	25	75	100
			30	**21**		**125**	**375**	**600**
			120	**92**				**3300**

Semester: **I**   Paper type: **Core**   Paper code: **Paper -1**Name of the

Paper:**Relational Database Management System**   Credits:**3**

Total Hours per Week: **5 Hour**   Lecture Hours: **4** Tutorial Hours: **1**   Practical Hours: **-**

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Course Objectives

1. To have a broad understanding of database concepts and database management system software
2. To have a high-level understanding of major DBMS components and their function
3. To be able to model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.
4. To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. To be able to program a data-intensive application using PL/SQL.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to have a broad understanding of database concepts and database management system software
2. After studied unit-2, Students are able to have a high-level understanding of major DBMS components and their function
3. After studied unit-3, Students are able to know the various normalization techniques.
4. After studied unit-4, Students are able to write SQL commands to create tables and indexes,insert/update/delete data, and query data in a relational DBMS.
5. After studied unit-5, Students are able to understand the PL/SQL and Stored Procedures.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

UNIT - I: INTRODUCTION TO DATABASE CONCEPTS   **Teaching Hours: 15**

Introduction : Flat File - Database System – Database – Advantages – Architecture – Database Management System as Implemented in Modern Database Packages – System Databases.

The Entity - Relationship Model : Introduction - The Entity Relationship Model – Entities – Entity Sets – Relationships – Relationship Sets – Mapping Cardinalities – Mapping Constraints – Keys – Roles in E-R Diagrams – Weak Entity Sets in E-R Diagrams – Non Binary Relationships – Combining Two E-R Diagrams – Representation of Strong and Weak Entity Sets – Linking a Weak to a Strong Entity – Breaking Higher Cardinalities into Lower Cardinalities – Use of Entity or Relationship Sets – Generalization - Aggregation.

Data Models: Introduction - Relational Approach – Relational Rules - The Hierarchical Approach – Hierarchical Model - The Network Approach – Higher Level Operations.

UNIT - II: STORAGE AND RELATIONAL DATA STRUCTURES **Teaching Hours: 15**

Storage Structure : File Organization and Addressing Schemes – Sequential and Indexed Sequential Organizations – Direct Organization of File – Interface Indexing – Hashing Scheme of File Organization – Dynamic Hashing Technique – Insertion Scheme in Dynamic Hashing – B-Trees – Indexing Methods - Clustering.

Relational Data Structure: Introduction - Relations - Domains.

UNIT - III: NORMALIZATION   **Teaching Hours: 15**

Normalization: Introduction – Purpose of Normalization - Normalization - Definition of Functional Dependence (FD) - Normal Forms: 1NF, 2NF, 3NF and BCNF.

UNIT - IV: STRUCTURED QUERY LANGUAGE (SQL)   **Teaching Hours: 15**

Creating, Dropping and Altering Tables – create table – drop table – alter table – Inserting Rows – Querying the Database – Simple select Statement Sub-Selects – Aggregate Functions – String, Number and Date Functions – SET Operations – Views – create view – drop view – Modifying the Database – insert – update – delete Statements.

UNIT - V: PROCEDURAL LANGUAGE – SQL (PL/SQL) **Teaching Hours: 15**

Data Types and Variables – Program Control Statements – null Statement – Assignment Statement – Conditional Statements – Loops – Program Structure – Anonymous Blocks –

Procedures and Functions – Stored Procedures and Functions – Packages – Triggers – Database Access using Cursors.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

Textbook

For Units – I, II and III

1. Rajesh Narang, "Database Management Systems", PHI Learning Private Limited, New Delhi, Fifth Printing, 2010.

For Units – IV and V

2. Rajshekhar Sunderraman,"ORACLE 8 Programming – A Primer" Addition – Wesly Publication, 2000.

References

1. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", Tata McGraw-Hill Publishing Company, 2003.
2. Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000.
4. Narang,"Database Management Systems", 2nd ed., PHI.

Web References

1. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf
3. http://kadakiaeducation.edu.in/Course/BCA/Course%20Material/RDBMS.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L	M	L	M	L	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	S	L	S	M	S	M	M
CO3	S	S	M	M	M	L	M	M	L	M	M	S	M	M	S
CO4	S	S	S	L	M	S	M	L	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	L	M	S	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Core**   Paper code: **Paper -2**Name of the
Paper**: Enterprise Java Programming**   Credits:**3**
Total Hours per Week: **5 Hour**   Lecture Hours: **4** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To introduce programming with Applet and AWT.
2.   An overview of database access and details for managing information using the JDBC API.
3. Examine the use of networking and collections.
4. Learn how to program Servlet and JSP.
5. To understand the web programming concepts in the perspective of Client and Server.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about applets concepts.
2. After studied unit-2, Students are able to understand java networking system.
3. After studied unit-3, Students are able to understand about collections and design patterns.
4. After studied unit-4, Students are able to develop applications using JSP.
5. After studied unit-5, Students are able to concept of web programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION   **Teaching Hours: 15**

Applet Fundamentals- Applet Class - Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets; GUI Application - Dialog Boxes - Creating Windows - Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components - AWT Graphics classes - File Choosers - Color Choosers – Tree – Table –Tabbed panels–Progressive bar - Sliders.

UNIT-II: JDBC AND JAVA NETWORKING   **Teaching Hours: 15**

JDBC -Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application - Creating a New Database and Table with JDBC - Working with Database Metadata; Java Networking - Basics of Networking - Networking in Java- Socket Program using TCP/IP - Socket Program using UDP- URL and Inetaddressclasses.

UNIT-III: COLLECTIONS AND DESIGN PATTERNS   **Teaching Hours: 15**

Collection Framework - ArrayList class - LinkedList class - ArrayListvs Linked List - ListIterator interface - HashSet class, LinkedHashSet class, TreeSet class PriorityQueue class - Map interface, HashMap class, LinkedHashMapclass ,TreeMap class - Comparable interface , Comparator interface, Comparable vs Comparator; Design Patterns: Introduction to Design patterns - Catalogue for Design Pattern - Factory Method Pattern, Prototype Pattern, Singleton Pattern, Adapter Pattern, Proxy Pattern, Decorator Pattern, Command Pattern, Template Pattern, Mediator Pattern;

UNIT-IV: SERVLET AND JSP   **Teaching Hours: 15**

Servlet: Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – GenericServlet, HttpServlet - First Servlet - Invoking Servlet - Passing Parameters to Servlets - Retrieving Parameters - Server-Side Include – Cookies; JSP : JSP Engines Working with JSP - JSP and Servlet - Anatomy of a JSP Page.

UNIT-V: WEB PROGRAMMING   **Teaching Hours: 15**

Client-Side Programming: Client-side programming technologies - Form design using HTML, XHTML and DHTML and CSS - Client side validation Using JavaScript - Content Structuring using XML - Adding Interactivity with AJAX -JQuery Framework; Server-side Programming:

Web Servers - Handling request and response - Handling Form data - Session management - Database Access.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. S. Sagayaraj, R. Denis, P.Karthik& D. Gajalakshmi "Java Programming", Universities Press, 2018.

References

1. Patrick Naughton& Herbert Schildt, "The Complete Reference: Java 2", Tata McGraw Hill, 1999.

2. Deitel&Deitel, "Java How to Program", Prentice Hall, 5th Edition, 2002

3. Peter Haggar, "Practical Java: Programming Language Guide", Addison-Wesley Pub Co, 1st Edition, 2000.

4. C.Muthu, "Programming with Java", McGraw Hill, Second Edition, 2008.

Web References

1. http://math.hws.edu/javanotes/c6/index.html
2. http://www.tutorialspoint.com/awt/
3. www.studytonight.com
4. www.javatpoint.com
5. www.learnjavaonline.org
6. www.codingbat.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	M	L	M	S	S	M	S	S
CO2	S	M	M	L	M	M	M	M	M	M	M	M	S	M	M
CO3	M	S	S	M	M	L	M	L	S	L	M	S	M	L	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	M	M	M	L	S	S	M	L	M	S	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Core**   Paper code: **Paper -3**Name of the

Paper**: Programming using C#.NET**   Credits:**3**

Total Hours per Week: **5 Hour**   Lecture Hours: **4**Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To know the differences between desktop and web application.
2.   To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about introduction of C#.NET.
2. After studied unit-2, Students are able to understand what is mean by windows forms.
3. After studied unit-3, Students are able to understand about delegates and events.
4. After studied unit-4, Students are able to understand reflection and remoting.
5. After studied unit-5, Students are able to understand about database in C#.NET.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION   Teaching Hours: 15

Introduction to .NET – Features of C# - Data Types – Value Types – Reference Types - Variables and Constants – Declaring – Assigning values – variables of nullable types – Operators – Type Conversions – Implicit and Explicit Type Conversions – Arrays – Single Dimensional and Multidimensional – Control Flow Statements – Selection – Iteration and Jump – Classes and

Objects – Access Modifiers – Defining a Class – Variables – Properties and Methods – Creating Objects – Inheritance – Polymorphism- Constructor and Destructors.

UNIT-II: WINDOWS FORMS   Teaching Hours: 15

Windows Forms – Form Class – Common Operations on Forms – Creating a Message Box – Handling Events – Mouse Events – Keyboard Events – Common Controls in Windows Forms – Label – TextBox – Button – Combo Box – List Box – Check Box – Radio Button – Group Box – Picture Box – Timer – Open File Dialog – Save File Dialog – Font Dialog – Color Dialog – Print Dialog – Tree View – Menu.

UNIT-III: DELEGATES AND EVENTS   Teaching Hours: 15

Delegates – Declaring a Delegate – Defining Delegate Methods – Creating and Invoking Delegate Objects – Multicasting with Delegates – Events – Event Sources – Event Handlers – Events and Delegates.

UNIT-IV: REFLECTION AND REMOTING   Teaching Hours: 15

Life Cycle of threads-Using Reflection – Reflecting the Members of a Class - Dynamic Loading and Reflection - .NET Remoting – Architecture – Hosting of Objects – Single Ton and Single Call – Remoting Server – Remoting Client.

UNIT-V: DATABASE   Teaching Hours: 15

Creating Connection String – Creating a Connection to a Database – Creating a Command Object – Working with Data Adapters – Using Data Reader to work with Databases – Using Dataset.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

   a. Book review and research paper review, syllabus and curriculum review.
   b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
   c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Vikas Gupta , "Comdex .NET Programming " , Dream Tech Press, New Delhi, 2011

2. Kogent Solutions, " C# 2008 Programming Black Book", Dream Tech Press, New Delhi, Platinum Edition, 2009

References

1. Rebecca M.Riordon, "Microsoft ADO .Net 2.0 Step by Step", Prentice Hall of India Private Limited, New Delhi, 2007

2. David S.Platt , "Introducing Microsoft .Net", Prentice Hall of India(Private) Limited, Third Edition, New Delhi, 2006

Web References

1. http://csharp.net-tutorials.com/index.php

2. http://csharp.net-tutorials.com/classes/introduction/

3. http://www.homeandlearn.co.uk/csharp/csharp.html

4. http://www.indiabix.com/c-sharp-programming/questions-and-answers/

5. https://www.wiziq.com/online-tests/43860-c-basic-quiz

6. http://www.withoutbook.com/OnlineTestStart.php?quizId=71

7. http://www.compileonline.com/compile_csharp_online.php http://www.ideone.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	S	M	L	S	S	M	L	S	S	S	M	M	S
CO4	M	M	S	L	S	M	M	S	M	M	M	M	M	S	S
CO5	M	S	M	M	M	S	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

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Semester: **I**   Paper type: **Practical**Paper code: **Paper -1**Name of the Paper**: 1 -**

Relational Database Management System   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To have a broad understanding of database concepts and database management system software

2. To have a high-level understanding of major DBMS components and their function

3. To be able to model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.

4. To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.

5. To be able to program a data-intensive application using PL/SQL.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to have a broad understanding of database concepts and database management system software

2. After studied unit-2, Students are able to have a high-level understanding of major DBMS components and their function

3. After studied unit-3, Students are able to know the various normalization techniques.

4. After studied unit-4, Students are able to write SQL commands to create tables and indexes,insert/update/delete data, and query data in a relational DBMS.

5. After studied unit-5, Students are able to understand the PL/SQL and Stored Procedures.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

1. Creating database tables and using data types.

    • Create table, • Modify table, • Drop table

2. Data Manipulation.

    • Adding data with Insert, • Modify data with Update, • Deleting records with Delete

3. Implementing the Constraints.

    • NULL and NOT NULL, • Primary Key and Foreign Key Constraint • Unique, Check and Default Constraint

4. Data Retrieval

    • Simple select clause, • Accessing specific data with Where, Ordered By, Distinct and Group By

5. Aggregate Functions.

    • AVG, • COUNT, • MAX, • MIN, • SUM, • CUBE

6. String functions.

7. Date and Time Functions, Union, intersection and set difference.

8. Nested Queries & JOIN operation.

9. Practical Based on performing different operations on a view.

10. Practical Based on implementing use of triggers, cursors & procedures.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L	M	L	M	L	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	S	L	S	M	S	M	M
CO3	S	S	M	M	M	L	M	M	L	M	M	S	M	M	S
CO4	S	S	S	L	M	S	M	L	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	L	M	S	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Practical**Paper code: **Paper -2**Name of the Paper**: 2 –**

Enterprise Java Programming   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: -**Practical Hours: 3**

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Course Objectives

1. To introduce programming with Applet and AWT.
2. An overview of database access and details for managing information using the JDBC API.
3. Examine the use of networking and collections.
4. Learn how to program Servlet and JSP.
5. To understand the web programming concepts in the perspective of Client and Server.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about applets concepts.
2. After studied unit-2, Students are able to understand java networking system.
3. After studied unit-3, Students are able to understand about collections and design patterns.
4. After studied unit-4, Students are able to develop applications using JSP.
5. After studied unit-5, Students are able to concept of web programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Develop Applet Programming with various techniques.
2. Develop applications using AWT.
3. Working with Graphics,Color and Font
4. Working with JDBC Classes (Database Operations- Create, Insert, Delete, Update, Select)
5. Handling ResultSet and Statements.

6. Jasper Report Generation

7. Working with Servlet and JDBC

8. Handling Client/Server Networking

9. Develop Java Server Pages applications using JSP Tags.

10. Working with Java Collections.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	M	L	M	S	S	M	S	S
CO2	S	M	M	L	M	M	M	M	M	M	M	M	S	M	M
CO3	M	S	S	M	M	L	M	L	S	L	M	S	M	L	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	M	M	M	L	S	S	M	L	M	S	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Practical**Paper code: **Paper -3**Name of the Paper**: 3 –**

Programming using C#.NET   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

6.   To know the differences between desktop and web application.

7.   To construct classes, methods, and accessor and instantiate objects.

8.   To create and manipulate GUI components in C#.

9.   To code solutions and compile C# projects within the .NET framework.

10. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

6.   After studied unit-1, Students are able to understand about introduction of C#.NET.

7.   After studied unit-2, Students are able to understand what is mean by windows forms.

8.   After studied unit-3, Students are able to understand about delegates and events.

9.   After studied unit-4, Students are able to understand reflection and remoting.

10. After studied unit-5, Students are able to understand about database in C#.NET.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1.   Variables, Constants and Arrays

2.   Classes and Objects

3.   Inheritance

4.   Polymorphism

5.   Windows Form Controls (Label, Text, Button, Check Box, Radio)

6.   Windows Form Controls (List, Combo, Timer, Group Box, Picture Box)

7.   Menu Handling

8. Reflection

9. ADO.NET Connection

10. Data Command

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	S	M	L	S	S	M	L	S	S	S	M	M	S
CO4	M	M	S	L	S	M	M	S	M	M	M	M	M	S	S
CO5	M	S	M	M	M	S	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Core Elective**   Paper code: **Paper -1**Name of the

Paper**: A – Computer Organization**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To understand the basics of Computer Organization.
2. To know about the functions of various languages and translation
3. To know the relationship between computer instruction and the Machine code execution.
4. To recognize the need of various types of computer organizations.
5. To understand the influence of parallel and vector processing.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about Organization and design concepts
2. After studied unit-2, Students are able to describe the translation model of assembly language to machine language.
3. After studied unit-3, Students are able to understand about Micro program control concepts.
4. After studied unit-4, Students are able to understand central processor unit.
5. After studied unit-5, Students are able to understand about pipeline and vector processing concepts.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: ORGANIZATION AND DESIGN　　　　　　**Teaching Hours: 9**

Instruction Codes - Computer Registers - Computer Instructions – Timing and Control – Instruction Cycle - Memory Reference Instructions – Input-Output and Interrupts.

UNIT-II: COMPUTER PROGRAMMING　　　　　　**Teaching Hours: 9**

Introduction - Machine language - Assembly language - The assembler - Program loops - Programming arithmetic and logical operation – Subroutines - Input-output programming.

UNIT-III: MICRO PROGRAM CONTROL　　　　　　**Teaching Hours: 9**

Control Memory – Address Sequencing – Micro program Examples – Design of Control Unit..

UNIT-IV: CENTRAL PROCESSOR UNIT　　　　　　**Teaching Hours: 9**

Introduction – General Register Organization – Stack Organization – Instruction Formats – Addressing Modes.

UNIT-V: PIPELINE AND VECTOR PROCESSING　**Teaching Hours: 9**

Parallel Processing – Pipelining - Arithmetic pipeline - Instruction pipeline - Vector Processing - Array Processor.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Morris Mano M. "Computer System Architecture". New Delhi: Prentice Hall of India Private Limited, 2011

References

1. William Stallings. "Computer Organization and Architecture". 8th edition. Pearson Publication, 2010

2. Morris Mano. "Digital Login and Computer Design". New Delhi: Prentice Hall of India Private Limited, 2001.

Web References

1. www.computer-pdf.com/architecture/

2. www.tutorialspoint.com/computer_logical_organization

3. https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/

4. https://www.javatpoint.com/computer-organization-and-architecture-tutorial

5. https://www.studytonight.com/computer-architecture/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	L	M	L	M	M	S	S	M	S	M	M	S
CO2	S	M	S	M	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Core Elective**   Paper code: **Paper -1**Name of the

Paper**: B – Parallel Computing**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To learn the Kinds of parallelism, Parallel computer architectures (processor arrays, centralized memory multiprocessors, distributed memory multiprocessors, and multicomputers)
2. To know and develop the Parallel algorithm design
3. To identify the MPI library of message-passing functions
4. To recognize the development of data-parallel programs and development of manager-worker programs with functional parallelism

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about Scalability and clustering concepts.
2. After studied unit-2, Students are able to understand about enabling technologies.
3. After studied unit-3, Students are able to understand interconnections of systems.
4. After studied unit-4, Students are able to understand Parallel Programming.
5. After studied unit-5, Students are able to understand about Message Passing Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: SCALABILITY AND CLUSTERING   Teaching Hours: 9

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

UNIT-II: ENABLING TECHONOLOGIES   **Teaching Hours: 9**

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding

UNIT-III: SYSTEM INTERCONNECTS   **Teaching Hours: 9**

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms

UNIT-IV:PARALLEL PROGRAMMING   **Teaching Hours: 9**

Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT-V: MESSAGE PASSING PROGRAMMINGTeaching Hours: 9

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw-Hill, New Delhi,2003.

References

1. David E. Culler & Jaswinder Pal Singh, "Parallel Computing Architecture: A Hardware/Software Approach", Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, "Parallel Programming in C with MPI & OpenMP", Tata McGrawHill, New Delhi, 2003.
3. Kai Hwang, "Advanced Computer Architecture" Tata McGraw-Hill, New Delhi, 2003.

Web References

1. www.computing.llnl.gov/tutorials/parallel_comp/
2. www.geeksforgeeks.org/introduction-to-parallel-computing/
3. www.techopedia.com/definition/8777/parallel-computing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	M	S	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	L	M	L	M	S	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	L	M	M	M	M	S	S
CO5	S	S	M	M	M	S	M	M	L	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

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Semester: **I**   Paper type: **Core Elective**   Paper code: **Paper -1**Name of the

Paper**: C– Embedded System**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To understand basic concepts in the embedded computing systems area;
2. To determine the optimal composition and characteristics of an embedded system;
3. To understand what is a microcontroller, microcomputer, embedded system
4. To design and program an embedded system at the basic level;
5. To develop hardware-software complex with the use of the National Instruments products.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand introduction about embedded system.
2. After studied unit-2, Students are able to understand about processors of embedded system
3. After studied unit-3, Students are able to understand about memory systems.
4. After studied unit-4, Students are able to understand about basic peripheral of embedded system.
5. After studied unit-5, Students are able to understand about Real-Time Operating system.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: INTRODUCTION   Teaching Hours: 9

Replacement for discrete logic-based circuits-Provide functional upgrades- Provide easy maintenance upgrades-Improves mechanical performance- Protection of intellectual property-Replacement for analogue circuits. Inside the embedded system-ProcessorMemory-Peripherals-Software-Algorithms -Microcontroller-Expanded microcontrollerMicroprocessor based-Board based.

UNIT-II: EMBEDDED PROCESSORS   Teaching Hours: 9

8 bit accumulator processors-Register models-8 bit data restrictions-Addressing memorySystem integrity-Example 8 bit architectures-Z80-Z80 programming model-MC6800- Microcontrollers-MC68HC05-MC68HC11-Architecture-Data processors-Complex instructions, microcode and nanocode-INTEL 80286-Architecture-Interrupt facilitiesInstruction set-80287 floating point support-Feature comparison. INTEL 80386DXArchitecture-Interrupt facilities-Instruction set-80387 floating point coprocessor-Feature comparison-INTEL 80486-Instruction set-Intel 486SX and overdrive processors-Intel Pentium-Multiple branch prediction-Data flow analysis-Speculative execution-The MMX instructions-The Pentium II- Motorola MC68000-The MC68000 hardware-Address bus-Data bus-Function codes-Interrupts-Error recovery and control signals.

UNIT-III: MEMORY SYSTEMS   Teaching Hours: 9

Memory technologies-DRAM technology - Video RAM - SRAM - Pseudo-static RAM - Battery backed-up SRAM - EPROM and OTP - Flash - EPROM - Memory organisation - By 1 organisation - By 4 organisation - By 8 and by 9 organisations - By 16 and greater organisations - Parity - Parity initialisation - Error detecting and correcting memory - Access times - Packages - Dual in line package - Zig–zag package - SIMM and DIMM - SIP - DRAM interfaces - The basic DRAM interface - Page mode operation - Page interleaving - Burst mode operation 87 EDO memory-DRAM refresh techniques - Distributed versus burst refresh - Software refresh - RAS only refresh - CAS before RAS (CBR) refresh - Hidden refresh - Memory management - Disadvantages of memory management - Segmentation and paging - Memory protection units - Cache memory - Cache size and organisation

UNIT-IV:BASIC PERIPHERALS   Teaching Hours: 9

Parallel ports-Multi-function I/O ports-Pull-up resistors-Timer/counters-Types-8253 timer modes-Interrupt on terminal count-Programmable one-shot -Rate generator-Square wave rate generator-Software triggered strobe-Hardware triggered strobe-Generating interruptsMC68230 modes-Timer processors-Real-time clocks-Simulating a real-time clock in software-Serial ports-Serial peripheral interface-I2C bus-Read and write access-Addressing peripherals-Sending an address index-Timing.

UNIT-V: REAL-TIME OPERATING SYSTEMTeaching Hours: 9

What are operating systems?-Operating system internals-Multitasking operating systemsContext switching, task tables, and kernels-Time slice -Pre-emption-Co-operative multitasking-Scheduler algorithms-Rate monotonic- Deadline monotonic scheduling-Priority guidelines-Priority inversion-Disabling interrupts -Message queues-Waiting for a resourceVMEbus interrupt messages-Fairness systems-Tasks, threads and processes-ExceptionsMemory model-Memory allocation-Memory characteristics-Example memory mapsMemory management address translation-Bank switching-Segmentation-Virtual memoryChossoing an operating system-Assembler versus high level language-ROMable codeScheduling algorithms-Pre-emptive scheduling-Modular approach-Re-entrant code-Crossdevelopment platforms-Integrated networking-Multiprocessor support-Commercial operating systems-pSOS+ - pSOS+ kernel-pSOS+m multiprocessor kernel-pREPC+ runtime supportpHILE+ file system -pNA+ network manager-pROBE+ system level debugger-XRAY+ source level debugger-OS-9.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

 a. Book review and research paper review, syllabus and curriculum review.
 b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
 c. Workshops, preparing technical term dictionaries from text books and reference books.
 d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
 e. Forming digital library: collecting text and reference books, course material.
 f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Heath S. "Embedded Systems Design", Butterworth - Heinemann 1997.

References

1. Kirk Zurell - "C Programming for Embedded Systems" R & D, Books - 2000

2. David. E, Simon, "An embedded software primer", Pearson Education Asia - Addison Wesley Longman (Singapore), Low Priced Edition, 2001, ISBN - 81 - 7808 - 045 - 1.

3. Michael Barr, "Programming Embedded Systems in C and C++", Shroff Publishers & Distributors Pvt.Ltd., Calcutta. March 2001, ISBN - 81 - 7366 - 076 - X.

Web References

1. www.entrancetutorials.com/embedded-systems-by-rajkamal-pdf/

2. www.internetofthingsagenda.techtarget.com/definition/embedded-system

3. www.en.wikipedia.org/wiki/Embedded_system

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	M	M	M	L	M	M	L	S	L	S	M	M	S
CO4	M	S	M	L	M	M	M	S	M	M	M	S	M	L	S
CO5	S	S	M	M	M	M	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Open Elective**   Paper code: **Paper - 1**Name of the

Paper**: A – E-Commerce**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To demonstrate an understanding of the foundations and importance of E-commerce
2. To demonstrate an understanding of retailing in E-commerce by: analyzing branding and pricing strategies, using and determining the effectiveness of market research and assessing the effects of disintermediation.
3. To analyze the impact of E-commerce on business models and strategy
4. To describe Internet trading relationships including Business to Consumer, Businessto-Business, Intra-organizational.
5. To describe the infrastructure for E-commerce
6. To describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamentals of E-Commerce.
2. After studied unit-2, Students are able to understand about E-Procurement.
3. After studied unit-3, Students are able to understand about Customer relationship management.
4. After studied unit-4, Students are able to understand about M-Commerce.
5. After studied unit-5, Students are able to understand about Management of mobile commerce services.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: E-COMMERCE FUNDAMENTALS   Teaching Hours: 9

Introduction - The e-commerce environment - The e-commerce marketplace - Focus on portals - Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies - E-business infrastructure: Introduction on Internet - Internet standards - Focus on controls the internet - Managing e-business infrastructure - Focus on web service and service-oriented - Focus on new access devices.

UNIT-II: E-PROCUREMENT   Teaching Hours: 9

Introduction - Drivers of e-procurement - Focus on estimating e-procurement cost savings - Risks and impacts of e-procurement - Implementing e-procurement - Focus on electronics B2B marketplaces - The future of e-procurement E-marketing: Introduction - E-marketing planning - Situation analysis - Objective setting – Strategy - Focus on characteristics of newmedia marketing communications – Tactics - Focus on online branding – Actions - Control.

UNIT-III: CUSTOMER RELATIONSHIP MANAGEMENT   Teaching Hours: 9

Introduction:e-CRM-conversion marketing - the online buying process - customer acquisition management - focus on marketing communications for customer acquisition - customer retention management focus on excelling in e- commerce service quality - customer extension - Analysis and design: Introduction - process modeling - Data modeling - Design for e-business - Focus on user centered site design - Focus on security design for e-business.

UNIT-IV:M-COMMERCE   Teaching Hours: 9

Introduction to m-commerce: Emerging applications - different players in m-commerce - mcommerce life cycle - Mobile financial services - mobile entertainment services - and proactive service

UNIT –V: MANAGEMENT OF MOBILE COMMERCE SERVICES Teaching Hours: 9

Content development and distribution to hand-held devices - content caching - pricing of mobile commerce services - The emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks - personalized content management - implementation challenges in m-commerce - futuristic m-commerce services.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Dave Chaffey, "E-Business and E-Commerce Management", 3rd Edition, 2009, Pearson Education.

References

1. Henry Chan, Raymod Lee and etl., "E-Commerce Fundamental and Applications", Wiley.

2. Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory".

3. Nansi Shi, "Mobile Commerce Applications", IGI Global, 2004.

4. Gary P. Schneider, "Electronic Commerce", 7th Edition, CENGAGE Learning India, New Delhi.

5. K.K. Balaji, D.Nag "E-Commerce", 2nd Edition, Mc Graw Hill Education, New Delhi.

6. P.T.Joseph," E-Commerce an Indian Perspective," PHI Publication, New Delhi.

7. Bhaskar Bharat, "Electronic Commerce – Technology and Application", McGraw Hill.

Web References

1. www.feinternational.com/blog/what-is-e-commerce-an-introduction-to-the-industry/

2. www.abetterlemonadestand.com/what-is-ecommerce/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	M	L	S	M	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	L	L	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Open Elective**   Paper code: **Paper - 1**Name of the

Paper**: B – Introduction to Computer Applications**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours:**1**Practical Hours: **-**

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Course Objectives

1. To know about computer and basic applications of computer.
2. To get knowledge about operating system
3. To aim at imparting a basic level appreciation Programme

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about computer.
2. After studied unit-2, Students are able to operate computer using GUI based Operating system.
3. After studied unit-3, Students are able to understand about word processing.
4. After studied unit-4, Students are able to understand about spread sheet.
5. After studied unit-5, Students are able to understand about making PPT presentation.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: KNOWING COMPUTER   **Teaching Hours: 9**

What is Computer - Basic Applications of Computer - Components of Computer System - Central Processing Unit (CPU) – VDU - Keyboard and Mouse - Other input/output Devices - Computer Memory - Concepts of Hardware and Software - Concept of Computing - Data and Information; Applications of IECT - Connecting keyboard – mouse - monitor and printer to CPU and checking power supply.

UNIT-II: OPERATING COMPUTER USING GUI BASED OPERATING SYSTEM
Teaching Hours: 9

What is an Operating System - Basics of Popular Operating Systems - The User Interface - Using Mouse - Using right Button of the Mouse and Moving Icons on the screen - Use of Common Icons - Status Bar - Using Menu and Menu – selection - Running an Application - Viewing of File - Folders and Directories - Creating and Renaming of files and folders - Opening and closing of different Windows - Using help - Creating Short cuts - Basics of O.S Setup - Common utilities.

UNIT-III: UNDERSTANDING WORD PROCESSING   **Teaching Hours: 9**

Word Processing Basics - Opening and Closing of documents - Text creation and Manipulation - Formatting of text - Table handling - Spell check -language setting and thesaurus - Printing of word document.

UNIT-IV:USING SPREAD SHEET   **Teaching Hours: 9**

Basics of Spreadsheet - Manipulation of cells - Formulas and Functions - Editing of Spread Sheet - printing of Spread Sheet.

UNIT –V: MAKING SMALL PRESENTATION   **Teaching Hours: 9**

Basics of presentation software - Creating Presentation - Preparation and Presentation of Slides - Slide Show - Taking printouts of presentation / handouts.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Introduction to Computer Applications, TNAU, Tamil Nadu.https://www.agrimoon.com/introduction-to-computer-applications-pdf-book/

Web References

1. https://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading01.htm
2. https://peda.net/kenya/ass/subjects2/computer-studies/form-1/itc2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	M	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	M
CO3	S	S	S	M	M	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	M	S	M	M	M	M	S	S
CO5	S	S	S	M	M	L	M	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**   Paper type: **Open Elective**   Paper code: **Paper - 1**Name of the

Paper**: C – Principles of Internet**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To learn the basics of Internet.
2. To provide fundamental knowledge in WWW.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about what is internet
2. After studied unit-2, Students are able to learn about connecting to the internet.
3. After studied unit-1, Students are able to understand about world wide web.
4. After studied unit-2, Students are able to learn about multimedia on the internet.
5. After studied unit-1, Students are able to understand about safeguarding the internet.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTERNET   **Teaching Hours: 9**

The wired world of the internet –Information travels across the internet –TCP/IP – Understanding internet addresses and domains –Anatomy of web connections –Internet file types. Internet's Underlying Architecture: Domain name system –Routers –The internet's client/server architecture. Applications of IECT - Connecting keyboard – mouse - monitor and printer to CPU and checking power supply.

UNIT-II: CONNECTING TO THE INTERNET   Teaching Hours: 9

Connecting your computer –Connecting to the internet from online services –ISDN –The internet/television connection –Network computers –DSL(Digital Subscriber Line). Communicating on the internet:E-mail–Usenet and newsgroups –Internet chat and instant messaging –Making phone calls on the internet.

UNIT-III: WORLD WIDE WEB   Teaching Hours: 9

Webpages –Web browsers –Markup Languages –Hypertext –Image maps and interactive forms –Web host servers –Websites with databases. Common Internet Tools:Gophers –Telnet –FTP and downloading files –Searching the internet.

UNIT-IV:MULTIMEDIA ON THE INTERNET   Teaching Hours: 9

Audio on the internet –Video on the internet –Intranet and shopping on the internet.

UNIT –V: SAFEGUARDING THE INTERNET   Teaching Hours: 9

Firewalls–Viruses –Digital certificates.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Preston Gralla, "How the Internet works", 10thEdition, Que publishers, 2014.

References

1. Raj Kamal, "Internet and Web Technologies", Tata Mc Graw Hill, 2002.
2. C Xavier, "World Wide Web design with HTML",Tata Mc-Graw Hill, 2008.

Web References

1. www.informatics.buzdo.com/p912-internet-principles.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	M	S	M	M	L	M	S	M	M	S
CO2	S	M	M	L	M	M	L	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	L	S	M	M	M
CO4	M	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	S	M	M	M	S	S	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core**   Paper code: **Paper -4**Name of the Paper:**Advanced Enterprise Java Programming**   Credits:**3**

Total Hours per Week: **5 Hour** Lecture Hours: **4**Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To expose the knowledge of MVC and Java server faces
2. To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts
3. To Develop Enterprise web application using EJB.
4. To understand and implement the object-relation mapping using Hibernate
5. To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to work with JSP, JSF and Servlet using MVC approach.
2. After studied unit-2, Students are able to develop the web applications using the MVC framework provided by Apache Struts
3. After studied unit-3, Students are able to develop Enterprise web application using EJB.
4. After studied unit-4, Students are able to implement the Object-Relation Mapping technique using Hibernate
5. After studied unit-5, Students are able to gets knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTEGRATING SERVLETS AND JSP, JAVA SERVER FACES

Teaching Hours: 15

JSP: Basics – Life cycle of JSP- Static and dynamic content- javaBeans components; Understanding the need for MVC: implementing MVC with request dispatcher, summarizing the MVC code, interpreting relative URL, three data sharing approaches; JSF: Basics, Framework roles, Simple JSF application, Life Cycle of JSF page, using core tags, using HTML Component tags, localized messages, Standard Converters and Validators.

UNIT-II: STRUTS FRAMEWORK **Teaching Hours: 15**

Introduction to Struts , Understanding Struts , Struts Flow Control Six Basic steps in using Struts, FormBeans, Forms, Using properties files, Advanced Action, Manual Validation, validation in the Action, validation in the form bean, Struts Tiles, Motivations , Basics, Tiles definitions file.

UNIT-III: ENTERPRISE JAVA BEANS **Teaching Hours: 15**

EJB: Session Bean, Entity Bean, Message driven Bean, defining clients access with interfaces, life cycle of enterprise Bean, creation of Enterprise Bean, web client, other Enterprise Bean features, handling exceptions, Container- Managed Transactions, Bean Managed Transactions.

UNIT-IV: HIBERNATE **Teaching Hours: 15**

Basics- Enterprise Application architectures, Hibernate Motivation, Object Relation Mapping, Collection Mapping, Association Mapping, Collection and Association Relationships, Relationships in Java and Databases, Component Mapping, Inheritance Mapping, Life cycle of Hibernate Entities, Transactions, HQL, Native SQL, Querying Terminology, SQL Query Options, Querying With Hibernate.

UNIT-V: SPRING **Teaching Hours: 15**

Foundation: Motivation- Spring Hello World, Runtime environment, Dependency injectionInversion of control ,Spring IoC container, Spring framework composition, Spring container instantiation, Spring bean definitions ,Bean naming, Bean scoping, Referencing other

beans, Properties integration-Resource integration - Collection mapping, AOP with spring framework.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Marty Hall, Larry Brown., "Core Servlets and Java Server Pages", 2nd Edition, Pearson Education, 2004

2. Stephanie Bodoffetl., "The J2EETM Tutorial", Pearson Education, Second Edition, 2005

3. Hibernate Reference Documentation 3.3.1, Copyright © 2004 Red Hat Middleware, LLC available at http://www.hibernate.org/hib_docs/v3/reference/en/html_single/

4. Gary Mak, Josh Long and Daniel Rubio, "Spring Recipes: A Problem-Solution Approach", Apress Publications, Second Edition, 2010

5. Craig Walls, "Spring in action", Manning Publisher, Third Edition, 2011

References

1. Cay S.Horstmann, Gary Cornell, "Core Java Volume I – Fundamentals Core Concepts", Prentice Hall of India, Ninth Edition, 2012

2. Cay S.Horstmann, Gary Cornell, "Core Java Volume II – Advanced Features", Prentice Hall of India, Ninth Edition, 2013

3. Minter Dave, Linwood Jeff, "Beginning Hibernate, From Novice to Professional", Apress, Second Edition, 2006

4. Doray, Arnold, "Beginning Apache, From Novice to Professional", Apress, Second Edition, 2006

Web References

1. http://courses.coreservlets.com/Course-Materials/struts.html
2. http://www.roseindia.net/jsp/index.shtml
3. http://www.oracle.com/technetwork/java/javaee/javaserverfaces-139869.html
4. http://docs.oracle.com/javaee/1.4/tutorial/doc/JSFIntro.html
5. http://docs.oracle.com/javaee/6/tutorial/doc/bnaph.html
6. http://en.wikipedia.org/wiki/JavaServer_Faces

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	M	S	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	M	S	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	S	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core**   Paper code: **Paper -5**Name of the

Paper:**Design and Analysis of Algorithm**   Credits: **3**

Total Hours per Week: **4 Hour**   Lecture Hours: **3** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. To understand the basic knowledge of algorithm design and its implementation.
3. To learn the key techniques of Divide-and-Conquer and Greedy Method.
4. To recognize the concept of Dynamic Programming and its algorithms
5. To familiarize with Backtracking algorithms.
6. To understand Branch and Bound techniques for designing and analyzing algorithms.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. After studied unit-2, Students are able to learn the key techniques of Divide-and-Conquer and Greedy Method.
3. After studied unit-3, Students are able to recognize the concept of Dynamic Programming and its algorithms
4. After studied unit-4, Students are able to understand backtracking.
5. After studies unit-5, Students are able to understand Branch and Bound techniques for designing and analyzing algorithms.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION   **Teaching Hours: 12**

Algorithm Specification-Performance Analysis: Space complexity- Time ComplexityAsymptotic notations-practical complexities-performance measurement- Randomized algorithms: An informal Description- Identifying the repeated element- Primality testingAdvantages and Disadvantages.

UNIT-II:DIVIDE-AND-CONQUER AND GREEDY METHOD   **Teaching Hours: 12**

Divide-and-conquer: General method-Binary Search-Finding the maximum and minimumMerge sort- quick sort- Strassen's Matrix multiplication- The greedy Method: The general method-Knapsack problem-Minimum cost spanning tree

UNIT-III: DYNAMIC PROGRAMMING   **Teaching Hours: 12**

Dynamic Programming: Dynamic programming- All pairs shortest paths- Single source shortest paths- String editing- 0/1 knapsack- The traveling salesperson problem-Flow shop scheduling

UNIT-IV: BACKTRACKING   **Teaching Hours: 12**

Backtracking: General Method-8 queen's problem- Sum of subsets- Graph coloring - Hamiltonian cycles-Knapsack Problem

UNIT-V: BRANCH AND BOUND   **Teaching Hours: 12**

Branch-and-Bound: General method of algebraic problem-Modular arithmetic- Comparison trees-Lower bound through reduction-Planar graph coloring problem-Bin packing.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

   a. Book review and research paper review, syllabus and curriculum review.
   b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
   c. Workshops, preparing technical term dictionaries from text books and reference books.
   d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
   e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt.Ltd, 2005

References

1. S.K.Basu, "Design Methods and Analysis of Algorithms", Fourth edition, 2010
2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Asia, Addison-Wesley Publishing Company, 2003
3. AnanyLevitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, Dorling Kindersley India Pvt.Ltd, 2003

Web Reference

1. http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
2. http://cs.uef.fi/pages/franti/asa/notes.html
3. http://computerstuff7090.blogspot.in/2012/11/design-analysis-and-algorithm-video.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	L	M	S	S	M	S	M	M	S
CO2	S	M	S	L	M	M	M	M	M	M	L	M	S	M	S
CO3	S	S	M	M	S	S	M	L	L	M	L	S	M	M	S
CO4	S	S	S	S	M	M	M	S	S	S	M	M	M	L	M
CO5	S	S	S	M	M	M	S	M	S	M	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core**   Paper code: **Paper -6**Name of the
Paper:**Web Application using C#.NET**   Credits: **3**

Total Hours per Week: **4 Hour**   Lecture Hours: **3** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To know the differences between desktop and web application.
2. To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to to know the differences between desktop application and web application.
2. After studied unit-2, Students are able to construct classes, methods, and access modifier and instantiate objects.
3. After studied unit-3, Students are able create and manipulate GUI components in C# for windows application.
4. After studied unit-4, Students are able to code solutions and compile C# projects within the .NET framework.
5. After studies unit-5, Students are able to build the web application with Database.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I:INTRODUCTION TO ASP.NET AND WEB FORMS   **Teaching Hours: 12**

Developing ASP.NET Applications - ASP.NET File Types - The bin Directory - Application Updates - A Simple Application from Start to Finish-web.config file Web Form Fundamentals - A Simple Page Applet - The Problem With Response.Write - Server Controls - HTML Server Controls - ViewState - The HTML Control Classes - Events - Event Handling Changes - The Currency Converter application-Adding Support for Multiple Currencies - Adding Linked Images - Setting Styles – A Deeper Look at HTML control classes-HTML control events-The HTML control Base class-The HtmContainerControl Class-The HtmlInputControl Class-The Page class-The Controls collection-The HttpRequest Class-The HttpResponse Class-The ServerUtility Class-Assessing HTML Server controls

UNIT-II:WEB CONTROL   **Teaching Hours: 12**

Web Controls - Stepping Up to web Controls - Basic Web Control Classes - The web Control Tags - The WebControl Base Class - Units Enumerated Values - Colors - Fonts - List Controls - Table Controls - AutoPostBack and Web Control Events - How Postback Events Work - The Page Lifecycle - The Greeting Card Applet - Validation and rich Controls- The Calendar Control-Formatting the Calendar-restricting Dates- The AdRotator control-The Wizard control-Validation-The Validation Controls -The Validation Process-The Validator Class-A Simple Validation Example –Sever side example-Manual Validation-Understanding Regular Expressions-Literals and MetaCharacters-Finding a Regular expression- A Validated Customer Form

UNIT-III: COMPONENT BASED PROGRAMMING   **Teaching Hours: 12**

Introduction – Creating a Simple Component – Properties and State – Database Components – Consuming the Database Component – Enhancing the Component with Error Handling – Aggregate Information – Data Objects.

UNIT-IV: CUSTOM CONTROLS   **Teaching Hours: 12**

User Controls – Creating a Simple User Control – Visual Studio.NET Custom Control Support – Independent User Controls – Integrated User Controls – User Control Events – Limitations – Deriving Custom Controls.

UNIT-V: DATABASE ACCESS WITH COMMAND, ADAPTER AND XML

Teaching Hours: 12

ADO.NET Data Access - About the ADO.NET Example - Obtaining the Sample Database - Simple Data Access - Simple Data Update - Importing the Namespaces - Creating a Connection - The Connection String SQL - Making the Connection - Defining the Select Command - Using a Command with a DataReader - Updating Data - Using Update - Insert - and Delete Commands - Accessing Disconnected Data - Selecting Disconnected Data - Selecting Multiple Tables - Modifying Disconnected Data - Modifying and Deleting Rows - Adding Information - to a DataSet - Updating Disconnected Data - The Command Builder - Updating a DataTable - Controlling Updates - An Update Example – Using XML - XML's Hidden Role in .NET - XML Basics - Attributes - Comments - The XML Classes - the XML TextWriter - The XML Text Reader - Working with XML Documents - Reading an XML Document - Searching an XML Document - XML Validation – CreatingXML Schema -XSD Documents - Validating an XML File.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Mathew MacDonald, "ASP.NET: The Complete Reference", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006

2. Dino Eesposito, "Introducing Microsoft ASP.NET 2.0", AsokeK.Ghosh, Prentice Hall of India, Eastern Economy Edition, New Delhi, 2006

References

1. Stephen Walther,"ASP.NET 3.5 Unleashed", Pearson Education, Dorling Kindersley Pvt. Ltd, Second Edition, 2008

Web References

1. http://csharp.net-tutorials.com/index.php
2. http://csharp.nettutorials.com/classes/introduction/
3. http://www.homeandlearn.co.uk/csharp/csharp.html
4. http://www.indiabix.com/c-sharp-programming/questions-and-answers/
5. https://www.wiziq.com/online-tests/43860-c-basic-quiz
6. http://www.withoutbook.com/OnlineTestStart.php?quizId=71
7. http://www.compileonline.com/compile_csharp_online.php http://www.ideone.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	S	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	S	M	S	S	S
CO3	M	S	M	M	M	S	M	L	S	M	S	S	M	M	M
CO4	M	S	L	L	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Practical**   Paper code: **Paper -4**   Name of the

Paper:**4 - Advanced Enterprise Java Programming**   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours:-Practical Hours: **3**

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Course Objectives

1. To expose the knowledge of MVC and Java server faces
2. To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts
3. To Develop Enterprise web application using EJB.
4. To understand and implement the object-relation mapping using Hibernate
5. To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to work with JSP, JSF and Servlet using MVC approach.
2. After studied unit-2, Students are able to develop the web applications using the MVC framework provided by Apache Struts
3. After studied unit-3, Students are able to develop Enterprise web application using EJB.
4. After studied unit-4, Students are able to implement the Object-Relation Mapping technique using Hibernate
5. After studied unit-5, Students are able to gets knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. JSP and MVC with Request Dispatcher
2. JSF in JSP Pages, Usingall HTML and core render kit
3. Actions and Forms
4. Properties and Messages
5. Creating Web Client and Session Bean
6. Bean Managed Transactions and Container Managed Transaction
7. Object Relation Mapping and Collection Mapping
8. Association Mapping and Component Mapping
9. Inheritance Mapping
10. Spring Actions and Spring MVC

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	M	S	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	M	S	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	S	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Practical**   Paper code: **Paper -5**   Name of the

Paper:**5 - Design and Analysis of Algorithm**   Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. To understand the basic knowledge of algorithm design and its implementation.
3. To learn the key techniques of Divide-and-Conquer and Greedy Method.
4. To recognize the concept of Dynamic Programming and its algorithms
5. To familiarize with Backtracking algorithms.
6. To understand Branch and Bound techniques for designing and analyzing algorithms.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. After studied unit-2, Students are able to learn the key techniques of Divide-and-Conquer and Greedy Method.
3. After studied unit-3, Students are able to recognize the concept of Dynamic Programming and its algorithms
4. After studied unit-4, Students are able to understand backtracking.
5. After studies unit-5, Students are able to understand Branch and Bound techniques for designing and analyzing algorithms.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Divide and Conquer with Recursive Function
2. Divide and Conquer with Non-Recursive Function
3. Strassen's Matrix Multiplication
4. Greedy Method
5. Dynamic programming
6. Shortest path problem
7. Travelling sales person problem
8. Back tracking
9. Modular Arithmetic
10. Bin Packing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	L	M	S	S	M	S	M	M	S
CO2	S	M	S	L	M	M	M	M	M	M	L	M	S	M	S
CO3	S	S	M	M	S	S	M	L	L	M	L	S	M	M	S
CO4	S	S	S	S	M	M	M	S	S	S	M	M	M	L	M
CO5	S	S	S	M	M	M	S	M	S	M	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Practical**   Paper code: **Paper -6**   Name of the

Paper:**6 - Web Application using C#.NET**   Credits: **2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To know the differences between desktop and web application.
2. To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to to know the differences between desktop application and web application.
2. After studied unit-2, Students are able to construct classes, methods, and access modifier and instantiate objects.
3. After studied unit-3, Students are able create and manipulate GUI components in C# for windows application.
4. After studied unit-4, Students are able to code solutions and compile C# projects within the .NET framework.
5. After studies unit-5, Students are able to build the web application with Database.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Web Configuration File
2. ViewState
3. HTML Control Classes, Control Events, Container and Input Control Classes,
4. Web Control Classes & Control Tags
5. Validation Controls
6. Rich Controls
7. Data Access
8. Components
9. Custom Controls
10. User Controls

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	S	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	S	M	S	S	S
CO3	M	S	M	M	M	S	M	L	S	M	S	S	M	M	M
CO4	M	S	L	L	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core Elective**   Paper code: **Paper -2**Name of the Paper:

A – Human Computer Interaction   Credits: **3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To plan and Develop procedures and life cycle of Human Computer Interaction
2. To analyze product usage through appropriate assessments and testing techniques.
3. To apply the interface structure standards/rules for different users.
4. To encourage communication between understudies of brain science, structure, and software engineering on UI improvement projects.
5. To understand the intensity of HCI in the cutting edge world and the job it can play in advancing value, openness, and progress.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to plan and Develop procedures and life cycle of Human Computer Interaction
2. After studied unit-2, Students are able to analyze product usage through appropriate assessments and testing techniques.
3. After studied unit-3, Students are able to apply the interface structure standards/rules for different users.
4. After studied unit-4, Students are able to encourage communication between understudies of brain science, structure, and software engineering on UI improvement projects.
5. After studies unit-5, Students are able to understand the intensity of HCI in the cutting edge world and the job it can play in advancing value, openness, and progress.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: HCI FOUNDATIONS   **Teaching Hours: 9**

Input–output channels, Human memory, Thinking: reasoning and problem solving, Emotion, Individual differences, Psychology and the design of interactive systems, Text entry devices, Positioning, pointing and drawing, Display devices, Devices for virtual reality and 3D interaction, Physical controls, sensors and special devices, Paper: printing and scanning, Memory, Processing and networks: Design focus - The myth of the infinitely fast machine

UNIT-II:DESIGNING INTERACTION   **Teaching Hours: 9**

Introduction, Models of Interaction, Framework and HCI, Ergonomics, Interaction Styles, Elements of WIMP Interfaces, Interactivity, Paradigms of Interaction, Interaction design basics, Process of design, User focus, Scenarios, Navigation design, Screen design and layout, Iteration and prototyping. Design Rules – Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI Patterns

UNIT-III: EVALUATION TECHNIQUES   **Teaching Hours: 9**

Evaluation, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing and evaluation method. Universal design: Introduction, design principles, Multi-Modal Interaction – Designing websites for screen readers, Choosing the right kind of speech, Apple Newton, Designing for diversity. User Support – Requirements of User support, Approaches to user support, Adaptive help systems, designing user support systems.

UNIT-IV: MODELS AND THEORIES   **Teaching Hours: 9**

Model Human Processor - Working Memory, Long-Term Memory, Processor Timing, Keyboard Level Model - Operators, Encoding Methods, Heuristics for M Operator Placement, What the Keyboard Level Model Does Not Model, Application of the Keyboard Level Model, GOMS - CMN-GOMS Analysis, Modeling Structure, State Transition Networks - Three-State Model, Glimpse Model, Physical Models, Fitts' Law. Guide Lines in HCI - Shneideman's eight golden rules, Norman's Sever principles, Norman's model of interaction, Nielsen's ten heuristics, Heuristic evaluation, contextual evaluation, and Cognitive walk-through.

UNIT-V: COLLABORATION AND COMMUNICATION MODELS Teaching Hours: 9

Face-to-face Communication, Conversation, Text-based Communication, Group working. Task Analysis: Introduction. Differences between task analysis and other techniques, Task

decomposition, Knowledge based analysis, Entity relationship based techniques, Sources of information and data collection, Use of task analysis. Dialog design notations, Diagrammatic notations, Textual dialog notations, Dialog semantics, Dialog analysis and design.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field

Textbook

1. Dix, A., Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. "Human-computer interaction". Pearson Education, Haddington, 2003.

Web References

1. https://www.udacity.com/course/human-computer-interaction--ud400
2. https://www.edx.org/professional-certificate/gtx-human-computer-interaction
3. https://www.tutorialspoint.com/human_computer_interface/index.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	S	M	M	S	M	S	M	M	S
CO2	S	M	S	S	M	M	S	M	M	M	L	M	S	L	M
CO3	M	S	M	M	M	S	M	L	L	S	S	S	M	M	L
CO4	S	M	S	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core Elective**   Paper code: **Paper - 2**Name of the

Paper:**B – Social Information Networks**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To understand the real world applications
2. To comprehend the elements of the social network
3. To demonstrate and envision the social network
4. To understand the role of web in the social network
5. To apply the concept of social network in appropriate application

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to clear understanding of real world applications.
2. After studied unit-2, Students are able to comprehend the elements of the social network
3. After studied unit-3, Students are able to demonstrate and envision the social network
4. After studied unit-4, Students are able to understand the role of web in the social network.
5. After studies unit-5, Students are able to apply the concept of social network in appropriate application.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTRODUCTION   **Teaching Hours: 9**

Introduction to social network analysis – Fundamental concepts in network analysis – social network data – notations for social network data – Graphs and Matrices, Relations and attributes, Analysis of network data, Interpretation of network data.

UNIT-II:MEASURES & METRICS   **Teaching Hours: 9**

Strategic network formation - network centrality measures: degree, betweenness, closeness, eigenvector - network centralization–density – eco-centric and socio-centric-reciprocity – transitivity – ego network – measures for ego network - dyadic network – triadic network - cliques - groups- clustering – search.

UNIT-III: COMMUNITY NETWORKS   **Teaching Hours: 9**

Community structure - modularity, overlapping communities - detecting communities in social networks – discovering communities: methodology, applications - community measurement - evaluating communities – Applications, Models.

UNIT-IV: NETWORK DYNAMICS   **Teaching Hours: 9**

Small world network - Watts–Strogatz networks - Statistical Models for Social Networks – Network evolution models: dynamical models, growing models - Nodal attribute model: exponential random graph models – Preferential attachment - Power Law - random network model: Erdos-Renyi and Barabasi- Albert–Epidemics - Hybrid models of Network Formation.

UNIT-V: THE WORLD WIDE WEB   **Teaching Hours: 9**

Structure of the web - Modelling and aggregating social network data – developing social semantic application – evaluation of web-based social network extraction – Data Mining – Text Mining in social network – Tools – case study.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Structure of the web - Modelling and aggregating social network data – developing social semantic application – evaluation of web-based social network extraction – Data Mining – Text Mining in social network – Tools – case study.

Web References

1. https://www.classcentral.com/course/sna-338
2. https://www.tutorialspoint.com/internet_technologies/social_networking.htm
3. https://www.datacamp.com/community/tutorials/social-network-analysis-python

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	S
CO3	S	S	L	S	S	S	M	L	L	S	L	S	M	M	M
CO4	S	M	M	L	M	M	M	S	M	M	S	M	M	L	L
CO5	M	S	M	M	M	S	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Core Elective**   Paper code: **Paper - 2**Name of the

Paper:**C – Cloud Computing**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To introduce the broad perceptive of cloud architecture and model.
2. To understand the concept of parallel and distributed computing
3. To be familiar with the different technologies.
4. To understand the features of virtualization.
5. To learn to design the trusted cloud Computing system with different cloud platforms

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the broad perceptive of cloud architecture and model.
2. After studied unit-2, Students are able to understand the concept of parallel and distributed computing
3. After studied unit-3, Students are able to understand the different technologies.
4. After studied unit-4, Students are able to understand understand the features of virtualization.
5. After studies unit-5, Students are able to design the trusted cloud computing system with different cloud platforms

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: INTRODUCTION   Teaching Hours: 9

Cloud Computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Historical Developments - Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Building Cloud Computing Environments - Application Development, Infrastructure and System Development, Computing Platforms and Technologies - Amazon Web Services (AWS), Google AppEngine, Microsoft Azure, Hadoop, Force.com and Salesforce.com

UNIT-II:PRINCIPLES OF PARALLEL AND DISTRIBUTED COMPUTING

Teaching Hours: 9

Parallel vs. Distributed Computing , Elements of Parallel Computing - Hardware Architectures for Parallel Processing, Approaches to Parallel Programming, Levels of Parallelism, Laws of Caution, Elements of Distributed Computing - General Concepts and Definitions, Components of a Distributed System, Architectural Styles for Distributed Computing, Models for Inter-Process Communication, Technologies for Distributed Computing - Remote Procedure Call, Distributed Object Frameworks, Service Oriented Computing. Virtualization - Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Execution Virtualization, and Other Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples - Xen: Paravirtualization, VMware: Full Virtualization, Microsoft Hyper-V

UNIT-III: CLOUD COMPUTING ARCHITECTURE   Teaching Hours: 9

Introduction, Cloud Reference Model - Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds - Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges - Cloud Definition, Cloud Interoperability and Standards, Scalability and Fault Tolerance, Security, Trust, and Privacy, Organizational Aspects. High-Throughput Computing: Task Programming - Task Computing, Characterizing a Task, Computing Categories, Frameworks for Task Computing, Task-based Application Models, Aneka Task-Based Programming.

UNIT-IV: ANEKA   Teaching Hours: 9

Cloud Application Platform - Framework Overview, Anatomy of the Aneka Container - From the Ground Up: Platform Abstraction Layer, Fabric Services, Foundation Services, Application Services, Building Aneka Clouds - Infrastructure Organization Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, Cloud Programming and Management - Aneka SDK , Management Tools. Concurrent Computing: Thread Programming- Introducing Parallelism for Single Machine Computation, Programming Applications with Threads - Techniques for Parallel Computation with Threads, Multithreading with Aneka - Introducing the Thread Programming Model, Aneka Thread vs. Common Threads, Programming Applications with Aneka Threads - Aneka Threads Application Model, Domain Decomposition: Matrix MultiplicationFunctional Decomposition: Sine, Cosine, and Tangent.

UNIT-V: CLOUD PLATFORMS IN INDUSTRY   **Teaching Hours: 9**

Amazon Web Services - Compute Services, Storage Services, Communication Services, Google AppEngine - Architecture and Core Concepts, Application Life-Cycle, Cost Model, Observations, Microsoft Azure - Azure Core Concepts - SQL Azure - Windows Azure Platform Appliance. Cloud Applications - Scientific Applications - Healthcare: ECG Analysis in the Cloud - Biology: Protein Structure Prediction - Biology: Gene Expression Data Analysis for Cancer Diagnosis - Geoscience: Satellite Image Processing, Business and Consumer Applications - CRM and ERP - Productivity - Social Networking - Media Applications - Multiplayer Online Gaming. Advanced Topics in Cloud Computing - Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi. Mastering cloud computing: foundations and applications programming. Tata McGraw Hill Education Private Limited, New Delhi , 2013

References

1. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2016.
2. Michael Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearson edition, 2008.
3. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Learning, 2012.

Web References

1. https://www.ibm.com/cloud
2. https://www.javatpoint.com/cloud-computing-tutorial

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	S	S	M	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	L	M	L	S	M	L	M	S	S	S	M	M	L
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Open Elective**   Paper code: **Paper - 2**Name of the
Paper:**A – Principles of Web Design**   Credits:**3**
Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To provide a comprehensive overview of the largest Web Technologies, Hyper Text
   Markup Languages (HTML) and Cascading Style Sheet (CSS).
2. To learn through hands-on, practical instruction that will assist the students to tackle the
   real-world problems they face in building websites today—with a specific focus on
   HTML5 and CSS3.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to learn how to combine basic HTML elements to
   create Web pages.
2. After studied unit-2, Students are able to understand the use of HTML tags and tag
   attributes to control a Web page's appearance.
3. After studied unit-3, Students are able to understand capable to learn how to add absolute
   URLs, relative URLs, and named anchors to Web pages.
4. After studied unit-4, Students are able to understand to gain a good understanding of
   using tables and frames as navigational aids on a Web site.
5. After studies unit-5, Students are able to control appearance webpages by applying style
   sheet

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: HTML INTRODUCTION   **Teaching Hours: 9**

Web page: Static & Dynamic Page - Web Browsers - HTML Editors - Tags – Elements – Attributes - HTML Page Structure - HTML Basic tags: Head – Title – Body. Basic text formatting: Heading tags – Paragraph tag – hr tag - Line break – Pre formatted. Presentational Element - Phrase Elements. List Tags: Ordered List – Unordered List – Definition List.

UNIT-II: LINKS, IMAGES AND TABLES   **Teaching Hours: 9**

Link: Basic link – Directories and directory structure – creating links. Image and Object: Adding image to your site – Adding other objects – Using image as links. Tables: Basic table elements and attributes – Advanced table – Accessibility issues with tables

UNIT-III: FRAMES AND FORMS   **Teaching Hours: 9**

Frames: The Frameset, No Frame Element - Creating Link between Frames - Nested Frameset. Form: Text Fields - Password Field - Radio Button – Checkbox - Submit Button – Reset Button – Button – Select – option – text area.

UNIT-IV: CASCADING STYLE SHEET-I   **Teaching Hours: 9**

Introduction – syntax – ID selector - Class selector – External CSS – Internal CSS – Inline CSS – Font property: Font family - font size – font weight - font style - font variant - font stretch - font size adjust. Text Formatting: Color, text-align, vertical-align, decoration – indent- shadow – transform- letter spacing –word pacing- white space - direction. Text Pseudo Classes: First-letter pseudo class - First line pseudo class.

UNIT-V: CASCADING STYLE SHEET-II   **Teaching Hours: 9**

Background: color – image – repeat – position – attachment. List: style type – style position – style image – marker offset. Table: table specific – border collapse – border spacing – caption side – empty cell – table layout. Outlines: outline width – outline style – outline color. The :focus and :active pseudo classes

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

    a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jon Ducktt. "Web Programming with HTML, CSS and JAVA SCRIPT", Wiley Publishing, 2005. Unit – I : Ch.1 Unit – II : Ch. 2, 3 & 4 Unit - III : Ch.5, 6 Unit – IV : Ch.7 Unit - V : Ch.8

References

1. Joel Skylar. "Principles of Web Design". Singapore : Thomson Asia Pvt. Ltd 2000
2. Powell , Thomas A. "Web Design – The Complete Reference", Tata McGraw Hill Edition 2000
3. Alexis Goldstein, Louis Lazaris, Estelle Weyl. "HTML5 & CSS3 for the Real World".

Web References

1. http://www.w3schools.com/css
2. http://www.tutorialspoint.com/css

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	S	M	M	M	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Open Elective**   Paper code: **Paper - 2**Name of the Paper:
B – Open Source Applications   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To understand the features of PHP
2. To develop the different applications using PHP
3. To demonstrate the applications using PHP with Mysql
4. To understand the concepts of Perl
5. To develop the applications using Perl

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the features of PHP
2. After studied unit-2, Students are able to develop the different applications using PHP.
3. After studied unit-3, Students are able to demonstrate the applications using PHP with Mysql.
4. After studied unit-4, Students are able to understand understand the concepts of Perl.
5. After studies unit-5, Students are able to develop the applications using Perl

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I:BASIC PHP   **Teaching Hours: 9**

Web Server-Apache-PHP-Data Types-User defined Variables-Constants-Operators-Control Structures-User defined Functions-Directory Functions-File system Functions-Arrays-String Functions-Date and Time Functions-Mathematical Functions-Miscellaneous Functions.

UNIT-II:ADVANCED PHP WITH MYSQL   **Teaching Hours: 9**

Exceptions handling-Error Handling Functions-Predefined Variables-Cookies-Sessions-COM-DOM- CURL-SOAP-Classes and Objects-Mail Function-URL Functions. PHP with MySQL: PHP MySQL Functions-Database driven application

UNIT-III: ADVANCED PHP WITH AJAX, SEO AND CMS PHP WITH AJAX

Teaching Hours: 9

Introducing Ajax-Ajax Basics-PHP and Ajax-Database Driven Ajax. PHP with SEO: Basic SEO-Provocative SE Friendly URLs-Duplicate Content- CMS: Wordpress Creating an SEFriendly Blog.

UNIT-IV: BASIC PERL   **Teaching Hours: 9**

Introduction-Scalar Data- Lists and Arrays-Subroutines-Input and Output- Hashes-Regular Expressions-Control Structures-Perl Modules-File Tests

UNIT-IV:ADVANCED PERL   **Teaching Hours: 9**

Directory Operations-Strings and Sorting-Smart Matching-Process Management- Advanced Perl Technique

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

  a. Book review and research paper review, syllabus and curriculum review.
  b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
  c. Workshops, preparing technical term dictionaries from text books and reference books.
  d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
  e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. **Unit 1& 2 :**
   Mehdi Achour, Friedhelm, Betz Antony Dovgal, Nuno Lopes, Hannes Magnusson, Georg Richter, Damien Seguy, Jakub Vrana And several others, "PHP Manual (Download the manual from PHP official website www.php.net)", 1997-2011 the PHP Documentation Group.

2. **Unit 3 :**
   Lee Babin, "Beginning Ajax with PHP From Novice to Professional", Apress, 2007 (Chapters 1, 2, 3 and 4) Jaimie Sirovich and Cristian Darie, "Professional Search Engine Optimization with PHP A Developer's Guide to SEO", Wiley Publishing, Inc., Indianapolis, Indiana ,2007 (Chapters 2, 3, 5 and16)

3. **Unit 4 & 5:**
   Randal L. Schwartz, Tom Phoenix, brian d foy, "Learning Perl, Fifth Edition Making Easy Things Easy and Hard Things Possible", O'Reilly Media, June 2008

References

1. Steven D. Nowicki, Alec Cove, Heow Eide-goodman ,"Professional PHP", Wrox Press, 2004.

Web References

1. www.php.net
2. www.phpclasses.org

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	S	S	S	L	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	L	S	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	L	S	M	L	S	M	M	S	S	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**   Paper type: **Open Elective**   Paper code: **Paper - 2**Name of the Paper:**C**
– Problem Solving Techniques   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To develop problem solving skills with top down design principles.
2. To become competent in algorithm design and program implementation.
3. To develop skills to apply appropriate standard methods in problem solving

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to develop programming techniques required to solve a given problem.
2. After studied unit-2, Students are able to develop problem solving skill using top – down design principles
3. After studied unit-3, Students are able to design an algorithm for a problem.
4. After studied unit-4, Students are able to develop techniques to handle array structure
5. After studies unit-5, Students are able to develop techniques such as searching and sorting

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I:PROGRAMMING TECHNIQUES   **Teaching Hours: 15**

Steps Involved in Computer Programming – Problem Definition – Outlining The Solution – Flow Chart – Developing Algorithms – Efficiency of Algorithms - Analysis of Algorithms.

UNIT-II:FUNDAMENTAL ALGORITHMS   **Teaching Hours: 15**

Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Sine Computation – Fibonacci Sequence – Reversing the Digits of an Integer – Base Conversion – Character to Number Conversion

UNIT-III: FACTORING METHODS   **Teaching Hours: 15**

Finding the Square Root of a Number – Smallest Divisor of an Integer – GCD of Two Integers – Generating Prime Numbers – Computing the Prime Factors of an Integer – Generation of Pseudo-Random Numbers – Raising a Number to a Large Power – Computing the Nth Fibonacci Number.

UNIT-IV: ARRAY TECHNIQUES   **Teaching Hours: 15**

Array Order Reversal – Array Counting orHistogram – Finding the Maximum Number in a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array – Finding the kth Smallest Element – Longest Monotone Subsequence.

UNIT-V:MERGING, SORTING AND SEARCHING   **Teaching Hours: 15**

Two Way Merge - Sorting by Selection, Exchange, Insertion, Partitioning - Binary Search – Hash Searching

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Dromey R G, "How to Solve it by Computer", Prentice Hall of India, 1997

References

1. Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction to Programming and Problem Solving with Pascal", Wiley Eastern Limited, New Delhi, 1982.

2. Harold Abelson and Gerald Sussman with Julie Sussman, " Structure and Interpretation of Computer Programs", MIT Press, 1985

Web References

1. http://nptel.ac.in/courses/106104074/
2. http://javahungry.blogspot.com/2014/06/algorithm-problem-solving-techniques-or-approaches-forsoftware-programmer.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	S
CO3	S	M	L	M	M	M	M	L	S	L	S	S	M	M	S
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Core**   Paper code: **Paper - 7**Name of the

Paper:**Distributed Operating System**   Credit:**4**

Total Hours per Week: **5 Hour**   Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand foundations of Distributed Systems.
2. To introduce the idea of memory management
3. To understand in detail the system level and support required for distributed system.
4. To understand the shell script commands of Unix

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand foundations of Distributed Systems.
2. After studied unit-2, Students are able to get the idea of memory management.
3. After studied unit-3, Students are able to comprehend in detail input and output process
4. After studied unit-4, Students are able to know the concept of multimedia operating system.
5. After studied unit-5, Students are able to understand the concept of security mechanism in distributed operating system

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTRODUCTION   **Teaching Hours: 15**

Operating system concepts - System Calls - OS Structure - Process and Threads: Process - Threads - Inter Process Communication - Scheduling - Classical IPC Problems.

UNIT-II: MEMORY MANAGEMENT   Teaching Hours: 15

Memory abstraction - Virtual Memory - Page Replacement Algorithm - Design issues for paging systems - implementation issues - Segmentation. File Systems: Files - Directories - File System Implementation - File System Management and Optimization.

UNIT-III: INPUT/OUTPUT   Teaching Hours: 15

Principles of I/O hardware - Principles of I/O software - I/O Software Layers - Disks - Clocks - User Interface - Thin Clients - Power Management. Deadlocks: Resources - Introduction - The Ostrich Algorithm - Deadlock Avoidance - Deadlock Prevention - Other issues.

UNIT-IV: MULTIMEDIA OPERATING SYSTEM   Teaching Hours: 15

Introduction - Multimedia Files - Video & Audio compression - Multimedia Process Scheduling - Multimedia File System Paradigms - File placement - Caching - Disk scheduling for Multimedia - Multiple Processor system: Multiprocessor - Multicomputers - Virtualization - Distributed systems.

UNIT-V: SECURITY   Teaching Hours: 15

Security Environment - Basics of Cryptography - Protection Mechanisms - Authentication - Insider Attacks - Exploiting Code Bugs - Malware – Defenses - Case Study: LINUX.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Andrew S. Tanenbaum - Modern Operating System - Prentice Hall of India Pvt Limited, 2001

References

1. Pradeep K. Sinha. - Distributed Operating Systems Concepts and Design - Prentice Hall of India Pvt Limited, 2008

2. Andrew S. Tanenbaum and Maarten Van Steen - Distributed Systems - Prentice Hall of India Pvt Limited, 2002.

Web References

1. https://en.wikipedia.org/wiki/Distributed_operating_system

2. https://www.tutorialspoint.com/distributed-operating-system

3. https://lasr.cs.ucla.edu/classes/188_winter15/readings/distributed_os_notes.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	S	M
CO3	S	S	L	M	M	S	M	L	S	M	S	S	M	M	M
CO4	S	M	M	L	M	S	M	S	M	M	L	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Core**   Paper code: **Paper - 8**Name of the Paper: **XML and Web Services**   Credit:**4**

Total Hours per Week: **5 Hour**   Lecture Hours: **4**Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To examine fundamental XML technology
2. To understand the use of JSON
3. To gain an understanding about the role of web services in commercial applications
4. To learn the emerging standard protocols like SOAP, WSDL and UDDI.
5. To introduce the role of web services in CMS

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental XML technology
2. After studied unit-2, Students are able to understand the use of JSON.
3. After studied unit-3, Students are able to design collaborating web services according to a specification.
4. After studied unit-4, Students are able to know the concept of SOAP, WSDL and UDDI.
5. After studied unit-4, Students are able to know the role of web services in CMS.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	Yes	No	Yes

UNIT - I: XML TECHNOLOGY FAMILY   Teaching Hours: 15

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – DTD – XML Schemas – X-Files – XML processing – DOM – SAX – presentation technologies– XSL – XHTML – voiceXML – Transformation – XSLT – XLINK – XPATH.

UNIT - II: JSON AND JSON SCHEMA   Teaching Hours: 15

Introduction to JSON – JSON Comparison with XML – JSON syntax, Datatypes, Objects – Examples – JSON Schema: Hello World! – The type Keyword – Declaring a JSON schema – JSON schema reference: Type specific keywords – Generic Keywords – Combining schemas – The $schema Keyword – Regular Expression – Structuring a complex schema: Reuse.

UNIT - III: ARCHITECTING WEB SERVICES   Teaching Hours: 15

Business motivations for web services – B2B – B2C – Technical motivations – limitations of CORBA and DCOM – Service-oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime.

UNIT - IV: WEB SERVICE BUILDING BLOCKS: SOAP, WSDL AND UDDI

                                                       Teaching Hours: 15

Introduction to SOAP – Basic SOAP syntax – Sending SOAP messages – Future of SOAP – Introduction to WSDL – Basic WSDL syntax- SOAP binding – Introduction of UDDI – UDDI API – Future of UDDI.

UNIT - V: XML-E-BUSINESS & XML-CONTENT MANAGEMENT SYSTEM

                                                       Teaching Hours: 15

Business to Business – Business to Customer – Different types of B2B Interaction – Components of E-business XML Systems – Enterprise Integration – ebXML – RosettaNet – Introduction of Web Content Management – Components of Content Management System – Role of XML in Web Content Management – Role of metadata (RDF and PRISM) in Web Content Management.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2002.
2. MichealDroettboom, "Understanding JSON Schema Release 1.0", 2013.

References
1. 1 Ethan Cerami, "Web Services Essentials", O'Reilly, Shroff Publishers & Distributors Pvt.Ltd, Fourth Edition, 2002.
2. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall Edition, 2004.

Web References

1. www.w3schools.com/xml/
2. https://www.tutorialspoint.com/xml/
3. www.xmlmaster.org/en/article/d01/
4. www.quackit.com/xml/tutorial/
5. www.tutorialspoint.com/webservices/
6. www.javatpoint.com/web-services-tutorial
7. tutorials.jenkov.com/web-services/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	L	M	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Core**   Paper code: **Paper - 9**Name of the Paper:

Programming using Python   Credits:**3**

Total Hours per Week: **5 Hour**   Lecture Hours: **4** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to explore the fundamental concepts of Python.
2. After studied unit-2, Students are able to understand Basics of Python programming language.
3. After studied unit-3, Students are able to solve simple problems using Python.
4. After studied unit-4, Students are able to understand about modules and packages.
5. After studied unit-5, Students are able to understand about the concept of Object Oriented Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: OVERVIEW   **Teaching Hours: 15**

Introduction to Python: Features of Python - How to Run Python – Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) – Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary-Data type conversion.

UNIT - II: FLOW CONTROL & FUNCTIONS   **Teaching Hours: 15**

Flow Control: Decision Making-Loops-Nested Loops-Types of Loops. Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

UNIT - III: MODULES, PACKAGES AND FILE HANDLING Teaching Hours: 15

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling: Opening a File - Closing a File - Writing to a File – Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

UNIT - IV: OBJECT ORIENTED PROGRAMMING   **Teaching Hours: 15**

Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python Encapsulation - Data Hiding- Inheritance - Method Overriding Polymorphism. Exception Handling: Built-in Exceptions - Handling Exceptions - Exception with Arguments- Raising Exception - User-defined Exception - Assertions in Python

UNIT - V: REGULAR EXPRESSIONS & WEB APPLICATIONS   Teaching Hours: 15

Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - Character Classes - Special Character Classes - Repetition Cases - findall() method - compile() method. Web Application Framework- Django Architecture- Starting development- Case Study: Blogging App.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jeeva Jose and P. SojanLal, "Introduction to Computing and Problem Solving with Python", Khanna Book Publising Co. (P) Ltd., 2016.
2. ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands – On Approach" Universities press (India) Pvt. limited 2016

References

1. Wesley J. Chun, "Core Python Programming", Second Edition, Prentice Hall Publication, 2006.
2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, ISBN: 780071321228

Web References

1. www.learnpython.org/
2. https://www.codecademy.com/learn/python
3. https://www.Codementor.io
4. https://www.Python.org

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Practical** Paper code: **Paper - 7** Name of the Paper: **7 -**

Distributed Operating System   Credit: **2**

Total Hours per Week: **3 Hour**   Lecture Hours: -   Tutorial Hours: **-** Practical Hours: **3**

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Course Objectives

1. To understand foundations of Distributed Systems.
2. To introduce the idea of memory management
3. To understand in detail the system level and support required for distributed system.
4. To understand the shell script commands of Unix

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand foundations of Distributed Systems.
2. After studied unit-2, Students are able to get the idea of memory management.
3. After studied unit-3, Students are able to comprehend in detail input and output process
4. After studied unit-4, Students are able to know the concept of multimedia operating system.
5. After studied unit-5, Students are able to understand the concept of security mechanism in distributed operating system

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

1. Write a shell script to copy, rename and print multiple files using choice menus.
2. Write a shell script to display logged in users who are using high CPU percentage.
3. Write a shell script to list processes based on CPU percentage and memory un-usage.
4. Write a shell script to display total used and free memory space.

5. Write a shell script that takes as command-line input a number n and a word. The program should then print the word n times, one word per line.
6. Write a shell scripts using the following statements. a) While-loop b) For-loop c) If-then-else d) Switch
7. Write a shell script using grep statement.
8. Write a shell script that can search all immediate sub-directories of the currentdirectory for a given file and then quit if it finds one.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	S	M
CO3	S	S	L	M	M	S	M	L	S	M	S	S	M	M	M
CO4	S	M	M	L	M	S	M	S	M	M	L	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Practical**Paper code: **Paper - 8**Name of the Paper:**8 - XML and Web Services**   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To examine fundamental XML technology
2. To understand the use of JSON
3. To gain an understanding about the role of web services in commercial applications
4. To learn the emerging standard protocols like SOAP, WSDL and UDDI.
5. To introduce the role of web services in CMS

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental XML technology
2. After studied unit-2, Students are able to understand the use of JSON.
3. After studied unit-3, Students are able to design collaborating web services according to a specification.
4. After studied unit-4, Students are able to know the concept of SOAP, WSDL and UDDI.
5. After studied unit-4, Students are able to know the role of web services in CMS.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	Yes	No	Yes

1. Simple XML file
2. Validating XML document using Internal DTD, External DTD
3. Validating an XML document using XSD

4. Validating an XML document with attributes using XSD

5. XML with mixed contents

6. Validating an XML document using XSD that implements user defined data type

7. Presenting an XML file using XSLT elements

8. Transforming XML using XSLT and implementing XPath – Nodeset functions

9. Transforming XML using XSLT and implementing XPath – number functions

10. Creating a Web Service and Creating and invoking a Web Service

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	L	M	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Practical** Paper code: **Paper - 9** Name of the Paper:**9 -**

Programming using Python   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to explore the fundamental concepts of Python.
2. After studied unit-2, Students are able to understand Basics of Python programming language.
3. After studied unit-3, Students are able to solve simple problems using Python.
4. After studied unit-4, Students are able to understand about modules and packages.
5. After studied unit-5, Students are able to understand about the concept of Object Oriented Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Working with numbers.

2. Implementing String operations.

3. Working with Tuples and Set.

4. Implementation of Dictionaries.

5. Demonstrating List Operations.

6. Flow Control and Functions.

7. Modules and Packages.

8. File handling.

9. Object Oriented Programming.

10. Exception Handling and Regular Expressions.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type:**Core Elective**Paper code: **Paper - 3**Name of the Paper: **A –**

Blockchain Technology   Credits: **3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2**Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To understand the functions of Blockchain
2. To have clarity in the Concepts, challenges, solutions with respect to Blockchain
3. To understand the facts and myths related to crypto currencies.
4. To apply the concept of Blockchain for various applications.
5. To correlate current Indian scenario in governing crypto currencies in India with Global standard.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the function of Blockchain.
2. After studied unit-2, Students are able to understand the concepts of Blockchain
3. After studied unit-3, Students are able to understand the facts and myths related to cryptocurrencies.
4. After studied unit-4, Students are able to apply the concept of Blockchain for various applications.
5. After studied unit-5, Students are able to understand about the advanced concept of Blockchain.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: BLOCKCHAIN 1.0   **Teaching Hours: 9**

Currency, Technology Stack: Blockchain, Protocol, Currency, the Double-Spend and Byzantine Generals' Computing Problems, How a Cryptocurrency Works, Summary: Blockchain 1.0 in Practical Use, The Blockchain Is an Information Technology.

UNIT – II: BLOCKCHAIN 2.0   **Teaching Hours: 9**

Contracts, Financial Services, Crowdfunding, Bitcoin Prediction Markets, Smart Property, Smart Contracts, Blockchain 2.0 Protocol Projects, Wallet Development Projects, Blockchain Development Platforms and APIs, Blockchain Ecosystem: Decentralized Storage, Communication, and Computation, Ethereum: Turing-Complete Virtual Machine, Dapps, DAOs, DACs, and DASs: Increasingly Autonomous Smart Contracts, The Blockchain as a Path to Artificial Intelligence.

UNIT – III: BLOCKCHAIN 3.0   **Teaching Hours: 9**

Justice Applications Beyond Currency, Economics, and Markets, Blockchain Technology Is a New and Highly Effective Model for Organizing Activity, Distributed Censorship-Resistant Organizational Models, Namecoin: Decentralized Domain Name System, Digital Identity Verification, Digital Art: Blockchain Attestation Services (Notary, Intellectual Property Protection), Blockchain Government.

UNIT – IV: BLOCKCHAIN 3.0   **Teaching Hours: 9**

Efficiency and Coordination Applications Beyond Currency, Economics, and Markets, Blockchain Science: Gridcoin, Foldingcoin, Blockchain Genomics, Blockchain Health, Blockchain Learning: Bitcoin MOOCs and Smart Contract Literacy, Blockchain Academic Publishing: Journalcoin, The Blockchain Is Not for Every Situation, Centralization-Decentralization Tension and Equilibrium.

UNIT – V: ADVANCED CONCEPTS   **Teaching Hours: 9**

Terminology and Concepts, Currency, Token, Tokenizing, Currency Multiplicity: Monetary and Nonmonetary Currencies, Demurrage Currencies: Potentially Inventory and Redistributable, Limitations: Technical Challenges, Business Model Challenges, Scandals and Public Perception, Government Regulation, Privacy Challenges for Personal Records, Overall: Decentralization Trends Likely to Persist.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Melanie. Swan. Blockchain: Blueprint for a new economy. "O'Reilly Media, Inc.", 2015.

References

1. Colm Gordon, "Blockchain Simplified", 2017.
2. Melanie Swan "Blockchain", O'Reilly Media, Inc., 2015.
3. Imran basher, "Mastering Blockchain" Packt publication, 2nd Edition, 2018.

Web References

1. https://www.udemy.com/course/blockchain-and-bitcoin-fundamentals
2. https://www.tutorialspoint.com/blockchain/index.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	L	M	L	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	M	S	M	M	M
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type:**Core Elective**Paper code: **Paper - 3**Name of the Paper:

B – Internet of Things   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To design and Develop IOT based solution for real world applications
2. To realize the evolution of Internet in Mobile Devices, Cloud & Sensor Networks
3. To understand the building blocks of Internet of Things and its characteristics.
4. To understand the concepts of IOT and its application.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to develop IOT based solution for real world applications.
2. After studied unit-2, Students are able to realize the evolution of Internet in Mobile Devices.
3. After studied unit-3, Students are able to understand the building blocks of Internet of Things.
4. After studied unit-4, Students are able to apply the concept of Blockchain for various applications.
5. After studied unit-5, Students are able to understand the IOT and its applications.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: INTRODUCTION   **Teaching Hours: 9**

Introduction and Definition of Internet of Things, IoT Growth – A Statistical View, Application Areas of IoT, Characteristics of IoT, Things in IoT, IoT Stack, Enabling Technologies, IoT Challenges, IoT Levels, Is Cyber Physical System the same as IoT? Is WSN the same as IoT?

UNIT - II: INTRODUCTION TO SENSORS, MICROCONTROLLERS, AND THEIR INTERFACING   **Teaching Hours: 9**

Introduction to Sensor Interfacing, Types of Sensors, Controlling Sensors through Webpages, Microcontrollers: A Quick Walkthrough, ARM. Protocols for IoT – Messaging and Transport Protocols, Messaging Protocols (MQTT, CoAP, AMQP), Transport Protocols (Li-Fi, BLE).

UNIT - III: PROTOCOLS FOR IOT   **Teaching Hours: 9**

Addressing and Identification, Internet Protocol Version 4 (IPv4), Internet Protocol Version 6 (IPv6), Uniform Resource Identifier (URI). Cloud for IoT - Introduction, IoT with Cloud – Challenges, Selection of Cloud Service Provider for IoT Applications: An Overview, Introduction to Fog Computing, Cloud Computing: Security Aspects, Case Study: How to use Adafruit Cloud? Application of Data Analytics in IOT.

UNIT - IV: APPLICATION BUILDING WITH IOT   **Teaching Hours: 9**

Introduction, Smart Perishable Tracking with IoT and Sensors, Smart Healthcare – Elderly Fall Detection with IoT and Sensors, Smart Inflight Lavatory Maintenance with IoT, IoT–Based Application to Monitor Water Quality, Smart Warehouse Monitoring – Let the Drone Fly for You, Smart Retail – IoT Possibilities in the Retail Sector, Prevention of Drowsiness of Drivers by IoT-Based Smart Driver Assistance Systems, System to Measure Collision Impact in an Accident with IoT.

UNIT - V: GETTING FAMILIARIZED WITH ARDUINO IDE   **Teaching Hours: 9**

Architecture, Arduino Programming, A Simple Application, Arduino Playground. Getting Familiarized with Raspberry Pi - Story behind Raspberry Pi, Architecture, Compatible Peripherals, Add-Ons, and Accessories, Operating System for Raspberry Pi, Setting up Raspberry Pi, Initial Configuration for Raspberry Pi, Linux Based Softwares in Raspberry Pi, Application Development with Raspberry-Pi – A Quick Walk Through.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram, Internet of Things, Wiley, India, 2019.

References

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1stEdition, VPT, 2014.

2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

Web References

1. https://www.coursera.org/courses?query=iot
2. https://online.stanford.edu/courses/xee100-introduction-internet-things
3. https://www.tutorialspoint.com/internet_of_things/index.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type:**Core Elective**Paper code: **Paper - 3**Name of the Paper:

C – Network Security   Credits:**3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. Identify some of the driving factors needed for network security
2. Identify and classify attacks and threats
3. Compare and contrast symmetric and asymmetric encryption systems.
4. Identify the web systems vulnerable to attack.
5. Use appropriate secure mail applications and security protocols

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to identify some of the deriving factors needed for network security.
2. After studied unit-2, Students are able to identify and classify attacks and threats.
3. After studied unit-3, Students are able to compare and contrast symmetric and asymmetric encryption.
4. After studied unit-4, Students are able to identify the web systems vulnerable to attack.
5. After studied unit-5, Students are able to use appropriate secure mail applications and security protocols.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT- I: SECURITY IN COMPUTING ENVIRONMENT   **Teaching Hours: 9**

Need for Security - Security Attack - Security Services - Information Security - Methods of Protection. Basics of Cryptography: Terminologies used in Cryptography - Substitution Techniques- Transposition Techniques. Encryption and Decryption: Characteristics of Good Encryption Technique -Properties of Trustworthy Encryption Systems - Types of Encryption Systems - Confusion and Diffusion -Cryptanalysis**.**

UNIT-II: SYMMETRIC KEY ENCRYPTION   **Teaching Hours: 9**

Data Encryption Standard (DES) Algorithm - Double and Triple DES - Security of the DES - Advanced Encryption Standard (AES) Algorithm - DES and AES Comparison. Public Key Encryption: Characteristics of Public Key System - RSA Technique - Key Exchange -Diffie-Hellman Scheme - Cryptographic Hash Functions - Digital Signature – Certificates - Certificate Authorities.

UNIT - III: IP SECURITY   **Teaching Hours: 9**

Overview of IP Security (IPSec) - IP Security Architecture - Modes of Operation - Security Associations (SA) - Authentication Header (AH) - Encapsulating Security Payload (ESP) - Internet Key Exchange. Web Security: Web Security Requirements - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - Secure Electronic Transaction (SET).

UNIT - IV: ELECTRONIC MAIL SECURITY   **Teaching Hours: 9**

Pretty Good Privacy - Threats to E-Mail - Requirements and Solutions - Encryption for Secure E-Mail - Secure E-Mail System. Firewalls: Firewalls – Types - Comparison of Firewall Types - Firewall Configurations - Planning and Enforcing Security Policies: Planning Security Policies - Risk Analysis - Security Policies for an Organization - External Security.

UNIT-V: PROTECTION OF COMPUTING RESOURCES   **Teaching Hours: 9**

Secure Programs - Non-malicious Program Errors - Viruses and Other Malicious Code - Targeted Malicious Code - Methods of Control. Security Features in Operating System: Objects to be Protected - Protection Methods of Operating Systems - Memory Protection - File Protection - User Authentication.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

Textbook

1. William Stallings. Cryptography and network security, 4/E. Pearson Education India, 2006.

References

1. Singh, "Network Security and Management", 2nd ed., PHI.

Web References

1. https://alison.com/course/introduction-to-computer-network-security
2. https://www.udemy.com/course/certified-secure-netizen/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	M
CO3	S	M	L	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Open Elective**   Paper code: **Paper - 3**Name of

the Paper: **A – Programming using C**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2**Tutorial Hours:**1**Practical Hours: **-**

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Course Objectives

1. To identifysituations where computational methods and computers would be useful.

2.   To enhance their analyzing and problem-solving skills and use the same for writing programs in C.

3. To develop logics and that will help them to create programs, applications in C.

4. To identify programming task involvedin a given computational problem.

5. To approachthe programming tasks using techniques learned and writepseudo-code.

6. To choosethe right data representation formats based on the requirements of the problem.

7. To usethe comparisons and limitations of the various programming constructs and choose the right one for the task in hand.

8. To enter the program on a computer, edit, compile, debug, correct, recompile and run it. To identify tasks in which the numerical techniques learned are applicable and apply them to write programs

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the concept of data types and operators.

2. After studied unit-2, Students are able to understand the concept of arrays and functions.

3. After studied unit-3, Students are able to understand the concept of pointers.

4. After studied unit-4, Students are able to understand the concept of storage classes and unions.

5. After studied unit-5, Students are able to understand file management in c language.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: DATA TYPES, OPERATORS AND STRUCTURES   **Teaching Hours: 9**

Structure of a C program – Basic data types (int, float, char, double, void) – constants and variables (variable declaration, integer, real,float, character, variables) – operators and expressions (arithmetic operators, relational operators, logical operators, bitwise operators, type casting, type conversion, enumerated data type, typedef) – Control Constructs (if, switch, while, do…while, for, break and continue, exit() function, goto and label).

UNIT – II: ARRAYS AND FUNCTIONS   **Teaching Hours: 9**

Arrays (declaration, one and two dimensional arrays) - Character Arrays and Strings. Function Fundamentals (General form, Function Definition, Function arguments, return value) – Parameter passing: call-by-value and call-by-reference – Recursion – Passing Arrays to Function – Passing Strings to Function.

UNIT – III: POINTERS   **Teaching Hours: 9**

Understanding Pointers – Accessing the Address of a Variable – Declaring the Pointer Variables – Initialization of Pointer Variables – Accessing a Variable through its Pointer – Pointer Expressions – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments – Functions returning Pointers – Pointers to Functions.

UNIT – IV: STORAGE CLASSES, STRUCTURES AND UNIONS   **Teaching Hours: 9**

Scope rules (Local variables and global variables, scope rules of functions) -Type modifiers and storage class specifier.

Structures – Basics of Structure – Declaring of Structure – Referencing Structure elements - Array of Structures – Nesting of Structures - Passing Structures to function – Pointers and Structures - Unions.

UNIT – V: FILE MANAGEMENT IN C   **Teaching Hours: 9**

Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Command Line Arguments.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. E.Balagurusamy, "Programming in ANSI C", Seventh Edition, McGraw Hill Education Private Limited, NewDelhi: 2017.

References

1. YashavantKanetkar, "Let us C", BPB Publications, Tenth Edition - New Delhi: 2010
2. Ashok N.Kamthane, "Programming in C", Second Impression, Pearson: 2012.

Web References

1. http://www.c4learn.com/?gclid=COK1y6nHk7wCFcUA4godmlgAKA/
2. http://www.cprogramming.com/tutorial/c-tutorial.html/
3. http://www.tutorialspoint.com/cprogramming/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	S
CO3	S	S	M	M	M	S	M	L	M	S	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	M	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Open Elective**   Paper code: **Paper - 3**Name of
the Paper: **B – Programming using C++**   Credits:**3**
Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand object oriented programming and advanced C++ concepts.
2. To understand the various functions and arguments in object oriented programming.
3. To understand the classes and objects in C++.
4. To be familiar with inheritance and polymorphisms.
5. To be able to understand the concepts of files and exception handling

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand Basic concepts of C++.
2. After studied unit-2, Students are able to understand the concept functions.
3. After studied unit-3, Students are able to understand the concept of Classes and Objects.
4. After studied unit-4, Students are able to understand the about inheritance and polymorphism.
5. After studied unit-5, Students are able to understand concept of exception handling files.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: BASIC CONCEPTS   Teaching Hours: 9

A look at Procedure Oriented Programming – Object Oriented Programming Paradigm – Basic Concepts of Object Oriented Programming – Benefits of OOP – Object Oriented Languages – Beginning With C++ - A Simple C++ Program – Structure of C++ Program – Tokens – Basic Data Types – Scope Resolution Operator – Manipulators – Expressions – Control Structures.

UNIT – II: FUNCTIONS   Teaching Hours: 9

Functions – Function Prototyping – Call by Value – Call by Reference – Inline Functions – Default Arguments – Passing Arrays to Functions – Passing Structures to Functions – Recursion – Pointers – Function Overloading – Friend Functions.

UNIT – III: CLASSES AND OBJECTS   Teaching Hours: 9

Defining Member Functions – Private Member Function – Data Members – Member Functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Constructors and Destructors – Object Pointers.

UNIT – IV: INHERITANCE AND POLYMORPHISM   Teaching Hours: 9

Operator Overloading – Inheritance – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Virtual Base Classes – Abstract Classes – Polymorphism – Virtual Functions.

UNIT – V: EXCEPTION HANDLING AND FILES   Teaching Hours: 9

Exception Handling – File I/O Stream – File Stream Operations – Opening and Closing a File – Sequential Access**Internal Assessment Methods:** (The following items may be brought under test, seminar and assignment framework)

  a. Book review and research paper review, syllabus and curriculum review.
  b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
  c. Workshops, preparing technical term dictionaries from text books and reference books.
  d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
  e. Forming digital library: collecting text and reference books, course material.
  f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. E Balagurusamy, "Object Oriented Programming with C++", 5th Edition, McGraw Hill Education India Pvt Ltd. 2012.

References

1. Andrew C. Staugaard JR, "Structured and Object-Oriented Problem Solving Using C++", 3rd Edition, Prentice Hall, 2002.

2. Herbert Schildt, "C++: The Complete Reference", 3rd Edition, Tata McGraw Hill, 1999.

Web References

1. http://www.doc.ic.ac.uk/~wjk/C++Intro/

2. http://www.ideone.com/

3. http://www.compilr.com/c-compiler

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	S	M	S	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	S	M	S	S	M
CO3	S	S	M	M	S	S	M	L	L	M	M	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**   Paper type: **Open Elective**   Paper code: **Paper - 3**Name of

the Paper: **C – Programming using Python**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2**Tutorial Hours: **1**   Practical Hours: **-**

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental concept of python.
2. After studied unit-2, Students are able to understand the concept functions.
3. After studied unit-3, Students are able to understand the concepts of file handling.
4. After studied unit-4, Students are able to understand the concepts of object oriented programming.
5. After studied unit-5, Students are able to understand concept of Regular Expressions.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: OVERVIEW   **Teaching Hours: 9**

Introduction to Python: Features of Python - How to Run Python – Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) – Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary-Data type conversion.

UNIT - II: FLOW CONTROL & FUNCTIONS   Teaching Hours: 9

Flow Control: Decision Making-Loops-Nested Loops-Types of Loops. Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

UNIT - III: MODULES, PACKAGES AND FILE HANDLING   Teaching Hours: 9

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling: Opening a File - Closing a File - Writing to a File – Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

UNIT - IV: OBJECT ORIENTED PROGRAMMING   Teaching Hours: 9

Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python Encapsulation - Data Hiding- Inheritance - Method Overriding Polymorphism. Exception Handling: Built-in Exceptions - Handling Exceptions - Exception with Arguments- Raising Exception - User-defined Exception - Assertions in Python

UNIT - V: REGULAR EXPRESSIONS & WEB APPLICATIONS   Teaching Hours: 9

Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - Character Classes - Special Character Classes - Repetition Cases - findall() method - compile() method. Web Application Framework- Django Architecture- Starting development- Case Study: Blogging App.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jeeva Jose and P. SojanLal, "Introduction to Computing and Problem Solving with Python", Khanna Book Publising Co. (P) Ltd., 2016.

2. ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands – On Approach" Universities press (India) Pvt. limited 2016.

References

1. Wesley J. Chun, "Core Python Programming", Second Edition, Prentice Hall Publication, 2006.

1. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, ISBN: 780071321228

Web References

1. www.learnpython.org/

2. https://www.codecademy.com/learn/python

3. https://www.Codementor.io
4. https://www.Python.org

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Core**Paper code: **Paper - 10**

Name of the Paper: **Mobile Application Development**   Credits:**4**

Total Hours per Week: **5 Hour**   Lecture Hours: **4**Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To know the basis of Android application and development environment
2. To able to develop simple and professional application
3. To get ready for the job opportunity in mobile application development

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about the mobile application development environment.
2. After studied unit-2, Students are able to understand about fragments
3. After studied unit-3, Students are able to know about UI using views.
4. After studied unit-4, Students are able to understand about handling pictures
5. After studied unit-5, Students are able to understand concept of Telephony and SMS in android.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: INTRODUCTION TO ANDROID   **Teaching Hours: 15**

History of Android Platform- Android APIs- Android Architecture Application Framework- Features of Android- Android Applications- Application Components - Manifest File-

Downloading and Installing Android and Android SDK - Setting up Android Virtual and physical Device - Exploring the Development Environment - The Java Perspective Using Eclipse - DDMS Perspective - Command-Line Tools- Developing and Executing the First Android Application - Using Eclipse IDE to Create an Application - Running Your Application - Exploring the Application - Using Command - Line Tools.

UNIT – II: ACTIVITIES, INTENTS AND FRAGMENTS   Teaching Hours: 15

Working with Activities- Creating an Activity- Starting an Activity – Managing the Life cycle of an Activity - Applying Themes and Styles to an Activity- Displaying a Dialog in the Activity - Hiding the title of the activity- Using Intents-Exploring Intent Objects- Exploring Intent Resolution- Exploring Intent Filters - Resolving Intent Filter Collision - Linking the Activities Using Intent - Obtaining Results from Intent – Passing Data Using an Intent Object- Fragments - Hiding Title Bar and Screen Orientation - Fragment Implementation - Finding Fragments - Adding, Removing and Replacing Fragments - Finding Activity Using Fragment - Using the Intent Object to Invoke Built-in Application..

UNIT - III: UI USING VIEWS AND VIEW - GROUPS   Teaching Hours: 15

Working with View Groups – Linear Layout – Relative Layout – Scroll Layout – Table Layout – Frame Layout – Tab Layout using the Action Bar – Working with Views – Text – Edit Text – Button – Radio Button – Check Box – Image Button – Toggle Button – Rating Bar – Binding Data with Adapter View Class – List View – Spinner – Gallery – Designing the Auto Text Complete View – Screen Orientation – Anchoring the Views of Current Activity – Handling UI Events – Handling User Interaction with Activities and Views – Specialized Fragments – List Fragment – Dialog Fragment – Preference Fragment – Creating Menus, Option Menus, Context Menu and Sub Menu.

UNIT - IV: HANDLING PICTURES AND MENUS WITH VIEWS AND STROING THE DATA   Teaching Hours: 15

Working with Image Views – Displaying Images in the Gallery View – Displaying Images in the Grid View – Using the Image Switcher View- Designing Context Menu for Image View- Using the Analog-Clock and Digital Clock Views – Embedding Web Browser in an Activity - Notifying the User Creating the Toast Notification - Creating the Status Bar Notification-

Creating the Dialog Notification - Introducing the Data Storage Options - Using Preferences - Using the SQLite Database Creating the Database - Executing the Database Operations.

UNIT - V: EMAILING, TELEPHONY AND SMS IN ANDROID   Teaching Hours: 15

Building an Application to Send Email - Handling Telephony - Displaying Phone InformationApplication Receiving Phone Calls – Making Outgoing Phone Calls Application - Handling SMS Sending SMS Using SMS Manager - Sending SMS Using Intent - Receiving SMS Using the Broadcast Receiver Object- Role of Default SMS Providers - . Publishing Android Application: Export android application – Google play store registration.

Supplementary Learming: Building Mobile Applications using Xamarin

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Pradeep Kothari, "Android Application Development (with kitkat support) Black Book", Kogent Learning Solution Inc., Dreamtech Press India Pvt. Ltd, Wiley Publications.

2. Sayed Y. Hashimi, SatyaKomatineni, Dave MacLean, "Pro Android 2", 2010 Edition, Wiley publications.

References

1. Reto Meier,"Professional Android Application Development",2009   Edition, Willy Publication.
2. ZigurdMednieks, Laird Dornin, G. Blake Meike,and Masumi Nakamura, "Programming Android", OReilly publications.

Web References
1. www.tutorialspoint.com
2. www.javatpoint.net
3. www.mkyong.com
4. www.java2s.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	L	S	M	M	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	L	S
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Core**   Paper code: **Paper - 11**

Name of the Paper: **Software Project Management**   Credits:**4**

Total Hours per Week: **6 Hour**   Lecture Hours: **4** Tutorial Hours: **2**Practical Hours: **-**

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Course Objectives

1. To provide sound knowledge in Project Management.
2. To understand the importance of requirement gathering
3. To explore different models in Software Development
4. To know the workflow of a Project
5. To identify various actors in the activity

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the introduction to software project management.
2. After studied unit-2, Students are able to learn about project planning.
3. After studied unit-3, Students are able to know about effort estimation and activity planning for the project.
4. After studied unit-4, Students are able to understand about risk management.
5. After studied unit-5, Students are able to learn how to work in groups.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT I: INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

Teaching Hours: 18

Introduction:Project – Software Projects vs other types of Project – Activities Covered by SPM – Some Ways of Categorizing Software Projects – Stakeholders, Setting Objectives – The Business Case - Project Success and Failure - Management and Management Control. Project Evaluation:A Business Case – Project Portfolio Management – Evaluation of Individual Projects – Cost Benefit Evaluation – Risk Evaluation.

UNIT II: PROJECT PLANNING AND SELECTION OF PROJECT APPROACH

Teaching Hours: 18

Project Planning - Introduction to Step Wise Project Planning – Step 0 to Step 10. Selection of an Appropriate Project Approach -Introduction – Build or Buy – Choosing Methodologies and Technologies – Software Processes and Process Models – Choice of Process Models – The Waterfall Model– Prototyping – other ways of categorizing prototype- Agile Methods – Extreme Programming - Selecting the Most Appropriate Process Model.

UNIT III: EFFORT ESTIMATION AND ACTIVITY PLANNING   Teaching Hours: 18

Effort Estimation – Introduction –Estimates – Problems with Over and Under-estimate – Basis for Software Estimating – Effort Estimation Techniques – Bottom-up Estimating – Top-down Approach and Parametric Models – Expert Judgment - Estimating by Analogy – Albrecht Function Point Analysis – Function Mark II – COCOMO & COCOMO II – Cost Estimation – Staffing Pattern. Activity Planning –Introduction – Objectives of Activity Planning – When to plan – Project Schedules – Project and Activities – Sequencing and Scheduling Activities – Networking Planning Models – Formulating a Network Model– Activity on Arrow Networks.

UNIT IV: RISK MANAGEMENT, RESOURCE ALLOCATION AND MONITORING

Teaching Hours: 18

Risk Management –Risk – Categories of Risk – A Framework for Dealing with Risk – Risk Identification – Risk Assessment – Risk Planning – Risk Management. Resource Allocation – Introduction – The Nature of Resources – Identifying Resource Requirements – Scheduling Resources. Monitoring –Creating the Framework – Collecting the Data – Review and Project Termination Review – Visualizing Progress – Cost Monitoring and Earned Value Analysis – Getting the Project Back to Target – Change Control – SCM.

UNIT V: MANAGING PEOPLE AND WORKING IN TEAMS   **Teaching Hours: 18**

Managing People –Understanding Behavior – Organizational Behavior – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – The Oldham-Hackman Job Characteristics Model – Stress – Health and Safety. Working in Teams –Introduction – Becoming a Team – Decision Making – Organization and Team Structures – Coordination Dependencies – Dispersed and Virtual Teams – Communication Genres – Communication Plans – Leadership.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. BOB Huges, Mike Cotterell, Rajib Mall "Software Project Management", McGraw Hill, Fifth Edition,2011.

References

1. Futrell, "Quality software Project management", Pearson Education India.
2. Royce, "Software Project Management", Pearson Education India.

Web References

1. https://www.lynda.com/Project-Management-training-tutorials/39-0.html
2. www.rspa.com/spi/project-mgmt.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	M	M	M	S	L	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Practical** Paper code: **Paper - 10**

Name of the Paper:**10 - Mobile Application Development**   Credits:**2**

Total Hours per Week: **3 Hour**   Lecture Hours: -   Tutorial Hours: **-**Practical Hours: **3**

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Course Objectives

1. To know the basis of Android application and development environment
2. To able to develop simple and professional application
3. To get ready for the job opportunity in mobile application development

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about the mobile application development environment.
2. After studied unit-2, Students are able to understand about fragments
3. After studied unit-3, Students are able to know about UI using views.
4. After studied unit-4, Students are able to understand about handling pictures
5. After studied unit-5, Students are able to understand concept of Telephony and SMS in android.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Simple Android Application.
2. Working with Activity
3. Working with Fragments
4. UI Controls (Text, Edit Text, Button, Radio Button)

5. UI Controls (Check Box, and Layout, Image Button, Toggle Button)
6. UI Controls (Rating Bar, List View, Gallery)
7. CRUD Operations Using SQLite DB
8. Emailing
9. Telephony
10. SMS

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	L	S	M	M	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	L	S
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Core Elective**   Paper code: **Paper - 4**

Name of the Paper: **A - Big Data Analytics** Credits: **3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand the needs for Big Data and its environments.
2. To learn the basic requirements of Big Data Technologies.
3. To expose the knowledge of MapReduce programming framework(Hadoop).
4. To be familiar with NoSQL DB's Cassandra and MongoDB
5. To understand Hive and Pig technologies for analyzing the Big Data

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about big data.
2. After studied unit-2, Students are able to learn about big data analytics.
3. After studied unit-3, Students are able to know about concepts of database.
4. After studied unit-4, Students are able to understand the concept of Hadoop foundation and analytics.
5. After studied unit-5, Students are able to learn about hadoopmapreduce and yarn framework.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: INTRODUCTION TO BIG DATA   Teaching Hours: 9

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   Teaching Hours: 9

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

UNIT – III: BIG DATA TECHNOLOGIES AND DATABASES   Teaching Hours: 9

Introduction to NoSQL, Uses, 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   Teaching Hours: 9

History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

UNIT – V: HADOOPMAPREDUCE AND YARN FRAMEWORK   Teaching Hours: 9

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

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 016

References

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.

Web References

1. http://strata.oreilly.com/2010/09/the-smaq-stack-for-big-data.html

2. http://blogs.computerworld.com/18840/big_data_smaq_down_storage_mapreduce_and_query

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	S	S	M	S	L	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

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Course Objectives

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence
2. To provide a basic exposition to the goals and methods of Artificial Intelligence
3. To enable the student to apply these techniques in applications which involve perception, reasoning and learning

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about artificial intelligence.
2. After studied unit-2, Students are able to learn about heuristic search techniques.
3. After studied unit-3, Students are able to know about predicate logic.
4. After studied unit-4, Students are able to understand about representing knowledge using rules.
5. After studied unit-5, Students are able to learn about game playing.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: INTRODUCTION   **Teaching Hours: 9**

AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems

UNIT – II: HEURISTIC SEARCH TECHNIQUES   Teaching Hours: 9

Generate and Test - Hill Climbing- Best-First - Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

UNIT – III: USING PREDICATE LOGIC   Teaching Hours: 9

Representing simple facts in logic - Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

UNIT – IV: REPRESENTING KNOWLEDGE USING RULES   Teaching Hours: 9

Procedural Vs Declarative knowledge – Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT – V: GAME PLAYING   Teaching Hours: 9

The minimax search procedure – Expert System - Perception and Action

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.

References

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures and Strategies for Complex Problem Solving", Pearson Education / PHI, 2002.

Web References
1. https://www.tutorialspoint.com/artificial_intelligence/
2. https://learn.saylor.org/course/view.php?id=96
3. https://in.udacity.com/course/intro-to-artificial-intelligence--cs271

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	M	M	M	S	M	L	L	S	M	S	M	M	S
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Core Elective**   Paper code: **Paper - 4**

Name of the Paper: **C – Machine learning**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To introduce the concepts likeconceptualization and summarization of big data and machine learning

2. Introduction to the course, recap of linear algebra and probability theory basics.

3. Bayesian Classification: Naive Bayes, Parameter Estimation (ML, MAP), Sequential Pattern Classification.

4. Non-parametric Methods: k-Nearest Neighbours Discriminative Learning models: Logistic Regression, Perceptrons, Artificial Neural Networks, Support Vector Machines.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about machine learning.

2. After studied unit-2, Students are able to learn about types of learning.

3. After studied unit-3, Students are able to learn about learning algorithms.

4. After studied unit-4, Students are able to understand about unsupervised and learning algorithms

5. After studied unit-5, Students are able to learn about IOT machine learning.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: INTRODUCTION TO MACHINE LEARNING   **Teaching Hours: 9**

Learning Systems- Goals and Applications- Aspects of developing a learning system- Training data- Linear Perceptrons as Neurons- Neural Nets- Working- Layers- Activation Functions- Feed Forward Neural Networks- Limitations- DBNs- Deep learning for Bigdata- Local minima- rearranging neurons- Spurious local minima- Comparison of AI- Machine learning & Deep learning.

UNIT – II: TYPES OF LEARNING   **Teaching Hours: 9**

Supervised Learning- Unsupervised Learning- Case Study- Classification- MLP in Practice- Overfitting-Linear and non-linear discriminative- decision trees- Probabilistic- K-nearest neighbor learning algorithm- curse of dimensionality.

UNIT – III: LEARNING ALGORITHMS   **Teaching Hours: 9**

Logistic Regression- Perceptron- Exponential Family- Generative Learning algorithms- Gaussian Discriminant Analysis- Naïve Bayes- SVM-Kernels- Model Selection- Bagging- Boosting- Evaluating and debugging- Classification errors.

UNIT – IV: UNSUPERVISED AND LEARNING ALGORITHMS   **Teaching Hours: 9**

Clustering- K-means Clustering- EM algorithm- Mixture of Gaussians- Factor Analysis- Principal and Independent Component Analysis- latent Semantic Indexing- Spectral or sub-space clustering.

UNIT – V:REINFORCEMENT LEARNING, IOT AND MACHINE LEARNING

          Teaching Hours: 9

Markov Decision Processes- Bellman Equations- Value Iteration and Policy Iteration- Linear quadratic regulation- LQG Q-Learning- Policy versus value learning- POMDPS- IoT- Recent trends- various models. Case Study: Object Detection and smudging using gradient Descent, Spam Filtering based on Text Classification

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Rajiv Chopra, ”Machine Learning”, Khanna Publications, New Delhi, 2018.
2. V.K. Jain, ”Machine Learning”, Khanna Publications, New Delhi, 2018.

References

1. Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 2013.
2. Pattern Classification, 2nd Ed., Richard Duda, Peter Hart, David Stork, John Wiley & Sons, 2001.
3. Pattern Recognition and Machine Learning, Christopher Bishop, Springer 2006.

Web References

1. https://www.datacamp.com/courses/introduction-to-machine-learning-with-r
2. https://elitedatascience.com/learn-machine-learning
3. https://www.analyticsvidhya.com/learning-path-learn-machine-learning/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	S	S	M	M	L	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	S	L	S	M	M	S
CO4	S	M	S	L	S	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Open Elective**   Paper code: **Paper - 4**

Name of the Paper:**A – Cyber Security**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2**Tutorial Hours: **1**   Practical Hours: **-**

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Course Objectives

1. To understand the cyber threats and their Impact
2. To have an awareness towards cybercrimes and legal impact against them
3. To avoid becoming a Victim to cyber threats
4. To assess risks and weakness in security policies
5. To respond to security alerts and identify flaws in systems and networks

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about cyberoffenses.
2. After studied unit-2, Students are able to learn about types tools and methods using in cybercrime
3. After studied unit-3, Students are able to computer forensics.
4. After studied unit-4, Students are able to understand about cyber security.
5. After studied unit-5, Students are able to learn about cybercrime.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT - I: INTRODUCTION TO CYBERCRIME AND CYBEROFFENSES

Teaching Hours: 9

Introduction, Cybercrime - Definition and Origins of the Word - Cybercrime and Information Security - Cybercriminals - Classifications of Cybercrimes - The Legal Perspectives - Cybercrimes: An Indian Perspective - Cybercrime and the Indian ITA 2000 - A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyberoffenses: How Criminals Plan Them – Introduction - How Criminals Plan the Attacks - Social Engineering – Cyberstalking - Cybercafe and Cybercrimes - Botnets: The Fuel for Cybercrime - Attack Vector - Basics of Cloud Computing.

UNIT - II: TOOLS AND METHODS USED IN CYBERCRIME   Teaching Hours: 9

Introduction - Proxy Servers and Anonymizers – Phishing - Password Cracking - Keyloggers and Spywares - Virus and Worms - Trojan Horses and Backdoors – Steganography - DoS and DDoS Attacks - SQL Injection - Buffer Overflow – Phishing - Identity Theft (ID Theft).

UNIT - III: UNDERSTANDING COMPUTER FORENSICS   Teaching Hours: 9

Introduction - Historical Background of Cyberforensics - Digital Forensics Science - The Need for Computer Forensics - Cyberforensics and Digital Evidence - Forensics Analysis of E-Mail - Digital Forensics Life Cycle, Chain of Custody Concept - Network Forensics - Approaching a Computer Forensics Investigation - Setting up a Computer Forensics Laboratory: Understanding the Requirements - Computer Forensics and Steganography -   Relevance of the OSI 7 Layer Model to Computer Forensics - Forensics and Social Networking Sites: The Security/Privacy Threats - Computer Forensics from Compliance Perspective - Challenges in Computer Forensics - Special Tools and Techniques - Forensics Auditing – Antiforensics.

UNIT - IV: CYBERSECURITY   Teaching Hours: 9

Organizational Implications – Introduction - Cost of Cybercrimes and IPR Issues: Lessons for Organizations - Web Threats for Organizations: The Evils and Perils - Security and Privacy Implications from Cloud Computing - Social Media Marketing: Security Risks and Perils for Organizations - Social Computing and the Associated Challenges for Organizations - Protecting People's Privacy in the Organization - Organizational Guidelines for Internet Usage - Safe

Computing Guidelines and Computer Usage Policy - Incident Handling: An Essential Component of Cyber security - Forensics Best Practices for Organizations - Media and Asset Protection: Best Practices for Organizations - Importance of Endpoint Security in Organizations.

UNIT - V: CYBERCRIME AND CYBERTERRORISM   **Teaching Hours: 9**

Social, Political, Ethical and Psychological Dimensions – Introduction - Intellectual Property in the Cyberspace - The Ethical Dimension of Cybercrimes - The Psychology - Mindset and Skills of Hackers and Other Cybercriminals - Sociology of Cybercriminals - Information Warfare: Perception or An Eminent Reality? Cybercrime: Illustrations - Examples and Mini-Cases - Real-Life Examples - Mini-Cases - Illustrations of Financial Frauds in Cyber Domain - Digital Signature-Related Crime Scenarios - Digital Forensics Case Illustrations - Online Scams. Cybercrimes - Legal Perspectives - Why Do We Need Cyberlaws: The Indian Context - The Indian IT Act - Challenges to Indian Law and Cybercrime Scenario in India - Consequences of Not Addressing the Weakness in Information Technology Act - Digital Signatures and the Indian IT Act - Amendments to the Indian IT Act - Cybercrime and and Punishment, Cyberlaw, Technology and Students: Indian Scenario.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jennifer L, Bayuk J, Heale P, Rohmeyer, Marcus Sachs, Jeffrey Schmidt and Joseph Weiss "Cyber ecurity Policy Guidebook", John Wiley & Sons ,2012.

References

1. Rick Howard, "Cyber Security Essentials", Auerbach Publications, 2011.
2. Richard A, Clarke, Robert Knake, "Cyber war: The Ne xt Threat to National Security & What to Do About It", Ecco, 2010.
3. Dan Shoemaker, "Cyber security The Essential Body of Knowledge", Cengage Learning, 2011.

Web References

1. https://www.javatpoint.com/cyber-security-tutorial
2. https://www.pewresearch.org/internet/quiz/cybersecurity-knowledge/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Open Elective**   Paper code: **Paper - 4**

Name of the Paper: **B – Decision Support System**   Credits:**3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours: **1**Practical Hours: **-**

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Course Objectives

1. To introduce the decision making system, models and support
2. To appraise the general nature and range of decision support and group support systems
3. To impart about knowledge based system and advanced intelligent systems

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about design making system.
2. After studied unit-2, Students are able to learn about types group support system
3. After studied unit-3, Students are able to learn about knowledge based system.
4. After studied unit-4, Students are able to understand about knowledge acquisition.
5. After studied unit-5, Students are able to learn about advanced intelligent system.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I: DECISION-MAKING SYSTEMS, MODELING, AND SUPPORT

Teaching Hours: 9

Decision-Making: Introduction and Definitions, Systems, Models, Phases of the Decision-Making Process, Decision-Making: The Intelligence Phase, the Design Phase, The Choice Phase,

The Implementation Phase, How Decisions Are Supported, Personality Types, Gender, Human Cognition, and Decision Styles, The Decision Makers

UNIT – II: DECISION SUPPORT AND GROUP SUPPORT SYSTEM   Teaching Hours: 9

DSS Configurations, What Is a DSS?, Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The Model Management Subsystem, The User Interface (Dialog) Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classifications. **Group Support System:** Group Decision-Making, Communication, and Collaboration, Communication Support, Collaboration Support: Computer-Supported Cooperative Work, Group Support Systems, Group Support Systems Technologies, Group systems Meeting room and Online, The GSS Meeting Process, Distance Learning, Creativity and Idea Generation.

UNIT - III: KNOWLEDGE-BASED SYSTEMS   Teaching Hours: 9

Concepts and Definitions of Artificial Intelligence, Evolution of Artificial Intelligence, The Artificial Intelligence Field, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, How Expert Systems Work, Problem Areas Suitable for Expert Systems, Benefits and Capabilities of Expert Systems, Problems and Limitations of Expert Systems, Expert System Success Factors, Types of Expert Systems, Expert Systems on the Web.

UNIT- IV: KNOWLEDGE ACQUISITION, REPRESENTATION, AND REASONING
Teaching Hours: 9

Concepts of Knowledge Engineering, Scope and Types of Knowledge, Methods of Knowledge Acquisition from Experts, Knowledge Acquisition from Multiple Experts, Automated Knowledge Acquisition from Data and Documents, Knowledge Verification and Validation, Representation of Knowledge, Reasoning in Rule-Based Systems, Explanation and Meta knowledge, Inferencing with Uncertainty, Expert Systems Development, Knowledge Acquisition and the Internet.

UNIT – V: ADVANCED INTELLIGENT SYSTEMS   Teaching Hours: 9

Machine-Learning Techniques, Case-Based Reasoning, Basic Concept of Neural Computing , Learning in Artificial Neural Networks, Developing Neural Network-Based Systems, Genetic

Algorithms Fundamentals, Developing Genetic Algorithm Applications, Fuzzy Logic Fundamentals, Developing Integrated Advanced Systems.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Efraim Turban and Jay E. Aronson, Decision Support System and Intelligent Systems, Prentice Hall International, 7th Edition 2007.

References

1. Janakiraman V. S and Sarukesi K, Decision Support Systems, Prentice Hall of India, 6th Printing 2006.

2. Lofti, Decision Support System and Management, McGraw Hill Inc, International Edition,
New Delhi 1996.

3. Marakas, Decision Support System, Prentice Hall International, Paperback Edition, New Delhi, 2003

Web References

1. ndwrcdp.werf.org/documents/WU-HT-03-35/DSS%20Tutorial.pdf
2. www.slideshare.net/sursayantan92/decision-support-systemdss
3. www.uky.edu/BusinessEconomics/dssakba/instmat.htm
4. https://ceit.aut.ac.ir/~shiry/lecture/DSS/Introduction.ppt

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	S	S	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	L	L	S	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**   Paper type: **Open Elective**   Paper code: **Paper - 4**

Name of the Paper: **C – Research Methods and Ethics** Credits: **3**

Total Hours per Week: **3 Hour**   Lecture Hours: **2** Tutorial Hours:**1**Practical Hours: **-**

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Course Objectives

1. To demonstrate the knowledge of research processes (reading, evaluating, and developing);
2. To perform literature reviews using print and online databases;
3. To identify, explain, compare, and prepare the key elements of a researchproposal/report;
4. To compare and contrast quantitative and qualitative research

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about foundation of research.
2. After studied unit-2, Students are able to learn about problem identification and formulation.
3. After studied unit-3, Students are able to learn about research design.
4. After studied unit-4, Students are able to understand about qualitative and quantitative research.
5. After studied unit-5, Students are able to learn the concepts of measurements in research.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT I: FOUNDATIONS OF RESEARCH
Teaching Hours: 9

Meaning – Objectives – Motivation - Utility. Concept of theory – empiricism - deductive and inductive theory. Characteristics of scientific method –Understanding the language of research – Concept – Construct – Definition –Variable - Research Process.

UNIT II: PROBLEM IDENTIFICATION & FORMULATION
Teaching Hours: 9

Research Question–Investigation Question –Measurement Issues –Hypothesis –Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing –Logic & Importance.

UNIT III: RESEARCH DESIGN
Teaching Hours: 9

Concept and Importance in Research –Features of a good research design –Exploratory Research Design –concept, types and uses, Descriptive Research Designs –concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.

UNIT IV: QUALITATIVE AND QUANTITATIVE RESEARCH
Teaching Hours: 9

Qualitative research –Quantitative research –Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT V: MEASUREMENT
Teaching Hours: 9

Concept of measurement–what is measured? Problems in measurement in research –Validity and Reliability. Levels of measurement –Nominal, Ordinal, Interval, Ratio.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self-discussion, self-learning process.

i. Following institution and intellectual and writing reports in the course field.

Textbook

1. C. R. Kothari: Research Methodology: Methods & Technology, New Age Int. Publ.

References

1. Gupta Gupta : Research Methodology: Texts and cases with SPSS Application (2011 edn.), International Book House, New Delhi.

2. A.K.P.C.Swain : A Text Book of Research Methodology, Kalyani Publishers.

Web References

1. https://libguides.wits.ac.za/c.php?g=693518&p=4914913

2. https://www.scribbr.com/dissertation/methodology/

3. https://www.intechopen.com/online-first/research-design-and-methodology

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	M	M	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	L	M	S	M	S
CO3	S	S	L	M	M	S	M	L	M	M	L	S	L	M	M
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	M	M	M	M	S	M	M

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