INFORMATION SECURITY

Paper Code: ETCS-401	L	T/P	C
Paper: Information Security	3	0	3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the basic concepts of web threats, legal ethical and professional issues of information security.

UNIT- I

Information and Security:

Information Systems: Recent History, Distributed Information System and its Importance, Role of Internet and Web Services, Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security. Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles, Privacy of Data.

[T1, T2][No. of hrs. 12]

UNIT-II

Networks and E-Security:

Concepts in Internet and World Wide Web: Brief review of Internet Protocols-TCP/IP, IPV4, IPV6. **Functions of various networking components:** Routers, bridges, switches, hub, gateway and Modulation Techniques. Need for security, Legal, Ethical and Professional Issues in Information Security, Risk Management, 11 Security Threats to E-Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards,

Digital forensics including digital evidence handling: Media forensics, Cyber forensics, Software forensics, Mobile forensics.

[T1, T2][No. of hrs. 11]

UNIT-III

Physical Security and Bio-metrics as Security:

Physical Security: Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges Framework for Information Security, Security Metrics, Information Security Vs Privacy

[T1, T2][No. of hrs. 11]

UNIT-IV

Network Cryptography:

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues,

Policies Network Security: Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunnelling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

[T1, T2][No. of hrs. 10]

Text Books:

[T1] Godbole," Information Systems Security", Wiley
[T2] Merkov, Breithaupt," Information Security", Pearson Education

References:

[R1] Yadav, "Foundations of Information Technology", New Age, Delhi
[R2] Schou, Shoemaker, “Information Assurance for the Enterprise", Tata McGraw Hill
[R3] Furnell, "Computer Insecurity", Springer
[R4] http://www.iiitd.edu.in/~gauravg/

SOFTWARE TESTING AND QUALITY ASSURANCE

Paper Code: ETCS-403	**L**	**T/P**	**C**
Paper: Software Testing and Quality Assurance	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To check the productivity of software alongwith its quality comparison with other software and core components of quality.

UNIT I

Introduction

Software testing:

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artifacts of testing (Faults, Errors, and Failures), Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels.

Software Quality:

Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.

[T1][T2][R3][No. of hrs. 10]

UNIT II

White Box and Black Box Testing

Different Testing Techniques, Differences between testing techniques

***Black Box Testing*:** Requirements based testing techniques, Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing

***White Box Testing*:** Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing

Integration, System and Acceptance Testing: Integration testing approaches, System testing, Scenario Testing, Deployment testing, Non-functional testing techniques,

Acceptance Testing: Acceptance criteria, types, test cases selection and execution.

[T1][T2][R2][No. of hrs. 10]

UNIT III

Quality Assurance: Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement

Quality Standards: Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.

[T2][R1][R3] [No. of hrs. 10]

UNIT IV

Test Selection & Minimization for Regression Testing

Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing.

Test Management and Automation

Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design & Architecture for automation, Testing tools, Object Oriented Testing.

[T1][R1][R2][No. of hrs. 10]

Text Books:

[T1] Yogesh Singh,"Software Testing", Cambridge University Press, 2011
[T2] Sagar Naik, Piyu Tripathy," Software Testing and Quality Assurance", Wiley

REFERENCE BOOKS:

[R1] Effective methods for Software Testing William Perry, Wiley
[R2] Aditya P. Mathur, "Foundation of Software Testing", Pearson Education.
[R3] Milind Limaye,"Software Quality Assurance, McGraw-Hill publication
[R4] Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications, 2008

WIRELESS COMMUNICATION

Paper Code: ETEC-405	**L**	**T/P**	**C**
Paper: Wireless Communication	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTER: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.

UNIT – I

Introduction To Wireless Communication Systems: Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

[T1,T2][No. of Hrs. 11]

UNIT - II

2G Networks: Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. **Spread Spectrum Systems-** Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

[T1,T2][No. of Hrs. 11]

UNIT - III

2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

[T1,T2][No. of Hrs. 11]

UNIT – IV

Wireless Local Loop (WLL): Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

[T1,T2][No. of Hrs. 11]

Text Books:

[T1] Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
[T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

Reference Books:

[R1] T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
[R2] Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
[R3] Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
[R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill,1998.
[R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
[R6] Schiller, Jochen, "Mobile Communications", 2nd Edition, Addison Wesley

DATA MINING AND BUSINESS INTELLIGENCE

Paper Code: ETCS-413	**L**	**T/P**	**C**
Paper: Data Mining and Business Intelligence	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the basics of Data Warehouse and Data Mining, to study algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data.

UNIT – I

Introduction to Data Warehousing: Overview, Difference between Database System and Data Warehouse, The Compelling Need for data warehousing, Data warehouse – The building Blocks: Defining Features, data warehouses and data marts, overview of the components, Three tier architecture, Metadata in the data warehouse.
Data pre-processing: Data cleaning, Data transformation ETL Process. ETL tools.
Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content.

[T1][No. of Hrs: 12]

UNIT – II

Principles of Dimensional Modeling: Objectives, From Requirements to data design, Multi Dimensional Data Model, Schemas: the STAR schema, the Snowflake schema, fact constellation schema.
OLAP in the Data Warehouse: Demand for Online Analytical Processing, limitations of other analysis methods-OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, hyper cubes.
OLAP Operations: Drill-down and roll-up, slice-and-dice , pivot or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, the DOLAP model, ROLAP versus MOLAP, OLAP implementation considerations. Query and Reporting, Executive Information Systems (EIS), Data Warehouse and Business Strategy.

[T1, R4][No. of Hrs. 11]

UNIT – III

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process (KDD Process), Data Mining Applications- The Business Context of Data Mining, Data Mining for Process Improvement, Data Mining as a Research Tool, Data Mining for Marketing, Benefits of data mining,
Major Data Mining Techniques: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN Algorithm.

[T2, R4][No. of Hrs: 11]

UNIT – IV

Cluster detection, K- means Algorithm, Outlier Analysis, memory-based reasoning, link analysis, Mining Association Rules in Large Databases: Association Rule Mining, genetic algorithms, neural networks.
Data mining tools.

[T2, R3][No. of Hrs: 10]

Text Books:

[T1] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2004.
[T2] Kamber and Han, "Data Mining Concepts and Techniques", Hart Court India P. Ltd. Elsevier Publications Second Edition, 2001

Reference Books:

[R1] W. H. Inmon, "Building the operational data store", 2nd Ed., John Wiley, 1999.
[R2] "Data Warehousing", BPB Publications, 2004.
[R3] Pang- Ning Tan, Michael Steinbach, Viach, Vipin Kumar, Introduction to Data Mining, Pearson
[R4] Shmueli, "Data Mining for Business Intelligence : Concepts, Techniques and Applications in Microsoft Excel with XLMiner",Wiley Publications

ADVANCED COMPUTER NETWORKS

Paper Code: ETIT-401	**L**	**T/P**	**C**
Paper: Advanced Computer Networks	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand different network protocols with emphasis on TCP/IP protocol suite.

UNIT-I

Network Layer:

ARP,RARP,ICMP,IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6).

Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD). The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent Multicast (PIM).

[T1][No. of Hours 10]

UNIT-II

Transport Layer: Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.

[R1, R3][No. of Hours 10]

UNIT-III

Optical Networking:

Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. **Quality of Service:** Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, Diffserv and Intserv.

[T2] [No. of Hours 10]

UNIT-IV

Overview of latest concepts:

TCP/IP Applications: VoIP, NFS, Telnet ,FTP,SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS(PAAS,SAAS,HAAS) and Cloud Computing, Big data, Elements of Social Network.

[R2][No. of Hours 12]

Text Books:

[T1] Douglas E. Comer, "Internet networking with TCP/IP", Pearson. TCP/IP, Vol. 2
[T2] B. A. Forouzan, "TCP/IP Protocol Suite", TMH, 2nd Ed., 2004.

Reference Books:

[R1] TCP/IP Illustrated, Volume 1 (The Protocols) by W. Richard Stevens, Pearson Education.
[R2] U. Black, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
[R3] W. Stallings, "Computer Communication Networks", PHI, 1999.

SOFTWARE TESTING AND QUALITY ASSURANCE LAB

Paper Code: ETCS-453	**L**	**T/P**	**C**
Paper: Software Testing and Quality Assurance Lab	**0**	**2**	**1**

List of Experiments:

Tool Required: Smartbear QA Complete

1. 1.To determine the nature of roots of a quadratic equations, its input is triple of +ve integers (say x,y,z) and values may be from interval[1,100] the program output may have one of the following:-
   [Not a Quadratic equations, Real roots, Imaginary roots, Equal roots] Perform BVA.
2. To determine the type of triangle. Its input is triple of +ve integers (say x,y,z) and the values may be from interval[1,100].The program output may be one of the following [Scalene, Isosceles, Equilateral, Not a Triangle].Perform BVA
3. Perform robust case testing on Problem No. 1.
4. Perform robust case testing on Problem No. 2.
5. Create a test plan document for any application (e.g. Library Management System)
6. Experiment: Study of Any Testing Tool (Win Runner)
7. Experiment: Study of Any Test Management Tool (QA Complete)
8. Experiment: Automate the Test cases using Test Automation tool(using QA Complete)
9. Experiment: Learn how to raise and report Bugs using Bug tracking tool (Bugzilla,Jira using QA Complete)
10. Experiment: Study of any open source testing tool (Web Performance Analyzer/O STA)

NOTE: At least 8 Experiments out of the list must be done in the semester.

INFORMATION SECURITY LAB

	L	T/P	C
Paper Code: ETCS-451			
Paper: Information Security Lab	**0**	**2**	**1**

List of Experiments:

1. Make an experiment to implement WEP/WPA2 PSK, 802.1x EAP security protocol.
2. Implement firewall through App to login into bank-site,; to implement E-commerce, debit card transaction through payment gateway
3. Implement bio-metric system to have physical security through different access control permissions.
4. Implement RSA algorithm.
5. Implement DES algorithm
6. Implement Diffie-Hellman algorithm
7. Make a study of anyone simulation tool based on parameters of information security
8. Implement VPN through Packet-Tracer or any other network simulator tool.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.

WIRELESS COMMUNICATION LAB

	L	T/P	C
Paper Code: ETEC-463			
Paper: Wireless Communication Lab	**0**	**2**	**1**

List of Experiments:

1. Eight experiments suggested on kits for GSM, CDMA and any possible experiments covering the subjects.
2. Setting up wireless network with and without infrastructure support.
3. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
4. Configuring Routing between wired and wireless Networks.
5. Configuring Security in wireless network with and without infrastructure support.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.

DATA MINING AND BUSINESS INTELLIGENCE LAB

Paper Code: ETCS-457(ELECTIVE)	**L**	**T/P**	**C**
Paper: Data Mining and Business Intelligence Lab	**0**	**2**	**1**

List of Experiments:

1. Study of ETL process and its tools.
2. Program of Data warehouse cleansing to input names from users (inconsistent) and format them.
3. Program of Data warehouse cleansing to remove redundancy in data.
4. Introduction to WEKA tool.
5. Implementation of Classification technique on ARFF files using WEKA.
6. Implementation of Clustering technique on ARFF files using WEKA.
7. Implementation of Association Rule technique on ARFF files using WEKA.
8. Implementation of Visualization technique on ARFF files using WEKA.
9. Study of DBMINER tool
10. Study of ARMINER tool.

NOTE: At least 8 Experiments out of the list must be done in the semester.

ADVANCED COMPUTER NETWORKS LAB

	L	T/P	C
Paper Code: ETCS-457(ELECTIVE)			
Paper: Advanced Computer Network Lab	**0**	**2**	**1**

List of Experiments:

1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
2. Configuration of IP addressing for a given scenario for a given set of topologies.
3. Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.
4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
    a. ARP/RARP protocols
    b. RIP routing protocols
    c. BGP routing
    d. OSPF routing protocols
    e. Static routes (check using netstat)
5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.
6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb.Use a TFTP client and repeat the experiment.
7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.
8. Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS). Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

NOTE: At least 8 Experiments out of the list must be done in the semester.