DON BOSCO COLLEGE (CO-ED)

Affiliated to Thiruvalluvar University

PROGRAMME HANDBOOK

MASTER OF COMPUTER SCIENCE (M.SC)

CURRICULUM AND SYLLABUS UNDER CBCS

WITH EFFECT FROM 2020-2021

DON BOSCO COLLEGE (CO-ED)

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PROGRAM OVERVIEW

Post Graduate and Research Department of Computer Science, Don Bosco College (Co-Ed) was established in the year 2015 as a first Post Graduate Department and 2017 as a first Research Department of Don Bosco College (Co-Ed). It was the dream and initiative of Rev. Dr. S. Thaddeus SDB. The aim was to give priority to training rural and tribal students. The department has focused on the integration of Theory, practical and Research from the beginning. The duration of the course is 2 years and divided into 4 semesters. This programme provides numerous opportunities to the students who are interested in the field of Computer Science and desire to work in IT and/or IT enabled industries. It prepares students with the required knowledge to proceed for research studies such as M.Phil and Ph.D.

UNIVERSITY REGULATIONS - DEFINITIONS

PROGRAM - "Programme" means a course of study leading to the award of a degree in a discipline.

PROGRAM DURATION - It shall extend over a period of two years comprising of four semesters with two semesters in one academic year.

COURSE - "Course" refers to a paper / practical / subject offered under the degree programme. Each Course is to be designed with lectures / tutorials/Laboratory or field work / seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective tea**c**hing and learning needs.

CREDITS - The weightage given to each course of study (subject) by the experts of the Board of Studies concerned. The total minimum credits, required for completing a PG program is 90.

CHOICE BASED - All Post Graduate Programmer offered by Thiruvalluvar University are under Choice Based Credit System. This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

ELIGIBILITY FOR ADMISSION - Candidate seeking admission to the first year of the PG Degree Course should have passed the B.Sc Computer Science or BCA in the recognised university.

PATTERN OF STUDY

The pattern of study for all PG Programs in Thiruvalluvar University consist of the following:

(i). Main Subjects (Core)

There are 3 main subjects in each semester, these subjects are mandatory.

(ii). Elective Subjects

Students can select any two subjects as elective and open elective according to their choice.

(iii). Compulsory Paper

Apart from main and elective subjects, students have to study the compulsory paper (Human Rights).

(iv). Main Practical

With respect to the main subjects, there are 3 practical papers in First, Second and third semester and 1 Practical in fourth Semester.

(v). Filed Study

During the second semester students have to do their filed study. This will give them an exposure to do the social impact.

(i). MOOC Course

In third Semester have to do any one of the Massive Open Online Courses (MOOCs) on SWAYAM, NPTEL and other such portals are encouraged to complete.

(ii). Main Project

In 4th semester students have to do their main project as a project trainee in any software industry. But, students are encouraged to engage with research projects.

PASSING MINIMUM

1. A candidate shall be declared to have passed the whole examination, if the candidate passes in all the theory papers and practical's wherever prescribed as per the scheme of examinations by earning 90 credits.

2. A candidate should get **not less than 50% in the University (external)** Examination, compulsorily, in any course. Also the candidate who secures **not less than** 50% marks in the external as well as internal (CIA) examinations put together in any course shall be declared to have successfully passed the examination in the subject in theory as well as Practical's.

DISTRIBUTION

Table - 1(A): The following are the distribution of marks for external and internal for University (external) examination and continuous internal assessment and passing minimum marks for **theory papers of PG Programmers**.

UNI. EXAM TOTAL (ESC)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	38	25	12	100	50

Note: ESE - End Semester Examination

Table - 1(B): The following are the Distribution of marks for the Continuous Internal Assessment in the theory papers of PG Programmes.

S.No.	For Theory - PG courses	Distribution of Marks	
		Assignments	**Tests**
1	Assignment - 1 (First 2 Units of the Syllabus)	10	-
2	Test-1 (First 2 Units of the Syllabus for 2 Hour duration)	-	50
3	Assignment- 2 (3^{rd} & 4^{th} Units of the Syllabus)	10	
4	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50
5	Assignment - 3 (5^{th} Unit of the Syllabus)	10	-
6	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	TOTAL MARKS	30	200
	Marks to be converted to	5	20
	Total Maximum Marks for CIA	25	

Table – 2(A): The following are the distribution of marks for University (external) examinations and continuous internal assessments and passing minimum marks for the **practical courses of PG Programmes**.

UNI. EXAM TOTAL (ESC)	**PASSING MINIMUM FOR UNI.EXAM**	**CIA TOTAL**	**PASSING MINIMUM FOR CIA**	**TOTAL MARKS ALLOTTED**	**PASSING MINIMUM (UNI.EXAM+CIA)**
75	38	25	12	100	50

Table – 2(B): The following are the distribution of marks for the Continuous Internal Assessment in PG practical courses.

S.No.	**For Practical - UG courses**	**Distribution of Marks**	
		Assignments	**Tests**
1	Regular maintenance of the Observation note book-1 (Up to the end of I-Semester)	10	-
2	Test-1 (Up to the end of I-Semester for 2 Hours duration)	-	25
3	Regular maintenance of the Observation note book-2 (Up to the end of II-Semester)	10	
4	Test-2 (Up to the end of II-Semester for 2 Hours duration)	-	25
5	Regular maintenance & proper completion of the Record note book	10	-
6	Test-3 (Entire Syllabus following University examination pattern)	-	25
	TOTAL MARKS	30	75
	Marks to be converted to	10	15
	Total Maximum Marks for CIA	25	

QUESTION PAPER PATTERN

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2017-2018 onwards.

External Maximum 75 Marks – wherever applicable (Ext.75 + Int.25 = Total. 100)

Section A	Very short answer questions	10X 2=20	10 questions – 2 from each unit
Section B	Short answer questions of either / or type (like 1a (or) 1b)	5X5=25	5 questions – 1 from each unit
Section C	Essay-type questions / Problem (Answer any 3 out of 5)	3X10=30	5 questions – 1 from each unit

GRADING

Once the marks of the CIA and end-semester examinations for each of the course are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade, grade point as per the details given below:

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	**9.0-10.0**	**O**	Outstanding
80-89	**8.0-8.9**	**D+**	Distinction
75-79	**7.5-7.9**	**D**	
70-74	**7.0-7.4**	**A+**	First Class
60-69	**6.0-6.9**	**A**	
50-59	**5.0-5.9**	**B**	Second Class
40-49	**4.0-4.9**	**C**	Third Class
00-39	**0.0**	**U**	Re-appear
Absent	**0.0**	**AAA**	Absent

PROGRAMME STRUCTURE

S.No	Study Components / Course Title	Ins. Hrs./ week		Credit	Title of the Paper	Maximum Marks		
						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 Major 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 N/W C. Cloud Computing	25	75	100
External Major 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		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. Block chain Technology B. Internet of Things C. Network Security	25	75	100
External Major 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		-	-				100
			30	**23**		**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	10	5	Project with viva voce (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 Analysis B. Artificial Intelligence C. Machine Learning	25	75	100
External Major for other major Students (Inter/multi-disciplinary papers)								
33.	Open Elective	Paper - 4	3	3	**(To choose one out of 3)** A. Cyber Security	25	75	100

					B. Decision Support system C. Research Methods & Ethics			
			30	**21**		**125**	**375**	**600**
			120	**90**				**3300**

*Field Study

There will be field study which is compulsory in the first semester of all PG courses with 2 credits. This field study should be related to the subject concerned with social impact. Field and topic should be registered by the students in the first semester of their study along with the name of a mentor before the end of the month of August. The report with problem identification and proposed solution should be written in not less than 25 pages in a standard format and it should be submitted at the end of second semester. The period for undergoing the field study is 30 hours beyond the instructional hours of the respective programme. Students shall consult their mentors within campus and experts outside the campus for selecting the field and topic of the field study. The following members may be nominated for confirming the topic and evaluating the field study report.

i) Head of the respective department
ii) Mentor
iii) One faculty from other department

**Inclusion of the Massive Open Online Courses(MOOCs) with 2 credits available on SWAYAM, NPTEL and other such portals approved by the University Authorities.

The Chairman, Board of Studies Recommends the available any minimum of Ten MOOCs and chooses the course to be included in the respective programmes.

@Compulsory Papers - Human Rights

Types of Courses	**Number of Courses**	**Hours per course**	**Credits per course**	**Total Hours**	**Total Credits**	**Marks per Course**	**Total Marks**
Core Theory	11	4-6	3-4	54	34	100	1100
Core Practical's	10	3	2	30	20	100	1000
Field Study	1	-	2	0	2	100	100
Project Work	1	10	6	10	6	100	100
Core Elective	4	3	3	12	12	100	400
Open Elective	4	3	3	12	12	100	400

MOOC Courses	1	-	2	0	2	100	100
Compulsory Course	1	2	2	2	2	100	100
Total	**33**			**120**	**90**		**3300**

PROGRAM EDUCATION OBJECTIVES (PEO)

OB1: EDUCATION - To prepare students so that they demonstrate problem solving and design skills including the ability to formulate problems and their solutions, think creatively, communicate effectively, and work collaboratively.

OB2: RESEARCH - To provide the students with specific knowledge of a variety of areas of Computer Science and have a broad idea of related disciplines, for a productive career as well as research as per the needs of the industry.

OB3: TECHNOLOGY - To provide our graduates with internship / project exposure in focused areas of their choice to solve complex real-world problems and prepare them to contribute to a specific discipline within computer science and possibly pursue advanced study or research.

OB4: ETHICAL AND PROFESSIONAL - The students will be able to exercise professional responsibility and be able to adapt to an ever-changing professional environment and be aware of societal issues with specific focus on human rights. To develop effective oral and written communication skills; and to develop an understanding of professional and ethical issues related to computing.

PROGRAM LEARNING OUTCOMES (PLO)

1. **Problem Solution:** Ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve problems to reach substantiated conclusions
2. **Individual and teamwork:** Ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
3. **Communication skills:** Ability to communicate within the profession and with society at large. Such abilities include reading, writing, speaking, listening, the ability to comprehend and write effective reports and documents.
4. **Professionalism:** Understanding of the roles and responsibilities as professionals in society, especially the primary role of protection of the public and the public interest.
5. **Ethics and equity:** Ability to apply professional ethics, accountability, and equity.
6. **Life-long learning:** Ability to identify and to address one's educational needs in the changing world in ways sufficient to maintain one's competence and to allow him/her to contribute to the advancement of selected domains.

7. **Knowledge of Computer systems:** Apply the knowledge of computational concepts to real world problems and develop applications for various requirements
8. **Application of professional skills:** Exhibit professional skills required to work in a team
9. **Programming:** Conduct investigations of complex problems and find solutions through research methods
10. **Software Engineering:** Handle research projects through systematic planning, designing and implementation
11. Design, develop, implement and test a software product by applying the **knowledge** of project management
12. Pursue a **career** in networking, security, data analytics, block chain, Internet of Things etc.

MAPPING OF INSTITUTION OBJECTIVES WITH PEOs

COLLEGE / PROGRAMME	EDUCATION	RESEARCH	TECHNOLOGY	ETHICAL AND PROFESSIONAL
OB1 : EDUCATION	√			
OB2 : RESEARCH		√		
OB3 : EMPLOYABILITY			√	
OB4 : COMM.SERVICE				√

MAPPING PEOs WITH POs / PSOs

PEO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
1 : EDUCATION	√	√	√			√				√		√
2 : RESEARCH	√	√		√		√	√		√	√	√	
3 : EMPLOYABILITY	√					√				√		
4 : ETHICAL AND PROFESSIONAL		√		√	√	√		√	√	√	√	

MAPPING COURSE OUTCOMES WITH POs / PSOs

SEMESTER	COURSE CODE	COURSE NAME	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
I	DCS11	Relational Database Management System	√	√	√	√	√		√	√				√
	DCS12	Enterprise Java Programming	√	√	√	√		√	√			√	√	
	DCS13	Programming using C#.NET	√	√	√	√		√			√	√	√	
	DPCS16	Practical: Relational Database Management System	√	√	√	√		√	√			√	√	
	DPCS17	Practical: Enterprise Java Programming	√	√	√	√		√	√			√	√	
	DPCS18	Practical: Programming using C#.NET	√	√	√	√		√	√			√	√	

	DECS14A	Computer Organization	√	√	√	√		√	√			√	√	
	DNCS18B	Introduction to Computer Applications	√	√	√	√		√	√			√	√	
II	DCS21	Advanced Enterprise Java Programming	√	√	√	√		√	√			√	√	
	DCS22	Design and Analysis of Algorithm	√	√	√	√				√	√	√	√	√
	DCS23	Web Application using C#.NET	√	√	√	√		√	√			√	√	
	DPCS24	Practical: Advanced Enterprises Java Programming	√	√	√	√		√	√			√	√	
	DPCS25	Practical: Design and Analysis of Algorithm	√	√	√	√		√	√			√	√	
	DPCS26	Practical: Web Applicati	√	√	√	√		√	√			√	√	

		on using c#.NET												
	DECS27C	Cloud Computing		√	√	√	√	√	√	√		√		√
	DNCS28B	Open Source Applications	√	√	√	√	√					√		√
	DHR20	Human Rights		√	√	√	√		√		√			
	DFS20	Field Study	√	√	√	√		√			√	√	√	
III	DCS31	Distributed Operating Systems	√	√	√	√				√	√	√	√	√
	DCS32	XML and Web Services	√	√				√	√	√		√	√	√
	DCS33	Programming Using Python	√	√	√	√				√	√	√	√	√
	DPCS37	Practical: Distributed Operating System	√	√				√	√	√	√			
	DPCS38	Practical: XML and Web Services	√	√				√	√	√	√			
	DPCS39	Practical: Programming Using Python	√	√	√	√	√					√		√

	DECS34B	Internet of Things	√	√	√	√		√	√			√	√	
	DOCS35A	Programming Using C	√	√	√	√				√	√	√	√	√
IV	DCS41	Mobile Application Development	√	√				√	√	√	√			
	DCS42	Software Project Management	√	√	√	√	√					√		√
	DECS43B	Artificial Intelligence	√	√	√	√		√	√			√	√	
	DOCS44B	Decision Support System	√	√	√	√	√					√		√
	DPCS45	Practical : Mobile Application Development	√	√	√	√		√	√			√	√	
	DPCS46	Project Work	√	√	√	√		√	√			√	√	√

RELATIONAL DATABASE MANAGEMENT SYSTEM

COURSE OBJECTIVES

1. The course focuses on the fundamentals of knowledgebase and relational database management systems, and the current developments in database theory and their practice.
2. After the completion of this course, the student will be able to know and understand the concepts and capabilities of DBMS.

COURSE OUTCOMES

1. Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
2. Formulate, using relational algebra, solutions to a broad range of query problems.
3. Write a SQL, solutions to a broad range of query and data update problems.
4. Use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database.
5. After the completion of this course, the student will be able to gain the basic knowledge on DBMS.

UNIT-I: INTRODUCTION

File System Vs. DBMS - Database System Applications - View of Data-Database language - Database design - ER Model _ Relational Model - Network Data Model - Hierarchical Data Model - Data Storage & Querying - Data Architecture.

UNIT-II: RELATIONAL MODEL

Relational Model - Structure of Relational Databases - Relational Algebra and Calculus - SQL - Basic Structure - Set Operations - Aggregate Functions - Null Values - Nested Queries
- Complex Queries - Views - Modification of the Database - Advanced SQL - Triggers.

UNIT-III: FUNCTIONAL DEPENDENCIES

Functional Dependencies - Features of Relational designs - Decomposition and Normalization using Functional Dependencies and Multivalued Dependencies - Join dependencies- Domain key Normal form.

UNIT- IV: PHYSICAL STORAGE MEDIA

Overview of Physical Storage Media - Magnetic disks - RAID - tertiary Storage - File Organization - Organization of records in Files - Indexing and Hashing - Ordered Indices - B+ -Tree Index Files - B-Tree Index Files - multiple Key Access - Static and Dynamic Hashing - Query Processing - Transaction Management - Transactions -

Concurrency.

UNIT-V: DISTRIBUTED DATABASES

Distributed Databases - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control - Object Based Databases - Complex Data types - Structured Types and Inheritance in SQL – Object identity and Reference - Types in SQL - XML - structure of XML data - XML Document - Schema - Querying and Transformation - Data Mining and Data Warehousing.

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- "Database System Concepts",FifthEdition,McGraw-Hill,2006.

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. Narang,"Database Management Systems", 2nd ed., PHI.

WEB REFERENCES

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

ENTERPRISE JAVA PROGRAMMING

COURSE OBJECTIVES

1. To be able to work out in the NetBeans
2. After the completion of this course, the student will be able to Know and understand the concepts and capabilities of NetBeans
3. To understand the database techniques of Access and to apply it.
4. To know the language like JSP, Servlet, Session, Bean, Struts and Hibernate

COURSE OUTCOMES

1. Design and develop sophisticated enterprise applications using a variety of Java related technologies
2. Incorporate efficient design principles in the development of a complex web application
3. Implement a sophisticated Graphical User Interface (GUI) of a web application using enterprise-level Java components that are independent of the server-side technologies
4. Incorporate authentication in a multi-tiered application
5. Implement session tracking using a variety of techniques and be able to select the most appropriate method based on the design

UNIT -I: APPLETS AND GUI

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

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 Inet address classes.

UNIT- III: COLLECTIONS AND DESIGN PATTERNS

Collection Framework – Array List class – Linked List class – Array List vs Linked List – List Iterator interface – Hash Set class, Linked Hash Set class, Tree Set class Priority Queue class - Map interface, Hash Map class, Linked Hash Map class ,Tree Map 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

Servlet: Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – Generic Servlet, Http Servlet - 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

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.

TEXT

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 McGrawHill, 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

http://math.hws.edu/javanotes/c6/index.html http://www.tutorialspoint.com/awt/ www.studytonight.com

PROGRAMMING USING C#.NET

COURSE OBJECTIVES

1. To be able to work out in the Web Application
2. After the completion of this course, the student will be able to know and understand the concepts and capabilities of an application using ASP.NET & C#
3. To understand the database techniques of Access and to apply it

COURSE OUTCOMES

1. They can introduce a new idea in their development
2. They can able to create a new Project by having a continuous practice in it.
3. They can able to create Application
4. After the completion of this course, the student will be able to Having acquired the knowledge on C# they will be able to develop their own soft wares on their own interest with all the features learnt. .

UNIT - I: INTRODUCTION TO C#

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

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

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

Life Cycle of threads-Using Reflection – Reflecting the Members of a Class - Dynamic

Loading and Reflection - .NET Remoting – Architecture – Hosting of Objects – Single Tonand Single Call – Remoting Server – Remoting Client.

UNIT - V: DATABASE

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.

TEXT BOOKS

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

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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

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RELATIONAL DATABASE MANAGEMENT SYSTEM

COURSE OBJECTIVES

1. To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
2. To be able to program a data-intensive application using DBMS APIs.

COURSE OUTCOMES

3. Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL
4. Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression fro queries.
5. Recognize and identify the use of normalization and functional dependency technique used in database design.
6. Recognize/ identify the purpose of query processing and optimization and also demonstrate the basic of query evaluation.
7. Apply and relate the concept of transaction, triggers.

Programs

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, Distinctand 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.

ENTERPRISE JAVA PROGRAMMING

COURSE OBJECTIVES

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

COURSE OUTCOMES

1. Learn the Internet Programming ,using Java Applets
2. create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit(AWT)& Swings
3. Apply event handling on AWT and Swing components.
4. LearntoaccessdatabasethroughJavaprograms,usingJavaDataBaseConnectivity(JDBC)
5. Create dynamic web pages, using Servlets and JSP.
6. Make are usable software component, using JavaBean.
7. Invoke the remote methods in an application using Remote Method Invocation(RMI)
8. Understand the multi-tier architecture of web-based enterprise applications using Enterprise Java Beans (EJB).
9. Develop Stateful, Stateless and Entity Beans.
10. Use Struts frame works, which gives the opportunity to reuse the codes for quick development.

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 Result Set 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.

PROGRAMMING USING C#.NET

COURSE OBJECTIVES

1. To code solutions and compile C# projects within the .NET framework.
2. To build own desktop application with Database

COURSE OUTCOMES

1. create and manipulate GUI components in C# for windows application.
2. build the desktop application with Database

Programs

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

CORE ELECTIVE
A. COMPUTER ORGANIZATION

COURSE OBJECTIVES

1. The purpose of the course is to introduce principles of computer organization and the basic architectural concept.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

COURSE OUTCOMES

1. Summarize the basic concept of instructions code and their impact on processor design.
2. Describe the operations and language f the register transfer, micro operations and input- output organization.
3. Explain the organization of basic computer , its design and the design of control unit
4. Use appropriate tools to design verify and test the CPU architecture with applying the theory concepts.
5. Learn the concepts of parallel processing, pipelining, Vector Processing and Array Processor

UNIT – I: ORGANIZATION AND DESIGN

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

UNIT – II: COMPUTER PROGRAMMING

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

UNIT – III: MICRO PROGRAM CONTROL

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

UNIT – IV: CENTRAL PROCESSOR UNIT

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

UNIT - V: PIPELINE AND VECTOR PROCESSING

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

TEXT

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 IndiaPrivate Limited, 2001.

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www.computer-pdf.com/architecture/

www.tutorialspoint.com/computer_logical_organization

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

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

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

B. PARALLEL COMPUTING

COURSE OBJECTIVES

1. To learn the Kinds of parallelism, Parallel computer architectures (processor arrays, centralized memory multiprocessors, distributed memory multiprocessors, and multi computers)
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

1. Students are able to compute speedup, efficiency, and scaled speedup of parallel computations, given appropriate data
2. Students are able to apply Amdahl's Law to predict the maximum speedup achievable from a parallel version of a sequential program, given its execution profile
3. Students are able to analyze the efficiency of a parallel algorithm
4. Students are able to explain the relative advantages and disadvantages of mesh, hypercube, and butterfly networks with respect to diameter, bisection width, and number of edges/node
5. Students are able to explain the advantages and disadvantages of constructing parallel computers using

UNIT - I: SCALABILITY AND CLUSTERING

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 TECHNOLOGIES

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

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

Mechanisms.

UNIT – IV: PARALLEL PROGRAMMING

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

UNIT-V:MESSAGE PASSING PROGRAMMING

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

TEXT

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 McGraw-Hill, New Delhi, 2003.
3. Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.

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

C. EMBEDED SYSTEM

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

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

UNIT I: INTRODUCTION

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-Processor-Memory-Peripherals-Software-Algorithms -Microcontroller-Expanded microcontroller-Microprocessor based-Board based.

UNIT II: EMBEDDED PROCESSORS

8 bit accumulator processors-Register models-8 bit data restrictions-Addressing memory-System 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 facilities-Instruction set-80287 floating point support-Feature comparison. INTEL 80386DX-Architecture-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

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

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 interrupts- MC68230 modes-Timer processors-Real-time clocks-Simulating a real-time clock in software-Serial ports-Serial peripheral interface-I2C bus-Read and write access-Addressingperipherals-Sending an address index-Timing.

UNIT V: REAL-TIME OPERATING SYSTEMS

What are operating systems?-Operating system internals-Multitasking operating systems-Context 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 resource- VMEbus interrupt messages-Fairness systems-Tasks, threads and processes-Exceptions- Memory model-Memory allocation-Memory characteristics-Example memory maps- Memory management address translation-Bank switching-Segmentation-Virtual memory- Chossoing an operating system-Assembler versus high level language-ROMable code- Scheduling algorithms-Pre-emptive scheduling-Modular approach-Re-entrant code-Cross- development platforms-Integrated networking-Multiprocessor support-Commercial operating systems-pSOS+ - pSOS+ kernel-pSOS+m multiprocessor kernel-pREPC+ runtime support- pHILE+ file system -pNA+ network manager-pROBE+ system level debugger-XRAY+ source level debugger-OS-9.

TEXT

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 - AddisonWesley 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.

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www.entrancetutorials.com/embedded-systems-by-rajkamal-pdf/
www.internetofthingsagenda.techtarget.com/definition/embedded-system
www.en.wikipedia.org/wiki/Embedded_system

A. E-COMMERCE
OPEN ELECTIVE

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

1. Demonstrate an understanding of the foundations and importance of E-commerce
2. 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. Analyze the impact of E-commerce on business models and strategy
4. Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
5. Describe the infrastructure for E-commerce Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.

UNIT – I: E-COMMERCE FUNDAMENTALS

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

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 new- media marketing communications – Tactics - Focus on online

branding – Actions - Control.

UNIT – III: CUSTOMER RELATIONSHIP MANAGEMENT

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 - Designfor e-business - Focus on user centered site design - Focus on security design for e-business.

UNIT – IV: M-COMMERCE

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

UNIT – V: MANAGEMENT OF MOBILE COMMERCE SERVICES

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.

TEXT

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

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.

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

B. INTRODUCTION TO COMPUTER APPLICATION

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 OUTCOME

1. Know about computer and basic applications of computer.
2. Get knowledge about operating system
3. Aim at imparting a basic level appreciation Programme

UNIT I: KNOWING COMPUTER

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

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

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

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

UNIT V: MAKING SMALL PRESENTATION

Basics of presentation software - Creating Presentation - Preparation and Presentation of

Slides - Slide Show - Taking printouts of presentation / handouts.

TEXT

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

WEB REFERENCES

https://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading01.htm
https://peda.net/kenya

C. PRINCIPLES OF INTERNET

COURSE OBJECTIVES

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

COURSE OUTCOMES

1. Learn the basics of Internet.
2. Provide fundamental knowledge WWW.

UNIT-I: INTERNET

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.

UNIT-II: CONNECTING TO THE INTERNET

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

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

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

UNIT-V: SAFEGUARDING THE INTERNET

Firewalls–Viruses –Digital certificates.

TEXT

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

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

ADVANCED ENTERPRISE JAVA PROGRAMMING

COURSE OBJECTIVES

1. To knows the fundamentals of Applet, JDBC, Swing, AWT, JSP, Servlet and Web service
2. To know to develop dynamic application using advanced java concepts
3. To be able to deal with Advanced Java Programming with real world problems

COURSE OUTCOMES

1. Students will be able to learn Advanced Java Programming basics and its components
2. They familiar with socket programming and web applications
3. The student will able to create their own applications using Advanced Java Programming Components
4. The students knows Applet class and its elements and they know how to connect the database using JDBC
5. They understand the usages of Sevlets, JSP components, Thread and Session Management
6. They can create a new animation and able to work with Network

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

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

Introduction to Struts , Understanding Struts , Struts Flow Control Six Basic steps in using Struts, Form Beans, 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

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

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

Foundation: Motivation- Spring Hello World, Runtime environment, Dependency injection-Inversion 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.

TEXTS

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

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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

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http://www.roseindia.net/jsp/index.shtml
http://www.oracle.com/technetwork/java/javaee/javaserverfaces-139869.html
http://docs.oracle.com/javaee/1.4/tutorial/doc/JSFIntro.html
http://docs.oracle.com/javaee/6/tutorial/doc/bnaph.html
http://en.wikipedia.org/wiki/JavaServer_Faces

DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES

1. To introduce design of algorithms as a means of problem-solving.
2. To learn how to analyse the complexity of algorithms.
3. Major algorithm design techniques will be presented and illustrated with fundamental problems in computer science.
4. Students will also learn the limits of algorithms and how there are still some problems for which it is unknown whether there exist efficient algorithms.
5. To experience in the application of logical and mathematical tools and techniques in computing.

COURSE OUTCOMES

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

UNIT - I: INTRODUCTION

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

UNIT - II: DIVIDE-AND-CONQUER AND GREEDY METHOD

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

UNIT - III: DYNAMIC PROGRAMMING

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

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

UNIT - V: BRANCH AND BOUND

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

TEXT

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 REFERENCES

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

WEB APPLICATION USING C#.NET

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

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

UNIT- I: INTRODUCTION TO ASP.NET AND WEB FORMS

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 CONTROLS

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

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

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

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.

TEXTS

1. Mathew MacDonald, "ASP.NET: The Complete Reference", Tata McGraw HillPublishing 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

REFERENCE

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

WEB REFERENCES

http://csharp.net-tutorials.com/index.php http://csharp.net-tutorials.com/classes/introduction/ http://www.homeandlearn.co.uk/csharp/csharp.html http://www.indiabix.com/c-sharp-programming/questions-and-answers/

https://www.wiziq.com/online-tests/43860-c-basic-quiz
http://www.withoutbook.com/OnlineTestStart.php?quizId=71
http://www.compileonline.com/compile_csharp_online.php http://www.ideone.com

PRACTICAL IV: ADVANCED ENTERPRISE JAVE PROGRAMMING

COURSE OBJECTIVES

1. To Develop Enterprise web application using EJB.
2. To understand and implement the object-relation mapping using Hibernate
3. To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC.

COURSE OUTCOMES

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

Program

1. JSP and MVC with Request Dispatcher
2. JSF in JSP Pages,Using all 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

PRACTICAL V: DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES

1. To understand the basic knowledge of algorithm design and its implementation.

COURSE OUTCOMES

2. To write programs in java/C++ to solve problems using Linear and Binary strategy.
3. To write programs in java/C++ to solve problems using backtracking and divide and conquer strategy.
4. To write programs in java/C++ to solve problems using greedy and dynamic programming techniques

Program

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

PRACTICAL VI: WEB APPLICATION USING C#.NET

COURSE OBJECTIVES

1. To create and manipulate GUI components in C#.
2. To code solutions and compile C# projects within the .NET framework.
3. To build own desktop application with Database

COURSE OUTCOMES

1. Students are able to create and manipulate GUI components in C# for windows application.
2. Students are able to code solutions and compile C# projects within the .NET framework.
3. Students are able to build the desktop application with Database.

Program

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

A. HUMAN COMPUTER INTERACTION

CORE ELECTIVE

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

1. Students are able to plan and Develop procedures and life cycle of Human Computer Interaction
2. Students are able to analyze product usage through appropriate assessments and testing techniques.
3. Students are able to apply the interface structure standards/rules for different users.
4. Students are able to encourage communication between understudies of brain science, structure, and software engineering on UI improvement projects.
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.

UNIT – I: HCI FOUNDATIONS

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

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

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

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

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.

TEXT

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

WEB REFERENCES

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

B. SOCIAL INFORMATION NETWORKS

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

6. Students are able to clear understanding of real world applications
7. Students are able to comprehend the elements of the social network
8. Students are able to demonstrate and envision the social network
9. Students are able to understand the role of web in the social network
10. Students are able to apply the concept of social network in appropriate application

UNIT-I: INTRODUCTION

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

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

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

UNIT-IV: NETWORK DYNAMICS

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

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.

TEXT BOOK

1. Wasserman, S. and Faust, K. Social network analysis: Methods and applications, Vol. 8.Cambridge university press, 1994.
2. Newman, M. (2018). Networks. Oxford university press..

WEB REFERENCES

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

C. CLOUD COMPUTING

COURSE OBJECTIVES

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

COURSE OUTCOMES

1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
2. Describe the concept of parallel and distributed computing.
3. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient.
4. Explain the different technologies and features of Aneka
5. Learn the concepts of to design the trusted cloud computing system with different cloud platforms.

UNIT - I: INTRODUCTION

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

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

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

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: MatrixMultiplicationFunctional Decomposition: Sine, Cosine, and Tangent.

UNIT - V: CLOUD PLATFORMS IN INDUSTRY

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

TEXT

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 workand 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

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

A. PRINCIPLES OF WEB DESIGN

OPEN ELECTIVE

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

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

UNIT - I : HTML INTRODUCTION

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

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

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

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

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.

TEXT

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

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

B. OPEN SOURCE APPLICATIONS

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

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

Unit- I: BASIC PHP

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

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

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 SE-Friendly Blog.

UNIT - IV: BASIC PERL

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

UNIT 5: ADVANCED PERL

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

Perl Techniques

TEXTS

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.

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)

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

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

WEB REFERENCES

www.php.net www.phpclasses.org

C. PROBLEM SOLVING TECHNIQUES

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

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

UNIT - I: PROGRAMMING TECHNIQUES

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

UNIT – II: FUNDAMENTAL ALGORITHMS

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

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

Array Order Reversal – Array Counting Or Histogramming – Finding the Maximum Numberin a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array – FindingThe kth Smallest Element – Longest Monotone Subsequence.

UNIT – V: MERGING, SORTING AND SEARCHING

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

TEXT

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 ofComputer Programs”, MIT Press, 1985.

WEB REFERENCES

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

DISTRIBUTED OPERATING SYSTEM

COURSE OBJECTIVES

1. This course provide an introduction to the fundamentals of distributed computers systems, assuming the availability of facilities for data transmission
2. After the completion of this course, the student will be able to know and understand the concepts and capabilities of networks.

COURSE OUTCOMES

1. To know the essential basics of distributed operating system
2. To acquire knowledge on Security and Exception Handling
3. To explain message passing and inter process communication and Practice with operating system concepts
4. To work with Hadoop and Analyzing the Data with Hadoop.
5. After the completion of this course, the student will be able to gain the basic knowledge on distributed operating system and HADOOP.

UNIT-I: INTRODUCTION

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

UNIT-II: MEMORY MANAGEMENT

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

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

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

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

TEXT

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

https://en.wikipedia.org/wiki/Distributed_operating_system
https://www.tutorialspoint.com/distributed-operating-system
https://lasr.cs.ucla.edu/classes/188_winter15/readings/distributed_os_notes.html

XML AND WEB SERVICES

COURSE OBJECTIVE

1. Understand how Web services related to Service Oriented Architecture.
2. Become familiar with the pillar Web service specifications for XML, XML Schema, SOAP, WSDL and UDDI.
3. Pick up design patterns and best practices for Web service interface documents.
4. Experience the development of Web services using the Schema elements and objects.
5. Explain the benefits of packaging business applications as services over the Internet

COURSE OUTCOMES

1. Recite the advantages of using XML technology family
2. Knowledge of service oriented computing paradigm, its evolution and the emergence of web services and XML and JSON Schemas
3. Analyze the problems associated with tightly coupled distributed software architecture
4. Indentify and select the appropriate framework components in creation of web service solution
5. Implement e-business solutions using XML based web services

UNIT - I: XML TECHNOLOGY FAMILY

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

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

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

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

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.

TEXTS

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

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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.

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https://www.tutorialspoint.com/xml/
www.xmlmaster.org/en/article/d01/
www.quackit.com/xml/tutorial/
www.tutorialspoint.com/webservices/
www.javatpoint.com/web-services-tutorial
tutorials.jenkov.com/web-services/

PROGRAMMING USING PYTHON

COURSE OBJECTIVES

1. Understand the programming basics (operations, control structures, data types, etc.)
2. Readily use the Python programming language
3. Apply various data types and control structure
4. Understand the object-oriented program design, development and Web Application Framework

COURSE OUTCOMES

1. Describe the components of a computer and notion of an algorithm.
2. Apply suitable programming constructs and built-in data structures to solve a problem.
3. Develop, document, and debug modular python programs.
4. Use classes and objects in application programs and visualize data.

UNIT - I: OVERVIEW

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

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

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

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

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.

TEXTS

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.

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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

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https://www.codecademy.com/learn/python
https://www.Codementor.io
https://www.Python.org

DISTRIBUTED OPERATING SYSTEM

COURSE OBJECTIVES

1. Detail the system level and support required for distributed system and development
2. To Apply shell script commands of Unix

COURSE OUTCOMES

3. To provide hardware and software issues in modern distributed systems.
4. To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
5. To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.
6. To know about Shared Memory Techniques.
7. Have sufficient knowledge about file access.
8. Have knowledge of Synchronization and Deadlock.

Program

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.

XML AND WEB SERVICES

COURSE OBJECTIVES

1. To learn the emerging standard protocols like SOAP, WSDL and UDDI.

COURSE OUTCOMES

2. Develop a Program using XML.
3. Design and Explain the basic concept of XML and Create XML documents and Schema.
4. Design and implement applications on the document with attributes using XSD
5. Develop an interactive web applications to Creating and invoking a Web Service

Program

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

PROGRAMMING USING PYTHON

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

COURSE OUTCOMES

1. Express proficiency in the handling of numbers, strings and functions
2. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets
3. Able to write programs using flow control, functions, modules and packages
4. Identify the commonly used operations involving file systems and regular expressions
5. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python
6. Able to write programs using Exception Handling and Regular Expressions

Program

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

CORE ELECTIVE
A. BLOCKCHAIN TECHNOLOGY

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 cryptocurrencies.
4. To apply the concept of Blockchain for various applications.
5. To correlate current Indian scenario in governing cryptocurrencies in India with Global standard.

COURSE OUTCOMES

1. Students are able to understand the functions of Blockchains
2. Students are able to have clarity in the Concepts, challenges, solutions with respect to blockchain
3. Students are able to understand the facts and myths related to cryptocurrencies.
4. Students are able to apply the concept of Blockchain for various applications.
5. Students are able to correlate Current Indian scenario in governing cryptocurrencies in India with Global standard.

UNIT – I: BLOCKCHAIN 1.0

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

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

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

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

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.

TEXT

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.

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https://www.udemy.com/course/blockchain-and-bitcoin-fundamentals
https://www.tutorialspoint.com/blockchain/index.htm

B. INTERNET OF THINGS

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

1. Understand the definition and significance of the Internet of Things
2. Discuss the architecture, operation, and business benefits of an IoT solution
3. Examine the potential business opportunities that IoT can uncover
4. Explore the relationship between IoT, cloud computing, and big data
5. Identify how IoT differs from traditional data collection systems

UNIT - I: INTRODUCTION

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

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

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

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

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.

TEXT

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.

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https://www.coursera.org/courses?query=iot
https://online.stanford.edu/courses/xee100-introduction-internet-things
https://www.tutorialspoint.com/internet_of_things/index.htm

C. NETWORK SECURITY

COURSE OBJECTIVES

1. Understand vulnerability in a computer system.
2. Explain useful and common tools used by the attacker
3. Understand basic concept of how to protect and design private network.
4. Understand how to protect security of information.
5. Use theoretical and practical knowledge in securing data transfer and authentication

COURSE OUTCOMES

1. Design and develop IOT based solution for real world applications
2. Realize the evolution of Internet in Mobile Devices, Cloud & Sensor Networks
3. Understand the building blocks of Internet of Things and its characteristics.
4. Able to understand the concept of IOT and its application.

UNIT- I: SECURITY IN COMPUTING ENVIRONMENT

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

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

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

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

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.

TEXT

1. William Stallings. Cryptography and network security, 4/E. Pearson Education India, 2006.

REFERENCE

2. Singh,"Network Security and Management", 2nd ed., PHI.

WEB REFERENCES

https://alison.com/course/introduction-to-computer-network-security
https://www.udemy.com/course/certified-secure-netizen/

OPEN ELECTIVE
A. PROGRAMMING USING C

COURSE OBJECTIVES

1. Write algorithms, flowcharts and programs
2. Implement different programming constructs and decomposition of problems into functions.
3. Use and implement data structures like arrays and structures to obtain solutions.
4. Define and use of pointers with simple applications.

COURSE OUTCOMES

1. Describe the fundamentals of C programming Language.
2. Apply appropriate Control structures to solve problems.
3. Describe the concept of Arrays and Strings.
4. Write User defined functions and apply concept of recursion to solve problems
5. Describe the concept of Pointers and Structures.
6. Implement functions towards performing operations on Files

UNIT – I: DATA TYPES, OPERATORS AND STRUCTURES

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

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

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

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

Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Command Line Arguments.

TEXT

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.

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http://www.cprogramming.com/tutorial/c-tutorial.html/
http://www.tutorialspoint.com/cprogramming/

B. PROGRAMMING USING C++

COURSE OBJECTIVES

1. Explain the object-oriented concepts.
2. To learn the syntax and semantics of the C++ programming language.
3. To understand the concept of data abstraction and encapsulation
4. To understand the principle of operator overloading
5. To learn how inheritance and virtual functions are implemented.

COURSE OUTCOMES

1. Understand the basic concepts of object oriented programming language.
2. Explain the concept of classes and objects.
3. Explain special member functions called as constructors and destructors.
4. Explain the exciting feature of operator overloading.
5. Understand the basic concepts of inheritance and polymorphism.

UNIT – I: BASIC CONCEPTS

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

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

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

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

Exception Handling – File I/O Stream – File Stream Operations – Opening and Closing a File – Sequential Access.

TEXT

1. E Balagurusamy, “Object Oriented Programming with C++”, 5th Edition, McGraw Hill Education India Pvt Ltd. 2012.

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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.

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http://www.doc.ic.ac.uk/~wjk/C++Intro/
http://www.ideone.com/
http://www.compilr.com/c-compiler

C. PROGRAMMING USING PYTHON

COURSE OBJECTIVES

1. Understand the programming basics (operations, control structures, data types, etc.)
2. Readily use the Python programming language
3. Apply various data types and control structure
4. Understand the object-oriented program design, development and Web Application Framework

COURSE OUTCOMES

1. Describe the components of a computer and notion of an algorithm.
2. Apply suitable programming constructs and built-in data structures to solve a problem.
3. Develop, document, and debug modular python programs.
4. Use classes and objects in application programs and visualize data.

UNIT - I: OVERVIEW

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

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

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

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

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.

TEXTS

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

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www.learnpython.org/
https://www.codecademy.com/learn/python
https://www.Codementor.io
https://www.Python.org

MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES

1. To learn the Android Operating System and Applications and Mobile application development using Android Studio
2. To know the fundamentals of Android Development and Android Services.
3. To know about the Publishing and Internationalizing of Mobile Applications.

COURSE OUTCOMES

1. Demonstrate their understanding of the fundamentals of Android systems and essential android programming concepts
2. Develop various Android applications related to activities, layouts & rich uses interactive interfaces
3. Build an application using Android development environment like UI design
4. Develop Android applications related to mobile related server-less database like SQLITE
5. Demonstrate their ability to debug programs running on mobile devices

UNIT - I: INTRODUCTION TO ANDROID

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

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

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

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

Building an Application to Send Email - Handling Telephony - Displaying Phone Information Application 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

TEXTS

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.

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www.javatpoint.net
www.mkyong.com
www.java2s.com

SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES

1. To understand the basic concepts of Software Project Management.
2. To know how to plan for a Software Project Development.
3. To know about various Software Metrics and its types.
4. To get knowledge on various ERP Packages.
5. To know about Decision Structure and Support Systems

COURSE OUTCOMES

1. Students are able to understand the activities during the project scheduling of any software application.
2. Students are able to learn the risk management activities and the resource allocation for the projects.
3. Students are able to apply the software estimation and recent quality standards for evaluation of the software Projects.
4. Students are able to acquire knowledge and skills needed for the construction of highly reliable software project.
5. Students are able to able to create reliable, replicable cost estimation that links to the requirements of project planning and managing.

UNIT I: INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

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

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

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

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

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.

TEXT

1. BOB Huges, Mike Cotterell, Rajib Mall “Software Project Management”, McGraw Hill, Fifth Edition,2011.

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1. Futrell, “Quality software Project management”, Pearson Education India.
2. Royce, “Software Project Management”, Pearson Education India.

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www.rspa.com/spi/project-mgmt.html

MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES

1. To know the basis of Android application and development environment
2. To able to develop simple and professional application

COURSE OUTCOMES

1. Design and develop user interfaces for mobile apps using basic building blocks, UI components and application structure using Emulator
2. Write simple programs and develop small applications using the concepts of UI design, layouts and preferences
3. Develop applications with multiple activities using intents, array adapter, exceptions and options menu
4. Implement activities with dialogs, spinner, fragments and navigation drawer by applying themes
5. Develop mobile applications using SQLite, SMS, Email and Telephony

Program

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

CORE ELECTIVE
A. BIG DATA ANALYTSIS

COURSE OBJECTIVES

1. Understand the concept of Software testing and Quality Assurance and importance of the both in software industry.

COURSE OUTCOMES

1. Students will acquire the knowledge on software testing and quality assurance.
2. They will be able to perform Testing & Quality Assurance process on a sample project with desired documents.

UNIT – I: INTRODUCTION TO BIG DATA

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

UNIT – II: BIG DATA ANALYTICS

Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

UNIT – III: BIG DATA TECHNOLOGIES AND DATABASES

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

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:

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

TEXT

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

REFERENCE BOOKS

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

2.“Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013

3. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.

4. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

WEB REFERENCES

http://strata.oreilly.com/2010/09/the-smaq-stack-for-big-data.html

http://blogs.computerworld.com/18840/big_data_smaq_down_storage_mapreduce_and_query

B. ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES

1. To understand basic principles of Artificial Intelligence
2. To learn and design intelligent agents
3. To understand the basic areas of artificial intelligence including problem solving, knowledge representation, reasoning, decision making, planning, perception and action

COURSE OUTCOMES

1. Understand formal methods of knowledge representation
2. Understand foundation principles, mathematical tools and program paradigms of AI.
3. Apply intelligent agents for Artificial Intelligence programming techniques
4. Apply problem solving through search for AI applications
5. Apply logic and reasoning techniques to AI applications.

UNIT – I: INTRODUCTION

AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems

UNIT – II: HEURISTIC SEARCH TECHNIQUES

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

Representing simple facts in logic - Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

UNIT – IV: REPRESENTING KNOWLEDGE USING RULES

Procedural Vs Declarative knowledge – Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT – V: GAME PLAYING

The minimax search procedure – Expert System - Perception and Action

TEXT

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.

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https://in.udacity.com/course/intro-to-artificial-intelligence--cs271

C. MACHINE LEARNING

COURSE OBJECTIVES

1. Conceptualization 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

1. Able to understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
2. Able to apply these techniques in applications which involve perception, reasoning and learning
3. Able to acquire the knowledge of real world Knowledge representation
4. Able to analyze and design a real world problem for implementation and understand the dynamic behavior of a system
5. Able to use different machine learning techniques to design AI machine and enveloping applications for real world problems

UNIT – I: INTRODUCTION TO MACHINE LEARNING

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

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

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

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

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.

TEXTS

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.

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https://elitedatascience.com/learn-machine-learning
https://www.analyticsvidhya.com/learning-path-learn-machine-learning/

OPEN ELECTIVE
A. CYBER SECURITY

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

1. To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity
2. To understand how to deploy encryption techniques to secure data in transit across data networks.
3. To get insights into the various protocols for network security to protect against network threats.

UNIT - I: INTRODUCTION TO CYBERCRIME AND CYBEROFFENSES

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

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

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

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 Cybersecurity - Forensics Best Practices for Organizations - Media and Asset Protection: Best Practices for Organizations - Importance of Endpoint Security in Organizations.

UNIT - V: CYBERCRIME AND CYBERTERRORISM

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.

TEXT

1. Jennifer L, Bayuk J, Heale P, Rohmeyer, Marcus Sachs, Jeffrey Schmidt and Joseph Weiss “Cyber Security 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.

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B. DECISION SUPPORT SYSTEM

COURSE OBJECTIVES

1. DSS and its Characteristics
2. Decision Makers and styles
3. Decision processes and its modeling
4. Executive Information System
5. Perspective of DSS and Implementation of DSS

COURSE OUTCOMES

1. Understanding of Decision support system, Group support system, leadership skills, Expert systems and adopting problem solving techniques in an organization.
2. **A**ppraise issues related to the development of DSS
3. **S**elect appropriate modeling techniques
4. **A**nalyze, design and implement a DSS

UNIT - I: DECISION-MAKING SYSTEMS, MODELING, AND SUPPORT

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

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

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

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

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.

TEXT

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

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www.uky.edu/BusinessEconomics/dssakba/instmat.htm
https://ceit.aut.ac.ir/~shiry/lecture/DSS/Introduction.ppt

C. RESEARCH METHODS AND ETHICS

COURSE OBJECTIVES

1. Fundamentals of Research Methodology.
2. Quantitative methods.

COURSE OUTCOMES

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 research proposal/report;
4. To compare and contrast quantitative and qualitative research

UNIT I: FOUNDATIONS OF RESEARCH

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

Research Question–Investigation Question –Measurement Issues –Hypothesis –Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing –Logic & Importance.

UNIT III: RESEARCH DESIGN

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

Qualitative research –Quantitative research –Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT V: MEASUREMENT

Concept of measurement–what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement –Nominal, Ordinal, Interval, Ratio.

TEXT BOOK

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.

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