



SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

[M.S.]

Choice Based Credit System

(CBCS Pattern)

Faculty of Science and Technology

Syllabus of B.Sc. Information Technology 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	Software Engineering & Design Concepts	1	3	4
	S5.CC.2	MATLAB & DIP	1	3	4
	S5.CC.3	Java Server Pages & JDBC	1	3	4
	S5.CC.4	Project	1	3	4
	S5.CC.5	Elective: 1. Cloud Computing & Web Services 2. Distributed Computing & Concepts	1	3	4
	S5.SEC.1	Skills Enhancement Course (SEC) 1. Fundamental of Java script 2. Fundamental of SQL Server		2	2
	S5.Lab 1	MATLAB & DIP		2	2
	S5.Lab 2	Java Server Pages & JDBC		2	2
	S5.Lab 3	Seminar		2	2
	TOTAL			28	
Semester – VI	S6.CC.1	Fundamental of Software Testing	1	3	4
	S6.CC.2	Programming in Python	1	3	4
	S6.CC.3	Linux Operating System	1	3	4
	S6.CC.4	Window Programming	1	3	4
	S6.CC.5	Elective: 1. Neural Network & Fuzzy Logic 2. ERP & Technologies	1	3	4
	S6.SEC.1	Skill Enhancement Course (SEC) 1. Fundamental of Android OS 2. R Programming Language		2	2
	S6.Lab1	Programming in Python		2	2
	S6.Lab2	Linux Operating System		2	2
	S6.Lab3	Window Programming		2	2
	TOTAL			28	

Name of Course	B.Sc. Information Technology Third Year
Semester	V Semester
Name of Subject	Software Engineering & Design Concepts
Subject code	S5.CC.1

Prerequisites:

- Adequate knowledge of programming languages.
- Must know the mathematical functions for developing and maintaining the mathematical algorithms.
- 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.
- 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	6.2	6.1 Computer-Based Systems	2	1,2
	6.3	6.2 The System Engineering Hierarchy	1	1,2
	6.4	6.2.1 System Modeling	1	1,2
	6.5	6.2.2 System Simulation	1	1,2

References:

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

Name of Course	B.Sc. Information Technology Third Year
Semester	V Semester
Name of Subject	MATLAB & DIP
Subject code	S5.CC.2

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.
- 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.
- 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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. Information Technology Third Year
Semester	V Semester
Name of Subject	Java Server Pages & JDBC
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	Marty Hall &	

	price edition	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 <i>Import</i> attribute	1	1,2
3.6	The <i>Import</i> attribute	1	1,2
3.7	The <i>contentType</i> and <i>pageEncoding</i> attribute	1	1,2
3.8	Generating Excel Spreadsheet	1	1,2
3.9	The <i>session</i> attribute	1	1,2
3.10	The <i>isELIgnored</i> attribute	1	1,2
3.11	The <i>errorPage</i> and <i>isErrorPage</i> 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 <i>jsp:include</i> action	1	1,2
4.2	Including pages at page translation time: the <i>include</i> directive	1	1,2
4.3	Forwarding request with <i>jsp:Forward</i>	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: <i>StrignBean</i> .	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 <i>RequestDispathcher</i>	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. Information Technology Third Year
Semester	V Semester
Name of Subject	Cloud Computing & Web Services
Subject Code	S5.CC.5 (Core Course Elective – I)

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.

- 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:

1)	Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff
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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
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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
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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
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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
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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
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Name of Course	B.Sc. Information Technology Third Year
Semester	V Semester
Name of Subject	Distributed Computing & Concepts
Subject Code	S5.CC.5 (Core Course Elective – II)

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

2)	Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4
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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
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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
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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 (Berkeley 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
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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
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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
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Name of Course	B.Sc. Information Technology Third Year
Semester	V
Name of Subject	Fundamental of JavaScript
Subject Code	S5.SEC.1 (Skill Enhancement Course - 1)

Prerequisites:

- Basic knowledge of object-oriented programming concepts
- Basic knowledge of HTML
- 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.
- 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.
- Able to use concept of JavaScript to develop dynamic webpages
- Able 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	Thomas Powell and Fritz Schneider	McGraw-Hill 2 nd Edition

Name of Course	B.Sc. Information Technology Third Year
Semester	V Semester
Name of Subject	Fundamental of SQL Server
Subject Code	S5.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.
- Able to use maintaining relationship between tables and joining table.

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. Information Technology Third Year
Semester	V Semester
Name of Subject	MATLAB & DIP
Subject code	S5.Lab1

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

Name of Course	B.Sc. Information Technology Third Year
Semester	V
Name of Subject	Java Server Pages & JDBC
Subject Code	S5.Lab 2

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.

- 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 List

1. Write a program for demonstration of simple servlet & JSP page
2. Write 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 error Page & is Error Page 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. Information Technology Third Year
Semester	V Semester
Name of Subject	Seminar
Subject Code	S5.Lab 3

- Students have to prepare and present seminar on recent technologies with the help of guide.
- Students have to submit the seminar reports.

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Fundamental of Software Testing
Subject code	S6.CC.1

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.

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

- 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 Management		Lectures Required	Ref. No
1	1.1	Quality Concepts	2	1,2
	1.2	Software Quality Assurance	2	1,2
	1.3	Software Reviews	2	1,2
	1.4	Formal Technical Reviews	2	1,2
	1.5	The SQA Plan	2	1,2

References:

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

UNIT-II

Sr. No.	Levels Of Testing		Lectures Required	Ref. No
2)	2.1	A Strategic Approach to Software Testing	1	1,2
	2.2	Unit Testing	1	1,2
	2.3	Integration Testing	1	1,2
	2.4	Validation Testing	1	1,2
	2.5	System Testing	1	1,2
	2.6	The Art Of Debugging	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

UNIT-III

Sr. No.	Black Box & White Box Teting		Lectures Required	Ref. No
3)	3.1	Structural Testing(White Box Testing)	1	1,2
	3.2	Basic Path Testing	1	1,2
	3.3	Control Structural Testing	1	1,2
	3.4	Functional Testing(Block Box Testing)	1	1,2
	3.5	Object Oriented Testing Methods	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

UNIT-IV

Sr. No.	Product Metrics		Lectures Required	Ref. No
4)	4.1	Software Quality	3	1,2
	4.2	A Framework for Product Metrics	3	1,2
	4.3	Metrics for Testing 4.3.1 Halstead metrics applied to testing 4.3.2 Metrics for object oriented testing	5	1,2

References:

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

UNIT-V

Sr. No.	Testing For WebApps		Lectures Required	Ref. No
5)	5.1	Testing Concepts for WebApps	2	1,2
	5.2	The Testing Process-An Overview	2	1,2
	5.3	Content Testing	2	1,2
	5.3	User interface Testing	2	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	
2	Software Testing Concepts and Tools	NageswaraRoo	Dreamtech Publication

UNIT-VI

Sr. No.	Introduction To QTP 8.2		Lectures Required	Ref. No
6)	6.1	Testing Process	2	1,2
	6.2	QuickTestPro Window	2	1,2
	6.3	Add-in manager Window	1	1,2
	6.4	QTP Testing Framework	1	1,2
	6.5	Recording Models	1	1,2

References:

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

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Programming in Python
Subject code	S6.CC.2

Salient Features:

1. To understand the basic concept of Python.
 2. To gain understanding of web based console & windows programming.
 3. To teach student application development technology.
 4. To understand quick development concept with less code.
-
1. To impart the knowledge on basics concepts of object oriented programming.
 2. To outline the various characteristics of Python.
 3. To provide the familiarity in the concept of developing web based & game application.
 4. To converse an idea of creating application using Database Handling.
 5. To convey the idea of Python Machine learning concept.
-
1. To develop background knowledge as well as core expertise in Python
 2. To understand the console based application and provide the knowledge creating web based applications.
 3. To learn the object oriented concepts.
-
1. Adequate knowledge of Fundamental of C, C++ or JAVA.
 2. Adequate knowledge of Basics of DBMS.
 3. 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 5 th edition
2	Starting Out with Python plus MyProgramming Lab	Tony Gaddis	Pearson eText --Access Card Package 3 rd 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 --Access Card Package 3 rd edition
2	Learning Python	Mark Lutz	O'Reilly 5 th 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 My Programming Lab	Tony Gaddis	Pearson eText --Access Card Package 3 rd edition
2	Learning Python	Mark Lutz	O'Reilly 5 th 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 My Programming Lab	Tony Gaddis	Pearson eText --Access Card Package 3 rd edition
2	Learning Python	Mark Lutz	O'Reilly 5 th 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
			1	1,2

References:

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

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

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Linux Operating System
Subject code	S6.CC.3

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 be capable, not only to learn the basic functions and tasks 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
- 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.

UNIT-I

Sr. No.	Introduction		Lectures Required	Ref. No
1	1.1	Features of Linux OS	1	1,2,3
	1.2	Features of Linux OS	2	1,2,3
	1.3	Installation steps of Linux	2	1,2,3
	1.4	Linux kernel	1	1,2
	1.5	Linux boot loader	1	1
	1.6	Booting process of Linux OS	1	1

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

UNIT-II

Sr. No.	Working with Linux OS		Lectures Required	Ref. No
2)	2.1	Working with the Linux File System	1	1,2,3
	2.2	Logging into and working With Linux	2	1,2,3
	2.3	Changing User Information	2	1,2,3
	2.4	Linux Shell	1	1,2,3

	2.5	Text Editors in Linux	2	1,2
	2.6	Working with permissions	1	1,3

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

UNIT-III

Sr. No.	Linux Commands and Utilities	Lectures Required	Ref. No
3	Adduser , alias, at ,cat , cd, chmod , chown ,cp, cpio, dd,d f,dc,dir,du,find,finger,grep,zip,unzip,gzip,halt,hostname,ifconfig ,kill,login,look, lpc, lpd ,lpr, lprm, ls, mail, man,mde, mkdir,mor,mount, mv,netstat,passwd,ping, ps,pwd,rm, rmdir,shutdown,sort, su,tar,tree,moun, umount,unzip,vi,wc, who,whoami,zip.	9	1,2, 3,

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

UNIT-IV

Sr. No.	System Administration	Lectures Required	Ref. No	
4)	4.1	System services and runlevels.	2	1,2,3
	4.2	Controlling services with administrative tools (chkconfig & GUI based services)	1	2,3
	4.3	Performing system maintenance .	2	2,3
	4.4	Managing s/w with RPM	1	1,2
	4.5	Communication commands	2	2,3

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

UNIT-V

Sr. No.	Backup and Restore	Lectures Required	Ref. No
5)	5.1 Backup strategies and operation.	2	1,2,3
	5.2 Choosing backup hardware and media	2	1,2
	5.3 Using backup s/w and commands	2	1,2
	5.4 Managing users and groups	2	1,2,3

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

UNIT-VI

Sr. No.	Networking and shell scripting in Linux	Lectures Required	Ref. No
6)	6.1 Network configuration tools	1	1,2,3
	6.2 Working with DHCP	2	1,2,3
	6.3 Using NFS	1	1,2,3
	6.4 Introduction to SAMBA	1	1,2,3
	6.5 Introduction to DNS and Apache Web Server	2	1,2,3
	6.6 Working with shell scripting in linux.	2	1,2,3

References:

Sr. No	Name of Book	Writer	Publication
1	Red Hat Linux 7 Unleashed	Bill Ball ,David Pitts	Techmedia SAMS publication
2	UNIX System Administration Handbook	Evi Nemeth,Garth Snyder,Scott Seebass	Person Education Asia (LPE)(III Edition)
3	Red Hat Linux and Fedora Unleashed	Bill Ball and Hoyt Duff	

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Windows Programming
Subject Code	S6.CC.4

Salient Features:

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

Utility of Course:

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

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

1. Adequate knowledge of Fundamental of C or C++.
2. Adequate knowledge of Basics of DBMS.

UNIT – I

1.	Introduction	Lectur es	Ref. No.
	a) Introduction to .Net Technology & Framework	01	1, 2
	b) .Net Architecture	02	1, 2
	c) Common Language Runtime(CLR)	01	1, 2
	d) IDE Components	03	2
	e) Intellisense	01	2
	f) Project Types	01	2
	g) 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	Lecture s	Ref. No.
	a) Important Classes Used in Windows	01	2
	b) Creating and Customizing Windows Form	02	1
	c) TextBox and Label Control	01	2
	d) Button, CheckBox and RadioButton	02	2
	e) ListBox and ComboBox control	02	2
	f) 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 Require	Ref. No.
a) C# Function	02	1, 2
b) Call by Value & Call by Reference	02	1, 2
c) Out Parameter	01	1, 2
d) Array and ArrayList class	02	1,2
e) Jagged Array	01	2
f) 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 Require	Ref. No.
a) Properties	02	1, 2
b) Indexers	02	1, 2
c) Delegates	01	1, 2
d) Multicast Delegates	01	1,2
e) Custom Events		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 Require	Ref. No.
a) Creating & using Namespace(DLL library)	02	2
b) Creating & using interface	02	1, 2
c) Try Catch Block	02	1, 2
d) Using Finally Block	01	1,2
e) 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	Lectur es	Ref. No.
	a) Introduction ADO.Net	02	2
	b) Advantages of ADO.Net	01	2
	c) Developing a Simple ADO.NET Based Application	02	2
	d) Retrieving & Updating Data From Tables	01	2
	e) 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. Information Technology Third Year
Semester	VI Semester
Name of Subject	Neural Network & Fuzzy Logic
Subject Code	S6.CC.5

Salient Features:

1. To understand the basic concept of Artificial Neural Network and Fuzzy System.
 2. To gain understanding neural network Architecture and Neural network rules.
 3. To gain understanding different type of Fuzzy Sets and Fuzzy Operations.
 4. To understand Multilayer Feed forward.
 5. To Understand Neruo Fuzzy System and Application
-
1. To impart the knowledge on basics concepts of Artificial Neural Network and Fuzzy System.
 2. To outline the various Fuzzy operations.
 3. To converse an idea of Recurrent Network and Unsupervised Learning.
 4. To convey the idea of Machine learning concept.
-
1. To develop background knowledge as well as core expertise in ANN and Fuzzy System
 2. To understand Concept of Machine Learning and Pattern Recognitions

Prerequisites:

1. Adequate knowledge of Fundamental of operating system, Data Structure, C and C++.
2. Adequate knowledge of Basics of DBMS.

Unit – I

1.	Introduction to Neural Networks	Lectures Required	Ref. No.
1.1	Biological Neuron and their Artificial Neuron	01	1, 2, 3, 4, 5
1.2	McCulloch-Pits Neuron Model	01	1, 2, 3, 4, 5
1.3	Linearly Seperatibility, NOR Problem	02	
1.4	Overview of Neural Network Architecture	02	1, 2, 3, 4, 5
1.5	Learning Rules - Supervised Learning - Unsupervised Learning - Perceptron Learning - Reinforcement Learning - Delta Learning Rule	05	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Unit – II

2. Introduction to Fuzzy Logic and operations on fuzzy sets		Lectures Required	Ref. No.
2.1	Crisp Sets: an Overview ,	1	1, 2, 3, 4, 5
2.2	Fuzzy Sets: Basic Types,	1	1, 2, 3, 4, 5
2.3	Fuzzy Sets: Basic Concepts	1	1, 2, 3, 4, 5
2.4	Fuzzy Sets Vs Crisp Sets	1	1, 2, 3, 4, 5
2.5	Additional Properties of alpha cuts	1	1, 2, 3, 4, 5
2.6	Crisp & Fuzzy Relation	1	1, 2, 3, 4, 5
2.7	Fuzzy Equivalence Relations	1	1, 2, 3, 4, 5
2.8	Fuzzy Compatibility Relation	1	1, 2, 3, 4, 5
2.9	Fuzzy complements	1	1, 2, 3, 4, 5
2.10	Fuzzy Union	1	1, 2, 3, 4, 5
2.11	Fuzzy Intersections	1	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Unit- III

3.	Multilayer Feed forward	Lectures Required	Ref. No.
3.1	Generalized Delta Learning	1	1, 2, 3, 4, 5
3.2	Back propagations training algorithm	2	1, 2, 3, 4, 5
3.3	Radial Basis Function (RBF)	2	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Unit- IV

4.	Recurrent Network and Unsupervised Learning	Lectures Require	Ref. No.
4.1	Hopfield Network	2	1, 2, 3, 4, 5
4.2	Counter propagation networks	2	1, 2, 3, 4, 5
4.3	Variant in Back propagations	2	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
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1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Unit V

5.	Associative Memories	Lectures Required	Ref. No.
5.1	Auto Associative Memory	2	1, 2, 3, 4, 5
5.2	Bidirectional Associative Memory (BAM)	2	1, 2, 3, 4, 5
5.3	Matrix Associative Memory	2	1, 2, 3, 4, 5
5.4	Hetro Associative Memory	2	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Unit VI

6.	Neuro Fuzzy System and Application	Lectures Required	Ref. No.
6.1	Fuzzy neurons, Fuzzy Neural Network	2	1, 2, 3, 4, 5
6.2	Application in Pattern Recognition		
6.3	Application in Expert System	2	1, 2, 3, 4, 5

References:

Sr. No.	Name of the Book	Author	Publication
1.	Fuzzy Sets and Fuzzy Logic Theory and Application	George J. Klir, Bo Yuan	
2.	Fuzzy Sets Uncertainty and Information	George J. Klir, Tina A. Floger	
3.	Introduction to the Theory of Neural Competition - John hertz, Krogh and Richard Addison Wesley	John hertz, Krogh and Richard Addison Wesley	
4.	Introduction to Artificial Neural Network	Jack M. Zurada	
5.	Neural Network and Fuzzy System	A Dynamic System	Koska PHI Edition

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	ERP & Technologies
Subject Code	S6.CC.5

Prerequisites:

Basic Programming, Mathematics-Statistics, Database

Concepts Course Objectives:

- To introduce the basic concepts of Enterprise Resource Planning.
- To introduce Business modeling and data modeling.
- To introduce ERP and related technologies such as OLAP, Data Mining, data ware housing etc.
- Understand how to process row data to make it suitable for various decision Support Systems.
- Discover and measure ERP modules for manufacturing (CAD/ CAM).

Salient Features:

- ERP helps in analyzing and summarizing different elements of information. ERP process is a form where in which all the data and information can be extracted for the purpose of future benefit.
- Understand different ERP Modules, ERP – A Manufacturing Perspective and **ERP Market**

Unit – I

1.	1. Introduction to ERP	Lectures Required	Ref. No.
1.1	Evolution of ERP	01	1
1.2	What is ERP?	01	1
1.3	Advantages of ERP	01	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit – II

2.	Enterprise – An Overview	Lectures Required	Ref. No.
2.1	Integrated Management Information	01	1
2.2	Business Modelling	03	1
2.3	Integrated Data Model	03	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit- III

3.	ERP and Related Technologies		Lectures Require	Ref. No.
	3.1	BPR	01	1
	3.2	MIS	01	1
	3.3	DSS	01	1
	3.4	EIS		1
	3.5	Data Warehousing	03	1
	3.6	Data Mining	03	1
	3.7	OLAP	02	1
	3.8	Supply Chain Management	02	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit- IV

4.	ERP – A Manufacturing Perspective		Lectures Required	Ref. No.
	4.1	ERP	02	1
	4.2	CAD / CAM	01	1
	4.3	MRP and BOM	01	1
	4.4	Close loop MRP	01	1
	4.5	Manufacturing Resource Planning and Distribution Requirements Planning	02	1
	4.6	JIT and Kanban	02	1
	4.7	Data Management	02	1
	4.8	Benefits of PDM	02	1
	4.9	MTO and MTS	02	1
	4.10	ATO, ETO, CTO	03	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit V

5.	ERP Modules		Lectures Required	Ref. No.
	5.1	Finance	02	1
	5.2	Plant Maintenance	01	1
	5.3	Quality Management	02	1
	5.4	Materials Management	01	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit VI

6.	ERP Market		Lectures Required	Ref. No.

	6.1	Benefits of ERP	01	1
	6.2	SAP AG	01	1
	6.3	Oracle Corporation	01	1
	6.4	QAD	02	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Fundamental of Android OS
Subject Code	S6.SEC.1

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

UNIT I: Introduction

Installing Eclipse, Installing Android Development Tools for Eclipse, Installing Android Studio

UNIT II: Android Architecture

Android applications structure, creating a project, working with the AndroidManifest.xml, Activities

UNIT III: UI Architecture

Application context, Intents, Activity life cycle

UNIT IV: User Interface Widgets

Text controls, Button controls, Toggle buttons, Images, **Notification and Toast**

UNIT V: Menus, Dialogs and Animation Options

menu, Context menu, Dialogs, Animation

UNIT VI: Working with data storage and Publishing Apps Shared preferences, Files access, SQLite database, publishing Apps

References:

1. Professional Android 4 Application Development, Edition 3, Reto Meier, Wrox John Wiley & Sons, 2012, ISBN 1118237226, 9781118237229.
2. Beginning Android 4 Application Development, Edition illustrated, Wei-Meng Lee, John Wiley & Sons, 2012, ISBN 1118240677, 9781118240670.
3. Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated, Lauren Darcey & Shane Conder, Sams Publishing, 2012, ISBN 0672335697, 9780672335693
4. <https://developer.android.com/>
5. <https://www.tutorialspoint.com/android/>
6. <https://developer.android.com/guide/>

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.
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. Information Technology Third Year
Semester	VI Semester
Name of Subject	R Programming Language
Subject code	S6.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.

- 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

- 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

- 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 List :

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. Information Technology Third Year
Semester	VI Semester
Name of Subject	Programming in Python
Subject code	S6.Lab.1

Salient Features:

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

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

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

3. Adequate knowledge of Fundamental of C, C++ or JAVA.
4. Adequate knowledge of Basics of DBMS.
5. Basic knowledge of Web Development.

PRACTICAL List:

- 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. Information Technology Third Year
Semester	VI Semester
Name of Subject	Linux Operating System
Subject code	S6.Lab.2

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

- 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:

- 1) Introduction to Red Hat Linux.
- 2) Red Hat installation.
- 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)
- 5) Communication Commands.(write,wall talk,mesg,prelogin,mesg,motd)
- 6) Backup and compression commands
- 7) Networking commands
- 8) Printing commands
- 9) DHCP configuration in Linux.
- 10) Working with shell scripting
- 11) Any 5 programs on shell scripting.

Name of Course	B.Sc. Information Technology Third Year
Semester	VI Semester
Name of Subject	Windows Programming
Subject Code	S6.Lab.3

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.

- 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.

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

Practical List

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.