DHANALAKSHMI SRINIVASAN

COLLEGE OF ARTS & SCIENCE FOR WOMEN (AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Nationally Reaccredited with 'A' Grade by NAAC)

Perambalur – 621 212 – Tamil Nadu

Department of Computer Science

B.Sc. Computer Science – Course Structure under CBCS

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

YEAR/ SEM.	PART	COURSE	COURSE TITLE	COURSE CODE	INS. PERIODS / WEEK	CREDIT	EXAM HRS.	MARKS		TOTAL
								INT.	EXT.	
I YEAR / I SEM	I	Language Course - I	Cheyyul (IkkalaIlakkiyam),Siru kathai, IlakkiyaVaralaru/ French / Hindi / Sanscrit / Arabic	21U1LT1/ 21U1LF1/ 21U1LH1/ 21U1LS1/ 21U1LA1	6	3	3	25	75	100
	II	English Language Course – I	English for Communication - I	21U1EL1	6	3	3	25	75	100
	III	Core Course – I	Basic Computer Concepts	21UCS1C1	6	5	3	25	75	100
		Core Course –II	Computer Basics and Animation Lab	21UCS1C2P	4	3	3	40	60	100
		Allied Course– I	Algebra and Calculus	21UCS1A1	4	3	3	25	75	100
		Allied Course –II	Numerical Analysis and Statistics	21UCS1A2	2	-	-	-	-	-
	IV	Environmental Studies	Environmental Studies	21U1EVS	2	2	3	25	75	100
	TOTAL				**30**	**19**		**165**	**435**	**600**
I YEAR / II SEM	I	Language Course – II	Cheyyul (IdaikalaIlakkiyam), Puthinam / French / Hindi / Sanscrit / Arabic	21U2LT2/ 21U2LF2/ 21U2LH2/ 21U2LS2/ 21U2LA2	6	3	3	25	75	100
	II	English Language Course – II	English for Communication - II	21U2EL2	6	3	3	25	75	100
	III	Core Course – III	Programming in C Language	21UCS2C3	6	5	3	25	75	100
		Core Course – IV	Programming in C Lab	21UCS2C4P	4	3	3	40	60	100
		Allied Course –II	Numerical Analysis and Statistics	21UCS1A2	2	3	3	25	75	100
		Allied Course –III	Operations Research	21UCS2A3	4	3	3	25	75	100
	IV	Value Education	Value Education	21U2VED	2	2	3	25	75	100
	TOTAL				**30**	**22**		**190**	**510**	**700**

II YEAR / III SEM	I	Language Course – III	Cheyyul (Kappiyangal), Urainadai, AluvalMuraiMadalgal, IlakkiyaVaralaru / French / Hindi / Sanscrit / Arabic	21U3LT3/ 21U3LF3/ 21U3LH3/ 21U3LS3/ 21U3LA3	6	3	3	25	75	100
	II	English Language Course – III	English through Literature	21U3EL3	6	3	3	25	75	100
	III	Core Course – V	Programming in C++	21UCS3C5	6	5	3	25	75	100
		Core Course – VI	Programming in C++ Lab	21UCS3C6P	4	3	3	40	60	100
		Allied Course – IV	Applied Physics – I	21UCS3A4	3	3	3	25	75	100
		Allied Course – V	Applied Physics Practical – I (Electronics)	21UCS3A5P	3	-	-	-	-	-
	IV	Non Major Elective – I	Computer Fundamentals	21UCS3N1A	2	2	3	25	75	100
			Introduction to Information Technology	21UCS3N1B						
			Office Automation	21UCS3N1C						
	TOTAL				**30**	**19**		**165**	**435**	**600**
II YEAR / IV SEM	I	Language Course – IV	Cheyyul (SangaIlakkiyam, NeedhiIlakkiyam, Nadagam, IlakkiyaVaralaru, PodhuKatturai) / French / Hindi / Sanscrit / Arabic	21U4LT4/ 21U4LF4/ 21U4LH4/ 21U4LS4/ 21U4LA4	6	3	3	25	75	100
	II	English Language Course – IV	English for Competitive Examinations	21U4EL4	6	3	3	25	75	100
	III	Core Course – VII	Java Programming	21UCS4C7	6	5	3	25	75	100
		Core Course – VIII	Java Programming Lab	21UCS4C8P	4	4	3	40	60	100
		Allied Course – V	Applied Physics Practical – I (Electronics)	21UCS3A5P	3	3	3	40	60	100
		Allied Course – VI	Applied Physics - II	21UCS4A6	3	3	3	25	75	100
	IV	Non Major Elective - II	Recent Trends in Enterprise Information Technology	21UCS4N2A	2	2	3	25	75	100
			PC Software	21UCS4N2B						
			Working Principles of Internet	21UCS4N2C						
TOTAL					**30**	**23**		**205**	**495**	**700**

III YEAR / V SEM.	III	Core Course IX	Data Base Management System	21UCS5C9	5	5	3	25	75	100
		Core Course X	RDBMS Lab	21UCS5C10P	5	4	3	40	60	100
		Core Course XI	Operating System	21UCS5C11	5	5	3	25	75	100
		Core Course XII	Data Structure and Algorithm	21UCS5C12	5	5	3	25	75	100
		Major Based Elective - I	Cryptography	21UCS5M1A	4	4	3	25	75	100
			Computer Graphics and Multimedia	21UCS5M1B						
			Software Engineering	21UCS5M1C						
	IV	Skill Based Elective – I	Page Maker	21UCS5S1A	2	2	3	25	75	100
			Corel Draw	21UCS5S1B						
			Flash	21UCS5S1C						
		Skill Based Elective – II	Dream Weaver	21UCS5S2A	2	2	3	25	75	100
			Illustrator	21UCS5S2B						
			Indesign	21UCS5S2C						
		Soft Skill Development	Soft Skill Development	21U5SS	2	2	3	25	75	100
TOTAL					**30**	**29**		**230**	**570**	**800**
III YEAR / VI SEM	III	Core Course – XIII	Php Scripting Language	21UCS6C13	6	6	3	25	75	100
		Core Course – XIV	Php Lab	21UCS6C14P	6	6	3	40	60	100
		Core Course – XV	Networking	21UCS6C15	6	6	3	25	75	100
		Major Based Elective – II	Digital Computer Fundamentals & Microprocessor	21UCS6M2A	5	4	3	25	75	100
			Dot Net Concepts	21UCS6M2B						
			Linux Administration	21UCS6M2C						
		Major Based Elective – III	Mini Project (in-house project)	21UCS6M3PW	6	4	3	40	60	100
			LINUX LAB	21UCS6M3P1						
			Multimedia Lab	21UCS6M3P2						
	IV	Gender Studies	Gender Studies	21U6GS	1	1	3	25	75	100
	V	Extension Activities	Extension Activities	-	-	1	-	-	-	-
TOTAL					**30**	**28**	**-**	**180**	**420**	**600**
GRAND TOTAL					**180**	**140**	**-**	**1135**	**2865**	**4000**

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PG - M.Sc. Computer Science – Course Structure under CBCS

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SEM.	COURSE	COURSE TITLE	COURSE CODE	INS PERIODS / WEEK	CREDIT	EXAM HRS.	MARKS		TOTAL
							INT.	EXT.	
I	Core Course - I	J2EE Technologies	20PCS1C1	6	5	3	25	75	100
	Core Course - II	J2EE Lab	20PCS1C2P	5	4	3	40	60	100
	Core Course - III	OOAD & UML	20PCS1C3	5	5	3	25	75	100
	Core Course - IV	Distributed Operating System	20PCS1C4	6	5	3	25	75	100
	Elective Course -I	Soft Computing	20PCS1E1A	5	3	3	25	75	100
		Mobile Communication	20PCS1E1B						
	Application Oriented Course - I	Grid Computing	20PCS1A1	3	3	3	25	75	100
	TOTAL			**30**	**25**	**-**	**165**	**435**	**600**
II	Core Course - V	Cloud Computing	20PCS2C5	6	4	3	25	75	100
	Core Course - VI	XML and Web Services	20PCS2C6	5	4	3	25	75	100
	Core Course - VII	Open Source Web Devevlopment	20PCS2C7	6	4	3	25	75	100
	Core Course- VIII	Open Source Technology Lab	20PCS2C8P	5	3	3	40	60	100
	Elective Course -II	Advanced Software Engineering	20PCS2E2A	5	4	3	25	75	100
		Parallel Computing	20PCS2E2B						
	Application Oriented Course - II	XML & Web Services Lab	20PCS2A2P	3	3	3	40	60	100
	TOTAL			**30**	**22**	**-**	**180**	**420**	**600**

III	Core Course - IX	Distributed Technologies	20PCS3C9	6	5	3	25	75	100
	Core Course - X	Distributed Technologies Lab	20PCS3C10P	6	4	3	40	60	100
	Core Course - XI	Data Mining and Warehousing	20PCS3C11	6	5	3	25	75	100
	Core Course - XII	Compiler Design	20PCS3C12	6	4	3	25	75	100
	Elective Course – III	Artificial Intelligence	20PCS3E3A	6	5	3	25	75	100
		Pervasive Computing	20PCS3E3B						
	TOTAL			**30**	**23**	**-**	**140**	**360**	**500**
IV	Core Course –XIII	Big Data Analytics	20PCS4C13	6	5	3	25	75	100
	Core Course –XIV	Cyber Security	20PCS4C14	6	5	3	25	75	100
	Project	Project	20PCS4PW	18	10	-	-	-	100
	TOTAL			**30**	**20**	**-**	**50**	**150**	**300**
	GRAND TOTAL			**120**	**90**	**-**	**535**	**1365**	**2000**

CORE COURSE I - J2EE TECHNOLOGIES

Semester : I **Max. Marks : 75**

Course Code : 20PCS1C1 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on the various technologies in J2EE and their implementation.

UNIT – I **(16 Hours)**

J2EE OVERVIEW: Distributed Multi-tiered Applications - J2EE Containers - Web Services Support –Packaging Applications – Development Roles – J2EE APIs – Sun Java System Application Server Platform Edition 8. UNDERSTANDING XML: Introduction to XML – Generating XML Data.

UNIT – II **(20 Hours)**

GETTING STARTED WITH WEB APPLICATIONS: Web Application Life Cycle – Web modules – Web Application Examples. JAVA SERVLET TECHNOLOGY: What Is a Servlet? – Servlet Life Cycle – Sharing Information – Creating and Initializing a Servlet – Writing Service Methods – Filtering Requests and Responses – Invoking Other Web Resources – Accessing the Web Context.

UNIT – III **(18 Hours)**

JAVASERVER PAGES TECHNOLOGY: What Is a JSP Page? - The Life Cycle of a JSP Page - Creating Static Content - Creating Dynamic Content - Expression Language - JavaBeans Components - Using Custom Tags - Reusing Content in JSP Pages - Transferring Control to Another Web Component - Including an Applet. JAVASERVER PAGES STANDARD TAG LIBRARY: Using JSTL.

UNIT – IV **(19 Hours)**

ENTERPRISE BEANS: What Is an Enterprise Bean? - What Is a Session Bean? - What Is an Entity Bean? - What Is a Message-Driven Bean? - Defining Client Access with Interfaces -The Contents of an Enterprise Bean - Naming Conventions for Enterprise Beans - The Life Cycles of Enterprise Beans. GETTING STARTED WITH ENTERPRISE BEANS: Creating the J2EE Application.

UNIT - V **(17 Hours)**

SECURITY: Understanding Login Authentication - HTTP basic authentication - Form-based login authentication - Client certificate authentication - Mutual authentication - Digest authentication. THE JAVA MESSAGESERVICE API: Overview - Basic JMS API concepts - The JMS API programming model. HTTP OVERVIEW: HTTP Requests – HTTP Responses.

OUTCOMES:

On completion of the course students will be able to

- Learn the graphics and animation on the web pages, using Java Applets
- Learn Java Data Base Connectivity (JDBC) so as to retrieve and manipulate the information on any relational database through Java programs.
- Learn the Server Side Programming using Servlet and JSP.
- Learn Java Bean so as to make the reusable software components
- Learn the invocation of the remote methods in an application using RMI

TEXT BOOK:

1. "The J2EE 1.4 Tutorial for Sun Java System Application Server Platform Edition8.2", Eric Armstrong; Jennifer Ball; Stephanie Bodoff; Debbie Bode Carson; Ian Evans; Dale Green; Kim Haase Eric Jendrock, Sun Microsystem, 2006.

REFERENCE BOOK:

1. "J2EE: The complete Reference", Jim Keogh, McGraw Hill Education (India) Private Limited, 2002 Edition.

CORE COURSE II - J2EE LAB

Semester : I **Max. Marks : 60**

Course Code : 18PCS1C2P **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objectives : To impart knowledge on developing web applications using J2EE technologies.

1. Tomcat server installation and creating the work environment.	**(6 Periods)**
2. (i) Welcome Servlet Programs	**(3 Periods)**
(ii) Servlet with Parameters	**(3 Periods)**
3. Session Tracking in Servlet	
(i) Using cookies	**(3 Periods)**
(ii) Using HttpSession	**(3 Periods)**
(iii) URL rewriting	**(3 Periods)**
4. (i) Hello World Jsp program	**(3 Periods)**
(ii) JSP: declarations, expression and scriplets	**(3 Periods)**
(iii) JSP with Parameter passing	**(3 Periods)**
5. Session tracking in JSP	
(i) Using cookies	**(3 Periods)**
(ii) Using HttpSession	**(3 Periods)**
(iii) URL rewriting	**(3 Periods)**
6. Online Exam using JSP (jdbc)	**(6 Periods)**
7. Job Portal using JSP (jdbc)	**(6 Periods)**
8. Entity Bean	**(6 Periods)**
9. Session Bean	**(6 Periods)**
10. Message Driven Bean	**(6 Periods)**
11. Simple web service using JSP.	**(6 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Understand, analyze and apply the role languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
- Create and communicate between client and server using Java and create a good, effective and dynamic website.

CORE COURSE III – OOAD & UML

Semester : I **Max. Marks : 75**

Course Code : 20PCS1C3 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To impart knowledge on object oriented analysis and design and unified modeling language.

UNIT – I **(13 Hours)**

Introduction - Use case Modelling.

UNIT - II **(13 Hours)**

Static Modelling Using Class diagrams – Interaction Diagrams.

UNIT - III **(16 Hours)**

Dynamic Modelling Using State and Activity diagram – The unified process of Software Development – Architectural Modelling.

UNIT – IV **(18 Hours)**

Design Patterns: Creational – Structural – Behavioral Patterns. Pragmatics: Management and Planning – Staffing – Release Management – Reuse – Quality Assurance and Metrics – Documentation – Tools – The benefits and Risks of Object – Oriented Development.

UNIT – V **(15 Hours)**

Object Oriented Programming Languages - Case Studies: Weather Monitoring Station - Inventory Tracking – Traffic Management.

OUTCOMES:

On completion of the course students will be able to

- Demonstrate the importance of modeling in the software development life cycle.
- Become familiar with the Unified modeling Language.
- Understand the object-oriented approach to analyzing and designing systems and software solutions.
- Employ the Unified modeling Language notations to create effective and efficient system designs.
- Understand the difference between writing programs for the software and doing analysis and design.

TEXT BOOK:

1. Mahesh P. Matha, Object – Oriented Analysis and Design Using UML , PHI

REFERENCE BOOKS:

1. Grady Booch, Object Oriented Analysis and Design , Pearson Edn.
2. Martin Fowler, Kendall Scott, UML Distilled, A Brief Guide to the Standard Object Modeling Languages , 2nd ed, Pearson Education.
3. James Rumbaugh et al, Object Oriented Modeling and Design , Pearson Education

CORE COURSE IV – DISTRIBUTED OPERATING SYSTEM

Semester : I	**Max. Marks : 75**
Course Code : 20PCS1C4	**Credit : 5**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To impart knowledge on Distributed Operating System.

UNIT-I **(16 Hours)**

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

UNIT-II **(20 Hours)**

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 **(20 Hours)**

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 **(20 Hours)**

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 **(14 Hours)**

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

OUTCOMES:

On completion of the course students will be able to

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

TEXT BOOK:

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

REFERENCE BOOK:

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

ELECTIVE COURSE I - SOFT COMPUTING

Semester : I **Max. Marks : 75**

Course Code : 20PCS1E1A **Credit :** 3

Total Periods : 75 **Exam Hrs. : 3**

Objective : On successful completion of the course the student should have: Understood Soft Computing.

UNIT – I **(13 Periods)**

Fundamentals of Neural Networks: Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures - Characteristics of Neural Networks-Learning Methods – Taxonomy - History of Neural Network - Early Neural Network Architectures.

UNIT-II **(17 Periods)**

Back propagation Networks :Architecture of Back propagation Network-Back propagation Learning – Illustrations – Applications - Effect of Tuning Parameters of the Back propagation Neural Network-Selection of Various Parameters in Back propagation Neural Network - Variations of Standard Back propagation Algorithms.

UNIT-III **(14 Periods)**

Adaptive Resonance Theory (ART) :Introduction - ART1 - ART2 - Applications

UNIT-IV **(16 Periods)**

Fuzzy Sets and Systems : Fuzzy Sets - Fuzzy Relations - Fuzzy Logic - Fuzzy Rule Based System - Defuzzification Methods - Applications.

UNIT-V **(15 Periods)**

Fuzzy Back propagation Networks : LR-Type Fuzzy Numbers-Fuzzy Neuron - Fuzzy Back propagation Architecture - Learning in Fuzzy Back propagation - Inference in Fuzzy Back propagation - Applications.

OUTCOMES:

On completion of the course students will be able to

- Learn about soft computing techniques and their applications
- Analyze various neural network architectures
- Understand propagation networks and algorithms
- Define the fuzzy systems
- Analyze the genetic algorithms and their applications.

TEXT BOOK:

1. Rajasekaran. S and Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2008 (Chapters: 2.1, 2.3-2.9, 3.1-3.7, 5.1-5.4, 6.3, 6.5, 7.3-7.6, 12.1-12.6)

REFERENCE BOOKS:

1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, Wiley India, 2008

ELECTIVE COURSE I – MOBILE COMMUNICATION

Semester : I **Max. Marks : 75**

Course Code : 20PCS1E1B **Credit :** 3

Total Periods : 75 **Exam Hrs. : 3**

Objective : On successful completion of this subject, the students should have understood Wireless networks WAP architecture.

UNIT I **(13 Periods)**

Introduction: Applications - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

UNIT II **(17 Periods)**

Telecommunications System: Telecommunication System – GSM – Architecture – Protocols – Handover-Security – UMTS and IMT 2000 – UMTS System Architecture-UTRAN - Core Network - Handover-Satellite System.

UNIT III **(15 Periods)**

Wireless LAN : IEEE S02.11 – System Architecture - Protocol Architecture - Medium Access Control Layer - MAC Frame - MAC Management—Roaming- Bluetooth: Architecture - Link Manager Protocol - Security and Link Management.

UNIT IV **(15 Periods)**

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

UNIT V **(15 Periods)**

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

OUTCOMES:

On completion of the course students will be able to

- Discuss cellular radio concepts.
- Identify various propagation effects.
- To have knowledge of the Telecommunication Architecture.
- Classify multiple access techniques in mobile communication.
- Enhance the knowledge on WAP & XML

TEXT BOOK:

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

REFERENCE BOOKS:

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

APPLICATION ORIENTED COURSE I – GRID COMPUTING

Semester : I	**Max. Marks : 75**
Course Code : 20PCS1A1	**Credit : 3**
Total Periods : 45	**Exam Hrs. : 3**

Objectives : To impart knowledge on Grid Computing Basics, Architectures, Infrastructure Models and the Fundamental Concepts of Grid Services.

UNIT – I **(7 Periods)**

Introduction: Grid Computing & Key Issues –Applications –Other Approaches –Grid Computing Standards –Pragmatic Course of Investigation.

UNIT – II **(9 Periods)**

Grid Benefits & Status of Technology: Motivations – History of Computing - Communications and Grid Computing – Grid Computing Prime Time – Suppliers and Vendors – Economic Value – Challenges.

UNIT – III **(9 Periods)**

Components of Grid Computing Systems and Architectures: Basic Constituent Elements - A Functional View – A Physical View – Service View.

UNIT – IV **(10 Periods)**

Grid Computing Standards - OGSI: Standardization – Architectural Constructs – Practical View – OGSA/OGSI Service Elements and Layered Model – More Detailed View.

UNIT – V **(10 Periods)**

Standards Supporting Grid Computing - OGSA: Functionality Requirements – OGSA Service Taxonomy – Service Relationships – OGSA Services – Security Considerations.

OUTCOMES:

On completion of the course students will be able to

- Understand the fundamentals of grid computing.
- Discuss the basics of grid monitoring.
- Learn the concepts of grid security and resource management.
- Understand the concepts of grid portals.
- Understand the service taxonomy

TEXT BOOK:

1. A Networking Approach to Grid Computing, Daniel Minoli, Wiley Publication14

REFERENCE BOOK:

1. Grid Computing –A Practical Guide to Technology and Applications, Ahmar Abbas, Charles River Media Publication.

CORE COURSE V - CLOUD COMPUTING

Semester : II **Max. Marks : 75**

Course Code: 20PCS2C5 **Credit : 4**

Total Periods : 90 **Exam Hrs. : 3**

Objectives : To impart knowledge on Cloud Computing basics and the various Cloud Computing Architectures, infrastructure models and the Fundamental Concepts cloud services.

UNIT – I (15 Periods)

DEFINING CLOUD COMPUTING- Cloud Types - The NIST Model - The Cloud Cube Model - Deployment Models - Service Models - Examining the Characteristics of Cloud Computing - Paradigm Shift - Benefits of Cloud Computing - Disadvantages of Cloud Computing - Assessing the Role of Open Standards. ASSESSING THE VALUE PROPOSITION: Early Adopters and New Applications - The Laws of Cloudonomics - Cloud Computing Obstacles - Behavioral Factors Relating to Cloud Adoption.

UNIT – II (20 Periods)

UNDERSTANDING CLOUD ARCHITECTURE: Exploring the Cloud Computing Stack – Composability Infrastructure – Platforms - Virtual Appliances - Communication Protocols – Applications. UNDERSTANDING SERVICES AND APPLICATIONS BY TYPE: Defining Infrastructure as a Service (IaaS) - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA.

UNIT III (19 Periods)

UNDERSTANDING ABSTRACTION AND VIRTUALIZATION: Using Virtualization Technologies - Load Balancing and Virtualization - Advanced Load Balancing - The Google Cloud - Understanding Hypervisors - Virtual Machine Types - VMware vSphere - Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance. CAPACITY PLANNING - Load testing - Resource Ceilings - Server and Instance Types.

UNIT IV (18 Periods)

USING MICROSOFT CLOUD SERVICES: Administrating the Clouds - Management Responsibilities - Lifecycle Management - Emerging Cloud Management Standards. UNDERSTANDING CLOUD SECURITY: Securing the Cloud – Securing Data – Establishing Identity and Presence.

UNIT V **(18 Periods)**

USING THE MOBILE CLOUD: Working with Mobile Devices – Defining the Mobile Market – Using Smartphones with the Cloud. WORKING WITH MOBILE WEB SERVICES: Understanding Service Types – Performing Service Discovery – Using SMS – Defining WAP and Other Protocols – Performing Synchronization.

OUTCOMES:

On completion of the course students will be able to

- Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- Understand the core issues of cloud computing such as security, privacy, and interoperability.
- Discuss the appropriate technologies, algorithms, and approaches for the related issues.
- Identify problems, and explain, analyze, and evaluate various cloud computing solutions.
- Understand the Mobile Web Services.

TEXT BOOK:

1. "Cloud Computing Bible", Barrie Sosinsky, Wiley Publishing Inc., 2011.

REFERENCE BOOKS:

1. "Cloud Computing", Michael Miller, Pearson Education Inc., 7th Edition, 2012.
2. "Cloud Computing Principles and Paradigms", RajkumarBuyya& Co., John Wiley & Sons Publications, 2011.

CORE COURSE VI – XML AND WEB SERVICES

Semester : II **Max. Marks : 75**

Course Code : 20PCS2C6 **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objectives : To impart knowledge on developing XML and Web services.

UNIT I **(13 Periods)**

INTRODUCTION : Role Of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML - Service Oriented Architecture (SOA).

UNIT II **(16 Periods)**

XML TECHNOLOGY: XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

UNIT III **(17 Periods)**

SOAP – 9: Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

UNIT IV **(14 Periods)**

WEB SERVICES : Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.

UNIT V **(15 Periods)**

XML SECURITY : Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines for Signing XML Documents - XML In Practice.

OUTCOMES:

On completion of the course students will be able to

- Analyze structured web document in XML based syntax
- Ability to know the Java API of the semantic web platform
- Identify and select the appropriate framework components in the creation of web service solutions.
- Able to know about Web Services and Enterprises
- To know about the techniques WSDL using SOAP and UDDI

TEXT BOOK:

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

REFERENCE BOOKS:

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.

CORE COURSE VII – OPEN SOURCE WEB DEVELOPMENT

Semester : II **Max. Marks : 75**

Course Code : 20PCS2C7 **Credit : 4**

Total Periods : 90 **Exam Hrs. : 3**

Objectives : To impart knowledge on Open Source Technology and its Applications.

UNIT I **(16 Periods)**

Introduction: Open Source – The Web Explained – How It Works?. Linux – The Choice of a GNU Generation – Introduction – Basic Unix.

UNIT II **(16 Periods)**

Apache Web Server: Introduction – Starting, Stopping and Restarting Apache – Configuration – Securing Apache – Create the Web Site – Apache Log Files.

UNIT III **(16 Periods)**

MySQL: Introduction – Tutorial – Database Independent Interface – Table Joins – Loading and Dumping a Database.

UNIT IV **(20 Periods)**

Python Language Basics - IPython and Jupyter Notebooks – Built in Data Structures – Functions – Files.

UNIT V **(22 Periods)**

NumPy Basics: Arrays and Vectorized Computation – Getting Started with Pandas – Plotting and Visualizaation.

OUTCOMES:

On completion of the course students will be able to

- Understand the concept of Linux and Unix
- Ability to learn the concept of MySQL
- Basic understanding of NumPy and Pandas
- Ability to use conditional loops and list by python
- Learn the Visualization through vector based computation

TEXT BOOKS:

1. Open Source Web Development with LAMP: Using Linux, Apache, MySQL, Perl and PHP – James Lee, Brent Ware, Addison Wesley, 2002.
2. Python for Data Analysis – Data Wrangling with Pandas, NumPy and IPython – Wes McKinney – 2nd Edition – O'REILLY - 2017

REFERENCE BOOK:

1. Introduction to Computing & Problem Solving with Python – Jeeva Jose, P.Sojan Lal, Khanna Book Publishing Co.(p) Ltd

CORE COURSE VIII – OPEN SOURCE TECHNOLOGY LAB

Semester : II **Max. Marks : 60**

Course Code : 20PCS2C8P **Credit : 3**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To impart knowledge on developing Open Source Technologies.

1. Write Python application using Variables and Data types.	**(9 Periods)**
2. Write Python application using Strings and Functions.	**(9 Periods)**
3. Write Python application using Loops, Arrays and Sorting	**(9 Periods)**
4. Write Python application using Matrices.	**(9 Periods)**
5. Array function using Numpy.	**(9 Periods)**
6. Aggregation function using Numpy.	**(9 Periods)**
7. Pandas Basics.	**(10 Periods)**
8. Twitter API Integration for tweet analysis.	**(11 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Apply rich controls and conditional statement logic in Python
- Demonstrate the functionality of stack and regular expressions through Python
- Ability to create and manipulate array functions using Numpy
- Ability to create indexing scripts using Pandas
- Build applications using Pandas

ELECTIVE COURSE II – ADVANCED SOFTWARE ENGINEERING

Semester : II **Max. Marks : 75**

Course Code : 20PCS2E2A **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objectives : To impart knowledge on Software Engineering.

UNTI I **(13 Periods)**

Introductions : Evolving Role of Software – Software Characteristics, Components and Its Applications – Generic View of Software Engineering – Software Process Models.

UNIT II **(15 Periods)**

Systems Analysis : Requirements Analysis – Analysis Principles – Prototyping Software Requirement Specification – Data Modeling, Functional Modeling And Behavioral Modeling.

UNIT III **(17 Periods)**

Design Concepts: Design and Software Quality, Design Concepts : Abstraction – Refinement - Modularity and Software Architecture Control Hierarchy - Structural Partitioning and Information Hiding - Effective Modular Design: Functional Independence - Cohesion and Coupling – Design Documentation.

UNIT IV **(16 Periods)**

Design Methods : Data Design – Architectural Design Process: Transform Mapping and Transaction Mapping – Interface Design – Procedural Design. Design for Real – Time Systems : System Considerations – Real Time Systems – Analysis and Simulation of Real Time Systems.

UNIT V **(14 Periods)**

Software Testing Methods: Software Testing Fundamentals. White Box Testing: Basis Path Testing and Control Structure Testing – Black Box Testing – Testing for Specialized Environments. Software Testing Strategies: A strategic Approach to Software Testing – Unit Testing – Integration Testing – Validation Testing – System Testing.

OUTCOMES:

On completion of the course students will be able to

- Analyze the software life cycle models
- Identify the importance of the software development process
- Analyze the importance of CASE tools
- Design and develop correct and robust software products using advanced software engineering techniques
- Able to understand the testing techniques.

TEXT BOOK :

1. R.S.Pressman ”Software Engineering”, (5th edition) Tata McGraw Hill, 1997

ELECTIVE COURSE II - PARALLEL COMPUTING

Semester : II **Max. Marks : 75**

Course Code : 20PCS2E2B **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objectives : To impart knowledge on Parallel Computing.

UNIT - I **(13 Periods)**

Introduction to Parallel Processing – Definition and Functions of Parallel Processing – Uni-Processor and Parallel Processing Systems – Parallel Computers – Pipeline Computers – Array Processor – Multiprocessor Systems – Performance of Parallel Computers – Application of Parallel Processor.

UNIT - II **(15 Periods)**

Memory and Input/Output System – Memory System for Parallel Processor Computers – Hierarchical Memory Structures – Virtual Memory System – Paged System – Segmented System with Paged Segments – Memory Management Policies – Fixed Partitioning and Variable Partitioning – Cache Memories and Management – Characteristics of Cache Memories – Cache Memory Organization – Input/Output Subsystem.

UNIT – III **(17 Periods)**

Pipeline Computers – Principles Of Linear Pipelining – Pipelined Structures of a Typical Central Processing Unit – Classification of Pipeline Processors – Interleaved Memory Organization – S Access Memory Organization – C Access Memory Organization – C & S Access Memory Organization – Static & Dynamic Pipelining – Principles of Designing Static Pipeline Processors – Instruction Prefetch and Branch Handling – Data Buffering and Busing Structures.

UNIT - IV **(16 Periods)**

Array Processors – Single Instruction Stream – Multiple Data Stream – SIMD Processors – Types of SIMD Computer Organization – Array Process or Organization and Associative Processors – Array Processor Computer Organization – SIMD Interconnection Networks – Static and Dynamic Networks – Linear Array, Mesh, Ring, Star, Tree, Systolic,

Completely Connected, Chordalring and Cube Networks – Parallel Algorithms for Array Processors – SIMD Matrix Multiplication – Parallel Sorting on Array Processors.

UNIT - V **(14 Periods)**

Multiprocessor ARCHITECTURE – Functional Structures of a Multiprocessor System Loosely and Tightly Coupled Multiprocessor – Processor Characteristics of Multiprocessing – Inter Processor Communication Mechanism – Instruction Set – Interconnection Networks – Time Shared or Common Bus – Cross Bar Switch and Multi Port Memories and Multistage Networks for Multiprocessor – Parallel Memory Organization – Interleaved Memory Configurations – Classification of Multiprocessor Operating System.

OUTCOMES:

On completion of the course students will be able to

- Familiar with the concepts of parallel processing and understand the particular problems arising in programming of parallel machines;
- Familiar with the parallel computing models and the design of parallel algorithms;
- Able to apply the basic algorithmic techniques and design algorithms in a shared memory as well as a distributed memory environment;
- Able to understand the array processors
- Understand to apply basic parallel programming principles in a shared/ distributed memory environment

REFERENCE BOOK:

1. Kai Hwang, Faye A.Briggs, "Computer Architecture and Parallel Processing, Prentice Hall of India, 1985.

APPLICATION ORIENTED COURSE II - XML & WEB SERVICES LAB

Semester : II **Max. Marks : 60**

Course Code : 20PCS2A2P **Credit : 3**

Total Periods : 45 **Exam Hrs. : 3**

Objectives : To impart knowledge on XML & Web Services.

1. Create an XML document to store an address book. **(4 Periods)**
2. Create an XML document to store information about books and create the DTD files. **(5 Periods)**
3. Create an XML schema for the book's XML document from exercise 2. **(5 Periods)**
4. Create an XML document to store resumes for a job web site and create the DTD file **(4 Periods)**
5. Present the book's XML document using cascading style sheets (CSS). **(4 Periods)**
6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting. **(5 Periods)**
7. Use Microsoft DOM to navigate and extract information from the book's XML document. **(5 Periods)**
8. Use Microsoft DSO to connect HTML form or VB form to the book's XML document and display the information. **(5 Periods)**
9. Create a web service for temperature conversion with appropriate client program. **(4 Periods)**
10. Create a web service for currency conversion (at five currencies) with appropriate client program. **(4 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Create dynamic web pages & add functionality to the WebPages by using XML & HTML
- Gain confidence to create dynamic website on real world problems.

CORE COURSE IX - DISTRIBUTED TECHNOLOGIES

Semester : III **Max. Marks : 75**

Course Code : 20PCS3C9 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives : To impart knowledge on distributed technologies.

UNIT – I **(15 Periods)**

Introduction to Distributed Computing – Challenges Involved in Establishing Remote Connection – Strategies Involved in Remote Computation – Current Distributed Computing Practices Through Dot Net and Java Technologies

UNIT – II **(20 Periods)**

Advanced ADO.NET – Disconnected Data Access – Gridview, Details View, Form View Controls – Crystal Reports – Role of ADO.NET in Distributed Applications

UNIT – III **(20 Periods)**

Advanced ASP.NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Site Navigation – Web Parts – Uses of these Controls and Features in Website Development

UNIT – IV **(18 Periods)**

Advanced Features of ASP.NET – Security in ASP. NET – State Management in ASP. NET – Mobile Application Development in ASP.NET – Critical Usage of these Features in Website Development.

UNIT – V **(17 Periods)**

Web Services – Role of Web Services in Distributed Computing – WSDL, UDDI, SOAP Concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through ASP. NET Application

OUTCOMES:

On completion of the course students will be able to

- Understand the concept and architecture of ASP.NET
- Create rich GUI web applications using Visual Studio.NET
- Learn and implement new features in ASP.NET
- Discuss and extend data list and data grid controls
- Demonstrate the database connectivity in ASP.NET

TEXT BOOK:

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

REFERENCE BOOK:

1. The Complete Reference ASP.NET – Herbert Schildt.

CORE COURSE X - DISTRIBUTED TECHNOLOGIES LAB

Semester : III **Max. Marks : 60**

Course Code : 20PCS3C10P **Credit : 4**

Total Periods : 90 **Exam Hrs. : 3**

Objectives : To impart knowledge on distributed technologies lab.

1) Create a table and insert a few records using Disconnected Access. **(8 Periods)**

2) Develop a project to update and delete few records using disconnected access.

(8 Periods)

3) Develop a project to view the records using GridView, DetailsView, FormView controls.

(8 Periods)

4) Develop a project to generate a crystal report from an existing database. **(8 Periods)**

5) Design a web page that makes uses of Ad Rotator Control. **(7 Periods)**

6) Design a web page involving Multi View or Wizard Control. **(7 Periods)**

7) Make use of Image Control involving two hot spots in a web page. **(7 Periods)**

8) Design a simple web site that makes use of Master Pages. **(7 Periods)**

9) Establish the security features in a simple web site with five pages. **(7 Periods)**

10) Use state management concepts in a mobile web application. **(7 Periods)**

11) Develop a web service that has an ASP.NET client. **(8 Periods)**

12) Develop a web service to fetch a data from a table and send it across to the client.

(8 Periods)

OUTCOMES:

On completion of the course students will be able to

- Design forms using various web controls
- Apply rich controls and validation controls to the web page
- Incorporate cookies, session and application state in a web page
- Create and manipulate the data in the database using ADO.NET
- Create a template using data list and data grid

CORE COURSE XI - DATA MINING AND WAREHOUSING

Semester : III	**Max. Marks : 75**
Course Code : 20PCS3C11	**Credit : 5**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To understand Data Mining and Data Warehousing Applications.

UNIT-I **(18 Periods)**

Introduction to Data Mining – Association Rule Mining.

UNIT-II **(18 Periods)**

Classification – Cluster Analysis.

UNIT-III **(18 Periods)**

Web Data Mining – Search Engines.

UNIT-IV **(18 Periods)**

Data warehousing – Introduction – Operational Data Stores – Data Warehouses – Data Warehouse Design – Guidelines for Data Warehouse Implementation – Data Warehouse Metadata - Software for ODS and Data Warehousing.

UNIT-V **(18 Periods)**

Online Analytical Processing – Information Privacy.

OUTCOMES:

On completion of the course students will be able to

- To understand the basic principles, concepts and applications of data warehousing and data mining,
- Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
- Describe different methodologies used in data mining and data ware housing.
- Compare different approaches of data ware housing and data mining with various technologies.

TEXT BOOK:

1. G.K. Gupta, Introduction to Data mining with case studies, Prentice Hall India , 2006 (ISBN 81-203-3053-6) [Unit-1 :(Chapters 1,2); Unit-2 : (Chapters 3,4); Unit-3 (Chapters 5,6); Unit-4 (Chapters 7), Unit-5 (Chapters 8,9)].

REFERENCE BOOKS:

1. K.P.Soman & Shyam Diwakar and V. Ajay, Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN -81-203- 2897-3)
2. Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Elsevier, Second Edition, 2007 (ISBN: 81-312-0535-5)

CORE COURSE XII – COMPILER DESIGN

Semester : III **Max. Marks : 75**

Course Code : 20PCS3C12 **Credit : 4**

Total Periods : 90 **Exam Hrs. : 3**

Objectives : To impart knowledge on different Phases of Compiler and Needs of the Compiler.

UNIT I (18 Periods)

INTRODUCTION: Different Phases of Compiler - Finite State Automation and Lexical Analysis - A Simple Approach to the Design of Lexical Analyzers- Regular Expressions - A Language for Specifying Lexical Analyzers.

UNIT II (19 Periods)

SYNTAX SPECIFICATION: Context Free Grammars - Parsers – Derivation and Parse Trees- Shift Reduce Parsing - Operator Precedence Parsing - Top-Down Parsing – Predictive Parsers.

UNIT III (17 Periods)

CODE GENERATION: Intermediate Code Generation - Translation -Implementation of Syntax - Directed Translators - Intermediate Code – Postfix Notation - Parse Trees and Syntax Trees - Three Address Codes, Quadruples and Triples.

UNIT IV (18 Periods)

SYMBOL TABLES: Contents of a Symbol Table - Data Structures for Symbol Tables - Implementation of a Simple Stack Allocation Scheme -Implementation of Block Structured Languages - Storage Allocation in Block Structured Languages - Errors - Lexical Phase Error.

UNIT V (18 Periods)

CODE OPTIMIZATION AND CODE GENERATION: Elementary Code Optimization technique - Loop Optimization - DAG Representation of Basic Blocks - Value Numbers and Algebraic Laws - Object Programs - Problems in Code Generation - A Machine Model - A Simple Code Generator.

OUTCOMES:

On completion of the course students will be able to

- Design and develop a comprehensive Compiler for a given language
- Implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler.
- Understand the concept parsing techniques
- Able to understand the memory allocation
- Understand the Loop Optimization and DAG

TEXT BOOK:

1. Alfred V. Aho, Jeffery D.Ullman, "Principles of Compiler Design", Narosa,New Delhi 2002. Ch:1.1-1.11,3.1-3.7,4.1,4.2,5.1-5.5,7.1-7.6,9.1,9.2 ,10.1,10.2,11.1, 11.2,12.1-12.4,15.1-15.4

REFERENCE BOOKS:

1. Dick Grune, Henri E. Bal, CerielJ.H.Jacobs, Koen G. Langondeon,"Modern Compiler Design", Wiley, Singapore, 2003.
2. Louden K., "Compiler Construction, Principles and Practice", Thomson,New Delhi, 2003.

ELECTIVE COURSE III – ARTIFICIAL INTELLIGENCE

Semester	**: III**	**Max. Marks**	**: 75**
Course Code	**: 20PCS3E3A**	**Credit**	**: 5**
Total Periods	**: 90**	**Exam Hrs.**	**: 3**

Objectives : To impart knowledge on Artificial Intelligence & Expert systems.

UNIT I **(18 Periods)**

Introduction: AI Problems - Al Techniques - Criteria for Success. Problems, Problem Spaces, Search: State Space Search - Production Systems

UNIT II **(18 Periods)**

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 **(18 Periods)**

Using Predicate Logic: Representing Simple Facts in Logic - Representing Instance and Is a Relationships - Computable Functions and Predicates - Resolution.

UNIT IV **(18 Periods)**

Representing Knowledge using Rules: Procedural vs Declarative Knowledge – Logic Programming - Forward vs Backward Reasoning - Matching - Control Knowledge.

UNIT V **(18 Periods)**

Game Playing – The Minimax Search Procedure – Expert System - Perception and Action

OUTCOMES:

On completion of the course students will be able to

- Compare AI with human intelligence and traditional information processing
- Discuss the core concepts and algorithms of advanced AI
- Apply the basic principles, models, and algorithms of AI
- Analyze the structures and algorithms of a selection of techniques
- Able to understand the logic programming

TEXT BOOK:

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.
   Unit1: Chapter 1(1.1,1.3.1.5), Chapter 2(2.1,2.2) Unit2: Chapter 3(3.1,3.2,3.3,3.6), Chapter 4(4.1,4.2,4.3,4.4). Unit3: Chapter 5(5.1,5.2,5.3,5.4). Unit4: Chapter 6. Unit5: Chapter 12(12.1,12.2),Chapter 20 and Chapter 21.

ELECTIVE COURSE III – PERVASIVE COMPUTING

Semester : III **Max. Marks : 75**

Course Code : 20PCS3E3B **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objective : To impart knowledge on the concept of Web Applications and WAP Fundamentals.

UNIT – I **(18 Periods)**

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – mBusiness – Application Examples: Retail, Airline Check-in and Booking – Health Care – Car Information System – E-mail Access via WAP and Voice.

UNIT – II **(18 Periods)**

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

UNIT - III **(18 Periods)**

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW Architecture – Protocols – Transcoding - Client Authentication via Internet.

UNIT - IV **(18 Periods)**

WAP and Beyond: Components of the WAP architecture – WAP Infrastructure – WAP Security Issues – WML – WAP Push – Products – i-Mode - Voice Technology: Basics of Speech Recognition- Voice Standards – Speech Applications – Speech and Pervasive Computing.

UNIT - V **(18 Periods)**

PDA: Device Categories – PDA Operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application Architecture: Background – Development of Pervasive Computing Web Applications - Pervasive Application Architecture.

OUTCOMES:

On completion of the course students will be able to

- Understand the applications of pervasive computing
- Able to know about the new technologies
- Understanding of Wireless Network Security mechanisms
- Understand the concept of Authentication
- Learn the core concept of PDA

TEXT BOOK:

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006.

REFERENCE BOOK:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

CORE COURSE XIII – BIG DATA ANALYTICS

Semester : IV **Max. Marks : 75**

Course Code : 20PCS4C13 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objective: To impart knowledge on Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals

UNIT – I **(18 Periods)**

Introduction to Big Data: Data, Characteristics of Data and Types of digital data: Unstructured - Semi-structured and Structure - 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 **(18 Periods)**

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 **(18 Periods)**

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 **(18 Periods)**

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 **(18 Periods)**

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

OUTCOMES:

On completion of the course students will be able to

- Understand the concept and challenge of big data and why existing technology is inadequate to analyze the Big Data;
- Collect, manage, store, query, and analyze various form of Big Data;
- Understand the impact of big data for business decisions and strategy.
- Address the limitations and challenges of working in a Big Data environment and thus utilize the opportunities for commercial and/or social benefit.
- Understand the workings of various tools using Big Data

TEXT BOOK:

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

REFERENCE BOOKS:

1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

CORE COURSE XIV – CYBER SECURITY

Semester : IV **Max. Marks : 75**

Course Code : 20PCS4C14 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objective : To impart knowledge on the concept of Threats, Attacks and Exploits fundamentals.

UNIT – I **(18 Periods)**

Introduction - Computer Security - Threats - Harm - Vulnerabilities - Controls - Authentication -Access Control and Cryptography.

UNIT - II **(18 Periods)**

Web—User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks.

UNIT – III **(18 Periods)**

Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management.

UNIT – IV **(18 Periods)**

Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining -Privacy on the Web - Email Security.

UNIT – V **(18 Periods)**

Emerging Technologies - The Internet of Things - Economics - Electronic Voting - Cyber Warfare.

OUTCOMES:

On completion of the course students will be able to

- Define the terms vulnerability, threat and attack
- Identify physical points of vulnerability in simple networks
- Able to understand the attacks in internet
- Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.
- Able to understand privacy concepts and emerging technologies in security

TEXT BOOK:

1. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition, Pearson Education , 2015.

REFERENCE BOOKS:

1. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.
2. Martti Lehto, Pekka Neittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015.

PROJECT

Semester : IV	**Max. Marks : 75**
Course Code : 20PCS4PW	**Credit : 10**
Total Periods : 270	**Exam Hrs. : 3**

Students to do the Project. The objective of the Project is to enable the students to work in Latest Software.

CORE COURSE I - BASIC COMPUTER CONCEPTS

Semester : I **Max. Marks : 75**

Course Code : 21UCS1C1 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge about the fundamental concepts of computers in a logical and informative manner.

UNIT I **(15 Periods)**

Introduction: Characteristics of Computers – The Evolution of Computers – The Computer Generations. Basic Computer Organization: Input Unit – Output Unit - Storage Unit – Arithmetic Logic Unit – Control Unit – The Central Processing Unit. Processor and Memory: The Main Memory.

UNIT II **(21 Periods)**

Secondary Storage Devices: Sequential and Direct Access Devices – Magnetic Disk - Optical Disk – CD-ROM. Input-Output Devices: Input Devices: Keyboard – Point-and-Draw Devices – Data Scanning Devices – Electronic-Card Reader. Output Devices: Monitors – Printers – Plotters. Computer Software: Types of Software.

UNIT III **(18 Periods)**

Operating Systems: Main Functions of an Operating System. Business Data Processing: Data Processing – Data Storage Hierarchy – Standard Methods of Organizing Data – File Management System: File Types – File Organizations – Database Management System: Database Models.

UNIT IV **(20 Periods)**

The Internet: Definition- Basic Services: Electronic Mail – File Transfer Protocol – Telnet - The World Wide Web. WWW Browsers – Uses of the Internet. Multimedia: Multimedia Computer System – Multimedia Components – Multimedia Applications.

UNIT V **(16 Periods)**

Getting Familiar with Photoshop – Working With Images and Selection.

OUTCOMES:

On completion of the course students will be able to

- Understand the concept of Evolution and Characteristics of computer
- Understand the concept of input ,output and storage devices of Computers
- Acquire the knowledge of Operating system and Database Management system
- Identify the uses of Internet and Multimedia
- Able to do editing works using Photoshop

TEXT BOOK:

1. Pradeep K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, Third Edition, 2017.
2. Comdex DTP Course Kit - Vikas Gupta, Dreamtech press, 2010.

REFERENCE BOOK:

1. Introduction to Computers – Alexis Leon, Vikas Publication.

CORE COURSE II – COMPUTER BASICS AND ANIMATION LAB

Semester	**: I**	**Max. Marks**	**: 60**
Course Code	**: 21UCS1C2P**	**Credit**	**: 3**
Total Periods	**: 60**	**Exam Hrs.**	**: 3**

Objectives: To impart knowledge about the fundamental concepts of computers in a logical and informative manner.

PHOTOSHOP

1. Design to Enhance and reduce the given Image size. **(6 Periods)**
2. Apply Background changes. **(6 Periods)**
3. Create your Visiting card. **(6 Periods)**
4. Create Cover page for any text book. **(6 Periods)**
5. Create a Paper advertisement of any commercial agency. **(6 Periods)**
6. Create a Pamphlet for any event to be conducted by an organization. **(6 Periods)**
7. Create Broucher for your college. **(6 Periods)**
8. Apply Custom shapes creation. **(6 Periods)**
9. Convert color photo to black and white photo. **(6 Periods)**
10. Apply Filter effects & Eraser effects. **(6 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Demonstrate working with selections, layers, and painting tools
- Demonstrate methods for making color corrections
- Demonstrate working with images.
- Demonstrate using filter effects and eraser effects.
- Demonstrate creating special effects.

CORE COURSE III - PROGRAMMING IN C LANGUAGE

Semester : II **Max. Marks : 75**

Course Code : 21UCS2C3 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge about the programming in c language concepts of logical and informative manner.

UNIT I **(15 Periods)**

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

UNIT II **(20 Periods)**

Data Input Output Functions - Simple C Programs - Flow of Control - If, If-Else, While, Do-While, For Loop, Nested Control Structures - Switch, Break and Continue, Goto Statements - Comma Operator.

UNIT III **(18 Periods)**

Functions -Definition - Prototypes - Passing Arguments – Function within a Function- Recursion.

UNIT IV **(20 Periods)**

Storage Classes - Automatic, External, Static, Register Variables .Arrays - Defining and Processing - Passing Arrays to functions - Multi-Dimension Arrays - Structures - User Defined Data Types- Unions Bitwise Operators.

UNIT V **(17 Periods)**

Pointers - Declarations - Passing Pointers to Functions - Operation on Pointers - Files: Creating, Processing, Opening and Closing a Data File.

OUTCOMES:

On completion of the course students will be able to

- Knowledge on constructs of C Language
- Skills in writing C programmes
- Ability to use the functions efficiently
- Skill on memory management and use of printers
- Ability to design and use structures

TEXT BOOK:

1. Ashok N.Kamthane, Programming with ANSI and Turbo C, Pearson Education, 2006

REFERENCE BOOKS:

1. B.W. Kernighan and D.M.Ritchie, the C Programming Language, 2nd Edition, PHI, 1988.
2. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000. Kanetkar .
3. Let us C, BPB Pub., New Delhi, 1999. M.T.Somashekara, Problem Solving in C, PHI.

CORE COURSE IV - PROGRAMMING IN C LAB

Semester : II	**Max. Marks : 60**
Course Code : 21UCS2C4P	**Credit : 75**
Total Periods : 60	**Exam Hrs. : 3**

Objectives: To impart practical knowledge about the programming in C lab concepts of logical and informative manner.

1. a) Program to find Simple Interest **(5 Periods)**
   b) Program to calculate area of rectangle, square and triangle **(5 Periods)**
2. a) Program to find odd or even of a given number **(4 Periods)**
   b) Program to find biggest of three numbers **(4 Periods)**
3. a) Program to find sum of digits of a given number **(4 Periods)**
   b) Program to find Factorial of a given number. **(4 Periods)**
4. a) Program to find the value of nCr using recursion. **(4 Periods)**
   b) Program to swap the two numbers using function and pointers. **(5 Periods)**
5. a) Program to perform matrix manipulations. **(5 Periods)**
   b) Program to sort the given numbers **(5 Periods)**
6. a) Program to check the given string is palindrome or not (Without using string functions) **(5 Periods)**
   b) Program to print full pyramid of * pattern. **(5 Periods)**
7. Program to prepare a Mark Sheet using files. **(5 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Develop good understanding of the C language and the art of development in an environment

CORE COURSE V - PROGRAMMING IN C++

Semester : III	**Max. Marks : 75**
Course Code : 21UCS3C5	**Credit : 5**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To impart knowledge about the programming in C++ language concepts of logical and informative manner.

UNIT I **(15 Periods)**

Principles Of Object Oriented Programming:-Basic Concept Of Object Oriented Programming-Benefits Of Oops-Structure Of C++ Program- Tokens,Expressions,Control Statement: Tokens-Keywprd-Identifier and Constants Basic Data Types In C++ - Operators in C++.

UNIT II **(20 Periods)**

Functions In C++: Introduction - Main Function - Function Prototype -Call By Reference-Return by Reference - inline Function - Friend Function -Virtual Function - Function Overloading-Classes and Objects : Structure of Class - Arrays within Class.

UNIT III **(20 Periods)**

Constructor And Destructor: Constructor – Multiple Constructor in Class – Copy Constructor – Dynamic Constructor – Destructor – Operator Overloading : Defining Operator Overloading – Manipulation Of String Using Operators – Rules For Operator Overloading.

UNIT IV **(18 Periods)**

Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance – Hierarchical Inheritance - Hybrid Inheritance - Pointers, Virtual Functions And Polymorphism: Pointers – Pointer to Objects – This Pointer – Virtual Function. Managing Console I/O Operations: Formatted I/O Operations - Unformatted I/O Operations.

UNIT V **(17 Periods)**

Working With Files: Classes For File Stream Operations - Opening And Closing a File - End-Of-File Detection – Updating a File - Error Handling During File Operations.

Exception Handling : Basics Of Exception Handling - Throwing Mechanism – Catching Mechanism.

OUTCOMES:

On completion of the course students will be able to

- Learn the basic concepts in C++ Programming
- Understand the principles of Object Oriented Concepts
- Be skillful in writing C++ code using classes objects and functions
- Know the Core concepts of OOPS such as Constructors and Inheritance
- Understand the concept of streams and file management in C++

TEXT BOOK:

1. Object Oriented Programming With C++ - E. Balagurusamy, 4th Edition, Tata McGraw Hill Publishing, 2013.

REFERENCE BOOK:

1. Ashok N.Kamthane, Object Oriented Programming with ANSI and Turbo C++, Pearson Education, 2006

CORE COURSE VI - PROGRAMMING IN C++ LAB

Semester : III **Max. Marks :60**

Course Code : 21UCS3C6P **Credit : 3**

Total Periods : 60 **Exam Hrs. : 3**

Objectives: To impart practical knowledge about the programming in c++ lab concepts of logical and informative manner.

1. a) Program to find factorial of a given number. **(5 Periods)**
   b) Program to convert dollars to rupees. **(5 Periods)**
2. a) Define a class to represent a bank account. **(5 Periods)**
   b) Consider a shopping list of items for which orders are placed with a dealer. **(5 Periods)**
3. a) Program to find the largest of three numbers using inline function. **(5 Periods)**
   b) Program to find mean of 'N' numbers using friend function. **(5 Periods)**
4. a) Program to find volume of cube, cylinder and rectangular box using function overloading. **(5 Periods)**
   b) Program to add two times in hours and minutes format using objects as function arguments. **(5 Periods)**
5. Program to illustrate the use of arrays of objects. **(5 Periods)**
6. Program to add two complex numbers using **(5 Periods)**
   a) Overloaded Constructors b) Operator Overloading
7. Program to check whether the given string is a palindrome or not using pointer method. **(5 Periods)**
8. Program to read the derived class data members such as name, roll number, sex, height and weight from the keyboard and display the contents of a class on the screen. **(5 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Provide a sound understanding of the basic concepts of OOPs.
- Equip the students with the knowledge of classes and objects

CORE COURSE VII - JAVA PROGRAMMING

Semester : IV **Max. Marks : 75**

Course Code : 21UCS4C7 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To understand the basic concepts of Java Programming with Java language

UNIT I (16 Periods)

Fundamentals of Object Oriented Programming – Java Evolution – Overview of Java Language – Constants, Variables and Data types – Operators and Expressions – Branching and Looping Statements.

UNIT II (18 Periods)

Classes, Objects and Methods – Defining a Class-Creating Objects – Constructors - Method Overloading – Static Members – Inheritance: Extending a Class – Overriding Methods – Final Classes – Abstract Methods and Classes – Visibility Control – Arrays, Strings and Vectors: One-Dimensional Arrays – Creating an Array – Two-Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types.

UNIT III (19 Periods)

Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages : Java API Package – Creating and Accessing Packages – Hiding Classes – Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority.

UNIT IV (18 Periods)

Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exceptions – Managing Input/Output Files in Java - Stream Classes – Character Stream, Byte Stream – Using Streams – Using the File Classes – Input/Output Exceptions – Creation of Files – Reading/Writing Characters – Reading/Writing Bytes – Handling Primitive Data Types – Random Access Files – Interactive Input and Output.

UNIT V **(19 Periods)**

Applet Programming: How Applets Differ from Applications – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Applet Tag – Adding Applet to HTML File – Running the Applet – Passing Parameters to Applets – Displaying Numerical Values – Getting Input from the User – Event Handling – Graphics Programming – The Graphics Class – Introduction to AWT Package – Introduction to Swings.

OUTCOMES:

On completion of the course students will be able to

- Gain ability to develop basic programming skills in Java
- Acquire fundamental knowledge in Object Oriented Programming
- Ability to generate simple packages and to design Thread
- Attain knowledge in various File Handling Techniques.
- Acquire ability to design and execute simple Applets.

TEXT BOOK:

1. E. Balagurusamy, Programming With Java a Primer, TMH, Fourth Edition, 2010.

REFERENCE BOOK:

1. P. Radha Krishna, Object Oriented Programming through Java, University Press (India) Private Ltd., 2007.

CORE COURSE VIII - JAVA PROGRAMMING LAB

Semester : IV **Max. Marks : 60**

Course Code : 21UCS4C8P **Credit : 4**

Total Periods : 60 **Exam Hrs. :3**

Objectives: To impart the practical knowledge about Java Programming languages.

1. Write simple programs to demonstrate **(6 Periods)**
   a) The various forms of inputs in Java b) Operators and expressions
   c) Control statements
2. Write a Java Program to define a class, describe its constructor, and instantiate its Object **(4 Periods)**
3. Write a Java Program to demonstrate method overloading **(4 Periods)**
4. Write a Java Program to demonstrate single and two Dimensional arrays. **(5 Periods)**
5. Write a Java program to demonstrate various methods in the String and String Buffer class. **(4 Periods)**
6. Write a Java Program to print Pascal's triangle. **(4 Periods)**
7. Write a Java Program to implement single inheritance **(4 Periods)**
8. Write a Java Program to implement multiple inheritances **(3 Periods)**
9. Write a Java program to implement the concept of importing classes from user defined package and creating packages. **(5 Periods)**
10. Write a Java program to implement the concept of threading by using Thread class and Runnable interface. **(4 Periods)**
11. Write a Java program to implement the concept of Exception Handling. **(4 Periods)**
12. Write a Java program using Applet **(5 Periods)**
    a) To display a message. b) For passing parameters.
13. Write a Java programs for using Graphics class to display basic shapes and fill them and set background and foreground colors. **(4 Periods)**
14. Write a Java program to demonstrate use of I/O streams. **(4 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Generate ability to generate simple packages and to design Thread.
- Acquire skills and knowledge in various File Handling Techniques.

CORE COURSE IX – DATA BASE MANAGEMENT SYSTEM

Semester : V **Max. Marks : 75**

Course Code : 21UCS5C9 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objective : To provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL

UNIT I **(14 Periods)**

Introduction: Flat File - Database System - Database - Actionable for DBA. The Entity - Relationship Model: Introduction - The Entity Relationship Model. Data Models: Introduction - Relational Approach -The Hierarchical Approach - The Network Approach.

UNIT II **(15 Periods)**

Storage Structure: Introduction - File Organization and Addressing Schemes. Relational Data Structure: Introduction - Relations - Domains.

UNIT III **(15 Periods)**

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

UNIT IV **(17 Periods)**

Structured Query Language: Features of SQL - Select SQL Operations - Grouping the Output of the Query - Querying from Multiple Tables – Retrieval Using Set operators - Nested Queries. T-SQL

UNIT V **(14 Periods)**

Procedural Language- SQL: PL/SQL Block Structure - PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor - Processing Explicit Cursor - Implicit Cursor - Exception Handlers – Sub Programs in PL/SQL - Functions - Precaution While Using PL/SQL Functions- Stored Procedure –DB Triggers-Object Oriented Technology.

OUTCOMES:

On completion of the course students will be able to

- Understand the fundamental concepts of database systems & use the features available in a DBMS package
- Know the organization of File and its addressing schemes
- Acquire knowledge on Normalization
- Develop the logical design of the database using data modeling concepts such as Entity Relationship diagrams.
- Familiarity on SQL queries, functions, cursors and triggers

TEXT BOOK:

1. Rajesh Narang, "Database Management Systems", PHI Learning PrivateLimited, New Delhi, sixth printing, 2010.

REFERENCE BOOK:

1. S.K. Singh, "Database Systems - Concept, Design and Applications",Dorling Kindersley (India) Pvt. Ltd., Second Impression, 2008

CORE COURSE X - RDBMS LAB

Semester : V **Max. Marks :60**

Course Code : 21UCS5C10P **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objective : To Impart Practical Training in MySQL

SQL

1. Table Creation, data Insertion, Deletion, Updating and Selection. **(10 Periods)**
2. DML: Operators (Arithmetic, Relational, Logical), SQL Functions (SingleRowFunction, Group Functions). **(10 Periods)**
3. DML: Set operations, Join operations **(6 Periods)**
4. Nested queries **(8 Periods)**
5. Creation of Synonym, Sequence & Index, Creation and manipulation ofViews. **(8 Periods)**

PL/SQL

6. PL/SQL- block **(7 Periods)**
7. Cursors **(6 Periods)**
8. Functions & Procedure **(8 Periods)**
9. Packages **(6 Periods)**
10. Triggers **(6 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Apply PL/SQL for query processing.
- Use PL/SQL stored procedure, stored functions, cursors and packages to query the database.

CORE COURSE XI - OPERATING SYSTEM

Semester : V **Max. Marks : 75**

Course Code : 21UCS5C11 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To impart knowledge about the Operating System concepts of logical and informative manner.

UNIT I **(14 Periods)**

Introduction –What is an Operating System? – Operating System Software – Brief History of Memory Hardware – Types of Operating System – Brief History of Operating System Development - Operating System Services - System Calls – Program Calls.

UNIT II **(15 Periods)**

MEMORY MANAGEMENT: Single User Contiguous Scheme – Fixed Partition – Dynamic Partitions – Best Fit Versus First Fit Allocation – Deallocation – Relocatable Dynamic Partitions – Paged Memory Allocation - Demand Paging – Page Replacement Policies and Concepts – Segmented Memory Allocation – Segmented / Demand Paged Memory Allocation – Virtual Memory – Cache Memory.

UNIT III **(18 Periods)**

PROCESS MANAGEMENT: Process Scheduler – Process Scheduling Policies – Process Scheduling Algorithms – DEADLOCK – Seven Cases of Deadlock – Conditions for Deadlock – Modeling Deadlock – Strategies for Handling Deadlocks – Starvation.

UNIT IV **(16 Periods)**

DEVICE MANAGEMENT: Types of Devices – Sequential Access Storage Media – Direct Access Storage Devices – FILE MANAGEMENT: The File Manager – Interactive with the File Manager – File Organization – Physical Storage Allocation – Access Methods.

UNIT V **(12 Periods)**

UNIX Operating System – Overview – History – Design goals – Memory Management – Process Management – Device Management – File Management- User Command Interface.

OUTCOMES:

On completion of the course students will be able to

- Understand the services provided by the OS and the design of an operating system.
- Understand the structure and organization of the file system.
- Understand what a process is and how processes are synchronized and scheduled.
- Understand the different approaches to memory management.
- Demonstrate an understanding of different I/O techniques in operating system.

TEXT BOOKS:

1. Ann McIverMcHoesIdaM.Flynn – Understanding Operating Systems – 6th Edition.

REFERENCE BOOK:

1. Abraham Silberschatz, Galvin and Gagne - Operating System Concepts –8th edition -Addison Wiley Publication.

CORE COURSE XII – DATA STRUCTURE AND ALGORITHM

Semester : V **Max. Marks : 75**

Course Code : 21UCS5C12 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To understand the basic concepts of data structure and algorithm concepts of logical and informative manner.

UNIT I **(15 Periods)**

Arrays and Sequential Representations – Ordered Lists – Stacks and Queues – Evaluation of Expressions – Multiple Stacks and Queues – Singly Linked List – Linked Stacks and Queues – Polynomial Addition.

UNIT II **(15 Periods)**

Trees – Binary Tree Representations – Tree Traversal – Threaded Binary Trees – Binary Tree Representation of Trees – Graphs and Representations – Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive Closure – Activity Networks – Topological Sort and Critical Paths.

UNIT III **(15 Periods)**

Algorithms – Priority Queues - Heaps – Heap Sort – Merge Sort – Quick Sort – Binary Search – Finding the Maximum and Minimum.

UNIT IV **(15 Periods)**

Greedy Method : The General Method – Optimal Storage on Tapes – Knapsack Problem – Job Sequencing with Deadlines – Optimal Merge Patterns.

UNIT V **(15 Periods)**

Back tracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.

OUTCOMES:

On completion of the course students will be able to

- Have fundamental knowledge on data structures.
- Perform various operations on stack
- Represent queue and its structures.
- Work with Trees and Tree Traversals
- Work with various standard algorithms.

TEXT BOOKS:

1. Fundamentals of Data Structure – Ellis Horowiz, SartajSahni, Galgotia Publications, 2008.
2. Computer Algorithms – Ellis Horowiz, SartajSahni and Sanguthevar Rajasekaran, University Press, 2008.

REFERENCE BOOK:

1. Data Structures – Seymour Lipschutz, Tata Mcgraw Hill, Schaum's Outline Series 2014.

MAJOR BASED ELECTIVE I - CRYPTOGRAPHY

Semester : V	**Max. Marks : 75**
Course Code : 21UCS5M1A	**Credit : 4**
Total Periods : 60	**Exam Hrs. : 3**

Objective: To impart knowledge regarding cryptography and network security.

UNIT I **(12 Periods)**

Introduction– The OSI Security Architecture – A Model for Network Security – Symmetric Cipher Model – Substitution Techniques – Transposition Techniques — Block Chipper Principles – The Strength Of DES – Block Chipper Design Principles.

UNIT II **(11 Periods)**

Advanced Encryption Standard - Confidentially Using Symmetric Encryption – Introduction to Number Theory – Public – Key Cryptography and RSA.

UNIT III **(13 Periods)**

Key Management – Diffie Hellman Key Exchange – Message Authentication and Hash Function – Digital Signature and Authentication Protocols –Digital Siganture-Authentication Protocols- Digital Signature Standard.

UNIT IV **(12 Periods)**

Authentication Application – Pretty Good Privacy – S/MIME – IP Security– Web Security Considerations –Secure Socket Layer Transport Layer –Secure Electronic Transaction.

UNIT V **(12 Periods)**

Intruders –Intrusion Detection – Password Management –Viruses and Related Threats – Virus Countermeasures – Fire Wall Design Principles– Trusted Systems

OUTCOMES:

On completion of the course students will be able to

- Discuss how cryptography helps to achieve common security goals
- Explain the notions of symmetric encryption, hash functions, and message authentication, and sketch their formal security definitions.
- Describe and implement the specifics of some of the prominent techniques for encryption, hashing, and message authentication
- Explain the notions of public-key encryption and digital signatures, and sketch their formal security definitions.
- Describe and implement the specifics of some of the prominent techniques for public-key cryptosystems and digital signature schemes

TEXTBOOK:

1. William Stallings, "Cryptography and Network Security Principles and Practices". Fourth edition, PHI Education Asia, 2005.

REFERENCE BOOKS:

1. Atulkahate "Cryptography and Network Security" second edition. TMH, 2007.
2. Behrouz A.forouzan" Cryptography and Network Security " TMH, 2010.

MAJOR BASED ELECTIVE I – COMPUTER GRAPHICS AND MULTIMEDIA

Semester	**: V**	**Max. Marks**	**: 75**
Course Code	**: 21UCS5M1B**	**Credit**	**: 4**
Total Periods	**: 60**	**Exam Hrs.**	**: 3**

Objective: To learn the basic principles of 3-Dimensional Computer Graphics and Multimedia.

UNIT I **(12 Periods)**

Overview of Graphics Systems: Video Display Devices – Raster-Scan Systems – Random-Scan Systems – Graphics Monitors and Workstation – Input Devices – Hard-Copy Devices – Graphics Software.

UNIT II **(13 Periods)**

Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm – Bresenham's line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes.

UNIT III **(11 Periods)**

Two-Dimensional Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations.

UNIT IV **(13 Periods)**

Multimedia in Use : Introducing Multimedia for Today and Tomorrow – What is Multimedia – Using Multimedia: Applications, Benefits and Problems – Technology : System Components – Multimedia Platforms.

UNIT V **(11 Periods)**

Technology: Development Tools – Image – Audio – Video.

OUTCOMES:

On completion of the course students will be able to

- Formulate the design process and principles.
- Assimilate the graphics and their transformations.
- Generate primitives, interactive graphics and raster graphics.
- Work with the concepts of Graphic packages and Geometric models.
- Create applications for interactive multimedia tools

TEXT BOOKS:

1. Computer Graphics C Version Second Edition, Donald Hearn and M.Pauline Baker, Pearson Education, 2006.
2. Multimedia in Practice : Technology and Practice. Judith Jeffcoate, Pearson Education, 2007.

REFERENCE BOOKS:

1. William M. Neuman, Robert R. Sprout, "Principles of interactive Computer Graphics", McGraw Hill International Edition.
2. Buford J. F Koegel, Multimedia Systems, Twelfth Indian Reprint, Pearson Education

MAJOR BASED ELECTIVE I –SOFTWARE ENGINEERING

Semester	**: V**	**Max. Marks**	**: 75**
Course Code	**: 21UCS5M1C**	**Credit**	**: 4**
Total Periods	**: 60**	**Exam Hrs.**	**: 3**

Objective : To provide knowledge of the various phases of software engineering process.

UNIT I **(12 Periods)**

INTRODUCTION - The Evolving Role of Software-Software Characteristics - Software Applications - Software Engineering: A Layered Technology -Process, Methods, and Tools -A Generic View of Software Engineering -The Software Process -Software Process Models : The Linear Sequential Model -The Prototyping Model -The RAD Model-The Incremental Model -The Spiral Model

UNIT II **(12 Periods)**

SYSTEM ENGINEERING: Computer-Based Systems -The System Engineering Hierarchy -Product Engineering -Requirements Engineering-System Modeling - ANALYSIS CONCEPTS AND PRINCIPLES: Requirements Analysis-Analysis Principles-Software Prototyping –Specification.

UNIT III **(12 Periods)**

ANALYSIS MODELING: The Elements of the Analysis Model-Data Modeling - Functional Modeling and Information Flow - Behavioral Modeling -The Mechanics of Structured Analysis. DESIGN CONCEPTS AND PRINCIPLES: Software Design and Software Engineering -The Design Process -Design Principles -Design Concepts.

UNIT IV **(12 Periods)**

ARCHITECTURAL DESIGN: Software Architecture-Data Design -Analyzing Alternative Architectural Designs-Mapping Requirements into a Software Architecture-Transform Mapping-Transaction Mapping. USER INTERFACE DESIGN:The Golden Rules-User Interface Design -Interface Design Activities.

UNIT V **(12 Periods)**

SOFTWARE TESTING TECHNIQUES: Software Testing Fundamentals-Test Case Design-White-Box Testing -Basis Path Testing -Control Structure Testing -Black-Box Testing. SOFTWARE TESTING STRATEGIES: Unit Testing-Integration Testing-Validation Testing-System Testing -The Art of Debugging

OUTCOMES:

On completion of the course students will be able to

- How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment
- An ability to work in one or more significant application domains
- Work as an individual and as part of a multidisciplinary team to develop and deliver quality software
- Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle
- Demonstrate an ability to use the techniques and tools necessary for engineering practice

TEXT BOOK :

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, TMH, Fourth Edition, 2014.

REFERENCE BOOK:

1. Software Engineering – Ian Sommerville, 9th Edition, Addison Wesley, 2011.

CORE COURSE XIII - PHP SCRIPTING LANGUAGE

Semester : VI **Max. Marks : 75**

Course Code : 21UCS6C13 **Credit : 6**

Total Periods : 90 **Exam Hrs. : 3**

Objective : To understand the Concepts of PHP and Ajax.

UNIT I **(16 Periods)**

Introduction to PHP : History of PHP-Unique Features in PHP- Creating Your First PHP Script-Mixing PHP with HTML –Variables and Operators: Storing Data in Variable-PHP Data Types – Constants - Manipulating Variable With Operator.

UNIT II **(19 Periods)**

Controlling Program Flow: Writing Simple Conditional Statements- Writing More Complex Conditional Statements- Repeating Actions with Loops- Interrupting and Skipping Loops- Working with String and Numeric Functions. Arrays: Storing Data in Arrays- Using Arrays with Forms.

UNIT III **(18 Periods)**

Using Functions and Classes: Creating User-Defined Functions- Creating Classes-Using Advanced OOP Concepts- Working with Files and Directories: Reading Files- Writing Files- Processing Directories- Performing Other File and Directory Operations

UNIT IV **(19 Periods)**

Working with Databases and SQL: Introducing Databases and SQL- Using PHP's MySQLi Extension- Adding or Modifying Data- Handling Errors- Working with XML: Introducing XML- Using PHP's Simple XML Extension.

UNIT V **(18 Periods)**

Working with Cookies, Sessions, and Headers: Working with Cookies- Working with Sessions- Using HTTP Headers- Securing PHP: Sanitizing Input and Output- Securing Data-Validating User Input- Configuring PHP Security.

OUTCOMES:

On completion of the course students will be able to

- Introduce the creation of static webpage using HTML
- Describe the importance of functions in web development
- Describe the importance of XML in web development
- Outline the principles behind using MySQL as a backend DBMS with PHP
- Describe fundamentals of web

TEXT BOOK:

1. PHP: A Beginner's Guide, Vikram Vaswani, McGraw Hill Education, 2008

REFERENCE BOOK:

1. The PHP Complete Reference, Steven Holzner, McGrawHillEducation, 2007

CORE COURSE XIV - PHP LAB

Semester : VI **Max. Marks : 60**

Course Code : 21UCS6C14P **Credit : 6**

Total Periods : 90 **Exam Hrs. : 3**

Objective : To Impart Practical Training in PHP Programming Language

1. Write a program to find the factorial of a number. **(7 Periods)**
2. Write a program using Conditional Statements. **(8 Periods)**
3. Write a program to find the maximum value in a given multi dimensional array. **(8 Periods)**
4. Write a program to find the GCD of two numbers using user-defined functions. **(7 Periods)**
5. Design a simple web page to generate multiplication table for a given number. **(8 Periods)**
6. Design a web page that should compute one's age on a given date. **(7 Periods)**
7. Write a program to download a file from the server. **(7 Periods)**
8. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page. **(8 Periods)**
9. Write a program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page. **(8 Periods)**
10. Write a program to draw the human face. **(7 Periods)**
11. Write a program to design a simple calculator. **(7 Periods)**
12. Design an authentication web page in PHP with MySQL to check username and password. **(8 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Get hands on experience on various techniques of web development and will be able to design and develop a complete website.

CORE COURSE XV - NETWORKING

Semester : VI **Max. Marks : 75**

Course Code : 21UCS6C15 **Credit : 6**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on the Communication Protocols and its Applications.

UNIT I **(18 Periods)**

Data Communication – Networks – Protocols and Standard – Line Configuration Topology – Transmission Mode – Categories of Networks – Internet Works.

UNIT II **(18 Periods)**

The OSI Model – Functions of the Layers – TCP/IP Protocol Suite: Signals, Analog and Digital Signal – Periodic and Periodic Signals – Analog Signals – Digital Signals – Data Transmission – Data Terminal Equipment – Data Circuit Terminals Equipment – Modems.

UNIT III **(18 Periods)**

Transmission Media: Guided Media – Unguided Media – Transmission Impairment – Media comparison. Multiplexing : FDM-TDM-WDM. Error detection and Correction: Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) - Check Sum-Error Correction.

UNIT IV **(18 Periods)**

Switching : Circuit Switching – Packet Switching – Message Switching. Networking and Internetworking Devices: Repeaters – Bridges – Routers-Gateways - Routing Algorithms – Distance Vector Routing – Link State Routing – Data Link Control – Line Discipline – Flow Control.

UNIT V **(18 Periods)**

TCP/IP Protocol Suite: Client Server Model – Domain Name System – File Transfer Protocol (FTP) – Simple Mail Transfer Protocols (SMTP) – World Wide Web (www) – Hyper Text Transfer Protocol (HTTP).

OUTCOMES:

On completion of the course students will be able to

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network.

TEXT BOOK:

1. "Data Communications and Networks" – Behrouz A. Forouzan, 4th edition, Tata McGraw Hill Edition, 2007.

REFERENCE BOOK:

1. "Computer Networks" – Andrew S. Tanenbaum, 5th edition, 2012.

MAJOR BASED ELECTIVE II – DIGITAL COMPUTER FUNDAMENTALS & MICROPROCESSOR

Semester : VI **Max. Marks : 75**

Course Code : 21UCS6M2A **Credit :** 4

Total Periods : 75 **Exam Hrs. : 3**

Objective : To provide an overview about Digital Electronics and Microprocessors

UNIT I **(15 Periods)**

Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – Binary Codes – Logic Gates and Circuits: – AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR Gates

UNIT II **(15 Periods)**

Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem - Simplifying Logic Circuits – Sum of Products – AND-OR Networks – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation - Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

UNIT III **(15 Periods)**

Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder –Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop –Master Slave Flip Flop Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Shift Registers.

UNIT IV **(15 Periods)**

Evolution of Microprocessor – Single chip Microcomputer – Microprocessor Applications –Buses- Memory Addressing capacity and CPU – Microcomputers – Processor Architecture – Intel 8085 – Instruction cycle – Timing Diagram

UNIT V **(15 Periods)**

Instruction Set of Intel 8085 – Instruction and Data Format – Address Modes – Status Flags – Intel 8085 instruction - Programming Microprocessor – Assembly language – Assembler.

OUTCOMES:

On completion of the course students will be able to

- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.

TEXT BOOKS:

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.
2. Fundamentals of Microprocessors and Microcomputers, Badri Ram, Eighth Edition, Dhanpat Rai Publications,2012.

REFERENCE BOOKS:

1. Digital Logic Design,M.MorrisMano ,Pearson Education, 2010
2. Microprocessors and Microcontrollers, Senthil Kumar Saravanan, Jeevananthan, Oxford Univ Press, 2010

MAJOR BASED ELECTIVE II – DOT NET CONCEPTS

Semester : VI	**Max. Marks :75**
Course Code : 21UCS6M2B	**Credit : 4**
Total Periods : 75	**Exam Hrs. : 3**

Objective : To impart knowledge about the dot net concepts of logical and informative manner.

UNIT I **(15 Periods)**

The ASP.NET Runtime Environment: Introduction to ASP.NET- The AJAX Revolution- ASP.NET of the Future- ASP.NET and IIS: The Web Server Environment- Deploying ASP.NET Applications- ASP.NET Configuration: The ASP.NET Configuration Hierarchy- Managing Configuration Data

UNIT II **(15 Periods)**

HTTP Handlers, Modules, and Routing : Writing HTTP Handlers- Writing HTTP Modules- URL Routing- Anatomy of an ASP.NET Page: Invoking a Page- The Page Class- The Page Life Cycle- ASP.NET Core Server Controls : Generalities of ASP.NET Server Controls- HTML Controls- Web Controls

UNIT III **(15 Periods)**

Working with the Page: Dealing with Errors in ASP.NET Pages- Page Personalization - Page Localization - Adding Resources to Pages - Page Composition and Usability : Page Composition Checklist - Page Usability Checklist.

UNIT IV **(15 Periods)**

ASP.NET Input Forms: Programming with Forms - Validation Controls - Working with Wizards - Data Binding: Foundation of the Data Binding Model – Data-Bound Controls - Data-Binding Expressions - Managing Tables of Data- Data Source Components.

UNIT V **(15 Periods)**

Layers of an Application: A Multitiered Architecture- The Business Layer- The Data Access Layer - ASP.NET Caching: Caching Application Data - Distributed Cache - Caching

ASP.NET Pages - ASP.NET Security: Security-Related Controls - Using Forms Authentication

OUTCOMES:

On completion of the course students will be able to

- Understand the ASP.NET Runtime Environment and ASP.NET page structure.
- Design web application with variety of controls.
- Access the data using inbuilt data access tools.
- Use Microsoft ADO.NET to access data in web Application & Configure and deploy Web Application.
- Develop secured web application & understands the ASP.NET security.

TEXT BOOK

1. Programming Microsoft ASP.NET 4, Dino Esposito, First Edition, 2011.

REFERENCE BOOK:

1. "Professional ASP.NET MVC 5 (WROX)" by Jon Galloway and Brad Wilson, 2014.

MAJOR BASED ELECTIVE II - LINUX ADMINISTRATION

Semester : VI **Max. Marks : 75**

Course Code : 21UCS6M2C **Credit : 4**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To understand the concepts of Linux, its distribution, file system and administration.

UNIT I (15 Periods)

Introduction to Linux – Understanding Linux – Why use Linux – A Brief History of Linux – Advantages of Using Linux - Disadvantages of Using Linux – Linux Installation Overview: Understanding Linux's Hardware Requirements- Understanding the Various Installation Methods- Troubleshooting Problems.

UNIT II (15 Periods)

Understanding System Administration: Understanding the Importance of Proper Administration - Understanding Multiuser Concepts- Understanding Centralized-Processing Systems- Understanding Distributed-Processing Systems- Defining the Role of the Network Administrator. Booting and Shutting Down: Understanding the Boot Process- Understanding LILO, the Linux Loader- Shutting Down Linux.

UNIT III (15 Periods)

Managing File Systems: Understanding File Systems- Mounting and Unmounting File Systems- Understanding the Network File System- Maintaining File Systems- Using the fsck Command- Creating and Formatting File Systems- Using Swap Files and Partitions- Understanding the File and Directory System: Understanding File and Path Names- Linux Standard Directories.

UNIT IV (15 Periods)

Network Administration: The History of TCP/IP- The Open Systems Interconnection Model- The TCP/IP Protocol Stack- IP Addresses - Subnetworks and Subnet Masks- Routing- Internet Network Setup- Configuring a TCP/IP Network: Initializing Ethernet Interfaces - Understanding TCP/IP Routing - Monitoring a TCP/IP Network with Netstat.

UNIT V **(15 Periods)**

Using the Internet: Understanding the Requirements for SLIP and PPP- Accessing Usenet News with a Web Browser- Getting on Mailing Lists- Using Wide Area Information Servers (WAIS). Creating Web Documents with HTML: Using Basic HTML Elements- Understanding HTML Syntax

OUTCOMES:

On completion of the course students will be able to

- Understand the basic set of commands and editors in Linux operating system
- Discuss file systems in Linux operating system
- Demonstrate the role and responsibilities of a Linux system administrator.
- Understand the network administration of TCP/IP protocol.
- Using the Internet in Linux operating system.

TEXT BOOK:

1. The Most Complete Reference – Special Edition Using LINUX

REFERENCE BOOK:

1. The Linux Command Line: A Complete Introduction – William E. Shotts Jr., 2nd Editon

MAJOR BASED ELECTIVE III - MINI PROJECT

Semester : VI	**Max. Marks : 75**
Course Code : 21UCS6M3PW	**Credit : 4**
Total Periods : 90	**Exam Hrs. : 3**

Students to do Mini Project in their respective Colleges. The objective of the Mini Project is to enable the students to work in convenient groups of not more than four members on a project with a Latest Software.

MAJOR BASED ELECTIVE III - LINUX LAB

Semester : VI **Max. Marks : 60**

Course Code : 21UCS6M3P1 **Credit : 4**

Total Periods : 90 **Exam Hrs. : 3**

Objective : To Impart Practical Training in LINUX Operating System

Write Shell Programs for the following using the Linux Operating System

1. Check whether the given number is prime or not. **(7 Periods)**
2. Find the biggest of given two numbers **(7 Periods)**
3. Write a program to check the given number is odd or even **(7 Periods)**
4. Write a program to generate Fibonacci Series **(7 Periods)**
5. Write a program to prepare electric bill for domestic consumers.

For first 100 units - Rs.0.75/ unit For next 100 units - Rs.1.50/unit Above 200 units - Rs.3.00/unit.

Prepare the bill for the following format: Customer No. ---------- Customer Name -------- Pre.Reading ---------- Cur.Reading ---------- Units Consumed ---------- Charge ---------- Signature -------- **(10 Periods)**

6. Write a program to display the result PASS or FAIL using the informationgiven below:

Student Name, Student Reg. No. Mark1, Mark2, Mark3, Mark4. The minimum pass for each subject is 50. **(10 Periods)**

7. Write a program to prepare a Payroll with Basic Pay, DA, Allowances, PF and Gross Pay. **(10 Periods)**
8. Using Case Statement, write a program to check the files ending with vowels. **(10 Periods)**
9. Write a single program to sort the names and numbers in alphabetical, ascending and descending order. **(10 Periods)**
10. Write a menu driven program to print Bio-data for five persons **(12 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Understand the basic commands of Linux operating system and can write shell scripts.
- Create file systems and directories and operate them.
- Create processes background and fore ground etc... by fork() system calls.

MAJOR BASED ELECTIVE III – MULTIMEDIA LAB

Semester : VI **Max. Marks :60**

Course Code : 21UCS6M3P2 **Credit :** 4

Total Periods : 90 **Exam Hrs. : 3**

Objective : To Impart Practical Training in Multimedia.

1. Write a program to justify a text entered by the user on both left and right hand side.forexample the test " An architect may have a graphics program to draw an entire building but be interested in only ground floor",can be justified in 30 columns.An architect may have a graphics programs draw an entire building but interested in ground floor. **(9 Periods)**

2. Study the notes of a piano and stimulate them using the keyboard and store them in file. **(9 Periods)**

3. Write a program to read a paragraph and store it to a file name suggested by the author **(9 Periods)**

4. Devise a routine to produce the animation effect of a square transforming to a triangle and then to a circle. **(9 Periods)**

5. Write a program to show a bitmap image on your computer screen. **(9 Periods)**

6. Create a web page for a clothing company which contains all the details of that company and at least five links to other web pages. **(9 Periods)**

7. Write a program by which we can split mpeg video into smaller pieces for the purpose of sending it over the web or by small capacity floppy diskettes and then joining them at the destination. **(9 Periods)**

8. Write a program to simulate the game of pool table. **(9 Periods)**

9. Write a program to simulate the game mine sweeper. **(9 Periods)**

10. Write a program to play "wave" or "midi" format sound files. **(9 Periods)**

OUTCOMES:

On completion of the course students will be able to

- Achieve a basic understanding of multimedia systems. With such background equipment, students would be able to evaluate more advanced or future multimedia systems.

NON MAJOR ELECTIVE I – COMPUTER FUNDAMENTALS

Semester : III **Max. Marks : 75**

Course Code : 21UCS3N1A **Credit :** 2

Total Periods : 30 **Exam Hrs. : 3**

Objective : To understand the basics of computer fundamentals.

UNIT – I **(6 Periods)**

Evolution of Computers - Generations, Types of Computers, Computer System Characteristics - Basic Components of a Digital Computer - Control Unit – ALU - Input/Output Functions and Memory - Memory Addressing Capability of a CPU, Word Length of a Computer - Processing Speed of a Computer - Computer Classification.

UNIT – II **(7 Periods)**

Input/Output Units-: Keyboard, Mouse – Trackball – Joystick - Digitizing Tablet – Scanners - Digital Camera – MICR – OCR – OMR - Bar-code Reader - Voice Recognition, Light Pen - Touch Screen - Monitors and Types Of Monitor – Digital – Analog – Size – Resolution - Refresh Rate - Dot Pitch - Video Standard –VGA – SVGA - XGA etc, - Printers & Types -Daisy Wheel - Dot Matrix – Inkjet – Laser - Line Printer – Plotter - Sound Card and Speakers.

UNIT – III **(6 Periods)**

Memory – RAM – ROM – EPROM - PROM and Other Types of Memory, Storage Fundamentals - Primary Vs Secondary Data Storage - Various Storage Devices - Magnetic Tape - Magnetic Disks - Cartridge Tape - Hard Disk Drives - Floppy Disks (Winchester Disk) - Optical Disks – CD – VCD - CD-R - CD-RW - Zip Drive - Flash Drives - Video Disk - Blue Ray Disc - SD/MMC Memory Cards - Physical Structure of Floppy & Hard Disk - Drive Naming Conventions in PC. DVD - DVD-RW - USB Pen Drive.

UNIT – IV **(6 Periods)**

Software and its Need - Types of Software - System Software - Application Software, System Software - Operating System - Utility Program - Algorithms - Flow Charts – Symbols - Rules for Making Flow Chart - Programming Languages – Assemblers - Compilers and Interpreter - Computer Applications in Business.

UNIT – V **(5 Periods)**

Introduction to Internet - Connecting to the Internet Hardware - Software & ISPs, Search Engines - Web Portals - Online Shopping – Email –Types of Email - Compose and Send a Message. Reply to a Message - Working with Emails.

OUTCOMES:

On completion of the course students will be able to

- Able to identify the components of a personal computer system
- Able to demonstrate mouse and keyboard functions, window and menu commands
- Able to demonstrate how to organize files and documents on a USB/hard drive
- Able to compose, format and edit a word document, send email messages (with or without attachments)
- Student will be able to navigate and search through the internet.

TEXT BOOK:

1. Computer Fundamentals –B. Ram –New Age International Publishers, 3rd Edition, 2005.

REFERENCE BOOKS:

1. S.K.Basandra, "Computers Today ", Galgotia Publications.
2. Computer Fundamentals –P. K. Sinha –BPB Publication, 2007.
3. PC Software –Shree Sai Prakashan, Meerut

NON MAJOR ELECTIVE I - INTRODUCTION TO INFORMATION TECHNOLOGY

Semester : III **Max. Marks : 75**

Course Code : 21UCS3N1B **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective : To understand the introduction to information technology.

UNIT I **(6 Periods)**

Introduction: History of Computer - Parts of Computer System - Hardware Devices - Software - Operating System - Examples of Operating Systems -Computer Networking - Visual Editor.

UNIT II **(6 Periods)**

Microsoft Word - Microsoft Excel - Microsoft PowerPoint

UNIT III **(6 Periods)**

Introduction to Multimedia - Images - Sound - Video Desktop Publishing Basics - Page Layout Programs - Text Generation - Graphics for DTP -Print Production.

UNIT IV **(6 Periods)**

Introduction to Internet -Working of Internet - Internet Services - Internet Addressing - E-Mail Basics - Web Development Tools - Introduction to HTML

UNIT V **(6 Periods)**

Information System -Management Information Concepts -Planning Issues and the MIS - Organizing Issues and the MIS -Control Issues and the MIS -Decision Support Systems.

OUTCOMES:

On completion of the course students will be able to

- Understand basic concepts and terminology of information technology.
- Understand the personal computers and their operations.
- Able to identify issues related to information security.
- Should be able to identify some of the instances in daily life where a *computer* is, or is likely to be, involved.
- Apply the knowledge of mathematics, science and computing in all fields.

TEXT BOOK:

1. Sanjay Saxsena, "A First Course in Computer", Vikas Publishing House, 2000

REFERENCE BOOKS:

1. Ron Mansfield, "Working in Microsoft Office",Tata Mcgraw Hill, 1997
2. Linda Tway, Sapphiro Pacific Lajolla, "Multimedia in Action", Academic Press,1995
3. Neil randal "Teach yourself the internet in a week", Prentice Hall of India, Second Edition, 1996.

NON MAJOR ELECTIVE I - OFFICE AUTOMATION

Semester : III **Max. Marks : 75**

Course Code : 21UCS3N1C **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective : To understand the basics of office automation.

UNIT I **(6 Periods)**

Exploring word 2007: Working in the Word Environment - Opening, Moving Around in and Closing a Document - Displaying Different Views of a Document - Creating and Saving a Document - Previewing and Printing a Document.

UNIT II **(6 Periods)**

Editing and Proofreading Documents: Make Changes to a Document - Insert Saved Text - Find the Most Appropriate word - Reorganize a Document Outline - Find and Replace Text.

UNIT III **(6 Periods)**

Error Corrections: Correct Spelling and Grammatical Errors - Finalize a Document. - Changing the Look - Quickly Format Text and Paragraphs - Manually Change the Look of Characters. - Manually Change the Look of Paragraphs.

UNIT IV **(6 Periods)**

Bulleted and Numbered Lists: - Create and Modify Lists - Presenting Information in Columns. Creating Table: Create a Tabular List - Present Information in a Table.

UNIT V **(6 Periods)**

Formatting a Table: Format Table Information - Perform Calculation in a Table - Use a Table to Control Page Layout.

OUTCOMES:

On completion of the course students will be able to

- Understand basic components of computer and devices.
- Able to perform documentation.
- Able to perform accounting operations.
- Able to perform presentation skills.
- Apply the knowledge on various subjects.

TEXT BOOK:

1. Joyce Cox and Team, "Step by Step 2007 Microsoft Office System", PHI Learning Private limited, New Delhi, 2009.

REFERENCE BOOK:

1. Peter Weverka, "MS Office 2013 All-in-One for Dummies", 1st Edition, Wiley Publications, 2013.

NON MAJOR ELECTIVE II - RECENT TRENDS IN ENTERPRISE INFORMATION TECHNOLOGY

Semester : IV	**Max. Marks : 75**
Course Code : 21UCS4N2A	**Credit : 2**
Total Periods : 30	**Exam Hrs. : 3**

Objective : To understand the basics of recent trends in information technology.

UNIT I **(6 Periods)**

Introduction to Information Technology: Information Technology – Understanding the Digital Domain – Representing Numbers and Text in Binary- Binary Codes

UNIT II **(6 Periods)**

Fundamentals of Computers: Computer Hardware – Software – System Software- Application Software – Translators - Computer Languages - MLL-HLL-ALL

UNIT III **(6 Periods)**

Transmission of Information: Fundamentals of Communications – Fiber Optics – Wireless Communications -ISDN

UNIT IV **(6 Periods)**

Computer Networking: Goals – Topologies - Local Area Networks – Wide Area Networks – Communication Protocols-

UNIT V **(6 Periods)**

Internet: Internet Architecture –- Types-Network Security - Internet Applications- Internet Address - Domain Name- E-mail

OUTCOMES:

On completion of the course students will be able to

- Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization.
- Identity, formulates, review research literature, and analyze complex engineering problems reaching substantiated conclusions.
- Create, select and apply appropriate techniques, resources, and modern engineering and IT tools.
- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice**.**
- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

TEXT BOOK:

1. Introduction to Information Technology Pelin Aksoy, Laura DeNardis,Cengage Learning India Private Limited, First Indian Reprint 2008.

REFERENCE BOOK:

1. Introduction to Information Technology – V. Rajaraman, 3rd Edition, 2018 by PHI Learning Private Limited.

NON MAJOR ELECTIVE II – PC SOFTWARE

Semester : IV **Max. Marks : 75**

Course Code : 21UCS4N2B **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective : To understand the Basics of PC Software.

UNIT I **(6 Periods)**

MS-Windows: Operating System-Definition & Functions - Basics Of Windows. Basic Components Of Windows – Icons - Types of Icons – Taskbar - Activating Windows - Using Desktop - Title Bar - Running Applications - Exploring Computer - Managing Files and Folders - Copying and Moving Files and Folders. Control Panel – Display Properties - Adding and Removing Software and Hardware - Setting Date and Time - Screensaver and Appearance - Using Windows Accessories.

UNIT II **(6 Periods)**

Documentation Using MS-Word -Introduction to Office Automation - Creating & Editing Document - Formatting Document - Auto-text – Autocorrect - Spelling and Grammar Tool - Document Dictionary - Page Formatting – Bookmark - Advance Features of MS-Word - Mail Merge – Macros – Tables - File Management – Printing – Styles - Linking and Embedding Object - Template.

UNIT III **(6 Periods)**

Electronic Spread Sheet using MS-Excel -Introduction to MS-Excel - Creating & Editing Worksheet - Formatting and Essential Operations - Formulas and Functions – Charts - Advance features of MS-Excel - Pivot Table & Pivot Chart - Linking and Consolidation.

UNIT IV **(6 Periods)**

Database Management using Excel – Sorting – Filtering – Table – Validation - Goal Seek and Scenario.

UNIT V **(6 Periods)**

Presentation using MS-PowerPoint: Presentations - Creating, Manipulating & Enhancing Slides - Organizational Charts - Excel Charts - Word Art - Layering Art Objects -

Animations and Sounds - Inserting Animated Pictures or Accessing through Object - Inserting Recorded Sound Effect or In-Built Sound Effect.

OUTCOMES:

On completion of the course students will be able to

- Demonstrate a basic understanding of computer hardware and software.
- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.
- Present conclusions effectively, orally, and in writing.
- Demonstrate basic understanding of network principles.

TEXT BOOK

1. Learn Microsoft Office –Russell A. Stultz –BPB Publication, 2017.

REFERENCE BOOKS

1. Microsoft Office –Complete Reference –BPB Publication
2. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.

NON MAJOR ELECTIVE II - WORKING PRINCIPLES OF INTERNET

Semester : IV **Max. Marks : 75**

Course Code : 21UCS4N2C **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective : To understand the working Principles of Internet

UNIT I **(6 Periods)**

What is Internet ? The Internet's underlying Architecture

UNIT II **(6 Periods)**

Connecting to the Internet – Communicating on the Internet

UNIT III **(6 Periods)**

How the World Wide Web works - Common Internet tools

UNIT IV **(6 Periods)**

Multimedia on the Internet – Intranet and Shopping on the Internet

UNIT V **(6 Periods)**

Safeguarding the Internet

OUTCOMES:

On completion of the course students will be able to

- Distinguish, identify and relate between the principal layers of a complex communication system.
- Have the skills required to install, administer and manage a Local Area Network (LAN) and be able to network that LAN to other network segments over wide area links.
- Communicate effectively with associates in written, oral or schematic form.
- Know and be able to apply basic management principles such as project and time management, break-even analysis, planning and control.
- Schedule or supervise telecommunications projects and follow up with written reports in accordance with established formats and procedures.

TEXT BOOK:

1. How the Internet Works, Preston Gralla, Pearson Education, Eighth Edition, 2006.

REFERENCE BOOK :

1. Internet for Everyone, Alexis Leon, S. Chand (G/L) & Company Ltd; Second Edition 2012.

SKILL BASED ELECTIVE I – PAGE MAKER

Semester : V **Max. Marks : 75**

Course Code : 21UCS5S1A **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective: To inculcate knowledge on Programming for Page Maker.

UNIT I **(5 Periods)**

Getting Started with Adobe Page Maker 7.0 - Creating a Publication - Working with Text

UNIT II **(6 Periods)**

Modifying Text - Working with Multiple Pages

UNIT III **(7 Periods)**

Working with Graphics - Formatting Text

UNIT IV **(7 Periods)**

Using Advanced Graphics - Adding Color and Using Mail Merge

UNIT V **(5 Periods)**

Working with Long Publications - Publishing Electronically

OUTCOMES:

On completion of the course students will be able to

- Basic features of page maker.
- Work with various tools.
- Work with platters and various templates.
- Positioning ruler, typing text, basic formatting.
- Work with various graphics, positioning, and logo

TEXT BOOK:

1. Adobe PageMaker 7.0, Kevin Proot, Cengage Learning

SKILL BASED ELECTIVE I – COREL DRAW

Semester : V	**Max. Marks : 75**
Course Code : 21UCS5S1B	**Credit : 2**
Total Periods : 30	**Exam Hrs. : 3**

Objective: To inculcate knowledge on Programming and Project Development using Corel Draw.

UNIT I **(6 Periods)**

CorelDRAW Basics

UNIT II **(6 Periods)**

Drawing and Selecting

UNIT III **(6 Periods)**

Working with Text

UNIT IV **(6 Periods)**

Working with Images

UNIT V **(6 Periods)**

Page Layout and Background

OUTCOMES:

On completion of the course students will be able to

- Various page setup concepts.
- Use of varies tools.
- Set up drawing pages using ruler, grid and gridlines.
- Drawing and shaping object, drawing lines, curves, dimension Lines.
- Work with style & templates.

TEXT BOOK

1. DTP Course Kit, Vikas Gupta, Dreamtech Press, 2009.

SKILL BASED ELECTIVE I – FLASH

Semester : V **Max. Marks : 75**

Course Code : 21UCS5S1C **Credit : 2**

Total Periods : 30 **Exam Hrs. : 3**

Objective: To inculcate knowledge on Programming for FLASH

UNIT –I **(6 Periods)**

Introducing Flash: How Flash works – Uses of Flash – Obtaining Flash –Installing Flash – The Flash Environment - Getting Started: The Timeline – The Stage – Tools and Tool Bars.

UNIT – II **(6 Periods)**

The Menu bar – Properties Inspector – Panels – Viewing options – Quick Start Templates – Accessibility Creating Objects : Stage and Overlay Objects – Tools Panel. Editing Objects: Grouping Objects – Free Transform Tool – Reshaping Objects – Aligning Objects.

UNIT – III **(6 Periods)**

Pixel Snapping – Stacking Order – Cut Away – Paste in Place. Color and Text: Standard Color Palette – Adding Solid Colors – Adding Gradients – Fill Transform Tool – More Color Options – Selecting Colors – Adding, Formatting and Manipulating Text.

UNIT – IV **(6 Periods)**

Symbols and Instances: Definitions – The Library – Converting Objects to Symbols – Creating a New Symbol – Symbol Editing Mode – Editing Symbols – Editing Instances. Sound and Video: Using Sound – Importing Sound – Editing Sounds, Adding Video – Manipulating Video.

UNIT – V **(6 Periods)**

Frames and Layers: Working with Frames – Adding Frames – Deleting and Copying Frames – Frame Properties – Working with Layers – Inserting Layers – Deleting and Copying Layers – Animation: Elements of Animation – Scenes – Frame – by – Frame

Animation – Motion Tweening – Motion Guides – Shape Tweening – Animating Text – Distribute Text to Layers – Movie Clips.

OUTCOMES:

On completion of the course students will be able to

- Utilize several Flash tools and tactics.
- Produce an interactive Flash based website.
- Demonstrate the ability to effectively utilize the timeline.
- Produce animation motion tween affects.

TEXT BOOK:

1. FLASH MX in easy steps - NICK VANDOME, Dreamtech, New Delhi

SKILL BASED ELECTIVE II – DREAM WEAVER

Semester : V	**Max. Marks : 75**
Course Code : 21UCS5S2A	**Credit :** 2
Total Periods : 30	**Exam Hrs. : 3**

Objective: To inculcate knowledge on Programming and Project Development using Dream Weaver.

UNIT I **(6 Periods)**

Introduction to Dreamweaver CS4 - Working with Dreamweaver Websites.

UNIT II **(6 Periods)**

Working with Web Pages - Working with HTML Tables - Framesets and Frames.

UNIT III **(6 Periods)**

Introduction to Cascading Style Sheets.

UNIT IV **(6 Periods)**

Working with Templates - Working with Flash Contents and HTML Forms.

UNIT V **(6 Periods)**

Working with JavaScript - Finalizing the Site.

OUTCOMES:

On completion of the course students will be able to

- Use adobe Dreamweaver to create personal and/or business websites following current professional and/or industry standards.
- Use critical thinking skills to design and create basic web sites.
- Use Adobe Dreamweaver and a stand-alone FTP program to upload files to a web server.
- Use critical thinking skills to design and create a multi-page website.

TEXT BOOK

1. Dreamweaver CS4 in Simple Steps, Kogent Learning Solutions Inc, Dreamtech Press, 2010

SKILL BASED ELECTIVE II – ILLUSTRATOR

Semester : V **Max. Marks : 75**

Course Code : 21UCS5S2B **Credit :** 2

Total Periods : 30 **Exam Hrs. : 3**

Objective: To inculcate knowledge on Programming and Project Development using Illustrator.

UNIT – I **(6 Periods)**

Introduction to Vector Graphics – Toolbox – Palettes – Opening – Viewing - Saving Documents. Templates – Paths – Selections - Distorting Paths. Organizing Objects – Grouping – Transparency - Blends.

UNIT - II **(6 Periods)**

Clipping Masks - Compound Paths – Texts – Flares - Info Palettes – Save - Save for Web - Export Graphs and Pathfinder - Align Symbol Sprayer - Creating Custom Symbols.

UNIT – III **(6 Periods)**

Stroke – Fill – Gradient – Options – Swatches - Color Modes – Patterns - Transform – Pencil – Smooth – Eraser – Brushes – Meshes – Opacity - Transparency Modes – Caps – Joins - Dashes Options - Effects Menu – Grid - Rulers and Guides.

UNIT – IV **(6 Periods)**

Use of Appearance Palette – Layers – Styles - Printing Options – Web - Pixel Preview Mode - Different File Formats. Slices - Logo Creations - Web Banner Creation and Animation.

UNIT –V **(6 Periods)**

Industry Tips and Tricks - Creating a Logo – Letter Head - Visiting Card for a Corporate Company.

OUTCOMES:

On completion of the course students will be able to

- Apply critical thinking skills to solve visual problems using Adobe Illustrator CS6
- Demonstrate knowledge of Adobe Illustrator by selecting and applying appropriate tools to complete a variety of specific graphic design exercises
- Demonstrate knowledge of specific technical issues relative to the of vector files including resolution, prep for internet use, convert to bitmap, and output (print issues)
- Demonstrate knowledge of how Adobe Illustrator is used by designers for a variety of production processes including WEB, Multimedia and Print.

TEXT BOOK:

1. Multimedia and Web Design, Vikas Gupta, Comdex, 2006.

SKILL BASED ELECTIVE II – INDESIGN

Semester : V	**Max. Marks : 75**
Course Code : 21UCS5S2C	**Credit : 2**
Total Periods : 30	**Exam Hrs. : 3**

Objective : To inculcate knowledge on Programming and Project Development using In design.

UNIT I **(6 Periods)**

Workspace - Page Setup – Library – Book – Tools – Palettes – Styles - Rotating & Skewing - Create Outlines - Special Characters - Fitting Options – Transparency - Path Finder – Layers - Compound Paths - Paths.

UNIT II **(6 Periods)**

Text Frame Options – Threading - Type on Path – Hyphenation - Story Editor, Introduction to Graphics Options - Master Pages - Indents & Tabs.

UNIT III **(6 Periods)**

Text Wrap - Numbering & Sections - Table Options - Stroke Color & Gradient Options - Swatches.

UNIT IV **(6 Periods)**

Guides - Margin Columns - Printing Issues - Placing Videos & Sounds - Buttons and Hyperlinks - Indexing & Tables of Contents - Data Merge – Footnotes – Glyphs – Interactive - Page Maker Toolbar.

UNIT V **(6 Periods)**

Ask the student to do a PDF presentation with hyperlinks on a product and conduct the test.

OUTCOMES:

On completion of the course students will be able to

- Describe what Adobe InDesign is and how it can be used.
- Demonstrate creating and viewing documents.
- Navigate their workspace.
- Demonstrate page creation and working with type.
- Demonstrate working with graphics and formatting objects.

TEXT BOOK:

1. In design one – to – one, Mc Clelland, O'Reilly, 2006.