

**MASTER OF SCIENCE
IN
INFORMATION TECHNOLOGY**

Curriculum & Syllabi

(Applicable for Candidates Admitted From 2018 - 2019)

UNDER CHOICE BASED CREDIT SYSTEM

**DEPARTMENT OF INFORMATION TECHNOLOGY
FACULTY OF SCIENCE AND HUMANITIES
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
SRM Nagar, Kattankulathur – 603203**

Program Educational Objectives (PEOs)

- PEO1. Graduates will have skills and knowledge to excel in their professional career in Computer Applications and related disciplines
- PEO2. Graduates will contribute and communicate effectively within the team to grow into leaders
- PEO3. Graduates will practice lifelong learning for continuing professional development
- PEO4. Graduates will have the capability to continue their formal education and successfully complete an advanced degree
- PEO5. Graduates will contribute to the growth of the nation and society by applying acquired knowledge in technical, computing and managerial skills.

Student outcomes (SOs)

The curriculum and syllabus for Bachelor degrees (2018) conform to outcome based teaching learning process. In general, FOURTEEN STUDENT OUTCOMES (a-n) have been identified and the curriculum and syllabus have been structured in such a way that each of the courses meets one or more of these outcomes. Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further each course in the program spells out clear instructional objectives which are mapped to the student outcomes.

- a. An ability to apply knowledge of computing, mathematics, and basic sciences appropriate to the discipline
- b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- d. An ability to function effectively on teams to accomplish a common goal
- e. An understanding of professional, ethical, legal, security and social issues and responsibilities
- f. An ability to communicate effectively with a range of audiences
- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society

- h. Recognition of the need for and an ability to engage in continuing professional development
- i. An ability to use current techniques, skills, and tools necessary for computing practice.
- j. An ability to use and apply current technical concepts and practices in the core information technologies
- k. An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems
- l. An ability to effectively integrate IT-based solutions into the user environment
- m. An understanding of best practices and standards and their application
- n. An ability to assist in the creation of an effective project plan.

SEMESTER I

CAREER STREAM TITLE	COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	Credit
Compulsory Core	PIT18101	Advanced data structures	4	1	0	5	5
	PIT18102	Advanced Java programming	4	1	0	5	5
	PIT18103	Web technology	3	1	0	4	3
Compulsory lab	PIT18104	Advanced Java Programming Laboratory	0	0	4	4	2
	PIT18105	Web technology Laboratory	0	0	4	4	2
Skill Based Elective	PIT18E51	Distributed Operating System	3	1	0	4	3
	PIT18E52	Computer Networks					
	PIT18E53	Software Engineering					
Supportive Course	PIT18106	Linux based Latex Laboratory	0	0	4	4	2
		Total	16	6	8	30	22

SEMESTER II

CAREER STREAM TITLE	COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	Credit
Compulsory Core	PIT18201	Open source technologies	4	1	0	5	4
	PIT18202	Data mining and Data Warehousing	4	1	0	5	4
	PIT18203	Big data analytics	3	1	0	4	4
Compulsory Laboratory	PIT18204	Open source technologies Laboratory	0	0	4	4	2
	PIT18205	Data mining Laboratory	0	0	4	4	2
Skill Based Elective	PIT18E54	Cloud computing	3	1	0	4	4
	PIT18E55	Network Protocols					
	PIT18E56	Software Project Management					
Non - Major Elective		open elective – I	1	0	1	2	2
Supportive course	PIT18206	Information Literacy and Software Documentation with Research Tool (Internal Evaluation)	1	0	1	2	2
		Total	14	6	10	30	24

SEMESTER III

CAREER STREAM TITLE	COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	Credit
Compulsory Core	PIT18301	Mobile Application Development	4	1	0	5	4
	PIT18302	Python	4	1	0	5	4
	PIT18303	Enterprise Resource Planning	3	1	0	4	4
Compulsory Laboratory	PIT18304	Mobile Application Development Laboratory	0	0	4	4	2
	PIT18305	Python Lab	0	0	4	4	2
Skill Based Elective	PIT18E57	Business Intelligence	3	1	0	4	4
	PIT18E58	Cryptography and Network Security					
	PIT18E59	Object Oriented Analysis and Design					
Non - Major Elective		open elective – II	1	0	1	2	2
Supportive course	PIT18306	Mini Project	1	0	1	2	2
		Total	14	6	10	30	24

SEMESTER IV

CAREER STREAM TITLE	COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	Credit
Major Core Project	PIT18401	Industrial Project	0	0	30	30	14
		Total			30	30	14
		Total Credits = 84					

SEMESTER-I

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18101	ADVANCED DATA STRUCTURES	4	1	0	5	5

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
At the end of this course the learner is expected:						
1.	To gather extensive knowledge in Data Structures.	a	c			
2.	To improve the problem solving quality using data structure techniques.	a	b	i		
3.	To strengthen the knowledge in algorithms.	a	b	j	i	

UNIT I - LINEAR DATA STRUCTURES

(15 Hours)

Algorithm Analysis – Asymptotic Notations - Introduction - Abstract Data Types (ADT) – Arrays – Stack – Queue – Circular Queue - Applications of stack ,queue – Infix to postfix conversion – evaluation of expression – Linked Lists – Doubly Linked lists – Applications of linked list.

UNIT II - TREE STRUCTURES

(15Hours)

Need for non-linear structures – Trees and its representation – Binary Tree – expression trees –Binary tree traversals – Data structures for general trees – applications of trees – Huffman Algorithm - Binary search tree.

UNIT III - BALANCED SEARCH TREES, SORTING AND INDEXING

(15 Hours)

AVL trees –B-Trees - Sorting – Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing - Hashing functions - Collision Resolution Techniques - Separate chaining - Open addressing - Multiple hashing.

UNIT IV - GRAPHS

(15 Hours)

Definitions – Representation of graph - Graph Traversals - Applications of graphs - Topological sort – Shortest path algorithms – Minimum cost spanning tree – Prim's and Kruskal's algorithms..

UNIT V - ALGORITHMS

(15Hours)

Divide and Conquer: Binary Search - Greedy Algorithm: Knapsack Problem – Dynamic Programming: Multistage Graph – Backtracking: Sum of Subset Problem – Branch and Bound: Travelling Salesman Problem.

TEXT BOOKS:

1. Anany Levitin (2011), "Introduction to the Design and Analysis of Algorithms", Addison Wesley Professional. (Unit I).
2. Seymore Litschutz, Schaum Outline, "Data Structures", Adapted by G.A.V PAI, McGrawHill. (For Units II to V).

REFERENCE BOOKS:

1. Q. Ashton Acton (2013), "Algorithms-Advances in Research and Application", Scholarly Editions.
2. Stefan Brandle, Jonathan Geisler, James Roberge, David Whittington (2008), "C++ Data Structures".

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18102	ADVANCED JAVA PROGRAMMING	4	1	0	5	5

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
At the end of this course the learner is expected:						
1.	To be familiarize with Advanced Concepts of Java like Swing and RMI	a	c			
2.	To understand the Java Servlets and Database connectivity.	a	b	i		

UNIT I - APPLICATIONS IN DISTRIBUTED ENVIRONMENT (15 Hours)

Remote method invocation – Activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming services – CORBA programming models – JAR file creation.

UNIT II - DATABASE ACCESS AND SERVLET PROGRAMMING (15 Hours)

Database Access: Overview of JDBC, JDBC Drivers, Connecting to a Database, Statement Interfaces, ResultSets, Using MetaData.

Servlet – Introduction – Types : Generic Servlet, HttpServlet – Servlet Life Cycle – Servlet Classes: Servlet, ServletRequest, ServletResponse, ServletContext, ServletConfig – Single Thread Model – Session Tracking: Cookies, URL Rewriting, Hidden Fields, The Session API

UNIT III - JSP and XML

(15 Hours)

JSP: JSP Overview, How JSP works, Components of a JSP page, Implicit objects, RequestDispatching: Anatomy of Request Processing, Include Directive, JSP:include Action, Forwarding Requests, RequestDispatcherObject, Model1 Vs Model2. JSP and Java Bean: Java Bean, JSP Actions, JSP and XML: XML Overview, XML Parsers, XSL Transformations with XSLT.

UNIT IV - ENTERPRISE APPLICATIONS

(15 Hours)

EJB Architecture: Logical Architecture, Software Architecture,-View of EJB Conversation - Building and Deploying EJB's, - Roles in EJB- EJB Session Beans: constraints on session beans, Life Cycle with example- EJB Entity Beans: When to use Entity Bean, Bean-Managed Versus Container-Managed Persistence, primary keys, Entity Bean Life Cycle, Example: Container Managed Persistence, Bean-Managed persistence- Message Driven Beans: Life Cycle.

UNIT V - INTEGRATING SERVLETS AND JSP: MVC ARCHITECTURE (15 Hours)

Understanding the need for MVC – frameworks, implementing MVC with request dispatcher – defining Beans to represent the data, writing servlets to handle requests, populating Beans, storing the results, forwarding the requests, summarizing the MVC code, interpreting relative URL, three data sharing approaches, forwarding requests from JSP pages

TEXT BOOKS:

1. Elliott Rusty Harold, (2013), “Java Network Programming”, O'Reilly Publishers. (For Unit I to III)
2. Antonio Goncalves, (2010), “Beginning Java EE 6 Platform with Glass Fish 3”, Apress, Second Edition. (For Units IV to V)

REFERENCE BOOKS:

1. Phil Hanna, “JSP: The Complete Reference”, Osborne/Tata McGraw-Hill
2. Ed Roman,(2009), “Mastering Enterprise Java Beans”, John Wiley and Sons Inc.
3. Tom Valesky, (2008), “Enterprise Java Beans”, Addison-Wesley.
4. Marty Hall, Larry Brown, (2004), “Core Servlets and Java Server Pages”, II Edition, Pearson Education.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18103	WEB TECHNOLOGY	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES			Student Outcomes			
At the end of this course the learner is expected:						
1.	To familiarize basics of Internet.	a	c			
2.	To manage the Web designing and uploading.	a	b	i		
3.	To understand various scripting languages like Java scripting and VB scripting.	a	c	i		

UNIT I - INTERNET CONCEPTS

(12 Hours)

Fundamental of Web ,History of Web, Web development overview, Domain Name System (DNS), DHCP,and SMTP and other servers ,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture and protocol (IP) ,Web Browser and Web Server.

UNIT II - HTML and DHTML

(12 Hours)

HTML Tag, Rules of HTML, Text Formatting & Style, List, Adding Graphics to Html Document, Tables and Layout, Linking Documents, Frame, Forms, Project in HTML, Introduction to DHTML, CSS, Class & DIV, External Style Sheet.

UNIT III - JAVA SCRIPT AND VB SCRIPT

(12 Hours)

Java Script (JS) in Web Page, Advantage of Java Script, JS object model and hierarchy ,Handling event, Operators and syntax of JS, Function, Client side JS Vs Server side JS ,JS security Introduction to VB Script, Operator & Syntax of VB Script, Dialog Boxes, Control & Loop, Function in VBS.

UNIT IV - XML

(12 Hours)

Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema ,XSLT ,DOM

structure model ,XML quires and transformation .

UNIT V - JQUERY

(12 Hours)

Introduction to jQuery : What Does jQuery Do for Me?, Obtaining jQuery, Installing jQuery - Selecting and Filtering : Using the Selectors API, Filtering a Selection, Searching within a Selection with find method, Finding an Element's Siblings with siblings method, Searching Ancestors Using the parents and parent Methods - Events - Filtering Selections and Arrays : Basic Iteration, Filtering Selections and Arrays - jQuery CSS : CSS Method, The outer Width and outer Height Methods – jQuery Effects : Showing and Hiding Elements, Sliding Elements, Fading Elements, Custom Animation.

TEXT BOOKS:

1. Margaret Levine Young, "Internet-The Complete Reference", McGraw Hill, 2nd Edition (For Unit I to III)
2. Jon Duckett, (2005), "Web Programming with HTML, CSS and JavaScript", Wiley Publishing. (For Unit IV to V)

REFERENCE BOOKS:

1. Sean, "XML By Example".
2. Flanagan .O, "Java Script :The Definite Guide "
3. "Mastering VB Script", BPB Publication
4. Jack Franklin, (2013), "Beginning JQuery", APRESS.
5. Adam Boduch,(2013), JQuery UI Cookbook".

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18104	ADVANCED JAVA PROGRAMMING LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To be familiarize with Advanced Concepts of Java like Swing and RMI	a	c			
2.	To understand the Java Servlets and Database connectivity.	a	b	i		
3.	To learn about the networking principle and implementation	a	i	l		

EXERCISES

- Create a distributed application to download various files from various servers using RMI.
- Typical experiment to investigate the use of CORBA technology with Java.
- Create a GUI based application which can demonstrates the use of JDBC for Database Connectivity
- Create a GUI based application which can use for database modification using JDBC
- Web Application Using Servlet
 - HTTP handling (Get Request and post request)
 - Create telephone Bill table
 - Use GET and POST method to interact with the telephone table.
 - Session and cookies
 - Create web page calculate hit count using session and cookies.
 - Applet to Servlet communication
 - Create applet to enter query.
 - Execute query using Servlet.
 - Program that demonstrates the use of session management. .
- Web Application using JSP
 - Use Bean Methods
 - Create Bean for Banking Transaction using Java
 - Interact the Bean Using JSP
 - Shopping cart using session
 - Create shopping cart for Book Shop
 - Session maintained in the web page.
- Create a JSP based Web application which allows the user to edit his/her database Information.
- An EJB application that demonstrates Session Bean.
- An EJB application that demonstrates Entity Bean.
- An EJB application that demonstrates MDB.
- MVC Architecture

- (i) Implementing MVC with Request Dispatcher
- (ii) Data Sharing Approaches

Other than these possible lab exercises related to syllabus can also be included.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18105	WEB TECHNOLOGY LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To provide knowledge on Internet and its related concepts.	a	c			
2.	To enrich the knowledge of scripting languages.	a	b	i		
3.	To enable the learner to become a Web Designer.	a	i	l		

EXERCISES

HTML

1. Creating HTML page and Run
2. Font tag, colors and images
3. Hyperlinks, Lists in HTML
4. Tables
5. Physical and Logical Tags
6. Forms Controls
7. Frames with tags
8. CSS – Format all web pages in the common format using CSS

JAVA SCRIPT

1. Data types and variables, operators
2. Conditional Statements and Looping
3. Functions
4. Strings, Date and Time
5. Array and Math
6. Cookies
7. Debugging JavaScript
8. Handling Mouse Events
9. Develop Digital Clock & Calculator
10. Web Page with forms and Validations
11. Authentication and Verifications
12. Events Handling

VBSCRIPT

1. Data Types & Variables
2. Procedures, Conditional, Looping
3. Functions, Date, Time
4. Constants, Events, Methods, Objects, Operators
5. Validation
6. Error Handling

JQUERY

1. Obtaining and installing jQuery
2. Selectors
3. Events
4. Effects
5. Callback
6. HTML
7. CSS

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E51	DSTRIBUTED OPERATING SYSTEM	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
At the end of this course the learner is expected:						
1.	To provide knowledge on OS and its related concepts.	a				
2.	To enrich the knowledge of new operating systems.	a	b	i		
3.	To strengthen the knowledge in OS algorithms.	a	c	i		

UNIT I – INTRODUCTION: (12 Hours)

Introduction - Examples of distributed system - Resource sharing - Challenges Operating System Structures, Review of structures: monolithic kernel, layered systems, virtual machines. Process based models and client server architecture; The micro-kernel based client-server approach, Communication

UNIT II - TYPES OF OS: (12 Hours)

Inter-process communication , Remote Procedure Call, Remote Object Invocation, Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT. Theoretical Foundations Introduction. Inherent Limitations of distributed Systems. Lamport's Logical clock. Global State Distributed Mutual Exclusion

UNIT III - PROCESS MANAGEMENT : (12 Hours)

Classification of distributed mutual exclusion algorithm. NonToken based Algorithm: Lamport's algorithm, Ricart-Agrawala algorithm. Token based Algorithm: Suzuki-Kasami's broadcast algorithm. Distributed Deadlock Detection Deadlock handling strategies in distributed systems. Control organizations for distributed deadlock detection. Centralized and Distributed deadlock detection algorithms: Completely Centralized algorithms, path pushing, edge chasing, global state detection algorithm.

UNIT IV – PROTECTION AND SECURITY: (12 Hours)

Requirements for protection and security regimes. The access matrix model of protection. System and user modes, rings of protection, access lists, capabilities. User authentication, passwords and signatures. Use of single key and public key encryption. Distributed file systems

UNIT V – DISTRIBUTED FILE SYSTEM:**(12 Hours)**

Issues in the design of distributed file systems: naming, transparency, update semantics and fault resilience. Use of the Virtual File System layer. Examples of distributed systems including SunNFS, the Andrew filestore, CODA file system and OSF DCE. Distributed Shared Memory Architecture and motivations. Algorithms for implementing DSM. Memory Coherence CORBA

BOOKS:

1. Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms, PHI (UNIT I –III)
2. Singhal Mukesh & Shivaratri N. G., Advanced Concepts in Operating Systems, TMH (UNIT IV –V)

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E52	COMPUTER NETWORKS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn the fundamental concepts of computer networking.	a	c			
2.	To familiarize the student with the basic taxonomy and terminology of the computer networking area.	a	b	i		
3.	To allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks. □	a	c	i		

UNIT I - INTRODUCTION TO COMPUTER NETWORKS**(12 Hours)**

History and Need for Networking - Service Description – Connectionless and Connection-Oriented Services – Circuit and Packet Switching – Access Networks and

Physical Media – Wireless Links and Characteristics – OSI Reference Model - Service Models –Ad-hoc network, GPS, Sensor network.

UNIT II - APPLICATION LAYER

(12 Hours)

Principles of Network Applications – The Web and HTTP – FTP – Electronic Mail – SMTP – Mail Message Formats and MIME – DNS – Socket Programming with TCP and UDP. Multimedia Networking: Internet Telephony – RTP – RTCP – RTSP. Network Security: Principles of Cryptography – Firewalls – Application Gateway – Attacks and Counter measures.

UNIT III - TRANSPORT LAYER

(12 Hours)

Transport Layer Services – Multiplexing and Demultiplexing – UDP – Reliable Data Transfer – Go-Back-N and Selective Repeat. Connection-Oriented Transport: TCP – Segment Structure – RTT estimation – Flow Control – Connection Management – Congestion Control – TCP Delay Modeling – SSL and TLS. Integrated and Differentiated Services: Intserv– Diffserv.

UNIT IV - NETWORK LAYER

(12 Hours)

Forwarding and Routing – Network Service Models – Virtual Circuit and Datagram Networks – Router – Internet Protocol (IP) – IPv4 and IPv6 – ICMP – Link State Routing – Distance Vector Routing – Mobile IP

UNIT V - LINK LAYER

(12 Hours)

Layer Services – Error Detection and Correction Techniques – Multiple Access Protocols – Link Layer Addressing – ARP – DHCP – Ethernet – Hubs, Bridges, and Switches –PPP. Ring Topology - Physical Ring – Logical Ring.

TEXT BOOKS:

1. James F. Kurose and Keith W. Ross (2006), “Computer Networking: A Top-Down Approach Featuring the Internet”, 3rd Edition, Pearson Education.
2. Andrew S. Tanenbaum (2003), “Computer Networks”, 4th edition, Prentice-Hall of India.

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie (2007), “Computer Networks: A Systems Approach”, 4th edition, Elsevier Publishing.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E53	SOFTWARE ENGINEERING	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To classify the various Software Process Models	a	c			
2.	To build an Analysis Model and subsequently architect a suitable design	a	b	i		
3.	To understand Testing Strategies and Testing Tactics	a	c	i		

UNIT I - INTRODUCTION TO SOFTWARE ENGINEERING (12 Hours)

Basic Concept about Software Engineering, Professional and ethical responsibility - Socio-technical Systems: Emergent system properties, Systems engineering, Organizations, people and computer systems, Legacy systems - Critical Systems: A simple safety-critical system - Software Processes: Software process models - Process iteration - Process activities - Rational Unified Process - Computer-aided software engineering - Project Management: Management activities - Project planning - Project scheduling - Risk management.

UNIT II - REQUIREMENTS ENGINEERING AND ANALYSIS MODEL (12 Hours)

Software Requirements: Functional and non-functional requirements - User requirements - System requirements - Interface specification - Software Requirements Document - Requirements Engineering Process: Feasibility studies - Requirements elicitation and analysis - Requirements validation - Requirements management - System Models: Context models - Behavioral models - Data Models - Object models - Structured methods.

UNIT III - DESIGN ARCHITECTURAL DESIGN (12 Hours)

Architectural design decision, System organization, Decomposition styles, Control styles, Reference architectures - Distributed Systems Architecture: Multiprocessor architectures, Client-server architectures, Distributed object architectures - Application Architectures: Data processing systems - Transaction processing systems - Object-oriented Design: Objects and object classes - An object-oriented design process- Design evolution - User Interface Design : Design issues - User interface design process-User analysis - User interface prototyping - Interface evaluation.

UNIT IV - SOFTWARE DEVELOPMENT AND TESTING (12 Hours)

Rapid Software Development: Agile methods, Extreme programming, Rapid application development, and Software prototyping - Component-based Software Engineering: Components and component models -The CBSE process - Component composition. - Verification and Validation: Planning Verification and validation, Software inspections, Automated static analysis, Verification and formal methods - Software Testing: System testing, Component testing, Test case design, Test automation.

UNIT V - MANAGEMENT, QUALITY AND CONFIGURATION (12 Hours)

Managing People: Selecting staff, Motivating people, Managing groups, People Capability Maturity Model - Software Cost Estimation: Software productivity, Estimation techniques, Algorithmic cost modeling, Project duration and staffing - Quality Management: Process and product quality - Quality assurance and standards- Quality planning- Quality control- Software measurement and metrics - Configuration Management: Configuration management Planning - Change management - Version and release management- System building- CASE tools for configuration management.

TEXT BOOKS:

1. Ian Sommerville (2004), "Software Engineering", 7th Edition, Addison Wesley.(For Units I to III)
2. Roger Pressman (2005), "Software Engineering A practitioner's Approach", 6th Edition, McGraw-Hill International Edition.(For Units IV to V)

REFERENCE BOOKS:

1. Pankaj Jalote (1997), "An Integrated Approach to Software Engineering", Second Edition, Narosa Publishing House.
2. Richard Fairley (2004). "Software Engineering Concepts", Tata McGraw Hill Edition.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test	Model Examination	Assignment	Attendance	Total

			II				
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18106	LINUX BASED LATEX LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To provide knowledge on Latex and its related concepts.	a	c			
2.	To provide knowledge on Latex and its related concepts.	a	b	g	i	
3.	To enable the learner to prepare manuscripts towards the submission of journal publications To enrich the knowledge of document handling.	a	c	i	j	l

Exercises

1. Creating presentation using Beamer tool
2. Create Latex basic Document.
3. Adding Mathematical Symbol in Latex Editor.
4. Create a table, Brackets and tables in Latex.
5. Adding enumerate List and add an elements in it.
6. Text and document formatting
7. Creating Package
8. Adding Macros
9. Add graphics in Latex Document
10. Calculus notation in Latex Document

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total

	Marks	10	10	15	15	50
Total						100

SEMESTER II

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18201	OPEN SOURCE TECHNOLOGIES	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To develop knowledge on dynamic objects, Graphical, Database objects used in Web sites.	a	c			
2.	To understand the advanced dynamic web page development.	a	b	i		
3.	To enable the learner for aiming careers in PHP Programming and content management.	a	c	i	l	

UNIT I - BASIC PHP (15 Hours)

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

UNIT II - ADVANCED PHP with MySQL (15 Hours)

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

UNIT III - ADVANCED PHP with AJAX, SEO and CMS (15 Hours)

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

UNIT IV - BASIC PERL (15 Hours)

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

UNIT V - ADVANCED PERL (15 Hours)

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

TEXT BOOKS:

1. Mehdi Achour, Friedhelm, Betz Antony Dovgal, Nuno Lopes, Hannes Magnusson, Georg Richter, Damien Seguy, Jakub Vrana And several others, (1997-2011), "PHP Manual (Download the manual from PHP official website www.php.net)", The PHP Documentation Group. (For Units I to III)
2. Lee Babin,(2007), "Beginning Ajax with PHP From Novice to Professional", Apres., (For Units IV to V)

REFERENCE BOOKS:

1. Jaimie Sirovich and Cristian Darie, (2007), "Professional Search Engine Optimization with PHP A Developer's Guide to SEO", Wiley Publishing, Inc., Indianapolis, Indiana.
2. Randal L. Schwartz, Tom Phoenix, brian d foy, "Learning Perl, Fifth Edition.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18202	DATA MINING AND DATA WAREHOUSING	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
At the end of this course the learner is expected:						
1.	To gain knowledge in the areas of datamining.	a	c			
2.	To understand datawarehousing technology and designing database for building applications for the current trend.	a	c	i		
3.	To analyze a business situation and build suitable database applications.	a	c	i	j	

UNIT I – INTRODUCTION TO DATAMINING (15 Hours)

Introduction to Data Mining -Data and large datasets- Basic Data Mining Tasks- DM versus Knowledge Discovery in Databases - Data Mining Issues- Data Mining Metric - Social Implications of Data Mining- Overview of Applications of Data Mining.

UNIT II – DATA WAREHOUSING (15 Hours)

Introduction to Data Warehousing- Architecture of DW- OLAP and Data Cubes- Dimensional Data Modeling-star, snowflake schemas- Data Preprocessing – Need, Data Cleaning, Data Integration &Transformation - Data Reduction - Overview of Machine Learning

UNIT III – DATA MINING TECHNIQUES (15 Hours)

Frequent item-sets and Association rule mining: Apriori algorithm -Use of sampling for frequent item set - FP tree algorithm - Graph Mining: Frequent sub-graph mining - Tree mining – Sequence Mining

UNIT IV – CLASSIFICATION (15 Hours)

Introduction -Supervised Vs Unsupervised classifications - Decision tree learning- Construction, performance, attribute selection Issues: Over-fitting, tree pruning methods, missing values, continuous classes-Classification and Regression Trees (CART)-Inference- Linear classifier - Least squares classifier- Bayesian classifier.

UNIT V – CLUSTERING (15 Hours)

Introduction to clustering - k-means- Expectation Maximization (EM) algorithm- Prediction: Linear regression-Non-linear regression- Accuracy Measures : Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap- Brief overview of advanced techniques: Active learning - Reinforcement learning- Text mining

Text Books:

1. Han, Kamber “Data Mining: Concepts and Techniques” Morgan Kaufmann.
2. Romez Elmasri, Shamkant B.Navathe, “Fundamentals of Database Systems” Pearson Education
3. Margaret H. Dunham, S. Sridhar, Data Mining – Introductory and Advanced Topics, Pearson Education
4. Tom Mitchell, —Machine LearningII, McGraw-Hill, 1997

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%

Total	100%
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COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18203	BIG DATA ANALYTICS	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the analytic basics	a	c			
2.	To understand the basics of Hadoop, MapReduce,	a	b	i		
3.	To understand how the analysis of data derives from the statement of a research problem or hypothesis and the availability of empirical data.	a	c	i	j	

UNIT I - INTRODUCTION TO BIG DATA

(12 Hours)

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools

UNIT II - STATISTICAL DATA ANALYSIS

(12 Hours)

Parameter and Statistic- Sampling Distribution- Meaning-Standard Error and its uses. Tests of Significance- Null and Alternative Hypotheses. Type-I and Type-II Error-Critical Region and Level of Significance. One tailed and Two tailed Tests. Critical values or Significant values. Tests of Significance for Large Samples- Test of Significance for Single Proportion- Test of Significance for Difference of Proportions- Test of Significance for Single Mean- Test of Significance for Difference of Means. Chi-Square Distribution – Definition- Applications of Chi-Square Distribution- To test the goodness of fit.- To test the independence of Attributes. Student's "t" -Distribution- Definition- Applications of Student's "t" –Distribution- To test for Single Mean- To test for Difference of Means F-Distribution- Definition- To Test for Equality of Two Population variances. Meaning of Resampling and its uses - Cross Validation - Jackknife and Bootstrap - Prediction Error and its uses.

UNIT III - HADOOP

(12 Hours)

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS- Java interfaces to HDFS- How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution – Map Reduce Features

UNIT IV - HADOOP ENVIRONMENT**(12 Hours)**

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance

UNIT V - FRAMEWORKS**(12 Hours)**

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper.

TEXT BOOKS:

1. Michael Berthold, David J. Hand, (2007), "Intelligent Data Analysis", Springer. (For Unit I)
2. RSN Pillai, Bagavathi, "Statistics Theory and Practice", S.Chand (For Unit II)
3. Tom White (2012), "Hadoop: The Definitive Guide" Third Edition, O'reilly Media (For Unit III to V)

REFERENCE BOOKS:

1. Anand Rajaraman and Jeffrey David Ullman, (2012) "Mining of Massive Datasets", Cambridge University Press.
2. Viktor Mayer, Schonberger, Kenneth Cukier, "Big Data : A Revolution That Will Transform How We Live, Work and Think".

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18204	OPEN SOURCE TECHNOLOGIES LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES					Student Outcomes		
At the end of this course the learner is expected:							
1.	To create dynamic Web pages and web platform	a	c	I			

	Applications and understand Open source communities					
2.	To create and to use Graphical, Database objects for interactive web applications such as Cloud solutions	a	b	i		

EXERCISES

1. Write a PHP program to store current date-time in a COOKIE and display the "Last visited on" date-time on the web page upon reopening of the same page.
2. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
3. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
4. Develop a online shopping cart application using PHP and My Sql
5. Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc.
6. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
7. Write perl program using input and output statements to verify password.
8. Write Perl program for
9. String manipulation
10. Arrays
11. Hashing
12. Implement Smart Matching and Process Management using Perl.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18205	DATA MINING LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To create data warehouse using DW software package	a	c	i		
2.	To implement case study using data mining software	a	b	i		

EXERCISES

1. Creation of a Data Warehouse.
2. Apriori Algorithm.
3. Decision Tree.
4. Bayesian Classification.
5. K-means clustering.
6. Linear Regression
7. A Case Study on Text Mining.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E54	CLOUD COMPUTING	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the basic concepts on cloud computing.	a	c			
2.	To attain the knowledge on the reason for migration	a	b	i	i	

	on cloud.					
3.	To acquire the clear idea about the working principles of cloud computing	a	c	g	i	j

UNIT I - CLOUD COMPUTING BASICS

(12 Hours)

Cloud Computing Overview- Applications – Intranets and the cloud – Why Cloud Computing Matters – Benefits – Limitations – Companies in the Cloud Today – Cloud Services.

UNIT II - CLOUD COMPUTING TECHNOLOGY

(12 Hours)

Hardware and Infrastructure – Clients – Security- Network – Services – Accessing the Cloud - Platforms – Web Applications – Web APIs –Web Browsers –Cloud Storage – Overview – Cloud Storage Providers –Standards – Application – Client – Infrastructure – Service.

UNIT III - CLOUD COMPUTING AT WORK

(12 Hours)

Software as a service – Overview – Driving Forces – Company offerings – Industries – Software plus Services – Overview - Mobile Device Integration –Providers – Microsoft Online.

UNIT IV - DEVELOPING APPLICATIONS

(12 Hours)

Google – Microsoft – Intuit Quick Base – Cast Iron Cloud – Bungee Connect - Local clouds and Thin Clients – Virtualization – Server Solutions – Thin Clients.

UNIT V - MIGRATING TO THE CLOUD

(12 Hours)

Cloud Services for Individuals – Cloud services aimed at the mid-market –Enterprise-Class Cloud Offerings – Migration.

TEXT BOOK

1. Velte T. Antony, Velte J. Toby. and Elsen Peter Robert (2010), "Cloud Computing: A Practical Approach", Tata McGraw- Hill (For Unit I to V)

REFERENCES

1. Miller Michael (2008), "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing.
2. Beard Haley (2008), "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pvt. Limited.

Course Nature : Theory
Assessment Method (Max.Marks: 100)

In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E55	NETWORK PROTOCOLS	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To Know which protocols are part of the TCP/IP protocol suite	a	c			
2.	To Understand how each protocol fits into the Internet Protocol Stack and the OSI Model	a	b	g	i	
3.	To Understand how the protocols relate to one another	a	c	i	j	l

UNIT I - FUNDAMENTALS OF NETWORKING STANDARDS AND PROTOCOLS

(12 Hours)

Network Communication Architecture and Protocols - OSI Network Architecture seven Layers Model - Definition and Overview of TCP/IP Protocols -TCP/IP Four Layers Architecture Model - Other Network- Architecture Models: IBM SNA.

UNIT II - ROUTED AND ROUTING PROTOCOLS

(12 Hours)

Application Layer Protocols-Presentation Layer Protocols- Session Layer Protocols - Transport Layer -Protocols - Network Layer Protocols - Data Link Layer Protocols - Routing Protocols - Multicasting Protocols - MPLS.

UNIT III - ISDN AND NETWORK MANAGEMENT PROTOCOLS

(12 Hours)

Overview of ISDN – Channels – User access Protocols - Network management requirements – Network monitoring – Network control – SNMP V1, V2 and V3 – Concepts, MIBs –Implementation issues-RMON.

UNIT IV - SECURITY AND TELEPHONY PROTOCOLS

(12 Hours)

Network Security Technologies and Protocols - AAA Protocols - Tunnelling Protocols - Security Protocols- Private key encryption – Data encryption system, public key encryption – RSA – Elliptic curve cryptography – Authentication mechanisms– Web security -Secured Routing Protocols - IP telephony -Voice over IP and VOIP Protocols –Signalling Protocols- Media/CODEC.

UNIT V - NETWORK ENVIRONMENTS AND PROTOCOLS (12 Hours)

Wide Area Network and WAN Protocols - Frame relay - ATM - Broadband Access Protocols -PPP Protocols - Local Area Network and LAN Protocols - Ethernet Protocols - Virtual LAN Protocols - Wireless LAN Protocols - Metropolitan Area Network and MAN Protocol - Storage Area Network and SAN Protocols.

TEXT BOOKS:

1. Javvin, (2005), "Network Protocols" , Javvin Technologies Inc , II Ed. (For Unit I to III)
2. William Stallings, (2000), "Cryptography and Network Security", PHI. (For Unit IV to V)

REFERENCE BOOKS:

1. Mani Subramanian, (2000), "Network Management–Principles and Practices", Addison Wesley.
2. William Stallings, (1999), "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley. William Stallings, (1999), "Data and Computer Communications", 5th Edition, PHI.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

3.

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18E56	SOFTWARE PROJECT MANAGEMENT	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand software process patterns, frameworks, and the need for assessing the software.	a	c			
2.	To understand the need for time management in developing a software and the software quality	a	b	i	j	

UNIT I : INTRODUCTION TO SOFTWARE ENGINEERING (12 Hours)

Evolving role of software –Legacy Software –Software Myths -A Generic View of Process: Software Engineering-Layered technology – Process framework –CMMI – Process Patterns – Process Assessment – Personal and Team Process Models – Process Technology – Product and Process.

UNIT II - PERSONAL SOFTWARE STRATEGY (12 Hours)

Personal Software Process strategy- the logic for a software engineering discipline – Software process– Process Maturity –Logic & productivity of PSP -Baseline process – PSP process elements – PSPO process, measures & project plan summary – Time & Defect recording log –Measurement overview – Fundamental process measures – Goal-Question-Metric Paradigm – General PSP objectives, Goals and questions – GQM example – Gathering data — Establishing a baseline for your personal process.

UNIT III - PLANNING PROCESS (12 Hours)

Planning process- Contents of a software plan – Planning a software project – Producing a quality plan - Measuring software size - Size measures & framework – Establishing a counting standard – Using LOC counts & counters – Reuse considerations – Line of code Accounting – Calculating Productivity–Estimating software size: Background – Popular estimating methods – Proxy-based estimating – the PROBE size estimating method – Object categories – Estimating considerations - Resource and schedule estimating: Resource planning – Estimating development time – Combining multiple estimates – Using multiple regression – Schedule Estimating – Earned value tracking – Estimating accuracy

UNIT IV- SOFTWARE DESIGN & QUALITY

(12 Hours)

Design and code reviews- Personal reviews – Reviews principles –Design review principles – Review measures – Check lists –Relationship between reviews and inspections -Software Quality Management–Economics of software quality– Developing a quality strategy–Process Benchmarking – Yield Management – Defect removal strategies – Defect prevention strategies - Design process – Design quality – Structuring the design process–Design notation–Design Templates–Functional specification template – State specification template – Logic specification template – Operational scenario template – Using templates in design – Design Guidelines

UNIT V - SOFTWARE VERIFICATION

(12 Hours)

Design Verification– Design standards – Verification methods – Verifying the object state machine – Program tracing – Verifying program correctness – Comments on verification methods -Scaling up the personal software process: Using abstractions – Stages of product size – Developing large-scale programs – Potential problem with abstractions – Development strategy – PSP3 -Defining the software process– Software process basics – Process definition – Defining process phases – Process development considerations – Process evolution – Development Process.

TEXT BOOKS:

1. Roger S Pressman, (1997), "Software Engineering", 4th Edition, McGraw Hill International Edition. (Unit I)
2. Watts S. Humphrey, (2001), "A Discipline for Software Engineering", Pearson Education. (Units II – V)

REFERENCE BOOKS:

1. Watts S. Humphrey, (2005), "A Self-Improvement Process for Software Engineers", Addison Wesley Professional.
2. Watts S. Humphrey, (1996), "Using a defined and measured Personal Software Process", IEEE Software.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18206	INFORMATION LITERACY AND SOFTWARE DOCUMENTATION WITH RESEARCH TOOL (Internal Evaluation)	1	0	1	2	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To recognize when information is needed and have the ability to locate evaluate and use effectively	a	c	g	i	l
2.	To Understand the economic, legal, and social issues surrounding the use of informationethically and legally	a	b	f	g	m
3.	To use the research tool as per their study	a	c	i	j	k

Reference:

1. Information Literacy Competency Standards for Higher Education, American Library Association, 2000. <http://www.ala.org/acrl/ilcomstan.html>.

Research Tool

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart

Text Book

1. Bansal R.K, Goel A.K., Sharma M.K., "MATLAB and its Applications in Engineering", Pearson Education, 2012.

Course Nature : Project							
Assessment Method (Max.Marks: 100)							
In Semest er	Assessme nt Tool	Docume ntation	Literatur e survey	Review 1	Review 2	Review 3	Tota l
	Marks	30	25	15	15	15	100 %

SEMESTER III

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18301	MOBILE APPLICATION DEVELOPMENT	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn and apply software patterns for the development of the application models described above.	a	c			
2.	To learn and work within the capabilities and limitations of a range of mobile computing devices.	a	b	i	l	
3.	To design and implement and deploy mobile applications using an appropriate software development environment.	a	c	i	j	

UNIT I - INTRODUCTION TO MOBILE DEVELOPMENT (12Hours)

What is mobile computing? History of mobile environments – early mobile phones to smart phones and tablets, Development for mobile environments, Differences from traditional application development, Trends in mobile development.

UNIT II - MOBILE DEVELOPMENT (12Hours)

Introduction, Advantages, Limitations, Features useful for mobiles – Geolocation, offline web applications, offline web storage, animations, 2D/3D graphics, Audio/Video etc. , Frameworks -HTML5 , Phone Gap (Apache Cordova) framework and jQuery Mobile framework.

UNIT III - INTRODUCTION TO ANDROID (12Hours)

Android Overview -- Features, Architecture, Applications, Application frameworks, Libraries, Runtime, Kernel, Android Ecosystem – Application stores, publishing, Android Development Tools – Android SDK, Android emulator, Development on hardware devices

UNIT IV - BASIC ANDROID DEVELOPMENT (12Hours)

Writing Android Applications, Activity Lifecycle, Multi device support, Fragments, Data storage, Intents, Data sharing, Audio playback, Photo capture

UNIT V - ADVANCED ANDROID DEVELOPMENT (12 Hours)

Animations. OpenGL ES, Wireless connections, Data syncing, Location aware applications, Best practices for development, Security, Distribution and Monetizing

TEXT BOOKS:

1. Ed Burnette, (2010) "Hello Android: Introducing Google's Mobile Development Platform", The Pragmatic Programmers, 3rd edition. (For Units I to III)
2. Jeff McWherter and Scott Gowell, (2012)"Professional Mobile Application Development", Wrox. (For Units IV to V)

REFERENCE BOOKS:

1. Charlie Collins, Michael Galpin and Matthias Kappler, (2012), "Android in Practice", DreamTech.
2. James Dovey and Ash Furrow, (2012), "Beginning Objective C", Apress.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of	C
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					LTP	
PIT18302	PYTHON	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the advanced programming concepts.	a	c			
2.	For aiming careers in the current technologies	a	b	i		

UNIT I - INTRODUCTION

(12 Hours)

Introduction to Python - Python's Technical Strengths - Types and Operations - Introducing Python Object Types - Numeric Types - String Fundamentals.

UNIT II – FILE HANDLING

(12 Hours)

Lists and Dictionaries - Tuples, Files - Introducing Python Statements - Assignments, Expressions, and Prints.

UNIT III – CONTROL STRUCTURES

(12 Hours)

if Tests and Syntax Rules - while and for Loops - Iterations and Comprehensions

UNIT IV - FUNCTIONS

(12 Hours)

Functions and Generators - Function Basics – Scopes – Arguments - Advanced Function.

UNIT V - PACKAGES

(12 Hours)

Modules and Packages – Modules - Module Coding Basics - Module Packages - Advanced Module.

TEXT BOOKS:

1. Learning Python - Fifth Edition - Mark Lutz - O'reilly.

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18303	ENTERPRISE RESOURCE PLANNING	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the need for ERP in business	a	c			

2.	To incorporate information technology in business	a	b	i		

UNIT I INTRODUCTION

(12 Hours)

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems.

UNIT II ERP SOLUTIONS AND FUNCTIONAL MODULES

(12 Hours)

Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR, and best business practices - Business process Management, Functional modules.

UNIT III ERP IMPLEMENTATION

(12 Hours)

Planning Evaluation and selection of ERP systems - Implementation life cycle - ERP implementation -Methodology and Frame work- Training – Data Migration - People Organization in implementation-Consultants - Vendors and Employees.

UNIT IV POST IMPLEMENTATION

(12 Hours)

Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation.

UNIT V EMERGING TRENDS ON ERP

(12 Hours)

Extended ERP systems and ERP add-ons –CRM - SCM - Business analytics - Future trends in ERP systems-web enabled - Wireless technologies - cloud computing.

TEXTBOOK

Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2008.

REFERENCES

1. Sinha P. Magal and Jeffery Word, Essentials of Business Process and Information System, Wiley India, 2012
2. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
3. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw- Hill, 2008.
4. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009
5. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.

6. Summer ERP, Pearson Education, 2008

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18304	MOBILE APPLICATION DEVELOPMENT LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	Design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and Views and using Menus.	a	c			
2.	To transfer apps to mobile. Understanding the new technology in java integrated with android.	a	b	i	l	
3.	Exercises using PhoneGap and the Android SDK using various features of Android.	a	c	i	j	

Exercises

Implement the following in the Android Environment

1. List
2. Menu
3. Progress Bar
4. Spinner
5. Rating bar
6. SQLite
7. Text and Password
8. Colors
9. Font
10. Intent
11. Images

12. Audio
13. Video
14. An app can be using created using all the above UI's

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18305	PYTHON LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	1. To create simple programs in the lab using python	a	c			
2.	To transfer apps . Understanding the new technology in python.	a	b	i		

EXERCISES

1. Compute G.C.D of Two Numbers
2. Find the Square root of given Number
3. Find the Exponentiation of the Number
4. Find the maximum of a list of numbers.
5. Find N prime Numbers.
6. Linear Search and Binary Search
7. Insertion Sort and Selection sort
8. Multiplication of two Matrix
9. String Functions.
10. Find the most frequent word in the text file.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT15E57	BUSINESS INTELLIGENCE	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To introduce the idea of decision making in complex industrial and service environments	a	c			
2.	To understand the science behind better predictions and decisions	a	b	i		
3.	To generate an ability to design, analyze and perform experiments on real life problems using various Decision making methodologies.	a	c	i		

UNIT I - INTRODUCTION AND CHARACTERISTICS OF COMPLEX BUSINESS PROBLEMS

(12 Hours)

Introduction to decision making methods, AHP, SAW,VIKOR,WPM MCDM,MADM methods and examples Number of Possible Solutions, Time-Changing Environment, Problem Specific Constraints , Multi-objective Problems , Modeling the Problem, A Real-World Example

UNIT II - ADAPTIVE BUSINESS INTELLIGENCE AND PREDICTION METHODS AND MODELS

(12 Hours)

Data Mining, Prediction, Optimization ,Adaptability,the Structure of an Adaptive Business Intelligence System ,Data Preparation, Different Prediction Methods,

Mathematical Methods, Distance Methods: Logic Methods, Modern Heuristic Methods
Additional Considerations, Evaluation of Models

UNIT III - MODERN OPTIMIZATION TECHNIQUES (12 Hours)

Local Optimization Techniques, Stochastic Hill Climber, Simulated Annealing, Tabu Search, Evolutionary Algorithms, Constraint Handling

UNIT IV- COMPUTATIONAL INTELLIGENCE AND EXPERT TECHNIQUES IN DECISION MAKING (12 Hours)

Design of an expert system for decision making using Neural Network, fuzzy logic and genetic algorithm, Classifiers, Evolutionary Computation: Ant colony optimization, Particle

UNIT V - HYBRID SYSTEMS AND ADAPTIVE BUSINESS INTELLIGENCE MARKETING (12 Hours)

Hybrid Systems for Prediction, Hybrid Systems for Optimization, Adaptability, Campaigns, Manufacturing, Investment Strategies, Emergency Response Services, Credit Card Fraud

TEXT BOOKS:

1. Zbigniew Michalewicz, Martin Schmidt, Matthew Michalewicz, Constantin Chiriac, "Adaptive Business Intelligence", Springer Publications.
2. Venkata Rao, "Decision Making in the Manufacturing Environment: Using Graph Theory and Fuzzy Multiple Attribute Decision Making Methods", Springer publications.
3. Da Ruan, "Computational Intelligence in Complex Decision Systems", Atlantis Press, Amsterdam Press, World Scientific.
4. Hans Jurgен Zimmermann, "Fuzzy sets, decision making and expert system", Kluwer Academic Publishers, Boston
5. B Carlo Vercellis "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT15E58	CRYPTOGRAPHY AND	3	1	0	4	4

	NETWORK SECURITY				
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INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the need for cryptography in networks security	a	c			
2.	To incorporate the learnt concepts in authentication application programs	a	b	i	l	

UNIT I

(12 Hours)

Overview – Symmetric Ciphers: Classical Encryption Techniques

UNIT II

(12 Hours)

Symmetric Ciphers: Block ciphers and Data Encryption Standards. Public-key encryption and Hash Functions: Public-Key Cryptography and RSA

UNIT III

(12 Hours)

Network Security Practices: Authentication applications – Electronic Mail Security

UNIT IV

(12 Hours)

Network Security Practices: IP Security – Web security

UNIT V

(12 Hours)

System Security: Intruders – Malicious Software – Firewalls

TEXT BOOKS:

1. William Stallings, (2003), "Cryptography and Network Security – Principles and Practices", Prentice Hall, Third Edition, (For Unit I to V)

REFERENCE BOOKS:

1. Johannes A, Buchanan, "Introduction to cryptography", Springer Verlag.
2. Atul Kahate, "Cryptography and Network Security", TMH.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT15E59	OBJECT ORIENTED ANALYSIS & DESIGN	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To Develop a working understanding of normal object-oriented analysis and design processes	a	c			
2.	To Develop an appreciation for and understanding of the risks inherent to large-scale software development	a	b	i	j	
3.	To Develop an understanding of the application of OOAD practices from a software project	a	c	i	l	

UNIT I - MODELING IN GENERAL

(12 Hours)

Object Oriented development – Evidence for Usefulness of Object Oriented development - Modeling Concepts: Modeling – Abstraction - The Three Models – Overview of Unified Modeling Language and introduction to UML diagrams.

UNIT II - CLASS MODELING

(12 Hours)

Class Modeling: Object and Class Concepts – Link and Association Concepts - Inheritance - Sample Class Model - Navigation of Class Models - Advanced Class Modeling: Advanced Object & Class Concepts - Association Ends -N-ary Associations – Aggregation - Abstract Classes - Multiple Inheritance –Metadata – Reification – Constraints - Derived Data – Packages.

UNIT III - DYNAMIC MODELING

(12 Hours)

State Modeling: Events – States – Transitions & Conditions - State diagrams - State Diagram Behavior - Advanced State Modeling: Nested State Diagrams - Nested States - Signal Generalization – Concurrency - Sample State Model - Relation of Class & State Models - Interaction Modeling: Use Case Models - Sequence Models - Activity Models - Advanced Interaction Modeling: Use Case Relationships - Procedural Sequence Models - Special Constructs for Activity Models.

UNIT IV - SYSTEM ANALYSIS

(12 Hours)

Process Overview: Development Stages - Development Life Cycle - System Conception: Devising a System Concept - Elaborating a Concept- Preparing a

problem Statement - Domain Analysis: Overview of Analysis - Domain Class Model - Domain State Model - Domain Interaction Model - Iterating the Analysis - Application Analysis: Application Interaction Model -Application Class Model - State Model – Operations.

UNIT V - SYSTEM DESIGN

(12 Hours)

System Design: Overview of System Design - Estimating performance - Making a Reuse plan - Breaking a System into Subsystems - Identifying Concurrency- Allocation of Subsystems - Management of Data Storage - Handling Global Resources - Choosing a Software Control Strategy - Handling Boundary Conditions - Setting Trade-off Priorities - Common Architectural Styles - Architecture of the ATM System - Class Design: Bridging the Gap - Realizing Use Cases - Designing Algorithms - Recursing Downward – Refactoring - Design Optimization - Reification of Behavior -Adjustment of Inheritance – Organizing Class Design.

TEXT BOOKS:

1. Michael Blaha and James Rumbaugh, Object-Oriented Modeling and Design with UML, Prentice Hall of India Private Limited, New Delhi. (For Units I to III)
2. Ali Bahrami, (1999), Object-oriented Systems Development using UML, McGraw Hill, Boston (For Units IV to V) .

REFERENCE BOOKS:

Object-Oriented Modeling and Design with UML, (2006) **Michael** Blaha and James Rumbaugh, Prentice Hall of India Private Limited, New Delhi.

1. Object-Oriented Analysis and Design with Applications (3rd Edition) Grady Booch, Robert A. Maksimchuk, Michael W. Engle.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT18306	MINI- PROJECT	1	0	1	2	2

INSTRUCTIONAL OBJECTIVES				Student Outcomes			
At the end of this course the learner is expected:							
1.	To impelement the concepts studied in the course			a	c		
2.	To develop applications using software engineering			a	b	i	

The Students can choose a topic according to the current trend, select a problem, solve it and show Demonstrations.

Course Nature : Project						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Review 1 (Abstract)	Review 2	Review 3	Attendance	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Report and Presentation	Analysis	Findings and Conclusion	Viva-Voce	Total
	Marks	10	10	20	10	50
Total						100

SEMESTER-IV

COURSE CODE	COURSE TITLE	L	T	P	Total of LTP	C
PIT15401	INDUSTRIAL PROJECT	0	0	30	30	14

INSTRUCTIONAL OBJECTIVES				Student Outcomes			
At the end of this course the learner is expected:							
1.	To implemenent the concepts studied in the course			a	c		
2.	To develop applications using real time experience			a	b	i	

Review

Tentative Dates

Zeroth Review

In 2 Weeks of time

First Review

In 6 Weeks but within
schedule of 1st Assessment

Second Review

In 12 Weeks but within
schedule of 2nd Assessment

Third Review

In 18 Weeks but within schedule
of 3rd Assessment

Viva voce

End of April

Course Nature : Project						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Review 1 (Abstract)	Review 2	Review 3	Attendance	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tool	Report and Presentation	Analysis	Findings and Conclusion	Viva-Voce	Total
	Marks	10	10	20	10	50
Total						100