SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED [M.S.]

Choice Based Credit System (CBCS Pattern)

Faculty of Computer Studies

Syllabus of B.Sc. Computer Science Third Year

Effective from Academic Year (2018-2019)

Under Graduate (UG) Program

Semester	Subject Code	Course Name	Credit		Total Credits
			Internal	External	
Semester – V	S5.CC.1	Windows Programming with C#.NET	1	3	**4**
	S5.CC.2	Python Programming	1	3	**4**
	S5.CC.3	JSP and Servlet	1	3	**4**
	S5.CC.4	Project	1	3	**4**
	S5.CC.5	Elective: Operating System Mobile Communication Distributed Computing	1	3	**4**
	S5.SEC.1	Skills Enhancement Course (SEC) Java script Linux and Shell Programming R Lang.		2	**2**
	S5.Lab 1	C#.NET		2	**2**
	S5.Lab 2	Python		2	**2**
	S5.Lab 3	JSP Servlet		2	**2**
		Environmental Studies			
		TOTAL			**28**
Semester – VI	S6.CC.1	Cloud Computing	1	3	**4**
	S6.CC.2	Android Programming	1	3	**4**
	S6.CC.3	Digital Image Processing	1	3	**4**
	S6.CC.4	Software Engineering	1	3	**4**
	S6.CC.5	Elective: Software Testing Data Mining and Data warehousing Cyber Security	1	3	**4**
	S6.SEC.1	Skill Enhancement Course (SEC) XML Programming SQL Server MySQL		2	**2**
	S6.Lab1	Android		2	**2**
	S6.Lab2	DIP		2	**2**
	S6.Lab3	Seminar		2	**2**
		TOTAL			**28**

Name of Course	B.Sc.(CS) TY
Semester	V Semester
Name of Subject	Windows Programming with C#.NET
Subject Code	S5.CC.1

Salient Features:

- To understand the DOTNET framework.
- To gain understanding of windows programming.
- To teach student application development technology.

Utility of Course:

- To impart the knowledge on basics concepts of object oriented programming.
- To outline the various characteristics of c#.
- To provide the familiarity in the concept of developing window application.
- To converse an idea of creating application using ADO.Net.
- To convey the idea of CLR and .Net framework.

Learning Objectives:

- To develop background knowledge as well as core expertise in C#.
- To understand the windows form creation and provide knowledge for creating windows applications.
- To learn the object oriented concepts.

Prerequisites:

- Adequate knowledge of Fundamental of C or C++.
- Adequate knowledge of Basics of DBMS.

UNIT – I

1.	**Introduction**		**Lectures Required**	**Ref. No.**
	1.1	Introduction to .Net Technology & Framework	01	1, 2
	1.2	.Net Architecture	02	1, 2
	1.3	Common Language Runtime(CLR)	01	1, 2
	1.4	IDE Components	03	2
	1.5	Intellisense	01	2
	1.6	Project Types	01	2
	1.7	Java vs C#	01	1

References:

Sr. No.	**Name of the Book**	**Author**	**Publication**
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

UNIT – II

2.	**Windows Applications and Windows Controls**		**Lectures Required**	**Ref. No.**
	2.1	Important Classes Used in Windows Application	01	2
	2.2	Creating and Customizing Windows Form	02	1
	2.3	TextBox and Label Control	01	2
	2.4	Button, CheckBox and RadioButton	02	2
	2.5	ListBox and ComboBox control	02	2
	2.6	Menus and Dialog Boxes	03	2

References:

Sr. No.	Name of the Book	Author	Publication
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

UNIT- III

3.	Functions, Arrays and Strings		Lectures Required	Ref. No.
	3.1	C# Function	02	1, 2
	3.2	Call by Value & Call by Reference	02	1, 2
	3.3	Out Parameter	01	1, 2
	3.4	Array and ArrayList class	02	1,2
	3.5	Jagged Array	01	2
	3.6	String Class	01	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

UNIT- IV

4.	Properties, Indexers, Delegates & Events		Lectures Required	Ref. No.
	4.1	Properties	02	1, 2
	4.2	Indexers	02	1, 2
	4.3	Delegates	01	1, 2
	4.4	Multicast Delegates	01	1,2
	4.5	Custom Events	01	1,2

References:

Sr. No.	Name of the Book	Author	Publication
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

UNIT V

5.	Namespace, interface & Exception handling		Lectures Required	Ref. No.
	5.1	Creating & using Namespace(DLL library)	02	2
	5.2	Creating & using interface	02	1, 2
	5.3	Try Catch Block	02	1, 2
	5.4	Using Finally Block	01	1,2
	5.5	Custom Exception	01	1,2

References:

Sr. No.	Name of the Book	Author	Publication
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

UNIT VI

6.	Database Connectivity		Lectures Required	Ref. No.
	6.1	Introduction ADO.Net	02	2
	6.2	Advantages of ADO.Net	01	2
	6.3	Developing a Simple ADO.NET Based Application	02	2
	6.4	Retrieving & Updating Data From Tables	01	2
	6.5	Disconnected Data Access Through Dataset Objects	02	2

References:

Sr. No.	Name of the Book	Author	Publication
1.	Programming in C#	E Balagurusamy	Mc Graw Hill
2.	Visual C#.Net	C Muthu	Mc Graw Hill

Name of Course	B.Sc. (Computer Science) Third Year
Semester	V Semester
Name of Subject	Python Programming
Subject code	S5.CC.2

Salient Features:

- To understand the basic concept of Python.
- To gain understanding of web based console & windows programming.
- To teach student application development technology.
- To understand quick development concept with less code.

Utility of Course:

- To impart the knowledge on basics concepts of object oriented programming.
- To outline the various characteristics of Python.
- To provide the familiarity in the concept of developing web based & game application.
- To converse an idea of creating application using Database Handling.
- To convey the idea of Python Machine learning concept.

Learning Objectives:

- To develop background knowledge as well as core expertise in Python
- To understand the console based application and provide the knowledge creating web based applications.
- To learn the object oriented concepts.

Prerequisites:

- Adequate knowledge of Fundamental of C, C++ or JAVA.
- Adequate knowledge of Basics of DBMS.
- Basic knowledge of Web Development.

UNIT-I

Sr. No.	Introduction		Lectures Required	Ref. No
1	1.1	Introduction to Python	1	1,2
	1.2	Features of python	2	1,2
	1.3	Python Interpreter	2	1,2
	1.4	Python installation	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Learning Python	Mark Lutz	O'Reilly 5th edition
2	Starting Out with Python plus My Programming Lab	Tony Gaddis	Pearson eText --Acces s Card Package 3rd edition

UNIT-II

Sr. No.	Data types and control structures		Lectures Required	Ref. No
2)	2.1	Operators (unary, arithmetic, etc.)	1	1,2
	2.2	Data types, variables, expressions, and statements	7	1,2
	2.3	Assignment statements	3	1,2
	2.4	Strings and string operations,	1	1,2
	2.5	Control Structures: loops and decision	3	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Starting Out with Python plus MyProgrammingLab	Tony Gaddis	Pearson eText --Acces s Card Package 3rd edition
2	Learning Python	Mark Lutz	O'Reilly 5th edition

UNIT-III

Sr. No.		Modularization and Classes	Lectures Required	Ref. No
3)	3.1	Standard modules	1	1,2
	3.2	Packages	1	1,2
	3.3	Defining Classes	1	1,2
	3.4	Defining functions	1	1,2
	3.5	Functions and arguments (signature)	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Starting Out with Python plus MyProgrammingLab	Tony Gaddis	Pearson eText --Acces s Card Package 3rd edition
2	Learning Python	Mark Lutz	O'Reilly 5th edition

UNIT-IV

Sr. No.		Exceptions and data structures	Lectures Required	Ref. No
4)	4.1	Data Structures (array, List, Dictionary)	2	1,2
	4.2	Exception Raising	1	1,2
	4.3	Exception Handling	2	1,2
	4.4	Error processing	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Starting Out with Python plus MyProgrammingLab	Tony Gaddis	Pearson eText --Acces s Card Package 3rd edition
2	Learning Python	Mark Lutz	O'Reilly 5th edition

UNIT-V

Sr. No.		Object Oriented Design	Lectures Required	Ref. No
5)	5.1	Programming types	1	1,2
	5.2	Object Oriented Programming	1	1,2
	5.3	Inheritance	1	1,2
	5.4	Polymorphism	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Starting Out with Python plus MyProgrammingLab	Tony Gaddis	Pearson eText --Acces s Card Package 3rd edition
2	Learning Python	Mark Lutz	O'Reilly 5th edition

UNIT-VI

Sr. No.	Database Connectivity and Networking		Lectures Required	Ref. No
6)	6.1	Getting MySQL for python	1	1,2
	6.2	Connecting with database	1	1,2
	6.3	Passing Query to MySQL	1	1,2
	6.4	Networking	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Learning Python	Mark Lutz	O'Reilly 5th edition
2	MySQL for Python	Albert Lukaszcwskc	Packet publication 1st edition

Name of Course	**B.Sc. CS Third Year**
Semester	**V Semester**
Name of Subject	**Java Server Pages(JSP) and Servlet**
Subject Code	**S5.CC.3**

Silent Features:

Java is a most popular, secure and platform independent pure object oriented programming language supporting a large number of applications such as desktop application, web based application and mobile based application. Java Server pages and servlet course teaches students how to develop dynamic web applications for internet. This course is designed for students who are familiar to programming, and want to learn how to develop dynamic website through Java. They will learn how to create dynamic web applications project along with MVC Architecture and the key principles underlying its design.

Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To gain an understanding of the process that is involved in Web application Development, Life cycle of servlet, handling form etc.
- To become familiar with Server side Programming and web server.
- To gain an understanding of Cookies, Session, Generating different Contents Types,
- To understand JDBC, Java Beans and MVC Architecture
- Ability to build many simple web based application or dynamic websites that you can upload on servers.

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research
- Understand the JSP, Servlet and MVC architecture.
- Install and use appropriate tools for JSP and Servlet development, including IDE, Web Server etc.
- Build user interfaces with JSP, Servlet Java Beans and MVC and more.

Prerequisite:

- Basic of Java Programming covered in Semester IV
- Basics of HTML, CSS and JavaScript covered in Semester II.

UNIT I

I	**Introduction**		**Lecture Required**	**Ref no**
	1.1	A Servlets jobs	1	1,2
	1.2	Why build web pages dynamically?	1	1,2
	1.3	Advantages of Servlets over traditional CGI	1	1,2
	1.4	The Role of JSP	1	1,2
	1.5	Installing & Configuring the JDK & Apache Tomcat	1	1,2
	1.6	Basic Servlet structure	1	1,2
	1.7	A Servlet that generate plain text, A Servlet that generate HTML text	1	1,2
	1.8	A Servlet package	1	1,2
	1.9	The Servlet life cycle	1	1,2
	1.10	Servlet debugging	1	1,2

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

UNIT II

II		Handling Client Request: Form DATA, Cookies and session tracking	Lecture Required	Ref no
	2.1	Reading Form Data from Servlet	1	1,2
	2.2	Example: Reading three parameter	1	1,2
	2.3	Example: Reading all parameter	1	1,2
	2.4	Filtering String for HTML –specific character,	1	1,2
	2.5	Benefits of cookies and Some problem with cookies	1	1,2
	2.6	Sending and receiving cookies	1	1,2
	2.7	Using cooking to detect first time visitors,	1	1,2
	2.8	The need for session tracking, Session tracking basics, Session tracking API,	1	1,2
	2.9	A Servlets that shows per client access counts	1	1,2

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

UNIT III

III		Overview of JSP technology and Invoking Java code with JSP scripting elements & The JSP page directives	Lecture Required	Ref no
	3.1	The Need and benefits of JSP	1	1,2
	3.2	Basic syntax od JSP	1	1,2
	3.3	Invoking Java code from JSP, Using JSP Expression	1	1,2
	3.4	Using Scriptlets to make parts of the JSP page conditional	1	1,2
	3.5	The *Import* attribute	1	1,2
	3.6	The *Import* attribute	1	1,2
	3.7	The *contentType* and *pageEncoding* attribute	1	1,2
	3.8	Generating Excel Spreadsheet	1	1,2
	3.9	The *session* attribute	1	1,2
	3.10	The *isELIgnored* attribute	1	1,2
	3.11	The *errorPage* and *isErrorPage* attribute	1	1,2

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

UNIT IV

IV	Including files and applets in JSP pages and Using Java Beans components in JSP documents		Lecture Required	Ref no
	4.1	Including pages at request time: the *jsp:include* action	1	1,2
	4.2	Including pages at page translation time: the *include* directive	1	1,2
	4.3	Forwarding request with *jsp:Forward*	1	1,2
	4.4	Including applets for java plug-in	1	1,2
	4.5	Why use Beans?	1	1,2
	4.6	What are Beans?	1	1,2
	4.7	Using Beans: basic task, Example: *StrignBean.*	1	1,2

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

UNIT V

V	Integrating Servlets and JSP, Accessing database with JDBC		Lecture Required	Ref no
	5.1	Understanding the need for Model View Controller	1	1,2
	5.2	MVC Framework, Architecture of approach	1	1,2
	5.3	Implementing MVC with *RequestDispathcher*	1	1,2
	5.4	Summarizing MVC code	1	1,2

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

UNIT VI

VI	Accessing database with JDBC		Lecture Required	Ref no
	6.1	Using JDBC in General	1	1,2
	6.2	Basic JDBC Examples	1	1,2
	6.3	Insert, Update, Delete and searching in database,	1	1,2
	6.4	Simplifying Database Access with JDBC Utilities,	1	1,2
	6.5	Using Prepared Statements.		

References

Sr. No.	Name of the book	Author	Publication
1	Core Servlets and Java Server Pages-By- Low price edition	Marty Hall & Larry Brown	
2	The Complete reference Struts	James Holmes	

Name of Course	B.Sc. (Computer Science) Third Year
Semester	V Semester
Name of Subject	Operating System
Subject Code	S5.CC.5 (Core Course Elective - 1)

Prerequisites:

- Adequate knowledge of Fundamental of Computer.
- Adequate knowledge of Fundamentals of Data Structures.

Course Objectives:

- To introduce basic concepts and functions of modern operating systems.
- To understand the concept of process and thread management.
- To understand the scheduling of processes and threads.
- To understand the concept of concurrency control.
- To understand the concept of I/O and File management.
- To understand various Memory Management techniques.

Course Outcomes:

- Fundamental understanding of the role of Operating Systems.
- To understand the concept of a process and thread.
- To apply the cons of process/thread scheduling.
- To apply the concept of process synchronization, mutual exclusion and the deadlock.
- To realize the concept of I/O management and File system.
- To understand the various memory management techniques

Salient Features:

- To understand overall structure of operating system.
- To gain understanding concept of deadlock, process synchronization etc.

UNIT – I

1.	**Introduction**		**Lecturers Required**	**Ref. No.**
	a)	What Operating System Do – 1) User View, 2) System View, 3) Defining OS	1	1
	b)	Computer System Organization	2	1
	c)	Computer System Architecture – 1) Single Processor System 2) Multiprocessor System	2	1
	d)	Extended Machine Concept	1	2
	e)	An Operating System Resource Manager	2	2

References:

Sr. No.	**Name of the Book**	**Author**	**Publication**
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8th Edition
2	Operating Systems	Stuart E. Madnick, John J. Donovan	Tata McGraw-Hill Publishing Limited

UNIT – II

2.	System Structure		Lecturers Required	Ref. No.
	a)	Operating System Services	1	1
	b)	User Operating System Interface – 1) Command Interpreter 2) GUI	1	1, 2
	c)	System Boot	1	1, 2
	d)	System Calls	1	1, 2
	e)	Types of System Calls – 1) Process Control 2) File Management 3) Device Management 4) Information Maintenance 5) Communication 6) Protection	3	1

References:

Sr. No.	Name of the Book	Author	Publication
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8^{th} Edition
2	Operating Systems	Achyut Godbole, Atul Kahate	McGraw Hill Education Third Edition

UNIT – III

3.	Process Management		Lecturers Required	Ref. No.
	a)	Process Concept – 1) The Process 2) Process States 3) Process Control Block	3	1, 2
	b)	Process Scheduling – 1) Scheduling Queues 2) Schedulers 3) Context Switching	3	1, 2
	c)	Scheduling Criteria	1	1
	d)	Scheduling Algorithms – 1) FCFS 2) SJF 3) Priority Scheduling 4) Round-Robin Scheduling	4	1

References:

Sr. No.	Name of the Book	Author	Publication
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8^{th} Edition
2	Operating Systems	Achyut Godbole, Atul Kahate	McGraw Hill Education Third Edition

UNIT – IV

4.	Multithreaded Programming		Lecturers Required	Ref. No.
	a)	Overview	1	1, 2
	b)	Multithreading Models	2	1, 2
	c)	Thread Libraries – pthreads	1	1

References:

Sr. No.	Name of the Book	Author	Publication
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8th Edition
2	Operating Systems	Achyut Godbole, Atul Kahate	McGraw Hill Education Third Edition

UNIT – V

5.	Memory Management		Lecturers Required	Ref. No.
	a)	Introduction	1	2
	b)	Contiguous Memory Allocation 1) Memory Allocation 2) Fragmentation	2	1
	c)	Paging 1) Basic Method 2) Hardware Support	2	1
	d)	Segmentation 1) Basic Method 2) Hardware Support	3	1

References:

Sr. No.	Name of the Book	Author	Publication
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8th Edition
2	Operating Systems	Achyut Godbole, Atul Kahate	McGraw Hill Education Third Edition

Unit – VI

6.	File System		Lecturers Required	Ref. No.
	a)	File concept	1	1
	b)	Access Methods 1) Sequential 2) Direct	2	1
	c)	Directory and Disk Structure 1) Directory Overview 2) Single Level Directory 3) Two Level Directory	3	1
	d)	Allocation Methods 1) Contiguous Allocation 2) Linked Allocation 3) Indexed allocation	3	1
	e)	Free Space Management 1) Bit Vector 2) Linked List 3) Grouping 4) Counting	2	1

Reference:

Sr. No.	Name of the Book	Author	Publication
1	Operating System Concepts	Abraham Silberschatz, Peter Galvin, Greg Gagne	WILEY India Edition 8th Edition

Name of Course	B.Sc. Computer Science Third Year
Semester	V Semester
Name of Subject	Elective- Mobile Communication
Subject Code	S5.CC.5 (Core Course Elective – II)

Prerequisites:

- Understanding of how TCP/IP networks operate
- Basic understanding of radio communication concepts and signaling protocol.

Course Objectives:

- To understand the basics of wireless voice and data communication technologies.
- To study about the wireless communication Techniques.
- To understand measurement and performance of mobile and wireless system.
- To understand security and privacy issues in wireless environments.

Course Outcomes:

- Evaluate the usability of mobile devices such as smart phones.
- Select appropriate wireless technologies in commercial and enterprise applications.
- Assess the capabilities of next generation networks and role of mobile technologies.

Salient Features:

- Covers evolutionary path of modern wireless communication networks from different generations.
- Detailed discussions on cellular technologies.
- Brief overview of emerging wireless networking technologies such as IEEE 802.11, HIPERLAN ,Bluetooth.

UNIT-I

Sr. No.	Introduction		Lectures Required	Ref. No
1	1.1	Application	2	1,2
	1.2	A Short History Of Wireless Communication	2	1,2
	1.3	A Market For Mobile Communication	2	1,2
	1.4	Some Open Research Topic	1	1,2
	1.5	A Simplified Reference Model	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

UNIT-II

Sr. No.	Introduction To Cellular Mobile System		Lectures Required	Ref. No
2)	2.1	Introduction	1	2
	2.2	Basic Cellular System	2	2
	2.3	Performance Criteria	1	2
	2.4	Operation Of Cellular System	2	2
	2.5	Planning A Cellular System	1	2
	2.6	Analog Cellular System	2	2

References:

Sr. No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

UNIT-III

Sr. No.		Medium Access Control	Lectures Required	Ref. No
3)	3.1	Motivation For Specialized MAC	1	1,2
	3.2	SDMA	2	1,2
	3.3	FDMA	2	1,2
	3.4	TDMA	2	1,2
	3.5	CDMA	2	1,2

References:

Sr.No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

UNIT-IV

Sr. No.		Telecommunication System	Lectures Required	Ref. No
4)	4.1	GSM	3	1,2
	4.2	DECT	3	1,2
	4.3	TETRA	3	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

UNIT-V

Sr. No.		Wireless LAN	Lectures Required	Ref. No
5)	5.1	Infra-red Vs radio transmission	2	1,2
	5.2	Infrastructure and analog Network	1	1,2
	5.3	IEEE 802.11	2	1,2
	5.3	HIPERLAN	2	1,2
	5.5	Bluetooth	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

UNIT-VI

Sr. No.	Mobile Network Layer		Lectures Required	Ref. No
6)	6.1	Mobile IP	3	1,2
	6.2	Dynamic Configuration Protocol	3	1,2
	6.3	Mobile ad-hoc Networks	3	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Mobile Communications Second Edition	Jochen Schiller	Pearson Education
2	Mobile Cellular Telecommunications Second Edition	William C.Y.Lee	Mc-Graw-Hill

Name of Course	B.Sc. Computer Science Third Year
Semester	V Semester
Name of Subject	Distributed Computing
Subject Code	S5.CC.5 (Core Course Elective – III)

Pre-requisites:

- Computer Networks
- Operating Systems
- C Programming

Course / Learning Objectives:

- Introduce distributed computing environment.
- Emphasize on design techniques and constraints of distributed computing environment.
- Emphasize on analysis of distributed computing environment.

Course Outcomes/ Utility of Course:

- Distinguish between distributed computing and parallel computing.
- Understand concepts of architectural Styles, Communication, and Synchronization.
- Demonstrate different naming & synchronization technologies
- Explore various distributed concepts.

Salient Features:

- Helps to understand Concepts of distributed computing environment
- Motivate to Use distributed architectures instead of central and / or parallel
- Help to understand working of various existing distributed systems.

UNIT – I

1.	Introduction		Lecturers Required	Ref. No.
	1.1	Definition of distributed system	1	1
	1.2	Goals	2	1
	1.3	Types of Distributed systems	4	1

References:

	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

UNIT – II

2.	Architectures		Lecturers Required	Ref. No.
	2.1	Architectural styles	02	1
	2.2	System Architectures: 2.2.1 Centralized Architectures, 2.2.2 Decentralized Architectures 2.2.3 Hybrid Architectures	03	1
	2.3	Architectures Versus Middleware	03	1
		2.3.1 Interceptors 2.3.2 General Approaches to Adaptive Software	03	1
	2.4	Self-Management in Distributed systems 2.4.1 The Feedback Control Model 2.4.2 Example: Systems Monitoring with Astrolabe	03	1

References:

1)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

UNIT – III

3.	Processes		Lecturers Required	Ref. No.
	3.1	Threads	03	1
	3.2	Virtualization	03	1
	3.3	Clients	03	1
	3.4	Servers	03	1
	3.5	Code Migration	03	1

References:

1)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

UNIT – IV

4.	Communication		Lecturers Required	Ref. No.
	4.1	Fundamentals	01	1
	4.2	Remote Procedure Call 4.2.1 Basic RPC Operation 4.2.2 Parameter Passing 4.2.3 Asynchronous RPC	03	1
	4.3	Message oriented communication 4.3.1 Message Oriented Transient Communication (Berkely Sockets) 4.3.2 Message Oriented Persistent Communication (Message Queuing Model)	04	1
	4.4	Stream oriented communication	03	1
	4.5	Multicast communication	04	1

References:

1)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

UNIT – V

5.	Naming		Lecturers Required	Ref. No.
	5.1	Names, Identifiers, and Addresses	02	1
	5.2	Flat Naming 5.2.1 Simple Solutions Broadcasting & Multicasting Forwarding Pointers	02	1
	5.3	Structured Naming	02	1
	5.4	Attribute-Based Naming	02	1

References:

1)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

UNIT – VI

6.	Synchronization		Lecturers Required	Ref. No.
	6.1	Clock synchronization: 6.1.1 Physical clocks 6.1.2 Global Positioning System 6.1.3 Clock synchronization Algorithms	02	1
	6.2	Logical Clocks 6.2.1 Lamport's Logical Clock 6.2.2 Vector Clocks	03	1
	6.3	Mutual Exclusion: 6.3.1 Centralized Algorithm 6.3.2 A Decentralized Algorithm 6.3.3 A Distributed Algorithm 6.3.4 A Token Ring Algorithm	05	1
	6.4	Election Algorithms 6.5.1 Traditional Election Algorithms (Bully, Ring Algorithm) 6.5.2 Election in Wireless Environments	02	1

References:

1)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

Name of Course	B.Sc. Computer Science Third Year
Semester	V
Name of Subject	JavaScript
Subject Code	S5.SEC.1 (Skill Enhancement Course - 1)

Prerequisites:

- Basic knowledge of object-oriented programming concepts
- Basic knowledge of HTML

Course Objectives:

- What JavaScript is and where it is used.
- Basic programming concepts like variables, data types and conditional statements.
- What functions are and why they're useful.
- The basic syntax of the JavaScript programming language.
- Implementation of different types of object in JavaScript.
- To introduce concept of regular expression.

Course Outcomes:

- Use operators, variables, arrays, control structures, functions and objects in JavaScript.
- Identify popular JavaScript Libraries.
- Use regular expressions for form validation.
- Use Array, Math and String methods to access proper data.
- To build dynamic web pages and web applications.

Salient Features:

- Able to use concept of JavaScript to develop dynamic webpages
- Abe to use built in functions in web applications

Practical Assignments –

Sr. No.	Name of Assignment
1	Write a JavaScript program to print "Hello World".
2	Write a JavaScript program to perform all arithmetic operations.
3	Write a JavaScript program to find out entered number is even or odd.
4	Write a menu driven program in JavaScript, which has following options (Use of switch statement). 1. Addition 2. Subtraction
5	Write a JavaScript program to display series 1, 2, …, 10 using while loop.
6	Write a JavaScript program to display multiplication table of any number entered through the keyboard using do - while loop.
7	Write a JavaScript program to find the factorial value of any number entered through the keyboard using for loop.
8	Write a JavaScript program to demonstrate concept of global and local variables.
9	Write a recursive function in JavaScript to obtain the factorial value of any number entered through the keyboard.
10	Write a JavaScript program to demonstrate array methods.
11	Write a JavaScript program to demonstrate math methods.
12	Write a JavaScript program to demonstrate string methods.
13	Write a JavaScript program to demonstrate concept of regular expression.

Reference:

Sr. No.	Name of the Book	Author	Publication
1	JavaScript 2.0 - The Complete Reference	Thomas Powell and Fritz Schneider	McGraw-Hill 2nd Edition

Name of Course	B.Sc.(COMPUTER SCIENCE) Third Year
Semester	V Semester
Name of Subject	Linux and Shell programming(Skill Enhancement)
Subject code	S5.SEC.1

Silent Features:

Linux is a powerful, free and open source code Operating System available in market.it can be used for both purposes like desktop and server use.so from smartphones to cars, supercomputers and home appliances, the Linux operating system is everywhere. So by learning this subject student will capable, not only to learn the basic functions and task of operating system but also they can develop and release their own software on internet without any cost.

Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To become familiar with open source software and user interface.
- To securely handle OS without any viruses and malwares.
- For easily use free software available on internet.
- To understand the basic operating system command.
- To understand the basic concept of shell programming

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research in open source market.
- Understand the Linux OS architecture.
- Install and use different types of distributions available in market..

Prerequisite:

- Basics of Operating System covered in Semester I.

PRACTICAL List:

Sr. No.	Name of Assignment
1	Introduction to Red Hat Linux(Explain Desktop environment ,features and flavors of Linux.)
2	Red Hat installation.-(Explain all 21 step by step installation of LINUX)
3	Simple commands in Linux (files and directory related commands-cat,cp,sort,touch,vi,mkdir,cd,rm ,rmdir, etc…)
4	Administrative commands in Linux (commands requires root(#) prompt – for ex. – useradd,at,mount,groupadd etc)
5	Communication Commands.(write,wall talk,mesg,prelogin,mesg,motd)
6	Backup and compression commands-(zip,unzip,gzip,gunzip)
7	Networking commands-(ifconfig,netstat,ping,route)
8	Printing commands-(lpr,lpc,lpq,lpd,lprm)
9	DHCP configuration in Linux.(configuring all hosts in lab)
10	Working with shell scripting (Explain what is shell and syntax of branching and looping statements in Linux)
11	Any 5 programs on shell scripting.

Name of Course	B.Sc.(COMPUTER SCIENCE) Third Year
Semester	V Semester
Name of Subject	R Programming
Subject code	S5.SEC.1

Prerequisites:

- Must learn how to code. C and C++ languages are highly recommended.
- Must also learn how to read programming languages that you do not know.
- Must have a background of Mathematics.
- Finally, try running source codes available on the internet and create such codes on your own.

Course Objectives:

- To learn fundamental concepts of R Programming Language.
- To study basic Syntax and Semantics of R Programming Language.
- To understand how to use R for effective data analysis.
- To expose students to current applications in the field of Data warehousing, and Data Science

Course Outcomes:

At the end of this course, students will be able to:

- Access online resources for R and import new function packages into the R workspace
- Import, review, manipulate and summarize data-sets in R
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests
- Perform appropriate statistical tests using R
- Create and edit visualizations with R

Salient Features:

- Confidence building
- Ability to understand the problem and find solutions
- Ability to analyze and explore data-sets and generate appropriate visualizations.
- Developing and maintaining projects

Practical Assignment

Sr. No.	Name of Assignment
1	Downloading and Installing R.
2	Performing Basic operations and study of basic functions in R
3	Write R Program to Find Sum, Mean and Product of Vector in R Programming
4	Write R Program to Take Input From User
5	Write R Program to Generate Random Number from Standard Distributions
6	Write R Program to Find Minimum and Maximum
7	Write R Program to Sort a Vector
8	Write R Multiplication Table
9	Write R program to find even, odd and prime number
10	Write R Program to check Armstrong Number
11	Write R Program to Print the Fibonacci Sequence
12	Write R Program to Make a Simple Calculator

Name of Course	B.Sc.(CS) TY
Semester	V Semester
Name of Subject	Windows Programming with C#.NET
Subject Code	S5.Lab.1

Salient Features:

- To understand the DOTNET framework.
- To gain understanding of windows programming.
- To teach student application development technology.

Utility of Course:

- To impart the knowledge on basics concepts of object oriented programming.
- To outline the various characteristics of c#.
- To provide the familiarity in the concept of developing window application.
- To converse an idea of creating application using ADO.Net.
- To convey the idea of CLR and .Net framework.

Learning Objectives:

- To develop background knowledge as well as core expertise in C#.
- To understand the windows form creation and provide knowledge for creating windows applications.
- To learn the object oriented concepts.

Prerequisites:

- Adequate knowledge of Fundamental of C or C++.
- Adequate knowledge of Basics of DBMS.

Practical Assignment

Sr. No.	Name of Assignment
1	Write a program for demonstration of creating simple windows application.
2	Write a program for demonstration of Text Box and Button control.
3	Write a program for demonstration of List Box and Combo Box Control.
4	Write a program for demonstration of designing Menus.
5	Write a program for demonstration of using dialog boxes.
6	Write a program for demonstration of C# functions.
7	Write a program for demonstration of Array.
8	Write a program for demonstration of creating properties.
9	Write a program for demonstration of creating Indexers.
10	Write a program for demonstration of creating Delegates.
11	Write a program for demonstration of creating custom namespace.
12	Write a program for demonstration of handling exception.
13	Write a program for demonstration of creating and using custom exception.
14	Write a program for demonstration of accessing data from database.
15	Write a program for demonstration of modifying data from database.

Name of Course	B.Sc. (Computer Science) Third Year
Semester	V Semester
Name of Subject	Python Programming
Subject code	S5.Lab.2

Salient Features:

- To understand the basic concept of Python.
- To gain understanding of web based console & windows programming.
- To teach student application development technology.
- To understand quick development concept with less code.

Utility of Course:

- To impart the knowledge on basics concepts of object oriented programming.
- To outline the various characteristics of Python.
- To provide the familiarity in the concept of developing web based & game application.
- To converse an idea of creating application using Database Handling.
- To convey the idea of Python Machine learning concept.

Learning Objectives:

- To develop background knowledge as well as core expertise in Python
- To understand the console based application and provide the knowledge creating web based applications.
- To learn the object oriented concepts.

Prerequisites:

- Adequate knowledge of Fundamental of C, C++ or JAVA.
- Adequate knowledge of Basics of DBMS.
- Basic knowledge of Web Development.

Practical Assignment

Sr. No.	Name of Assignment
1	Program to demonstrate Constant Variable.
2	Program to demonstrate scope of Variable
3	Program to demonstrate branching statement
4	Program to demonstrate Looping statement
5	Program to demonstrate simple class
6	Program to demonstrate String class and it's method.
7	Program to demonstrate String Buffer and it's method.
8	Program to demonstrate inheritance and its Types
9	Program to demonstrate package
10	Program to demonstrate polymorphism
11	Program to demonstrate database connectivity
12	Program to demonstrate networking

Name of Course	**B.Sc. CS Third Year**
Semester	**V**
Name of Subject	**Java Server Pages(JSP) and Servlet**
Subject Code	**S5.Lab 3**

Silent Features:

Java is a most popular, secure and platform independent pure object oriented programming language supporting a large number of applications such as desktop application, web based application and mobile based application. Java Server pages and servlet course teaches students how to develop dynamic web applications for internet. This course is designed for students who are familiar to programming, and want to learn how to develop dynamic website through Java. They will learn how to create dynamic web applications project along with MVC Architecture and the key principles underlying its design.

Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To gain an understanding of the process that is involved in Web application Development, Life cycle of servlet, handling form etc.
- To become familiar with Server side Programming and web server.
- To gain an understanding of Cookies, Session, Generating different Contents Types,
- To understand JDBC, Java Beans and MVC Architecture
- Ability to build many simple web based application or dynamic websites that you can upload on servers.

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research
- Understand the JSP, Servlet and MVC architecture.
- Install and use appropriate tools for JSP and Servlet development, including IDE, Web Server etc.
- Build user interfaces with JSP, Servlet Java Beans and MVC and more.

Prerequisite:

- Basic of Java Programming covered in Semester IV
- Basics of HTML, CSS and JavaScript covered in Semester II.

Practical Assignment

Sr. No.	Name of Assignment
1	Write a program for demonstration of simple servlet & JSP page
2	Writer a program for demonstration of Servlet life cycle.
3	Write a program to create a Servlet using package
4	Write a JSP Page to display response in excel sheet.
5	Write a servlet to read the form data? Design the html form for it
6	Write a JSP pages to include pages at translation time.
7	Write a servlet to read all parameter & their values from html form.
8	Write a program for filtering string for html specific characters
9	Write a servlet for demonstration of sending & receiving cookies
10	Write a JSP page to demonstrate errorPage & isErrorPage attributes.
11	Write a servlet to display lottery numbers for demonstration of servlet life cycle.
12	Write a JSP Page for including applet. Design the applet for it.
13	Write a servlet to display page access count using cookie.
14	Write a JSP Page for demonstration of import attribute.
15	Write a program for creating beans & using beans in JSP.
16	Write a program for demonstration of session and cookies.

17	Write a JSP page to store registration information into database, design the form for it.
18	Write a JSP page to display records from database.
19	Write a servlet that use cookie to identify first time visitors
20	Write a JSP Page to demonstrate including pages at request time.
21	Write a JSP Page for demonstration of *is EL Ignored attribute*.
22	Write a simple JSP page to generate table of 10 rows & two columns contains 1 to 10 numbers & its square.
23	Write a JSP Page to update the records in database.
24	Write a JSP page that generates Excel spreadsheets
25	Write a JSP Page to delete the record from database.
26	Write a JSP page for demonstration of prepared Statement.

Name of Course	B.Sc. Computer Science Third Year
Semester	VI Semester
Name of Subject	Cloud Computing
Subject Code	S6.CC.1

Silent Features:

It is most demanding area in IT industry. Every organization now days, trying to migrate to cloud computing from different perspectives. It is associated with architectural modelling and service providing. Other areas like resource pooling, cost economics, elasticity of organization also use clouds. Thus it has become extremely important to understand the key defining features of cloud computing.

Learning Objectives:

- To Study basics of cloud computing, and comprehend the terminology, tools and technologies associated with today's top cloud platforms.
- To provide the programmer's perspective of working of Cloud Computing.
- Implement Simple Cloud programs to solve simple problems.

Utility of the course:

- Awareness of existing demanding trends for Clouds and Virtualizations in the IT industry in order to get placement as well as in research

Prerequisite:

- Knowledge about Computer Hardware and Networking.

UNIT – I

1.	**Enterprise computing: a retrospective**		**Lecturers Required**	**Ref. No.**
	1.1	Introduction	1	1
	1.2	Mainframe architecture	2	1
	1.3	Client-server architecture	2	1
	1.4	3-tier architectures with TP monitors	2	1

References:

	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

UNIT – II

2.	**The internet as a platform and Software as a service**		**Lecturers Required**	**Ref. No.**
	2.1	Internet technology and web-enabled applications	2	1
	2.2	Web application servers	2	1
	2.3	Internet of services	2	1
	2.4	Emergence of software as a service	2	1
	2.5	Successful SaaS architectures	2	1
	2.6	Dev 2.0 platforms	2	1
	2.7	Cloud computing	2	1

References:

1.	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

UNIT – III

3.	Cloud computing platforms		Lecturers Required	Ref. No.
	3.1	Infrastructure as a service: Amazon EC2	3	1
	3.2	Platform as a service: Google App Engine	3	1
	3.3	Microsoft Azure	3	1

References:

1.	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

UNIT – IV

4.	Web services, AJAX and mashups		Lecturers Required	Ref. No.
	4.1	Web services: SOAP and REST	2	1
	4.2	SOAP versus REST	2	1
	4.3	AJAX: asynchronous ‘rich’ interfaces	2	1
	4.4	Mashups: user interface services	2	1

References:

1.	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

UNIT – V

5.	Data in the cloud		Lecturers Required	Ref. No.
	5.1	Relational databases	3	1
	5.2	Cloud file systems: GFS and HDFS	3	1
	5.3	BigTable, HBase and Dynamo	3	1
	5.4	Cloud data stores: Datastore and SimpleDB	3	1

References:

1.	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

UNIT – VI

6.	MapReduce and extensions		Lecturers Required	Ref. No.
	6.1	Parallel computing	3	1
	6.2	The MapReduce model	3	1
	6.3	Parallel efficiency of MapReduce	3	1
	6.4	Relational operations using MapReduce	3	1
	6.5	Enterprise batch processing using MapReduce	3	1

References:

1.	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff

Name of Course	**B.Sc. CS Third Year**
Semester	**VI**
Name of Subject	**Android Programming**
Subject Code	**S6.CC.2**

Silent Features:

Android is a powerful Operating System supporting a large number of applications in Smart Phones. Android programming course teaches students how to develop applications for the Android operating system. This course is designed for students who are familiar to programming, and want to learn how to develop Android apps. They will learn how to create an Android project along with Android architecture and the key principles underlying its design.

Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To gain an understanding of the processes that are involved in an Android developed application
- To become familiar with Android development tools and user interface.
- To understand Activity and Intends
- To understand SQLite Database.
- To Understand Web view control
- Ability to build Many simple apps that you can share with your friends

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research
- Understand the Android OS architecture.
- Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.
- Understand the Android application architecture, including the roles of the task stack, activities, & services.
- Build user interfaces with fragments, views, form widgets, text input, lists, tables, and more.

Prerequisite:

- Basic of Operating System covered in Semester I.
- Basic of Java Programming covered in Semester IV
- Basic of Java Server Pages Covered in Semester V

UNIT I

I	**Introduction**		**Lecture Required**	**Ref no**
	1.1	Introduction to Mobile Programming	1	1,2
	1.2	Smartphones future	1	1,2
	1.3	Overview of the Operating Systems used on different mobile devices	1	1,2
	1.4	Android Operating System, Its Features and Versions	1	1,2,3
	1.5	Overview of the development languages available on different mobile devices	1	1,2,3
	1.6	Explore mobile device features not available on PCs such as accelerometer, GPS etc	1	1,2
	1.7	Installing Eclipse, Installing Android Development Tools, Installing Android Studio	2	1,2,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Editionillustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

UNIT II

II	Android Architecture		Lecture Required	Ref no
	2.1	Android Stack	1	1,2,3,4
	2.2	Android applications structure	2	1,2,3,4
	2.3	Creating a project	1	1,2,3,4
	2.4	Working with the, AndroidManifest.xml	1	1,2,3,4
	2.5	Using the log system	1	1,2,3,4
	2.6	Activities	2	1,2,3,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Edition illustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

UNIT III

III	User Interface(UI) Architecture		Lecture Required	Ref no
	3.1	Application context	1	1,2,3,4
	3.2	Intents	2	1,2,3,4
	3.3	Activity life cycle	1	1,2,3,4
	3.4	Supporting multiple screen sizes	1	1,2,3,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Editionillustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

UNIT IV

IV	User Interface Widgets		Lecture Required	Ref no
	4.1	Text controls	1	1,2,3,4
	4.2	Button controls	2	1,2,3,4
	4.3	Toggle buttons	1	1,2,3,4
	4.4	Images,	1	1,2,3,4
	4.5	**Notification and Toast-** Parameters on Intents	1	1,2,3,4
	4.6	Pending intents	1	1,2,3,4
	4.7	Status bar notifications	1	1,2,3,4
	4.8	Toast notifications	1	1,2,3,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Edition illustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

UNIT V

V	Menus, Dialogs List, Location & Maps and Animation		Lecture Required	Ref no
	5.1	Localization	1	1,2,3,4
	5.5	Options menu and Context menu	1	1,2,3,4
	5.3	Dialogs- Alert dialog	1	1,2,3,4
	5.4	Custom dialog	1	1,2,3,4
	5.5	Dialog as Activity	1	1,2,3,4
	5.6	Using string arrays	1	1,2,3,4
	5.7	Creating lists, and Custom lists Google maps	2	1,2,3,4
	5.8	Using GPS to find current location	1	1,2,3,4
	5.9	Animation -View animation and Draw able animation	2	1,2,3,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Editionillustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

UNIT VI

VI	Working with data storage and Publishing Apps		Lecture Required	Ref no
	6.1	Shared preferences	1	1,2,3,4
	6.2	Preferences activity	1	1,2,3,4
	6.3	Files access	2	1,2,3,4
	6.4	SQLite database	3	1,2,3,4
	6.5	Preparing for publishing	1	1,2,3,4
	6.6	Signing and preparing the graphics	1	1,2,3,4
	6.7	Publishing to the Android Market	2	1,2,3,4

References

Sr. No.	Name of the book	Author	Publication
1	Professional Android 4 Application Development, Edition 3	Reto Meier	Wrox Publication
2	Beginning Android 4 Application Development, Editionillustrated	Wei-Meng Lee, John Wiley & Sons	Wrox Publication
3	Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated	Darcey & Shane Conder	Sams Publishing
4	https://developer.android.com/		

Name of Course	B.Sc. (Computer Science)Third Year
Semester	VI Semester
Name of Subject	Digital Image Processing
Subject code	S6.CC.3

Prerequisites:

- Must learn how to code. Python and C++ languages are highly recommended
- Must also learn how to read programming languages that you do not know
- Must have a background on discrete digital signal processing. Discrete digital signal processing will help you understand concepts such as how filtering really works. It can also help you understand how computers perceive an image.
- Finally, try running source codes available on the internet and create such codes on your own.

Course Objectives:

- To learn fundamental concepts of Digital Image Processing
- To study basic image processing operations
- To understand image analysis algorithms
- To expose students to current applications in the field of digital image processing

Course Outcomes:

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques.

Salient Features :

- Confidence building
- Ability to understand the problem and find solutions
- Developing and maintaining projects

UNIT-I

Sr. No.	**Introduction to MATLAB**		**Lectures Required**	**Ref. No**
1	1.1	Introduction	1	2,3
	1.2	Advantages and Disadvantages of MATLAB	2	1,2,3
	1.3	MATLAB Environment	2	1,2,3
	1.4	Using MATLAB Scratch Pad	1	2,3,4
	1.5	Variables and Arrays	2	2,4
	1.6	Multidimensional Arrays	1	2,4
	1.7	Scalar and Array Operations	2	2,4

References:

Sr. No	**Name of Book**	**Writer**	**Publication**
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

UNIT-II

Sr. No.	Introduction to Digital Image Representation		Lectures Required	Ref. No
2)	2.1	Elements of Digital Image Processing System	2	1,2,3,4
	2.2	Digital Image Representation	2	1,2,3,4
	2.3	Reading, displaying and writing images	3	1,2,3,4
	2.4	Data classes and Image types	2	1,2,3,4
	2.5	Converting between data classes and image types	3	2,4
	2.6	Introduction to M-function Programming	3	2,4

References:

Sr. No	Name of Book	Writer	Publication
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

UNIT-III

Sr. No.	Intensity Transformation and Spatial Filtering		Lectures Required	Ref. No
3)	3.1	Background	1	1,2,3,4
	3.2	Intensity Transformation Functions Using imadjust( ) Using log( )	4	1,2,3,4
	3.3	Histogram Processing and function plotting	4	1,2,3,4
	3.4	Spatial filtering Linear spatial filtering Non-Linear spatial filtering	6	1,2,3,4

References:

Sr. No	Name of Book	Writer	Publication
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

UNIT-IV

Sr. No.		Frequency Domain Processing	Lectures Required	Ref. No
4)	4.1	Introduction to Discrete Fourier Transformation(DFT)	3	1,2,4
	4.2	Computing and visualizing 1D-DFT	2	1,2,4
	4.3	Computing and visualizing 2D-DFT	2	1,2,4
	4.4	Filtering in frequency domain	3	1,2,4

References:

Sr. No	Name of Book	Writer	Publication
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

UNIT-V

Sr. No.		Image Restoration	Lectures Required	Ref. No
5)	5.1	A model of image Degradation/Restoration Process	1	1,2,4
	5.2	Noise models	2	1,2,4
	5.3	Restoration Techniques	2	1,2,4
	5.4	Geometric Transformation	2	1,2,4
	5.5	Image Registration	1	1,2,4

References:

Sr. No	Name of Book	Writer	Publication
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

UNIT-VI

Sr. No.		Color Image Processing	Lectures Required	Ref. No
6)	6.1	Color Image Representation	1	1,2,3
	6.2	Converting to ther color spaces	1	1,2,3
	6.3	The Basics of color image processing	1	1,2,3
	6.4	Spatial filtering of color images	1	1,2,3

References:

Sr. No	Name of Book	Writer	Publication
1	Digital Image Processing	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
2	Digital Image Processing using MATLAB	R.C. Gonzalez, R.E. Woods and S.L. Eddins	Second Edition, Pearson Education
3	Fundamentals of Image Processing	A.K. Jain	PHI publication
4	MATLAB Programming for Engineers	Stephen J. Chapman	Third Edition, Thomson Learning

Name of Course	B.Sc. (Computer Science) Third Year
Semester	VI Semester
Name of Subject	Software Engineering
Subject code	S6.CC.4

Prerequisites:

- Adequate knowledge of programming languages.
- Must know the mathematical functions for developing and maintaining the mathematical algorithms.

Course Objectives:

- To develop software engineering skills and testing plans.
- To understand system concepts and its application in Software development.
- To enhance skills of designing and testing software.
- To learn technical skills to assure production of quality software.

Course Outcomes:

- Ability to learn various methods of software development.
- Ability to apply various software testing techniques

Salient Features:

- Improve your skills & build Confidence
- Ability to understand the problem and find solutions
- Lifelong learning and readily adapt to new software engineering environments.

UNIT-I

Sr. No.	Introduction to Software Engineering		Lectures Required	Ref. No
1	1.1	The Evolving Role of Software	2	1,2
	1.2	Software	1	1,2
	1.3	Software Characteristics	2	1,2
	1.4	Software Applications	2	1,2
	1.5	Software Evolution	2	1,2
	1.6	Software Crisis & Horizon	1	1,2
	1.7	Software Myths	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering(5 th edition)	R.Pressmen	M C Graw Hill
2	Software Engineering(4 th edition)	R.Pressmen	M C Graw Hill

UNIT-II

Sr. No.	Process Of Software		Lectures Required	Ref. No
2	2.1	Software Engineering	1	1
	2.2	Software Process	1	1
	2.3	The Waterfall Model	2	1,2
	2.4	Incremental Process Models	2	1,2
	2.5	Evolutionary Process Models	2	1,2
	2.6	Spiral Model	1	1,2

References:

Sr.No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Engineering 7th / 8th Edition	IAN Sommerville	Pearson Edition

UNIT-III

Sr. No.	A Generic View of Process		Lectures Required	Ref. No
3	3.1	Software Engineering – A Layered Technology	1	1,2
	3.2	Process Framework	1	1,2
	3.3	Personal and Team Process Models	1	1,2
	3.4	Personal Software Process (PSP)	1	1,2
	3.5	Team Software Process (TSP)	1	1,2
	3.6	Process Technology	1	1,2
	3.7	Product and process	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Engineering 7th / 8th Edition	IAN Sommerville	Pearson Edition

UNIT-IV

Sr. No.	AGILE DEVELOPMENT		Lectures Required	Ref. No
4	4.1	What Is Agility?	1	1
	4.2	What Is an Agile Process?	2	1
	4.3	The Politics of Agile Development	2	1
	4.4	Agile Process Models	2	1
	4.5	Feature Driven Development (FDD)	2	1

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill

UNIT-V

Sr. No.	5. Software Engineering Practice		Lectures Required	Ref. No
5	5.1	Software Engineering Practice	1	1
	5.2	The Essence of Practice	1	1
	5.3	Core Principles	1	1
	5.3	Communication Practices	1	1
	5.5	Planning Practices	1	1
	5.6	Modeling Practices	1	1
	5.7	Analysis Modeling Principles	1	1
	5.8	Design Modeling Principles	1	1

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering 7th / 8th Edition	IAN Sommerville	Pearson Edition

UNIT-VI

Sr. No.	System Engineering		Lectures Required	Ref. No
6	6.1	Computer-Based Systems	2	1,2
	6.2	The System Engineering Hierarchy	1	1,2
	6.3	System Modeling	1	1,2
	6.4	System Simulation	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Engineering 7th / 8th Edition	IAN Sommerville	Pearson Edition

Name of Course	B.Sc. (Computer Science) Third Year
Semester	VI Semester
Name of Subject	Software Testing
Subject code	S6.CC.5 (Core Course Elective – I)

Prerequisites:

- Adequate knowledge about software engineering.
- Must be familiar with computer hardware and able to read technical diagrams.

Course Objectives:

- To learn detection of bugs and performance issues in software.
- Understanding to develop and run test plans.
- Learn testing tools to detecting quickly bugs and error to smarter testing.
- To work with various software testing methods.

Course Outcomes:

- Determines the correctness, completeness and quality of software being developed.
- Technical documentation is well organized using testing.

Salient Features:

- Improve your skills & build confidence
- Ability to understand the problem and find solutions
- Lifelong learning and readily adapt to new software testing environments.

UNIT-I

Sr. No.	Quality concepts		Lectures Required	Ref. No
1	1.1	Quality	1	1,2
	1.2	Software Quality		1,2
	1.2.1	McCall's Quality Factors	1	1,2
	1.2.2	ISO 9126 Quality Factors	1	1,2
	1.2.3	Targeted Quality Factors	1	1,2
	1.3	The Cost of Quality	1	1,2
	1.4	Quality and Security	1	1,2
	1.5	Quality Control	1	1,2
	1.6	Quality Assurance	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-II

Sr. No.	Software Quality Assurance		Lectures Required	Ref. No
2	2.1	Software Quality Assurance	1	1,2
	2.2	Software Reviews	1	1,2
	2.3	Formal Technical Reviews	2	1,2
	2.4	Software Reliability	2	1,2
	2.5	The SQA Plan	1	1,2

References:

Sr.No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-III

Sr. No.	SOFTWARE TESTING STRATEGIES		Lectures Required	Ref. No
3	3.1	A Strategic Approach to Software Testing	2	1,2
	3.2	Unit Testing	1	1,2
	3.3	Integration Testing	2	1,2
	3.4	Validation Testing	1	1,2
	3.5	System Testing	1	1,2
	3.6	The Art Of Debugging	1	1,2

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References:

Sr.No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-IV

Sr. No.	TESTING APPLICATION		Lectures Required	Ref. No
4	4.1	Software Testing Fundamentals	1	1,2
	4.2	Internal and External Views of Testing	2	1,2
	4.3	White-Box Testing	3	1,2
	4.4	Basic Path Testing	3	1,2
	4.5	Control Structural Testing	2	1,2
	4.6	Black Box Testing	2	1,2

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References:

Sr.No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-V

Sr. No.	WEBAPPS FOR TESTING		Lectures Required	Ref. No
5	5.1	Testing Concepts for WebApps	2	1,2
	5.2	The Testing Process-An Overview	1	1,2
	5.3	Content Testing	1	1,2
	5.3	User interface Testing	1	1,2
	5.5	Navigation Testing	2	1,2
	5.6	Security Testing	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	M C Graw Hill
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-VI

Sr. No.		PRODUCT METRICS	Lectures Required	Ref. No
6	6.1	A frame work for product metrics	1	1,2
	6.2	Metrics for the requirements model	1	1,2
	6.3	Metrics for design model	1	1,2
	6.4	Metrics for source code	1	1,2
	6.5	Metrics for testing	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Software Engineering	R.Pressmen	
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

Name of Course	B.Sc. (Computer Science) Third Year
Semester	VI Semester
Name of Subject	Data Mining & Data Warehousing
Subject code	S6.CC.5 (Core Course Elective - II)

Prerequisites:
Basic Programming, Mathematics-Statistics, Database Concepts

Course Objectives:

- To introduce the basic concepts of Data Mining and Data Warehouse techniques.
- Examine the types of the data to be mined and apply preprocessing methods on raw data.
- Discover interesting patterns, analyse supervised and unsupervised models and estimate the accuracy of the algorithms.

Course Outcomes:
Students who complete this course should be able to

- Process raw data to make it suitable for various data mining algorithms.
- Discover and measure interesting patterns from different kinds of databases.
- Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.

Salient Features:
Data mining helps in analyzing and summarizing different elements of information. Mining process is a form where in which all the data and information can be extracted for the purpose of future benefit. It helps in

- It helps to identify the shopping patterns
- Increases website optimization:
- It is beneficial for marketing campaigns:
- Determining customer groups:
- Increases brand loyalty:

UNIT-I

Sr. No.	Introduction		Lectures Required	Ref. No
1	1.1	Basic Data Mining task	1	1,2
	1.2	Data Mining Vs Knowledge discovery in databases	3	1,2
	1.3	Data mining metrics	3	1,2
	1.4	Social Implication of Data Mining	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

UNIT-II

Sr. No.	Related Concepts		Lectures Required	Ref. No
2)	2.1	Database/OLTP systems	1	1,2
	2.2	Information Retrieval	4	1,2
	2.3	Decision Support Systems	3	1,2
	2.4	Dimensional Modeling	1	1,2
	2.5	OLAP 2.6 Web Search Engines	3	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

UNIT-III

Sr. No.	Data Mining Techniques		Lectures Required	Ref. No
3)	3.1	Introduction.	1	1,2
	3.2	Statistical perspective on Data Mining	2	1,2
	3.3	on Tree	2	1,2
	3.4	Method Overloading	2	1,2
	3.5	Neural networks	3	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

UNIT-IV

Sr. No.	Classification		Lectures Required	Ref. No
4)	4.1	Introduction	2	1,2
	4.2	Statistical based algorithms	2	1,2
	4.3	Distance based algorithms Create Package	2	1,2
	4.4	Decision tree based algorithms	3	1,2
	4.5	Neural network based algorithm	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

UNIT-V

Sr. No.	Clustering		Lectures Required	Ref. No
5)	5.1	Introduction	1	1,2
	5.2	Hierarchical algorithms	1	1,2
	5.3	Partitional algorithms	1	1,2
	5.4	Clustering large databases	2	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

UNIT-VI

Sr. No.	Association Rules		Lectures Required	Ref. No
6)	6.1	Introduction	1	1,2
	6.2	Basic algorithms	1	1,2
	6.3	Parallel and distributed algorithms	1	1,2

References:

Sr. No	Name of Book	Writer	Publication
1	Data Mining – Introductory and Advanced Topics	Margaret H. Dunham & S. Shridhar	Pearson Education
2	Data Warehousing Fundamentals	j Ponniah	

Name of Course	B.Sc. (Computer Science) Third Year
Semester	VI Semester
Name of Subject	Cyber Security
Subject code	S6.CC.6 (Core Course Elective – III)

Android Programming **Prerequisite:**

- Adequate knowledge of computer network.
- Adequate knowledge of possible risks on internet.

Course Objective

- Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
- Gain familiarity with protective network and distributed system attacks, defenses against them.
- Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.
- Acquaintance with cyber Law and IT Act 2000.
- Develop an understanding of Technical aspects of Digital signature.
- Develop a basic understanding of domain Name Disputes and Trademark Law.
- Acquaintance and awareness with cybercrime.
- Understand the broad set of technical, social & political aspects of Cyber Security.
- Recognized the role security management plays in cyber security defense

Course Outcome:

- Explain the concepts of confidentiality, availability and integrity (CIA) in context of Information Assurance.
- Understand the objectives of IT Act and Cyber Law.
- Understands Encryption and decryption methods.
- Understand Digital signature and it's technical aspects.
- Understand the concept of Domain Name Disputes , Cyber squatting and Reverse Hijacking.
- Will understand cybercrimes such as hacking and other offences.

Silent Features:

- Develops the knowledge of cyber Law and Cyber Act.
- Develops the skill of encryption and decryption.
- Understands the cybercrimes and offences.

UNIT-I

Sr. No.	**Object and Scope of the IT Act**		**Lectures Required**	**Ref. No**
1	1.1	Genesis	2	1,2,3,4,5
	1.2	Object	2	1,2,3,4,5
	1.3	Scope of the Act	2	1,2,3,4,5

References:

Sr. No	**Name of Book**	**Writer**	**Publication**
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi

4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		6) Professional Book Publishers – New Delhi.

UNIT-II

Sr. No.		Encryption	Lectures Required	Ref. No
2)	2.1	Symmetric Cryptography	2	1,2,3,4,5
	2.2	Asymmetric Cryptography	2	1,2,3,4,5
	2.3	RSA Algorithm	3	1,2,3,4,5
	2.4	Public Key Encryption	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		7) Professional Book Publishers – New Delhi.

UNIT-III

Sr. No.		Digital Signature	Lectures Required	Ref. No
3)	3.1	Technology behind Digital Signature	2	1,2,3,4,5
	3.2	Creating a Digital Signature	2	1,2,3,4,5
	3.3	Verifying a Digital Signature	2	1,2,3,4,5
	3.4	Digital Signature and the Law	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		8) Professional Book Publishers – New Delhi.

UNIT-IV

Sr. No.		Domain Name Disputes and Trademark Law	Lectures Required	Ref. No
4)	4.1	Concept of Domain Names	1	1,2,3,4,5
	4.2	New Concepts in Trademark Jurisprudence	2	1,2,3,4,5
	4.3	Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming,	4	1,2,3,4,5
	4.4	Jurisdiction in Trademark Dispute	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		9) Professional Book Publishers – New Delhi.

UNIT-V

Sr. No.	Cyber Regulations Appellate Tribunal		Lectures Required	Ref. No
5)	5.1	Establishment & Composition Of Appellate Tribunal	3	1,2,3,4,5
	5.2	Powers of Adjudicating officer to Award Compensation	2	1,2,3,4,5
	5.3	Powers of Adjudicating officer to Impose Penalty	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		10) Professional Book Publishers – New Delhi.

UNIT-VI

Sr. No.	The Cyber Crimes		Lectures Required	Ref. No
6)	6.1	Tampering with Computer Source Documents	2	1,2,3,4,5
	6.2	Hacking with Computer System	3	1,2,3,4,5
	6.3	Publishing of Information Which is Obscene in Electronic Form	2	1,2,3,4,5
	6.4	Offences : Breach of Confidentiality & Privacy	2	1,2,3,4,5
	6.5	Offences : Related to Digital Signature Certificate	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		11) Professional Book Publishers – New Delhi.

Name of Course	**B.Sc CS TY**
Semester	**VI Semester**
Name of Subject	**XML Programming**
Subject Code	**S6.SEC.1**

Prerequisites:

- Basic knowledge of operating system & web browser.
- Basic knowledge of HTML, CSS & JavaScript.

Course Objectives:

- To understand what is XML & its uses.
- To understand DTD, CSS, XLST
- To understand what functions are and why they're useful.
- The basic syntax of the XML.
- Implementation and representation of different type documents.
- To introduce concept of Creating XML Links
- To understand Rendering XML with XSL

Course Outcomes:

- Use XML Markup and Core Concepts.
- Use of Document Models: A Higher Level of Control.
- Use different template rules.
- To build dynamic web pages and web applications.

Salient Features:

- Able to use concept of XML, DTD, XSL to develop webpages
- Abe to use features of XML in web applications

Sr. No	**Topics**
1.	**Introduction To XML**
	What is XML?
	Origins of XML
	Goals of XML
	XML Today
	Study of Creating Documents
	Study of Viewing XML
	Study of Testing XML
	Study of Transformation
2.	**XML Markup and Core Concepts**
	The anatomy of a Document
	Study of Elements: The Building Blocks of XML
	Study of Attributes: More Muscle for Elements
	Study of Namespaces: Expanding your Vocabulary
	Study of Entities: Placeholders for Content
	Study of Miscellaneous Markup
	Study of Well-Formed Documents

3.	**Creating XML Links**
	Study of Creating Hyperlinks
	Locators
	Study of Link Elements
	Simple Links
	Extended Links
	Extended Links Groups
	Study of Inline and Out-of-Line Links
	Study of Link Behavior
	Link Effects
	Link Timing
	The Behavior Attribute
4.	**Document Models: A Higher Level of Control**
	Study of Modeling Documents
	Study of DTD Syntax
	Example: A Checkbook
	Tips for Designing and Customization DTDs
	Example: Barebones DocBook
	Study of XML Schema: An Alternative to DTDs
5.	**Rendering XML with XSL**
	XSL 1
	XSL 2
	Study of Template Rules
	Matching an Element by its ID
	Matching an Element by its Name
	Matching an Element by its Ancestry
	Matching Several Element Names
	Matching an Element by its Attributes
	Matching an Element by its Children
	Matching an Element by its Position
	Wildcard Matches
	Resolving Selection Conflicts
	The Default Templet Rule
	Study of Formatting Objects
	Layout Formatting Objects
	Content Formatting Objects

References :

1. Learning XML by Erik T. Ray O'Reilly Media 1 st edition 2001. ISBN 81-7366-314-9
2. SAMS Tech Yourself XML in 21 Days by Simon North and Paul Hermans, 1st Edition 1999. Techmedia Publication, ISBN 81-7635-268-3

Name of Course	B.Sc. Computer Science Third Year
Semester	VI Semester
Name of Subject	SQL Server
Subject Code	S6.SEC.1

Prerequisites:

- Basic knowledge of operating system & DBMS.

Course Objectives:

- To understand what is MS SQL Server & its uses.
- To understand basic SQL queries.
- To understand different numerical, string & date handling function.
- Implementation and representation of different type relations in table.
- To understand backup and restore procedure.
- To understand repairing database.
- To understand procedures and triggers

Course Outcomes:

- Detailed understanding of MS SQL Server database.
- Knowledge of writing SQL queries.
- Knowledge of DDL, DML, DCL commands
- Knowledge of maintaining relation between table and database normalization.
- Understanding different numerical, string handling and date handling function.

Salient Features:

- Able to use concept database normalization.
- Able to use maintaining relationship between tables and joining table.
- Able to use store procedure

Practical List

1 Relational Database Systems
2 Planning the Installation and Installing SQL Server
3 SQL Server Management Studio
4 SQL Components
5 Data Definition Language
6 Queries
7 Modification of a Table's Contents
8 Stored Procedures and User-Defined Functions
9 System Catalog
10 Indices
11 Views
12 Security System of Database Engine
13 Concurrency Control
14 Triggers

Name of Course	B.Sc.(CS)TY
Semester	VI Semester
Name of Subject	MySQL
Subject Code	S6.SEC.1

Prerequisites:

- Basic knowledge of operating system & DBMS.

Course Objectives:

- To understand what is MySQL & its uses.
- To understand basic SQL queries.
- To understand different numerical, string & date handling function.
- Implementation and representation of different type relations in table.
- To understand back and restore procedure.
- To understand repairing database.

Course Outcomes:

- Detailed understanding of MySQL database.
- Knowledge of writing SQL queries.
- Knowledge of maintaining relation between table and database normalization.
- Understanding different numerical, string handling and date handling function.

Salient Features:

- Able to use concept database normalization.
- Abe to use maintaining relationship between tables and joining table.

1) SQL* formatting commands
2) To create a table, alter and drop table.
3) To perform select, update, insert and delete operation in a table.
4) To make use of different clauses viz where, group by, having, order by, union and intersection,
5) To study different constraints.
6) To use oracle function viz aggregate, numeric, conversion, string function.
7) To understand use and working with joins.
8) To make use of transaction control statement viz rollback, commit and save point.
9) To make views of a table.
10) To make indexes of a table.
11) To understand working with PL/SQL
12) To implement Cursor on a table.
13) To implement trigger on a table

Books Recommended:

1. Baron Schwartz , High Performance MySQL, O'Reilly, 2012.
2. Vikram Vaswani , The Complete Reference MySQL , McGraw Hill Educations, 2004.

Name of Course	**B.Sc. CS Third Year**
Semester	**VI**
Name of Subject	**Android Programming**
Subject Code	S6.Lab1

Silent Features:

Android is a powerful Operating System supporting a large number of applications in Smart Phones. Android programming course teaches students how to develop applications for the Android operating system. This course is designed for students who are familiar to programming, and want to learn how to develop Android apps. They will learn how to create an Android project along with Android architecture and the key principles underlying its design.

Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To gain an understanding of the processes that are involved in an Android developed application
- To become familiar with Android development tools and user interface.
- To understand Activity and Intends
- To understand SQLite Database.
- To Understand Web view control
- Ability to build Many simple apps that you can share with your friends

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research
- Understand the Android OS architecture.
- Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.
- Understand the Android application architecture, including the roles of the task stack, activities, & services.
- Build user interfaces with fragments, views, form widgets, text input, lists, tables, and more.

Prerequisite:

Basic of Operating System covered in Semester I, Basic of Java Programming covered in Semester IV and Basic of Java Server Pages Covered in Semester V

Practical List:

1. Installing Eclipse and Android Studio
2. Study of Android Application structure.
3. Sample Apps for Working with AndroidManifest.xml
4. Sample Apps for Working with Activities.
5. Sample Apps for Working with Application Context
6. Apps for Demonstration of Intends
7. Apps for Demonstration of Activity Life Cycle.
8. Apps for demonstration of Buttons and Textbox.
9. Designing simple Calculator Apps
10. Sample Apps for Working with Images and Buttons
11. Sample Apps for Working with Notification and Toast.
12. Sample Apps for Demonstration of Context menu and Dialogs
13. Sample Apps for Working with SQLite Database.
14. Sample Apps for Demonstration of File Access.
15. Sample Apps for Demonstration of Shared preferences and Preferences activity

Name of Course	B.Sc. (Computer Science)Third Year
Semester	VI Semester
Name of Subject	Digital Image Processing
Subject code	S6.Lab2

Prerequisites:

- Must learn how to code. Python and C++ languages are highly recommended
- Must also learn how to read programming languages that you do not know
- Must have a background on discrete digital signal processing. Discrete digital signal processing will help you understand concepts such as how filtering really works. It can also help you understand how computers perceive an image.
- Finally, try running source codes available on the internet and create such codes on your own.

Course Objectives:

- To learn fundamental concepts of Digital Image Processing
- To study basic image processing operations
- To understand image analysis algorithms
- To expose students to current applications in the field of digital image processing

Course Outcomes:

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques.

Salient Features :

- Confidence building
- Ability to understand the problem and find solutions
- Developing and maintaining projects

PRACTICAL List:

1) Demonstration of Matlab Environment
2) Demonstration of Matlab variables and arrays
3) Demonstration of Multidimensional Arrays
4) Demonstration of scalars and array operations
5) Demonstration of reading, displaying images
6) Demonstration of Data classes
7) Demonstration of Matlab Image types
8) Conversion between image types
9) Demonstration of M-function
10) Program to demonstrate switch statement
11) Demonstration of Intensity Transformation functions
12) Demonstration of histogram processing
13) Demonstration of spatial filtering
14) Demonstration of 1D-DFT and its inverse
15) Demonstration of 2D-DFT and its inverse
16) Demonstration of frequency domain filtering
17) Demonstration of noise models
18) Demonstration of restoration techniques
19) Demonstration of geometric transformation
20) Demonstration of color image representation
21) Demonstration of converting color images to different color spaces