Course Code	**:**	**ITPC24**
Course Title	**:**	**Software Verification and Validation**
Number of Credits	**:**	**4**
Prerequisites	**:**	**ITPC27**
Course Type	**:**	**PC**

Course Learning Objectives:
The objectives of the course is to prepare students for learning different techniques of verification and validation of object oriented and web based software.

Course Content:

1. **Introduction to Testing & Software Verification [1]**
   Review of Functional and Structural Testing Techniques- Slice Based testing and Mutation Based testing.Verification methods, SRS document verification, SDD document verification, source code reviews, User document verification, Software project Audit.

2. **Test Case Generation & Regression Testing [1]**
   Introduction to Use case diagram and use cases, test case generation from Use cases, validity checking and its guidelines, Data validation Strategies, Database Testing. Introduction to regression testing, regression test cases selection methods and their management, risk analysis, code coverage prioritization techniques.

3. **Object Oriented Testing [1] [2]**
   Introduction to object orientation and testing [1], issues in object oriented testing [2], path testing, state based testing, class testing, integration testing [2], GUI testing [2].

4. **Testing metrics, models & Web Application Testing**
   Introduction to software metrics, categorization of metrics, object oriented metrics used in testing, elements to measure during testing, software quality attributes prediction models. Introduction to web testing, functional testing, user interface testing, usability testing, configuration and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics.

Reference Books:

1. Yogesh Singh, Software Testing, Cambridge Publication, 2013.
2. Paul C. Jorgensen, Software Testing- A Craftsman's Approach, Auerbach Publication, 3rd Edition, 2012.

Course Outcomes:
On completion of the course the student will be able to:

1. Describe techniques in the areas of software inspection, software testing and software validation.
2. Apply different techniques for verification of the software.
3. Generate test cases for validation object oriented and web based software.

Course Code	**:**	**ITPC26**
Course Title	**:**	**Computer Networks**
Number of Credits	**:**	**4**
Prerequisites	**:**	
Course Type	**:**	**PC**

Course Learning Objectives:

1. Understand computer network basic, different models used for study of computer networks, ability to identify different designs, understanding of the issues surrounding wired and wireless Networks.
2. Design, calculate, and apply subnet masks to fulfil networking requirements and building the skills of routing mechanisms.

3. Analyse the features and operations of various application layer protocols such as Http, DNS, SMTP and FTP.
4. Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course content

1. Introduction

Network Functions, Network Topology, Network Services, Switching Approaches, Transmission media and systems, multiplexing and signaling techniques, Error detection and correction, Internet checksum algorithm.

2. Layered Architectures

Examples, OSI Reference Model, Overview of TCP/IP architecture, Socket system calls, SNMP, Electronic Mail.

3. Peer-to-Peer Protocols

Protocols, Service Models and End-to-End requirements, ARQ, Sliding Window Protocols, RTP, HDLC, PPP protocols, Statistical Multiplexing.

4. MAC and LAN Protocols

Multiple access communication, Random Access-ALOHA, Slotted-ALOHA, CSMA, CSMA-CD, LAN Standards – Ethernet, Fast Ethernet & Gigabit Ethernet, Bluetooth and WiMax standards.

5. Packet Switching Networks

Packet network topology, Datagrams and Virtual Circuits – Structure of Switch / Router, Connectionless and Virtual Circuit packet Switching, Traffic management and QoS – FIFO, Priority Queues, Fair Queuing, MPLS.

6. TCP/IP

Architecture, Internet protocols – IP packet, Addressing, Subnet addressing, IP routing, CIDR, ARP, RARP, ICMP, Reassembly, IPv6, UDP, Transmission Control Protocol – TCP, DHCP, Mobile IPv6, Internet Routing protocols, Multicast Routing.

BOOKS

1. Leon Garcia and IndraWidjaja: Communication Networks – Fundamental Concepts and Key Architectures, TMH, 2000.
2. A.S. Tanenbaum: Computer Networks, Fourth Edition, Pearson Education, 2003.
3. Forouzan: Data Communications and Networks, Fourth Edition, McGraw Hill, 2007.
4. William Stallings: Data and Computer Communications 5/e, PHI.

Course Outcomes (CO's)

1. Understand computer network basic, different models used for study of computer networks, ability to identify different designs, understanding of the issues surrounding wired and wireless Networks.
2. Design, calculate, and apply subnet masks to fulfil networking requirements and building the skills of routing mechanisms.
3. Analyse the features and operations of various application layer protocols such as Http, DNS, SMTP and FTP.
4. Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Programme Electives – I and II

Course Code	**:**	**ITPE20**