B. Tech. IT (6th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	**Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BITES1-601	Java Programming	3	0	0	40	60	100	3
BITES1-602	Computer Networks	3	1	0	40	60	100	4
BITES1-603	Computer Networks Laboratory	0	0	2	60	40	100	1
BITES1-604	Java Programming Lab	0	0	2	60	40	100	1
BITES1-605	***Project-I	0	0	4	60	40	100	2
	Departmental Elective-II (choose one)	3	0	0	40	60	100	3
BITED1-611	Software Testing and Quality Assurance							
BITED1-612	Cryptography and Network Security							
BITED1-613	Data warehousing and Data Mining							
BITED1-614	Mobile Communication							
	Departmental Elective-III (choose one)	3	0	0	40	60	100	3
BITED1-621	Information Theory and Coding Techniques							
BITED1-622	Cloud and Virtualization							
BITED1-623	Internet of Things							
BITED1-624	Software Engineering							
XXXXX	**Open Elective****	3	0	0	40	60	100	3
Total		**15**	**1**	**8**	**380**	**420**	**800**	**20**

** Open Elective Subject may be chosen from the list of open electives offered by other departments of university and can also be taken from existing lists of Open Elective-I, Open Elective-II and Open Elective-III subject lists

***Project work, seminar and internship in industry or at appropriate workplace.

JAVA PROGRAMMING

Subject Code- BITES1-601 **L T P C** **Duration – 45 hrs.**
3 0 0 3

COURSE OBJECTIVE

1. To learn the basic and advanced concepts of Java Programming language.
2. To experience the working environment required for programming in Java language and enhances their programming skills.

COURSE OUTCOMES

1. To learn the basics of Java and to understand the implementation of Classes and Inheritance with respect to Java.
2. To describe the concept of handling of exceptions and multithreading.
3. To understand how to implement I/O, Applets and Graphics in Java
4. To comprehend the advanced topics of Java Programming

COURSE CONTENTS

UNIT-I (12 Hrs.)

Introduction to Java: Features of Java, difference between Java and C++, JVM, Byte code, data types, variables, arrays, Type Conversion and Casting.

Classes and Inheritance: Class Fundamentals, methods, constructors, garbage collection, this keyword, Overloading constructors, Nested and Inner classes. Basics and types of inheritance, Method Overriding, Abstract Classes, final keyword, packages and interfaces.

UNIT-II (12 Hrs.)

Exception Handling: Basics, Exception Types, uncaught exceptions, try and catch, throwing exceptions.

Introduction to Multithreading: Java thread model, thread priorities, synchronization, inter thread communication, creating, suspending, resuming threads.

UNIT-III (12 Hrs.)

I/O: Input/ Output, reading and writing files.

Applets and Graphics: Applet basics, Applet class, Applet initialization and termination, event handling, keyboard and mouse events, AWT class, Layout managers, panels, canvases, Frame windows, drawing lines, rectangles, ellipses.

UNIT-IV (9 Hrs.)

Advance Concepts: JDBC Connectivity, Introduction to Java Beans, Java Swings, Java Server Pages.

RECOMMENDED BOOKS

1. Patrick Naughton & Herbert Schildt, ‘The Complete Reference Java 2’, 5th Edn., Tata McGraw Hill, 2002.
2. Balagurusamy, ‘Programming in JAVA’, BPB Publications, 2006.
3. Deitel and Deitel, ‘Java: How to Program’, 10th Edn., Pearson Education, 2014

COMPUTER NETWORKS

Subject Code- BITES1-602 **L T P C** **Duration – 60 hrs.**
3 1 0 4

COURSE OBJECTIVE

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To provide an opportunity to do network programming
3. To provide a WLAN measurement ideas.

COURSE OUTCOMES

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given problem related TCP/IP protocol developed the network programming.
4. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

COURSE CONTENTS

UNIT I (15 Hrs)

Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT II (15 Hrs)

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA,CSMA/CD,CDMA/CA

UNIT III (15 Hrs)

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping –ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

Transport Layer: Process to Process Communication, User Datagram Protocol(UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT IV (15 Hrs)

Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

RECOMMENDED BOOKS

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson PrenticeHall India.
3. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.

4. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
5. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

COMPUTER NETWORKS LABORATORY

Subject Code- BCSES1-603 **L T P C** **Duration- 30 Hrs**
0 0 2 1

PRACTICALS

1. Write specifications of latest desktops and laptops.
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
3. Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4. To Prepare straight and cross cables.
5. Study of various LAN topologies and their creation using network devices, cables and computers.
6. Configuration of TCP/IP Protocols in Windows and Linux.
7. Implementation of file and printer sharing.
8. Designing and implementing Class A, B, C Networks
9. Subnet planning and its implementation
10. Installation of ftp server and client

JAVA PROGRAMMING LABORATORY

Subject Code- BITES1-604 **L T P C** **Duration- 30 Hrs**
0 0 2 1

PRACTICALS

1. Write a Java Program to define a class, describe its constructor, overload the Constructors and instantiate its object
2. Write a Java Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object
3. Write a Java Program to define a class, define instance methods and overload them and use them for dynamic method invocation
4. Write a Java Program to demonstrate use of sub class
5. Write a Java Program to demonstrate use of nested class
6. Write a Java Program to implement array of objects.
7. Write a Java program to practice using String class and its methods
8. Write a Java Program to implement inheritance and demonstrate use of method overriding
9. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.
10. Write a program to demonstrate use of implementing interfaces.
11. Write a program to demonstrate use of extending interfaces

12. Write a Java program to implement the concept of importing classes from user defined package and creating packages.
13. Write a program to implement the concept of threading by extending Thread Class
14. Write a program to implement the concept of threading by implementing Runnable Interface
15. Write a program to implement the concept of Exception Handling using predefined exception.
16. Write a program to implement the concept of Exception Handling by creating user defined exceptions.

SOFTWARE TESTING AND QUALITY ASSURANCE

Subject Code- BITED1-611 **L T P C** **Duration – 45 hrs.**
3 0 0 3

COURSE OBJECTIVE

The main objective of this course is to make student able to understand the basic concepts of testing and various software quality assurance, attributes and plans.

COURSE OUTCOMES

1. To describe testing fundamentals, testing principles, TMM levels and classify the defects.
2. Apply suitable Black box and White Box testing techniques and design Test cases in practice.
3. Able to describe Software Quality attributes, Assurance functions and Prepare Software Quality Assurance plans.
4. Able to test Web Applications, ISO 9001 Quality Standards and CMM /CMMI Process models.

COURSE CONTENTS

UNIT-I (12 Hrs.)

Introduction to Testing as an Engineering Activity: The role of Process in Software Quality, Testing as a Process, Overview of Testing Maturity Model(TMM) - Testing Fundamentals: Basic Definitions, Software Testing Principles, Tester's Role in a Software Development Organization - Defects, Hypothesis and Test: Origins of Defect, Defect Classes, the defect Repository and Test Design.

Strategies and Methods for Test Case Design I: Test Case Design strategies-Black Box Approach to Test Case Design- Random Testing- Equivalence Class Partitioning- Boundary Value Analysis- Other Black Box Test Design Approaches- COTS-Black box Methods and TMM level 2 goals.

UNIT-II (11 Hrs.)

Strategies and methods for test case design II: White Box Approach to Test Case Design- Test Adequacy Criteria -Coverage and Control flow graphs - Covering Code Logic- Paths- Additional White Box Test Design Approaches: Data Flow, Loop Testing, Mutation Testing- White Box Testing Methods and the TMM.

UNIT-III (11 Hrs.)

Quality Concept - Quality - Software Quality - Garvin's Quality Dimensions - McCall's Quality Factors - software Quality Dilemma- Cost of Quality - Achieving software Quality.

ISO 9126 Software Quality Assurance: Elements of SQA - SQA tasks, Goals, Attributes & Metrics - Statistical SQA - Software Reliability -SQA Plan and its contents - Software configuration management: Base line - Configuration item - the SCM process.

UNIT-IV (11 Hrs.)

ISO 9000 standards: Overview of ISO 9001 standard-Various Sections/Elements of ISO 9001 Standards-Capability Maturity Model (CMM)-Levels and KPA's of CMM-CMMI-Continuous Representation-Capability Levels - Staged Representation- Maturity Levels and KPAs.

RECOMMENDED BOOKS

1. Yogesh Singh," Software Testing", Cambridge University Press, 2012.
2. Kshirasagar Naik, Priyadhrshini Tripathy, "Software Testing and Quality Assurance", John wiley& sons Inc Publication, 2008.
3. Nina S Godbole." Software Quality Assurance-Principles and Practice",Narosa Publishing, Second Edition, 2016.
4. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2010, Reprint.
5. Roger. S. Pressman "Software Engineering A Practitioner's Approach, 7e", McGraw Hill International Edition, 2014.

CRYPTOGRAPHY & NETWORK SECURITY

Subject Code- BITED1-612 **L T P C** **Duration – 45 hrs.**
3 0 0 3

COURSE OBJECTIVE

The main objective of this course is to make student able to understand the basic concepts, services, threats and principles in network security, various security services and mechanisms in the network protocol stack.

COURSE OUTCOMES

1. To understand security trends.
2. To implement various cryptographic algorithms.
3. To explain the hash function.
4. To understand the network security and system level security used.

COURSE CONTENTS

UNIT-I (12 Hrs.)

Security trends, Attacks and services, Classical crypto systems, Different types of ciphers, LFSR sequences, Basic Number theory, Congruence, Chinese Remainder theorem, Modular exponentiation, Fermat and Euler's theorem, Legendre and Jacobi symbols, Finite fields, continued fractions.

UNIT-II (9 Hrs.)

Simple DES, Differential crypto analysis, DES – Modes of operation, Triple DES, AES, RC4, RSA, Attacks – Primality test – factoring.

UNIT-III (12 Hrs.)

Discrete Logarithms, Computing discrete logs, Diffie-Hellman key exchange, ElGamal Public key cryptosystems, Hash functions, Secure Hash, Birthday attacks, MD5, Digital signatures, RSA, ElGamal DSA.

UNIT-IV (12 Hrs.)

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET. Intruders, Malicious software, viruses and related threats, Firewalls, Security Standards.

RECOMMENDED BOOKS

1. Wade Trappe, Lawrence C Washington, 'Introduction to Cryptography with Coding Theory', 2nd Edn., Pearson, 2007.
2. William Stallings, 'Cryptography and Network Security Principles and Practices', 4th Edn., Pearson/PHI, 2006.
3. W. Mao,'Modern Cryptography-Theory and Practice',2nd Edn., Pearson Education, 2007.
4. Charles P. Pfleeger, Shari Lawrence Pfleeger, 'Security in Computing', 3rd Edn., Prentice Hall of India, 2006.
5. Behrouz Forouzan, 'Cryptography & Network Security', 2nd Edn., McGraw-Hill, 2011.

DATA WAREHOUSING AND DATA MINING

Subject Code- BITED1-613 **L T P C** **Duration – 45 hrs.**

3 0 0 3

COURSE OBJECTIVE

Main objective of the course is to explain the basic concepts, modelling, architectures of data warehouse and to demonstrate the multidisciplinary fields of data mining.

COURSE OUTCOMES

1. Able to describe the basic concepts, modelling, architectures of data warehouse and sketch different Data warehouse schema for the given real world applications
2. Able to demonstrate the multidisciplinary fields of data mining and illustrate the techniques for data pre-processing.
3. Able to find frequent item set and generate association rules for the given transactions and analyze the performance of different association rule mining algorithms.
4. Able to analyze different types of data using classification and clustering techniques.

COURSE CONTENTS

UNIT-I (10 Hrs.)

Data Warehouse: Basic concepts - Data Warehouse Modeling: Data Cube and OLAP - Design and Usage – Implementation.

UNIT-II (12 Hrs.)

Data Mining-On What Kind of Data-Data Mining Functionalities- Data Mining Technologies- Targeted Applications - Major Issues in Data Mining. Data Preprocessing: Major tasks in data preprocessing - Data Cleaning- Data Integration - Data Reduction: Attribute subset selection - Clustering - Data Transformation by normalization.

UNIT-III (12 Hrs.)

Association Rules: Definition - Apriori Algorithm-Partitioning Algorithm-Pincer Search - Dynamic Item Set Counting Algorithm-FP Tree Algorithm- Discussion on different Algorithms-Incremental Algorithm-Border Algorithm-Generation of Association Rules.

UNIT IV(11 Hrs.)

Cluster analysis - Types of data -Requirements for cluster analysis - Categorization of major clustering methods - Partitioning - K-Means and K-Medoid algorithm - CLARA - CLARANS - Hierarchical clustering - BIRCH - Density based clustering – DBSCAN - Decision tree induction - Attribute selection measures - Tree Pruning.

RECOMMENDED BOOKS

1. Jiawei Han & Micheline kamber, "Data Mining-Concepts and Techniques" Morgan Kaufmann Publishers, Third Edition, 2012.
2. Arun K Pujari, "Data Mining Techniques" Universities Press India Ltd., Third Edition,2012.(Association Rules)
3. Dunham, "Data Mining- Introductory and Advanced Topics", Pearson Education, New Delhi, First Edition, 2006.
4. Pieter Adriaans, DolfZantinge,"Data Mining ",Pearson Education, Third Edition, Delhi 2009.
5. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World ", Pearson Education, Seventh Indian Reprint New Delhi, 2003.
6. George M. Marakas, " Modern Data Warehousing, Mining, & Visualization Core concepts", Pearson Education, First Edition, 2003
7. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley Publishers, Singapore, First Edition, 2001.

MOBILE COMMUNICATION

Subject Code- BITED1-614 **L T P C** **Duration – 45 hrs.**

3 0 0 3

COURSE OBJECTIVE

Main objective of the course is to explain the working principals of mobile communication systems and to analyze communication system for improved performance.

COURSE OUTCOMES

At the end of the course, students will demonstrate the ability to:

1. Understand the working principles of the mobile communication systems.
2. Understand the relation between the user features and underlying technology.
3. Analyze mobile communication systems for improved performance.

COURSE CONTENTS

UNIT-I (12 Hrs.)

Cellular concepts- Cell structure, frequency reuse, cell splitting, channel assignment, handoff, interference, capacity, power control; Wireless Standards: Overview of 2G and 3G cellular standards.

UNIT-II (11 Hrs.)

Signal propagation-Propagation mechanism- reflection, refraction, diffraction and scattering, large scale signal propagation and lognormal shadowing. Fading channels-Multipath and small scale fading- Doppler shift, statistical multipath channel models, narrowband and wideband fading models, power delay profile, average and rms delay spread, coherence bandwidth and coherence time, flat and frequency selective fading, slow and fast fading, average fade duration and level crossing rate.

UNIT-III (12 Hrs.)

Capacity of flat and frequency selective channels. Antennas- Antennas for mobile terminal monopole antennas, PIFA, base station antennas and arrays.

Multiple access schemes-FDMA, TDMA, CDMA and SDMA. Modulation schemes- BPSK, QPSK and variants, QAM, MSK and GMSK, multicarrier modulation, OFDM.

UNIT IV(10 Hrs.)

Receiver structure- Diversity receivers- selection and MRC receivers, RAKE receiver, equalization: linear-ZFE and adaptive, DFE.

MIMO and space time signal processing, spatial multiplexing, diversity/multiplexing tradeoff. Performance measures- Outage, average snr, average symbol/bit error rate.

RECOMMENDED BOOKS

1. WCY Lee, Mobile Cellular Telecommunications Systems, McGraw Hill, 1990.
2. WCY Lee, Mobile Communications Design Fundamentals, Prentice Hall, 1993.
3. Raymond Steele, Mobile Radio Communications, IEEE Press, New York, 1992.
4. AJ Viterbi, CDMA: Principles of Spread Spectrum Communications, Addison Wesley,1995.
5. VK Garg &JE Wilkes, Wireless & Personal Communication Systems, Prentice Hall,1996.

INFORMATION THEORY AND CODING TECHNIQUES

Subject Code- BITED1-621 **L T P C** **Duration – 45 hrs.**

3 0 0 3

COURSE OBJECTIVE

To introduce the fundamental concepts of information, Shannon's theorem, channel capacity and how to apply coding techniques.

COURSE OUTCOMES

At the end of the course, students will demonstrate the ability to:

1. Understand the concept of information and entropy.
2. Understand Shannon's theorem for coding.
3. Calculation of channel capacity.
4. Apply coding techniques.

COURSE CONTENTS

UNIT-I (12 Hrs.)

Basics of information theory, entropy for discrete ensembles; Shannon's noiseless Coding theorem; Encoding of discrete sources.

UNIT-II (11 Hrs.)

Markov sources; Shannon's noisy coding theorem and converse for discrete channels; Calculation of channel capacity and bounds for discrete channels; Application to continuous channels.

UNIT-III (11 Hrs.)

Techniques of coding and decoding; Huffman codes and uniquely detectable codes; Cyclic codes, convolutional arithmetic codes.

UNIT IV(11 Hrs.)

Linear and Block Codes For Error Correction: Matrix description of linear block codes, equivalent codes, parity check matrix, decoding of a linear block code, perfect codes, Hamming codes.

RECOMMENDED BOOKS

1. N. Abramson, Information and Coding, McGraw Hill, 1963.
2. M. Mansurpur, Introduction to Information Theory, McGraw Hill, 1987.
3. R.B. Ash, Information Theory, Prentice Hall, 1970.
4. Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.

CLOUD AND VIRTUALIZATION

Subject Code- BITED1-622 **L T P C** **Duration – 45 hrs.**

3 0 0 3

COURSE OBJECTIVE

1. To understand cloud storage, characteristics of cloud computing,
2. To know about cloud computing services and cloud hosting, cloud data storage and deployment models.
3. To learn cloud computing companies and cloud service providers, cloud infrastructure.
4. To learn advantages of cloud computing and issues with cloud computing.

COURSE OUTCOMES

1. To learn basic terms used in cloud computing and its benefits.
2. To learn architecture of Hadoop.
3. To implement cloud security.
4. To manage services provided by cloud.

COURSE CONTENTS

UNIT-I (12 Hrs.)

Cloud Computing Fundamentals: Introduction to Cloud Computing, private, public and hybrid cloud. Cloud types: IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, Role of virtualization in enabling the cloud; Benefits and challenges to Cloud architecture.

UNIT-II (12 Hrs.)

Hadoop - Apache Hadoop Architecture, Hadoop YARN, Comparison of Traditional system & Hadoop Ecosystem, Installation steps of Hadoop (1.x), Moving Data in and out of Hadoop, need for Record Reader and Record writer, understanding inputs and outputs file format of Map Reduce.

UNIT-III (10 Hrs.)

Cloud Security and Trust Management, Open Source Clouds -Baadal, Open Stack, Cloud Stack

UNIT-IV (11 Hrs.)

Cloud Applications, Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment, computing infrastructures available for implementing cloud based services.

RECOMMENDED BOOKS

1. Chris Eaton, Dirk deroos et al., 'Understanding Big data', 1st Edn., McGraw Hill, 2015.
2. Tom White, 'HADOOP: The definitive Guide', 4th Edn., O Reilly, 2015.
3. Gautam Shroff, 'Enterprise Cloud Computing Technology Architecture Applications', 1st Edn., Cambridge University Press, 2010.
4. Toby Velte, Anthony Velte, Robert Elsenpeter, 'Cloud Computing, A Practical Approach', 1st Edn., McGraw Hill Education, 2009.
5. Thomas Erl, ' Big Data Fundamentals', 1st Edn., Pearson Education, 2016
6. Srinivasan, ' Cloud Computing', 1st Edn,, Pearson Education, 2016.

INTERNET OF THINGS

Subject Code- BITED1-623 **L T P C** **Duration – 45 hrs.**
3 0 0 3

COURSE OBJECTIVE

The purpose of this course is to impart knowledge on IoT Architecture and various protocols, study their implementations

COURSE OUTCOMES

1. To Understand the Architectural Overview of IoT.
2. To Understand Raspberry.
3. To Understand the various IoT Protocols (Data link, Network).
4. To understand sensor applications.

COURSE CONTENTS

UNIT I (12 Hrs)

OVERVIEW: Introduction to IOT, how does it work? Difference between Embedded device and IoT device, Properties of IoT device, IoT Ecosystem, IoT Decision Framework, IoT Solution Architecture Models, Major IoT Boards in Market, Privacy issues in IOT.

UNIT II (9 Hrs)

Setting Up Raspberry Pi/Arduino to Create Solutions Explore Raspberry Pi, setting up Raspberry Pi, showing working of Raspberry Pi using Secure Shell (SSH) Client and Team Viewer.

UNIT III (12 Hrs)

IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS: Communication Protocols used in IoT Types of wireless communication, Major wireless Short-range communication devices, properties, comparison of these devices (Bluetooth, Wireless

Fidelity(WiFi), ZigBee, Low-power Wireless Personal Area Network(6LoWPAN)), Major wireless Long-range communication devices, properties.

UNIT IV (12 Hrs)

Sensors Applications of various sensors: Google Maps, Waze, WhatsApp, Ola Positioning sensors: encoders and accelerometers, Image sensors: cameras Global positioning sensors: Global Positioning System (GPS).

RECOMMENDED BOOKS

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, Birmingham – Mumbai.
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer.
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications.

SOFTWARE ENGINEERING

Subject Code- BITED1-624 **L T P C** **Duration – 45 hrs.**

3 0 0 3

COURSE OBJECTIVE

To enable the students to learn the principles and methodologies followed to develop a good software.

COURSE OUTCOMES

1. To study how software engineering principle evolve and to analyze the various software models that can be followed to develop software.
2. To understand the software analysis and design step of software development.
3. To study coding, testing and reliability of a software.
4. To highlight the various management activities and related terms of a software.

COURSE CONTENTS

UNIT-I (10 Hrs.)

Introduction: Evolution and impact of Software engineering, Software crisis, Principles of Software Engineering, Feasibility study

Software Life Cycle Models: Waterfall, prototyping, Evolutionary, and Spiral models, Comparison of software models.

UNIT-II (11 Hrs.)

Scheduling and Planning: Management Activities, Project planning and control, cost estimation, project scheduling using PERT and GANTT charts.

Requirement Analysis: Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification.

UNIT-III (14 Hrs.)

Software Design: Basic principles of software design, modularity, cohesion, coupling and layering, function-oriented software design: DFD and Structure chart, object modelling using UML, Object-oriented software development, Design specifications, Design metrics, Verification and validation, User Interface design.

Coding: Coding standards and Code review techniques, Coding styles, Coding metrics.

Software Testing: Fundamentals of testing, Types of software testing, White-box, and black-box testing, test case design techniques, mutation testing and Testing metrics.

UNIT-IV (10 Hrs.)

Reliability: Software reliability metrics, reliability growth modelling.

Software Quality Management: Risk Management, Quality management, ISO and SEI CMMI, Six Sigma, Computer aided software engineering, Software maintenance, Software Configuration Management, Component-based software developments

RECOMMENDED BOOKS

1. Pressman, 'Software Engineering: A Practitioner's Approach', 3rd Edn., TMH, 2004.
2. Flecher and Hunt, 'Software Engineering and CASE: Bridging and Culture Gap', 2000.
3. Shepperd, 'Software Engineering, Metrics', Vol.-1 (EN), McMillan, 1999.
4. Robert S. Arnold, 'Software Re–engineering', IEEE Computer Society, 1994.
5. Pankaj Jalote, 'An Integrated Approach to Software Engineering', 3rd Edn., Narosa Publishers, 2006.
6. Ghezzi, Cario, 'Fundamentals of Software Engineering', 2nd Edn., PHI, 2002.