

**BACHELOR OF TECHNOLOGY  
(INFORMATION TECHNOLOGY)  
SEVENTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>					
ETIT-401		Advanced Computer Networks	3	1	4
ETIT-403		Cryptography and Network Security	3	0	3
ETEC-405		Wireless Communication	3	0	3
<b>ELECTIVE (SELECT ANY TWO, ONE FROM EACH GROUP)</b>					
<b>GROUP-A</b>					
ETEC-401		Embedded Systems	3	0	3
ETEC-403		Coprocessors and Optical Communication	3	0	3
ETIT-407		Cloud Computing	3	0	3
ETIT-409		Distributed Databases	3	0	3
ETIT-411		Semantic Web Technologies	3	0	3
ETIT-413		Software Testing	3	0	3
ETIT-415		Digital Signal Processing	3	0	3
<b>GROUP-B</b>					
ETIT-419		NET and C# Programming	3	0	3
ETIT-421		Enterprise Computing in Java	3	0	3
ETIT-423		OS and Network Administration	3	0	3
ETIT-425		Cloud Computing	3	0	3
ETIT-427		Advanced Database Administration	3	0	3
ETIT-429		Probabilistic Graphical Models	3	0	3
ETHS-419		Sociology and Elements of Indian History for Engineers	3	0	3
<b>PRACTICAL/VIVA VOCE</b>					
ETIT-453		Advanced Computer Networks Lab	0	2	1
ETIT-455		Cryptography and Network Security Lab	0	2	1
ETEC-463		Wireless Communication Lab	0	2	1
ETIT-459		Lab session on Elective Group A or B	0	2	1
ETIT-461		Summer Internship/Industrial work shop/ Certification	0	0	1
ETIT-463		Minor Project+	0	6	3
<b>TOTAL</b>			<b>15</b>	<b>15</b>	<b>24</b>

**Imp:-** Elective Paper will be allotted if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 8<sup>th</sup> Semester is done before 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

**BACHELOR OF TECHNOLOGY  
(INFORMATION TECHNOLOGY)  
EIGHTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>					
ETIT 402		Mobile Computing	3	1	4
ETEC 406		Ad hoc and Sensor Networks	3	0	3
ETHS 402		Human Values and Professional Ethics-II	1	0	1
<b>ELECTIVE (SELECT ANY TWO, ONE FROM EACH GROUP)</b>					
<b>GROUP A</b>					
ETIT-406		Big Data Analytics	3	0	3
ETIT-408		Social Network Analysis	3	0	3
ETIT-410		Soft Computing	3	0	3
ETIT-412		Bioinformatics	3	0	3
ETIT-414		Web Application development using .NET	3	0	3
ETIC-414		VLSI Design	3	0	3
ETIT-416		Information Theory and Coding	3	0	3
ETCS-404		Human Computer Interaction	3	0	3
<b>GROUP B</b>					
ETIT418		Image Processing	3	0	3
ETIT420		Generation Networks	3	0	3
ETIT422		GPS and GIS	3	0	3
ETEC404		Satellite Communication	3	0	3
ETIT428		E-Commerce and M-Commerce	3	0	3
ETIT430		Disaster Management	3	0	3
ETIT 432		Selected Topics of Recent Trends in Information Technology **	3	0	3
<b>PRACTICAL/VIVA VOCE</b>					
ETIT 452		Mobile Computing Lab	0	2	1
ETEC-458		Ad hoc Sensor Network Lab	0	2	1
ETIT 456		Lab based on Elective - I	0	2	1
ETIT 458		Lab based on Elective - II	0	2	1
ETIT-460		Major Project	0	12	8
<b>TOTAL</b>			<b>15</b>	<b>21</b>	<b>26</b>

\*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The candidate/ she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after starting of Semester. The progress will be monitored through seminars and progress reports.

\*\*Syllabus may be revised after 2 years.

**NOTE:**

1. The total number of the credits of the B.Tech. (IT) Programme = 215.
2. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of 200 credits including mandatory papers (M).

**FOR LATERAL ENTRY STUDENTS:**

1. The total number of the credits of the B.Tech. (IT) Programme = 161.
2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

**NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF**

**ADVANCED COMPUTER NETWORKS****Paper Code: ETIT-401****Paper: Advanced Computer Networks**

L	T/P	C
3	1	4

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

- 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.
- 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 ICMP 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**

Overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), 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, Packet Classification, 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.

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**CRYPTOGRAPHY & NETWORK SECURITY****Paper Code: ETIT-403****Paper: Cryptography & Network Security**

L	T/P	C
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.

*Objectives: Syllabus should be proposed so as to be covered in 42 to 45 lectures (assuming 14 or 15 weeks session). Syllabus should be evenly divided into 4 Units only.*

**UNIT- I:**

Basic Cryptographic Techniques, Computational Complexity, Finite Fields, Number Theory, DES and AES, Public Key Cryptosystems, Traffic Confidentiality, Cryptanalysis, Intractable (Hard) Problems, Hash Functions, OSI Security Architecture, Privacy of Data.

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

**UNIT- II:**

Linear Cryptanalysis, Differential Cryptanalysis, DES, Triple DES, Message Authentication and Digital Signatures, Attacks on Protocols, Elliptic Curve Architecture and Cryptography, Public Key Cryptography and RSA, Evaluation of Cryptosystems, Asymmetric Key Management, Authentication requirements, Digital forensics including digital evidence handling, Media forensics, Cyber forensics, Software forensics, Mobile forensics.

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

**UNIT- III:**

Buffer Flow attack, Denial of service attack, Weak authentication, Design of Substitution Boxes (S-Boxes), Hash Functions, Security of Hash Functions, Secure Hash Algorithm, Authentication applications, Kerberos, IP security, Pretty Good Privacy (PGP), Web Security Light weight cryptography for mobile devices, Side channel attacks.

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

**UNIT- IV:**

System security, Security Standards, Intruders, and Viruses, Firewalls, Malicious software, Intrusion Detection System, Intrusion Prevention System, Trusted Systems, Virus Countermeasures, Authentication Strategies.

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

**Text Book:**

- [T1] William Stallings, "Cryptography And Network Security: Principles and Practices", Prentice Hall of India, Third Edition, 2003.
- [T2] Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.

**Reference Book:**

- R1] R.Rajaram, "Network Security and Cryptography" SciTech Publication, First Edition, 2013.
- R2] Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003
- R3] Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
- R4] <http://www.iiitd.edu.in/~gauravg/>

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**WIRELESS COMMUNICATION****Paper Code: ETEC-405****Paper: Wireless Communication**

L	T/P	C
3	0	3

**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 1G 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 (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 U.S. Cellular 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," 2<sup>nd</sup> 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", 2<sup>nd</sup> Edition, Addison Wesley





**EMBEDDED SYSTEMS**

**Paper Code: ETEC-401**  
**Paper: Embedded Systems**

L	T/P	C
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 enable a student to design an embedded system for specific tasks.*

**UNIT- I**

**Overview of Embedded Systems:** Characteristics of Embedded Systems, Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

**PIC Microcontrollers:** Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

[T1][No. of hrs. 12]

**UNIT- II**

**ARM Processors:** Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture

**Bus structure:** Timed, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI

[T2][No. of hrs. 12]

**UNIT- III**

**Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.**

[T3][No. of hrs. 10]

**UNIT-IV**

**RTOS:** Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

[T3][No. of hrs. 10]

**Text Book:**

[T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002

[T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.

[T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

**References Books:**

R1] The Design of Small-Scale Embedded Systems, Tim Wilmshurst, Palgrave, 2003

R2] Embedded System Design, Marcelle Petit, Kluwer Publishers, 2004.

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**OPTOELECTRONICS AND OPTICAL COMMUNICATION**

**Paper Code: ETEC-403**

<b>L</b>	<b>T/P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>3</b>

**Paper: Optoelectronics and Optical Communication**

**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 12.5 marks

*Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.*

**UNIT - I**

**Introduction: Optical Fiber.** Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definitions, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System .

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

**UNIT – II**

**Attenuation in Optical Fibers:** Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer Clad-Silica Fibers.

**Wave Propagation:** Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

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

**UNIT – III**

**Source & Detectors:** Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling, Coupled Detectors- Physical principles of PIN and APD, Detector response time, Dependence on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation. Digital signal transmission error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers .

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

**UNIT – IV**

**Optical Fiber Communication Systems:** Data Communication Networks – Network Topologies, MAC Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Networks, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

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

**Text Books:**

- [T1] J. Gowar, "Optical Communication System", IEEE Press – 2<sup>nd</sup> Edition.  
 [T2] R.P.Khare, "Fiber Optics and Opto-Electronics" Oxford Publication

**Reference Books:**

- R1] Optical Information Processing, H. T. G. Lu – Wiley, New York, 1983  
 R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992  
 R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press  
 R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013  
 R5] John M. Senior, "Optical Fiber Communications", Pearson, 3rd Edition, 2010.



**CLOUD COMPUTING****Paper Code: ETIT-407****L T/P C****Paper: Cloud Computing****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 12.5 marks

*Objective: To enable students to understand the basic concepts of Cloud Computing and to apply these concepts for designing, evaluating, simulations and comparing various applications in Cloud Computing.*

**UNIT I****Introduction to Cloud Computing**

Overview of Parallel Computing, Grid Computing, Distributed Computing and its Variants (e.g. MANETs, Peer to Peer, Cloud), Introduction to Economic Computing, Evolution of Cloud Computing and its vision, Issues and Challenges in Cloud Computing, Applications of Cloud Computing.

**[T1, T2][No. of Hours: 10]****UNIT II****Cloud Computing Architecture**

Cloud Computing Architecture, features of Clouds: components, types, technologies, Service Models (Services: IaaS, PaaS, SaaS), Deployment Models (Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud) various cloud providers, platforms and tools.

**[T1, T2] No. of Hours: 12]****UNIT III****Virtualization of Clouds**

**Virtualization:** Introduction, Evolution, Virtualized Environment characteristics, Server Virtualization, VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions, Cloud Security Mechanisms (Encryption, RBAC, IAM), Service Management in Cloud Computing (SLA, Billing & Accounting)

**[T1, T2][No. of Hours: 12]****UNIT IV****Advanced Cloud Applications**

Specialized Cloud Architecture: Direct I/O Access, Load-Balanced VMs, Switches, Multipath Resource Access, Federated Clouds, Basics of Cloud Mobility, Enterprise Cloud computing: Data, Processes, Components, Architectures, applications (Enterprise Software, ERP, SCM, CRM)

Case Studies on Open Source and Commercial available tools and platforms (Microsoft Azure, Google AppEngine, Amazon Web services, Hadoop, Eucalyptus, Cloud SIM etc).

**[T1, T2] No. of Hours: 11]****Text Books:**

- T1] Rajkumar Buyya, Christian Vecomila, and Ramanarajavelu, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013
- T2] Thomas Erl, Zaigam Mahmood, Ricardo Puttini, Cloud Computing Concepts, Technology & Architecture, 1<sup>st</sup> Reprint, Pearson India, 2013 (T1)
- T3] Kumar Saurabh, Cloud Computing, 2<sup>nd</sup> Edition, Wiley, 2013 (T3)
- T4] Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

**Reference Books:**

- R1] Barrie Sosinsky, Cloud Computing Bible, Wiley
- R2] A. Srinivasan and J. Suresh, Cloud computing a practical approach for learning and Implementation, Pearson India 1<sup>st</sup> edition
- R3] Michael Miller, Cloud Computing, Pearson, 2008.
- R4] Mukesh Singhal, Niranjana G. Shivaratri, TMH Edition. (Must be included for the basics of distributed systems basics from which all distributed systems have been originated).

**DISTRIBUTED DATABASES**

**Paper Code: ETIT-409**  
**Paper: Distributed Databases**

L	T/P	C
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 this paper is to facilitate the student with principles and foundations of Distributed databases.*

**UNIT I**

**Architecture of distributed systems:** network operating system, distributed operating systems, Distributed database systems, (a) Federated database systems, (b) multi database systems, and (c) Client Server systems, Distributed DBMS architecture.

**Distributed database design:** Top down design- Designing issues, Fragmentation, Allocation, Data dictionary, Bottom up design- Schema Matching, Schema Integration, Schema Mapping, Data Cleaning

**Data and Access Control:** views in centralised and distributed DBMS, Data security, Semantic Integrity Control.

[T1, R1][No. of Hours: 10]

**UNIT II**

**Query Processing:** Architecture of query processors, Layers of query processing, Query Decomposition, Normalization, Architecture of redundancy,

**Data Localization:** Primary horizontal fragmentation, Reduction of vertical fragmentation, reduction of derived fragmentation, hybrid fragmentation.

**Optimization of Distributed Query:** Join ordering, Semi join based algorithms, optimization.

[T1, T2][No. of Hours: 11]

**UNIT III**

**Transaction Management:** Properties of transactions, Types of transactions- flat transactions, nested transactions, workflow.

**Distributed Concurrency Control:** Serializability theory, Locking based concurrency control Algorithm, Timestamp based algorithms,

**Deadlock Management:** Prevention, Avoidance, Detection and Resolution.

[T1, T2][No. of Hours: 10]

**UNIT IV**

**Distributed DBMS Reliability:** Local Reliability protocol, Distributed Reliability protocol- two phase commit protocol, three phase commit protocol.

**Parallel Database System:** System architecture, Parallel query processing, Load Balancing, Database Clusters, Web Data Management, Web Search crawling, indexing ranking, Web Querying, Distributed XML Processing.

[T1, R2][No. of Hours: 11]

**Text Books:**

- [T1] Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.  
 [T2] Distributed Database Principles and Systems. Ceri and Pelagatti. McGraw Hill.

**Reference Books:**

- [R1] Distributed Systems: Concept and Design. Coulouris, Dollimore, and Kindberg. AW.  
 [R2] Recovery Mechanisms in Database Systems. Kumar and Hsu, Prentice Hall.  
 [R3] Concurrency Control and Recovery in Database Systems. Bernstein, Hadzilacos and Goodman, AW

SEMANTIC WEB TECHNOLOGIES

Paper Code: ETIT-411

Paper: Semantic Web Technologies

L	T/P	C
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: This is the aim behind the Semantic Web, which is also being referred to as Web 3.0 and which is heavily embedded in the Artificial Intelligence area. Its long-term goal is that of enhancing the human and machine interaction by representing the data in an understandable way for the machine.*

**UNIT-I**

**Introduction:** Why Semantics-Data integration across the web, Traditional data modelling methods, semantic relationships, metadata, Building models, Calculating with knowledge, Exchanging Information, Semantic web technology.

[T1, T2][No. of Hours: 10]

**UNIT-II**

**RDF Resource description language:** Simple Ontology's in RDF and RDF schema- Introduction, syntax for RDF, advanced features, Simple ontology's in RDF schemas.

**RDF Formal semantics:** Web semantics, Model theoretic semantic for RDF(S), Semantic reasoning with deduction rules, the syntax for RDF(S).

[T1, T2][No. of Hours: 12]

**UNIT-III**

**Web Ontology Languages (OWL):** OWL syntax and intuitive semantics, owl species, Description logics, Model theoretic semantics of owl, Automated Reasoning with OWL.

[T1, T2][No. of Hours: 10]

**UNIT-IV**

**Rules and Queries:** Ontology and rules, Data logics, first order rule language, Combining Rules with OWL-DL, Rule interchange format RQL.

**Query Language:** SPARQL-Query language for RDF, Conjunctive queries for OWL-DL.

[T1, T2][No. of Hours: 12]

**Text Books:**

- [T1] Foundation Of Semantic Web Technologies.-Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph.by Chapman and Hall Book(CRC Press).
- [T2] Programming The Semantic Web. Foyi Samarati, Carol Evans, Jamie Taylor by O'Reilly Media Publication.

**Reference Books**

- R1] A Semantic Web Primer MIT Press.
- R2] Knowledge Representation: Logical, Philosophical, and Computational Foundations, John Sowa. (ISBN-13:978-0534949055)
- R3] Foundations of Semantic Web Technologies, Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph (ISBN:978-1-4200-9059-5)
- R4] Agency and the Semantic Web, Christopher Walton, ISBN 13-978-0199292486.
- R5] Artificial Intelligence: A Modern Approach, 3rd Edition, Stuart Russell, Peter Norvig (ISBN-13:978-0-13-604259-4).



**SOFTWARE TESTING**

**Paper Code: ETIT-413**  
**Paper: Software Testing**

L	T/P	C
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 introduce the students about the knowledge of software testing, types of testing and testing tools.*

**UNIT I**

**Introduction:** What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

[T1, T2] [No. of Hours: 10]

**UNIT II**

**Functional Testing:** Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

**Structural Testing:** Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

[T1, T2] [No. of Hours: 11]

**UNIT III**

**Reducing the number of test cases:** Prioritization guidelines, Test Case Priority, Test Case Strategy, Scheme, Risk Analysis, Regression Testing, Slice based testing

**Testing Activities:** Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

[T1, T2] [No. of Hours: 11]

**UNIT IV**

**Object Oriented Testing:** Issues in Object Oriented Testing, Object Oriented Testing, GUI Testing, Object Oriented Integration and System Testing.

**Testing Tools:** Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

[T1, T2] [No. of Hours: 10]

**Text Books:**

- [T1] William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.  
 [T2] Cem Kaner, Jack Falk, and Martin Quick, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.  
 [T3] Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.  
 [T4] Louise Tamres, "Software Testing", Pearson Education Asia, 2002.

**Reference Books:**

- [R1] Roger S. Pressman, "Software Engineering, A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.  
 [R2] Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.  
 [R3] K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.  
 [R4] Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.  
 [R5] Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.  
 [R6] Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.  
 [R7] Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.  
 [R8] Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

**DIGITAL SIGNAL PROCESSING**

**Paper Code: ETIT-415**  
**Paper: Digital Signal Processing**

L	T/P	C
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.

**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

**UNIT-I:**

**Frequency Domain Sampling:** The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based on the DFT.

**Efficient computation of the DFT:** Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Match filter

[T2,T1] [No. of Hours: 11]

**UNIT-II:**

**Design & Structure of analog filters:** Impulse Invariance; Bilinear transformation and its use in design of Butterworth, Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel structures.

**Design & structure of FIR filters:** Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure.

[T1,T2] [No. of Hours: 11]

**UNIT-III:**

**Implementation of Discrete Time Systems:**

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

**Linear predictive Coding:**

Lattice filter design, Levinson Design Technique, Schur algorithm.

[T1,T2] [No. of Hours: 10]

**UNIT-IV:**

**Quantization Errors in Digital Signal Processing:** Representation of numbers, Quantization of filter coefficients, Round off Effects in digital filters.

**Multirate Digital Signal Processing:** Definition, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Polyphase decomposition.

[T1, T2][No. of Hours: 10]

**Text Books:**

[T1] Oppenheim & Schaffer, Digital Signal Processing, PHI-latest edition.

[T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication.

**Reference Books:**

[R1] S. K. Mitra, Digital Signal Processing, TMH edition 2006

[R2] Johnny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition

[R3] R.Babu, Digital Signal Processing, SciTech Publication.

.NET AND C# PROGRAMMING

Paper Code: ETIT-419

Paper: .NET and C# Programming

L	T/P	C
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: This course provides a solid foundation in the C# programming language, and covering the fundamental skills that are required to design and develop object-oriented applications for the web and Microsoft Windows by using Microsoft Visual C# .NET and the Microsoft Visual Studio .NET development environment.*

**UNIT I**

**MS.NET Framework Introduction:** Framework Components, Framework Versions, Types of Applications which can be developed, Base Class Library, Namespaces, MSIL / Metadata and PE files, The Common Language Runtime (CLR), Managed Code, MS.NET Memory Management / Garbage Collection, Common Type System (CTS), Common Language Specification (CLS), Types of JIT Compilers, Security Manager, control application development.

**Language basics:** Variable Declaration, Global, Stack and Heap Memory, Reference Type and Value Type, Datatypes & Variables Declaration, Implicit and Explicit Casting, Checked and Unchecked Blocks – Overflow Checks, Casting between objects, Boxing and Unboxing, Enum and Constant, Operators, Control Statements, Working with Arrays.

[T1, T2] **No. of Hours: 11****UNIT II**

**Introduction to Object Oriented Features:** What is an Object, state of an Object, Lifecycle of an Object, relationship between Class and Object, define Application using Objects, Principles of Object Orientation, Encapsulation, Inheritance, Polymorphism, Encapsulation is the combination of State and Behaviour together. Inheritance is based on "is a" relationship. Polymorphism with Examples. Constructor & Destructor, Working with "static" Members, Constructor in Inheritance, Type Casting of Reference Types, Static and Dynamic Binding and virtual Method, Abstract Class, Object as Parent of all classes, Interface, Syntax for Implementation of Interface, Explicit Implementation of Interface members, Types of Inheritance, exceptional handling.

[T1, T2] **[No. of Hours: 10]****UNIT III**

**Working with Collections and Generics:** List and List<T> are typesafety issue with ArrayList and Hashtable classes, IEnumerable and IEnumerator, Sorting Items in the collection using IComparable, custom generic classes, Generic Collection Classes.

Operator Overloading, Partial Classes, Importance of Attributes, working with components/assemblies, data stream and files: text stream, binary stream, working with file system, Serialization & Deserialization, multithreading.

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[T1, T2] **[No. of Hours: 11]****UNIT IV**

**WinForms:** Introduction, Controls, Menus and Context Menus, Menu Strip, Toolbar Strip, Graphics and GDI, SDI and MDI Applications, Dialog Box, Form Inheritance, Developing Custom, Composite and Extended Controls, Data Access using ADO.NET, Data Access using ADO.NET- dataset, XML, debugging and tracing, Delegates & Events: Delegate Declaration, Sample Application, Chat Application using Delegates, += and -= Operator (Events), Chat Application using Delegates and Events, General Syntax for Delegates and Events.

[T1, T2] **[No. of Hours: 12]****Text Books:**

- [T1] Stephen Walther, "ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Pearsons Publication,  
 [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy  
 [T3] Chris Love, Marco Bellinaso, "ASP.NET 3.5 Website Programming Problem - Design – Solution," Wrox publication 2012



**Reference Books:**

- [R1] George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy  
 [R2] Imar Spaanjaars, "Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009  
 [R3] Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," Wiley publication, 2008  
 [R4] Matthew MacDonald, "The Complete Reference: ASP.NET", Tata McGraw Hill, 2002.  
 [R5] Jason N. Gaylord et al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013



**ENTERPRISE COMPUTING IN JAVA****Paper Code: ETIT-421****L T/P C****Paper: Enterprise Computing in JAVA****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: In this course student will learn about J2EE technology and will be able to develop dynamic websites. This course will explain how Enterprise JavaBeans (EJBs) contain the application's business logic and business data.*

**Pre-requisites: Core java****UNIT I**

**Introduction to J2EE and building J2EE applications:** MVC architecture, Introduction to servlets and its life cycle, problems with cgi-pipe interface, generic and http servlet, servlet configuration, various session tracking techniques, servlet context, servlet configuration, servlet collaboration.

**[T1, T2] [No. of Hours: 10]****UNIT II**

**JSP Basics and Architecture:** JSP directives, Scripting elements, standard actions, implicit objects, JSP design strategies.

**Struts:** Introduction to struts, its architecture, advantages and application of Struts.

**[T1, T2] No. of Hours: 12]****UNIT III**

**EJB Fundamentals:** EJB, EJB Echo system, J2EE technologies, Enterprise beans and types, distributed objects and middleware, developing EJB components, remote local and home interface, bean class and deployment descriptor.

**[T1, T2] [No. of Hours: 10]****UNIT IV**

**Introducing session beans:** Session bean, statefull and stateless session beans, lifecycle of session beans.

**Introducing Entity beans:** Persistence concepts, features of entity beans, entity context, Introduction to JMS & Message driven beans.

**[T1, T2] [No. of Hours: 10]****Text Books:**

[T1] Ed Roman, Scott W Ambler, Ted Neward, “Mastering Enterprise Java Beans”, Wiley, 2<sup>nd</sup> Ed., 2005.

[T2] Govind Sesadri, “Enterprise Java Computing: Application and Architectures”, Cambridge University Publications, 1999.

**Reference Books**

R1] Ted Neward, “Effective Enterprise Java”, Addison-Wesley, 2004.

R2] Jim Farley, William Crawford, “Java Enterprise in a Nutshell”, O’Reilly and Associates, 3<sup>rd</sup> Ed.

R3] Austin Sincock, “Enterprise Java for J2EE”, Apress Publications.

R4] Joe Wigglesworth and McMilan Paula, “Java Programming: Advanced Topic”, Thomson, 3<sup>rd</sup> Ed., 2003.

R5] Subrahmanyam Allamaraju, Colric Buent, “Professional Java Server Programming, J2EE”, Apress, 1.3 Ed., 2005.

R6] Ivan Bayross and Sharanam Shah, “Java Server Programming”, Shroff.

R7] John Hunt and Chris Loftus, “Guide to J2EE: Enterprise Java” Springer Verlag Publications.

R8] Govind Seshadri, “Enterprise Java Computing: Application and Architectures”, Cambridge University Press, 1999.

**SYSTEM AND NETWORK ADMINISTRATION****Paper Code: ETIT-423****L T/P C****Paper: System and Network Administration****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: This course is intended for B.Tech students, who wish to improve skills through hands-on experience in System Administration and Network Administration*

**System Administration****UNIT- I**

**System Hardware:** PC and Server Hardware Architecture, Operating System Administration, UNIX, Windows, MAC OS.

**Centralization and Decentralization:** Centralized Authentication, Active Directories; LDAP,

**Storage:** RAID, Storage Area Network (SAN), Direct Attached Storage (DAS), Network Attached Storage (NAS); Data Integrity Backup and Recovery.

[T1, T2] [No. of Hours: 11]

**UNIT- II**

**Lab Management:** System Configuration, Cloning, Monitoring and Administering them; workstations, server, Data centers Data Backup and Recovery; Administering, Surveillance, Access Control,

**Special Topics:** High Availability Computing, Virtualization and Cloud Computing.

[T1, T2] [No. of Hours: 11]

**Network Administration:****UNIT- III**

**Network administrator** (definition and functions), Network Planning, Routine system maintenance

**Computer Networks:** OSI & TCP/IP Model, clean architecture;

**Switching & Routing:** Layer 2 & 3 Switching; Routing; VLAN; Cisco 12 and L3 switch Configuration; DHCP Configuration; IPv6, Wireless LAN: 802.11 a/b/g/n/ac WiFi; Access Point and Wireless Router configuration.

[T1, T2] [No. of Hours: 11]

**UNIT-IV**

**Internet Architecture:** ISP Architecture; DNS Resolution; Content Mapping, Internet Applications: DNS, Web, Mail, Proxy, NTP;

**Perimeter Security:** Firewall, UTM,

**Network Security:** LAN and WLAN Security issues; IP Spoofing; Dictionary Attack; DoS and DDoS Attack; Rogue/Misconfigured/External APs; Network Troubleshooting: ping, traceroute, nslookup, dig, tcpdump; Network Monitoring; SNMP, MRTG.

[T1, T2] [No. of Hours: 11]

**Text Books:**

- [T1] Thomas A Limoli, Christina J. Hogan, Strata R. Chalup "Theory and Practise of System and Network administration" Addison-Wesley Professional; 2 edition 2007
- [T2] [Subramaniam Mani](#), [Subramaniam Mani](#) "Network Management: Principles And Practice" Pearson Education India, 2006

**References Books:**

- [R1] [Evi Nemeth](#), [Garth Snyder](#), [Trent R. Hein](#), [Ben Whaley](#) "UNIX and Linux System Administration Handbook" (4th Edition), 2010
- [R2] Craig Hunt, "TCP/IP Network Administration" "O'Reilly Media, Inc.", 2002
- [R3] [Bill McCarty](#) Learning Red Hat Linux "O'Reilly Media, Inc.", 2003



**GRID COMPUTING**

**Paper Code: ETIT-425**  
**Paper: Grid Computing**

L	T/P	C
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 enable students to understand the basic concepts of Grid computing with performance issues, Web services, monitoring, optimization, security and resource management.*

**UNIT I**

**Fundamentals:** Overview of Distributed Systems and its variants like grid computing, cloud computing, Cluster Computing etc. Introduction to Grid Computing, its components (Functional View, A Physical View, Service View), Key issues and benefits, Characterization and Architecture of Grid, Grid - Types, Topologies, Components, Layers, Grid Computing Standards and Applications.

[T1, T2] [No. of Hours: 11]

**UNIT II**

**Web Services and Grid Middleware:** OGSA and WSRE: Overview, Services, Schema and architecture. Grid Monitoring Systems: Overview, architecture, GridICE, JAMM, MDS and Other monitoring Systems (Ganglia and GridMon), Grid

[T1, T2] [No. of Hours: 11]

**UNIT III**

**Grid Security and Resource Management:**

**Grid Security:** A Brief Security Primer, PKI, X509 Certificates, Grid Security

**Grid Scheduling and Resource Management:** Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

[T1, T2] [No. of Hours: 11]

**UNIT IV**

**Data Management and Grid Middleware-**

**Data Management:** Categories and Origins of Structured Data, Data Management, Challenges, Database integration with grid, Architectural Approaches-Collective Data Management Services, Federation Services .  
**Grid Middleware:** List of globally available Middlewares, Globus Toolkit.

[T1, T2] [No. of Hours: 11]

**Text Books:**

[T1] Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons.

[T2] Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson 2004.

[T3] Ian Foster & Carl Kesselman, The Grid 2 - Blueprint for a New Computing Infrastructure, Morgan Kaufman - 2004.

**References Books:**

R1] C.S. R. Prabhu, "Grid and Cluster Computing", PHI 2014

R2] Barry Wilkinson, "Grid Computing", CRC Press

R3] Joel M. Crichlow, "Distributed Systems: Computing over Networks", PHI, 2014.

R4] RajKumar Buyya, "High Performance Cluster Computing - Volume I Architectures and Systems", Pearson, 2013.

**ADVANCED DATABASE ADMINISTRATION****Paper Code: ETIT-427****Paper: Advanced Database Administration**

L	T/P	C
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 advancements in the Database Administration that are required for the student to become a DBA.*

**UNIT-I**

**Creating a Database** – Database configuring Assistant (DBCA), Password management, Using DBCA to delete a database.

**Managing the database instance** – Management framework, starting and stopping database control, Initialising parameter files, starting up and shutting down database instance.

**Managing Database storage structure** – Storage structure, How table data is stored? Tablespaces and data files, Space Management in Tablespaces, Tablespace management.

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

**UNIT-II**

**Database user security** – Creating a user, Authenticating users, Unlocking a user account and resetting the password, Privileges and role, System privileges, object privileges.

**Managing Schema Objects** – Table types, Action with tables, creating views, sequences, What is partition and why use it? Creating a Partition, Partitioning method, index organised tables and heap tables, creating index-organised tables, cluster, cluster types, sorted hash cluster.

**Managing data and concurrency** – Manipulating with data through SQL, function procedure, packages, Triggers, locking concepts, detecting and resolving lock conflicts.

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

**UNIT-III**

**Managing undo Data** – Monitoring Undo, Administering Undo, Configuring Undo retention, Sizing Undo tablespace.

**Implementing database security** – database transparent encryption (TDE), TDE process, Implementing TDE.

**Performance management** – troubleshooting, tuning.

[T1][T2][No. of Hrs. 10]

**UNIT-IV**

**Performing Backup and Recovery** – Configuring Recovery Manager, using Recovery manager, Recovering from noncritical Losses, recovery from loss of control file, data file and redo file.

**Performing flashback** – Flashback database, Flashback database Architecture, Configuring flashback Database using enterprise manager, Monitoring Flashback database

**Moving data**- General Architecture, Loading data with SQL \*loader, Data pump, Data pump export and import.

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

**Text Books:**

[T1] Sam R. Alapati “ Expert Oracle Database 11g Administration ” Dreamtech Press.

[T2] Darl Kuhn “Pro Oracle Database 11g Administration”, Apress

**References Books:**

[R1] Ken Simmons, Sylvester, Carstarphen” Pro SQL Server 2012 Administration”, Dreamtech Press

[R2] Sheeri K Cabral, Keith Murphy,” MySQL Administrator's Bible” John Wiley &amp; Sons

[R3] Steve Fogel, Paul Lane, “Oracle Database Administrator's Guide, 10g” Oracle

[R4] Craig S. Mullins, “Database Administration”, Addison-Wesley

**PROBABILISTIC GRAPHICAL MODELS****Paper Code: ETIT-429****Paper: Probabilistic Graphical Models**

L	T/P	C
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 probabilistic graphical models, parameter learning, convexity and Bayesian networks.*

**UNIT-I**

Bayesian network, Examples (HMM, diagnostic system, etc.), Separation and independence, Markov properties and minimalists, Markov network, Examples (Boltzmann machine, Markov random field, etc.), Cliques and potentials, Markov properties

[T1, T2, R1][No. of Hrs. 11]

**UNIT-II**

Exact inference, Complexity, Bucket elimination, Junction tree, Belief propagation (message passing), Application to HMM, min- and max-product algorithms.

[T1, R1][No. of Hrs. 11]

**UNIT-III**

Parameter learning, EM, Gradient learning, Bayesian learning, Expectation-Maximization (EM)

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

**UNIT-IV**

Approximate inference, Convexity, Mean field approach, Structured variational method, Loopy belief propagation, Characterization of solution spaces, Sampling methods.

[T1, T2, R2][No. of Hrs. 10]

**Text Books:**

- [T1] Bayesian Networks and Beyond by Daphne Koller and Peter Friedman  
 [T2] An Introduction to Probabilistic Graphical Models by Michael I. Jordan

**Reference Books:**

- [R1] Probabilistic Networks and Expert Systems by Judea Pearl, Daphne Koller, and Spiegelhalter, Springer 1999.  
 [R2] Learning in Graphical Models by M. Jordan (ed.), MIT Press, 1999.

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**SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS****Paper Code: ETHS-419****L T/P C****Paper: Sociology and Elements of Indian History for Engineers****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 this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.*

**UNIT I**

*Module 1A: Introduction to Elements of Indian History: What is History? History Sources Archaeology Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.*

[3 Lectures]

*Module 1B: Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (class, caste, gender, power). State & civil society.*

[7 Lectures]

[T1][No. of Hrs. 10]

**UNIT II**

*Module 2A: Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.*

[3 Lectures]

*Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.*

[7 Lectures]

[T1][No. of Hrs. 10]

**UNIT III**

*Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.*

[3 Lectures]

*Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.*

[9 Lectures]

[T1][No. of Hrs. 12]

**UNIT IV**

*Module 4A: Issues & concerns in post-colonial India (upto 1991): Issues & concerns in post-colonial India 2<sup>nd</sup> phase (LPG decade post 1991)*

[3 Lectures]

*Module 4B: Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.*

[10 Lectures]

[T1][No. of Hrs. 13]

**Text Books:**

[T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.

[T2] Giddens, A (2009), Sociology, Polity, 6<sup>th</sup> Edition**Reference Books:**

[R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan

[R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

**ADVANCED COMPUTER NETWORKS LAB****Paper Code: ETIT-453****Paper: Advanced Computer Network Lab**

L	T/P	C
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. ATP/RARP protocols
  - b. RFP 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's down.
6. Configure FTP Server on 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 test.
7. Configure 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.**

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**CRYPTOGRAPHY & NETWORK SECURITY****Paper Code: ETIT-455****Paper: Cryptography & Network Security**

L	T/P	C
0	2	1

**List of Experiments:**

1. Design a program for encryption and decryption using mono-alphabetic substitution or poly-alphabetic substitution
2. Write a program to implement DES and AES algorithm for Encryption and Decryption.
3. Study of Account and password management. PAM, password cracking.
4. To configure common services like IIS, Apache, OpenSSH, WU-FTP.
5. Study of Security analysis tools: Nessus, Microsoft Baseline Security analyzer.
6. Study of Security configuration tools: Bastille, Microsoft IIS lockdown tool.
7. To identify organization's Firewall IP address
8. To determine organization's Firewall Access Control.

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



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WIRELESS COMMUNICATION LAB

Paper Code: ETEC-463

Paper: Wireless Communication Lab

L	T/P	C
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.



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**EMBEDDED SYSTEMS LAB**

**Paper Code: ETIT-459(ELECTIVE)**  
**Paper: Embedded Systems Lab**

L	T/P	C
0	2	1

**List of Experiments:**

1. Introduction to microcontroller and interfacing modules.
2. To interface the seven segment display with microcontroller 8051
3. To create a series of moving lights using PIC on LEDs.
4. To interface the stepper motor with microcontroller.
5. To display character 'A' on 8\*8 LED Matrix.
6. Write an ALP to add 16 bits using ARM 7 Processor
7. Write an ALP for multiplying two 32 bit numbers using ARM Processor
8. Write an ALP to multiply two matrices using ARM processor

NOTE:- At least 5 Experiments out of the list must be done in the semester.



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**SYSTEM AND NETWORK ADMINISTRATION LAB****Paper Code: ETIT-459(ELECTIVE)****L T/P C****Paper: System and Network Administration Lab****0 2 1****List of Experiments:****System Administration:**

1. To install two or more operating systems on a computer.
2. Installation of Red Hat Linux using Graphical mode.
3. Installation of Red Hat Linux using command prompt
4. Creating a user in Linux server and assigning rights
  - i. Configuring and Troubleshooting of /etc/inittab.
  - ii. Configuring and Troubleshooting of /etc/passwd
5. Configuring and Troubleshooting of /etc/grub.conf

**Network Administration:**

## Linux TCP/IP Network Configuration

## Practical Examples of Nmap Commands for Linux System/Network Administrators

The Nmap aka Network Mapper is an open source and a very versatile tool for Linux system/network administrators. Nmap is used for exploring networks, perform security scans, network audit and finding open ports on remote machine. It scans for Live hosts, Operating systems, packet filters and open ports running on remote hosts.

1. Scan a System and its IP Address
2. Scan Multiple Hosts
3. Scan a whole network
4. Scan Multiple Hosts using last octet of IP address
5. Enable OS Detection with Nmap
6. Scan a Host to Detect Firewall
7. Scan a Host to check its protected by Firewall
8. Scan Ports Consecutively
9. Print Host interfaces and Routes
10. Scan a TCP Port
11. Scan a UDP Port



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**DIGITAL SIGNAL PROCESSING LAB**

Paper Code: ETIT-459(ELECTIVE)  
 Paper: Digital Signal Processing Lab

L	T/P	C
0	2	1

**List of Experiments:****Software Experiments:**

1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
3. Perform linear convolution using circular convolution and vice versa.
4. Write a MATLAB program to
  - i. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
  - ii. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
5. Perform the following properties of DFT-
  - i. Circular shift of a sequence.
  - ii. Circular fold of a sequence.
6. Write a MATLAB Program to design FIR Low pass filter using
  - i. Rectangular window
  - ii. Hanning window
  - iii. Hamming window
  - iv. Bartlett window
7. Write a MATLAB program to design
  - i. Butterworth Approximation.
  - ii. Chebyshev Approximation.
  - iii. Elliptic Approximation.
 a Low pass / High pass / Band pass / Band stop IIR Filter using
  - i. Butterworth Approximation.
  - ii. Chebyshev Approximation.
  - iii. Elliptic Approximation.

**Hardware Experiments using Texas Instruments Kits-DSK 6713:**

8. Introduction to Code composer Studio.
9. Write a program to generate a sine wave and see the effect of CRC.
10. Write a Program to generate audio signal.
11. Write a program to demonstrate Band Stop filter by FIR.

**Additional Experiments:**

12. Write a program to generate a cos wave and see the output on LED.
13. Write a program to blink the LED.
14. Write a program to display a string on LCD.

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

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**MOBILE COMPUTING****Paper Code: ETIT-402****Paper: Mobile Computing**

L	T/P	C
3	1	4

**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.

*Objectives: Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionality of Mobile communication. To understand the concepts of Ad hoc and wireless sensor networks. Introduce Mobile Application Development environment.*

**UNIT-I**

**Mobile Physical Layer:** Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM air-interface, channel structure, location management: HLR-VLR, hierarchical handoffs, channel allocation in cellular systems, CDMA, GPRS.

**Mobile Computing Architecture:** Issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile systems, Mobile databases, WAP: Architecture, protocol stack, Data gram protocol, Wireless transaction security, Wireless transaction protocol, wireless session protocol, application environment, and

[T1] [T2][T3] [No. of Hrs. 12]

**UNIT-II**

**Mobile Data Link Layer:** Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling, Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

**Blue Tooth:** IEEE 802.15 Blue tooth, Physical, MAC layer and link management.  
Local Area Wireless systems: WPANs, LANs, Zig Bee, RFID, WiMax.

[T1] [T2][T3] [No. of Hrs. 11]

**UNIT-III**

**MOBILE IP Network Layer:** IP and Mobile IP Network Layer- Packet Classification and Handover Management- Location Management- Registration, Tunneling and encapsulation, Optimization- Dynamic Host Configuration Protocol, Ad Hoc network localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), VoIP –IPSec.

**Mobile Transport Layer:** Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP.

[T1] [T2][T3] [No. of Hrs. 11]

**UNIT-IV**

**Support for Mobility:** Data based data handling, Data dissemination, UA Prof and Caching, Service discovery, Data management, Data replication for mobile computer, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML.

Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbian OS, Android, Mobile Agents. Introduction to Mobile application language and tool kits.

[T1] [T2][T3] [No. of Hrs. 11]

**Course Outcomes:**

1. Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks. 2.
2. Understand the architectures, the challenges and the Solutions of Wireless Communication.
3. Realize the role of Wireless Protocols in shaping the future Internet.
4. Able to develop simple Mobile Applications Using Toll kit.

**Text Books:**

- [T1] J. Schiller, "Mobile Communications", 2<sup>nd</sup> edition, Pearson, 2011.  
 [T2] Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012.  
 [T3] Dharam prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3<sup>rd</sup> edition, Cengage learning 2013.

**Reference Books:**

- [R1] Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub, Aug – 2010  
 [R2] Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking, 2009 ( introduction, WLAN MAC)  
 [R3] Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010  
 [R4] M. V. D. Heijden, M. Taylor, Understanding WAP, Artem House.  
 [R5] Charles Perkins, Mobile IP, Addison Wesley.  
 [R6] Charles Perkins, Ad hoc Networks, Addison Wesley.  
 [R7] Uwe Hansmann, Lohar Mark, Martin S. Nicklous, Thomas Stober, "Principles of Mobile Computing", Springer.  
 [R8] Evaggelia Pitoura and George Samarou, "Data Management for Mobile Computing", Kluwer Academic Press, 1998

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Converter, phone book, Text Editor etc.,  
 Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

- [R1] Donn Felton "Application Development For Dummies", Wiley, 2010  
 [R2] Reto Meier "Android 2 Application Development", Wrox's Prog. to Programmer Series.  
 [R3] Ed Burnham "Introduction: Introducing Google's Mobile Development Platform' third edition Pragmatic Programmers, 2012  
 [R4] Jerome (J.T) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.  
 [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University Press, 2005.  
 [R6] R.Riggs, A. Divalsari, M. "Programming wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74657-1 Addison Wesley, 2001

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**ADHOC AND SENSOR NETWORKS****Paper Code: ETEC-406****Paper: Ad Hoc and Sensor Networks**

L	T/P	C
3	0	3

**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 Q. 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 prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.*

**UNIT I****Ad Hoc Wireless Networks:**

Introduction. Issues in Ad Hoc Wireless Networks. Ad Hoc Wireless Internet.

**MAC Protocols for Ad Hoc Wireless Networks:**

Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms. Contention-Based MAC Protocols with Scheduling Mechanisms. MAC Protocols in Directional Antennas. Other MAC Protocols

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

**UNIT II****Routing Protocols for Ad Hoc Wireless Networks:**

Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms. Hierarchical Routing Protocols. Power-Aware Routing Protocols.

**Transport Layer and Security Protocols for Ad Hoc Wireless Networks:**

Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer Solutions. TCP Over Ad Hoc Wireless Networks. Other Transport Layer Protocols for Ad Hoc Wireless Networks. Security in Ad Hoc Wireless Networks. Network Security Requirements. Issues and Challenges in Security Provisioning. Network Security Attacks. Key Management. Secure Routing in Ad Hoc Wireless Networks.

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

**UNIT III****Wireless Sensor Networks:**

Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues.

**Hybrid wireless Networks:**

Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks.

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

**UNIT IV****Wireless Geolocation Systems:**

Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems.

**Recent Advances in Wireless Networks:**

Introduction. Ultra-Wide-Band Radio Communication. Wireless Fidelity Systems. Optical Wireless Networks. The Multimode 802.11 -IEEE 802.11a/b/g. The Meghadoot Architecture, introduction to vehicular sensor networks.

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

**Text Books:**

- [T1] Siva Ram Murthy, C. and Manoj, B. S., Adhoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, (2004) 2nd ed.
- [T2] Perkins, Charles E., Ad hoc Networking, Addison Wesley, (2000) 3rd ed.

**Reference Books**

- R1] Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition.
- R2] Pahlavan, Kaveh., Krishnamoorthy, Prashant., Principles of Wireless Networks, - A united approach - Pearson Education, (2002) 2nd ed.
- R3] Wang X. and Poor H.V. Wireless Communication Systems, Pearson education, (2004) 3rd ed.
- R4] Schiller Jochen., Mobile Communications, Pearson Education, (2003) 2nd ed.
- R5] Carlos De Morais Cordeiro and Dharam P Agrawal, "Ad hoc and Sensor Networks- Theory & Applications", 2<sup>nd</sup> Ed. Cambridge Univ Press India Ltd



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**HUMAN VALUES & PROFESSIONAL ETHICS – II****Paper Code: ETHS-402****L T/P C****Paper : Human Values & Professional Ethics-II****1 0 1****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.
3. Two internal sessional test of 10 marks each and one project report\* carrying 5 marks.

**Objectives:**

1. The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
2. To enable student to understand the need and importance of value-education and education for Human Rights.
3. To acquaint students to the National and International values for Global development

**UNIT I - Appraisal of Human Values and Professional Ethics:**

**Review of Universal Human Values:** Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility. Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values.

**Sensitization of Impact of Media on Education and Media on Values:**

- a) Impact of Science and Technology on Values
- b) Effects of Print and Electronic Media on Values
- c) Effects of computer on Values (Internet, e-mail, Chat etc.)
- d) Role of teacher in the preservation of tradition and culture.
- e) Role of family, tradition & community prayers in value development.

**Review of Professional Ethics:** Accountability, Collegiality, Royalty, Responsibility and Ethics Living Engineer as a role model for civil society. Living in harmony with 'SELF'. Four orders of living, their inter-correctness, Holistic technology (eco-friendly, sustainable technology).

[T1][T2][R1][T5][R4][No. of Hrs. 03]

**UNIT II – Engineers responsibility for safety:**

Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology, Technology assessment. The Perils of Technological Optimism – The Promise of Technology – Computer Technology Privacy.

**Some Case Studies:** Case Studies, BHOPAL Gas Tragedy, Jucos, Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

[T1][T2][R4][R2][No. of Hrs. 03]

**UNIT III – Global Issues**

**Globalization and MNCs:** International Trade, Issues,

**Case Studies:** Kellogg's, Satyam, Infosys Foundation, TATA Group of Companies

**Business Ethics:** Corporate Governance, Finance and Accounting, I.R.

**Corporate Social Responsibility (CSR):** Definition, Concept, ISO, CSR.

**Environmental Ethics:** Sustainable Development, Eco-System, Ozone depletion, Pollution.

**Computer Ethics:** Cyber Crimes, Data Stealing, Hacking, Embezzlement.

[T1][T2][R4][No. of Hrs. 05]

**UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:**

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

**Development and implementation of Codes:** Oath to be taken by Engineering graduates and its importance\*\*,

[T1][T2][R4][R2][No. of Hrs. 05]



**Text Books:**

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.  
 [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

**References Books:**

- [R1] Human Values and Professional Ethics. R. R. Gaur, R. Sangal and G. P. Bagaria, Eccl Books (2010, New Delhi). Also, the Teachers" Manual by the same author  
 [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press  
 [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.  
 [R4] Professional Ethics and Human Values – M Govindarajan, S Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi  
 [R5] A Textbook on Professional Ethics and Human Values – R.S. Nagarajan – New Age International (P) Limited, Publishers New Delhi.  
 [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT. LTD New Delhi.  
 [R7] Mike Martin and Ronald Schinzinger, "Ethics in Engineering" Mc Graw Hill  
 [R8] Charles L. Harris, Michael J Rabins, "Engineering Ethics, Cengage Learning  
 [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications  
 [R10] Caroline Whitback, "Ethics in Engineering Practice and Research, Cambridge University Press  
 [R11] Charles D. Fleddermann, "Engineering Ethics", Prentice Hall.  
 [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning  
 [R13] C. Sureshchandra, The Source book of Value Education, NCERT  
 [R14] M. Chery; Dhartiya Sanskriti, Agra (Dayalbagh)

\*Any topic related to the syllabus of the B.Tech student in the assimilation and implementation of human values and professional ethics in the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent development in professional ethics particularly related to engineering profession.

\*\*All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available alongwith the scheme and syllabus.



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**BIG DATA ANALYTICS****Paper Code: ETIT-406****L T/P C****Paper: Big Data Analytics****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 introduce the students about knowledge of Data Management, Big Data stacks and Data analysis.*

**UNIT-I**

**Big Data Introduction:** The Evolution of Data Management, Defining Big Data, Traditional and advanced analytics. Distributed Computing, need of distributed computing for big data, economics of computing, latency problem.

Examining Big Data Types, Structured Data, sources of big structured data, role of relational databases in big data, Unstructured Data, sources of unstructured data, role of a CMS in big data management.

[T1][R1][No. of Hrs. 11]

**UNIT-II**

**Big Data Stack:** Redundant Physical Infrastructure, Security Infrastructure, Operational Databases. Organizing Data Services and Tools, Analytical Data Warehouses, Big Data Analytics, Big Data Applications. **Virtualization and Cloud:** Server virtualization, Application virtualization, Network virtualization, Processor and memory virtualization, Disk and storage virtualization, Managing Virtualization with the Hypervisor.

[T1][No. of Hrs. 10]

**UNIT-III**

MapReduce Fundamentals, Writing map and reduce together, Optimizing MapReduce Tasks. Hadoop, Hadoop Distributed File System (HDFS), Name Nodes, Data nodes, Hadoop MapReduce.

[T1][T2][R1][No. of Hrs. 11]

**UNIT-IV**

**Big Data Analytics:** Basic analytics, Advanced analytics, Operational analytics, Monetizing analytics, Text Analytics and Big Data, Social media Analytics, Analytics Tools for Big Data, Intensity, Clarabridge, OpenText.

**Integrating Data Sources:** Dealing with Real-time Data Streams and Complex Event Processing, Operationalizing Big Data, Applying Big Data within Your Organization, Security and Governance for Big Data Environments.

[T1][No. of Hrs. 11]

**Text Books:**

[T1] Judith S. Hurwitz, Alan F. Nugent, Tom Halper, Margot M. Kaufman, "Big Data For Dummies", John Wiley & Sons, Inc.(2013)

[T2] Robert D. Schneider, "Hadoop For Dummies" John Wiley & Sons, Inc (2012)

**Reference Books:**

[R1] Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, by Paul Zikopoulos, McGraw Hill, 2011.

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SOCIAL NETWORK ANALYSIS

**Paper Code: ETIT-408**  
**Paper: Social Network Analysis**

L	T/P	C
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 introduce the students about knowledge of social network analysis and framework for network analysis.*

**UNIT-I**

Social network analysis: network definition, manipulation, calculation, visualization. Graph terminology and definitions. Representing networks: Adjacency matrix and properties. Weighted, directed, bipartite networks. Trees. Some simple networks.

[T1, R1][No. of Hrs. 10]

**UNIT-II**

Linear Algebra / Graph Properties: Eigenvectors and eigenvalues. Graph Laplacian. Markov matrices. Paths, walks, cycles. Degree, density, Degree distribution. Diameter, average path length. Average and local clustering. Centrality measures: degree, betweenness, closeness, Katz, Bonacich. Review of Poisson and growing random networks. Preferential attachment. Properties and phase transitions. Degree distribution of real networks to data. Exponential random graph models.

[T1][No. of Hrs. 11]

**UNIT-III**

Frameworks for evaluating results in network analysis: autocorrelation, matching technique, QAP regression, exponential random graphs, and other models. Computational considerations. Lab: Applying ERGM analysis. Graph partitioning. Spectral partitioning. Modularity and modularity maximization. Betweenness clustering. Lab: Calculating and comparing clustering approaches.

[T1][No. of Hrs. 11]

**UNIT-IV**

Game theory basics: players, moves, payoffs. Nash equilibrium. Efficiency and optimality. Examples. Network formation as a game. Pairwise stability. Positive and negative externalities. Processes on Networks: Diffusion on networks. SIS and SIR infection models and predictions. Search on networks. Networked adoption game.

[T1][No. of Hrs. 10]

**Text Books:**

[T1] Jackson, M. O. Social and Economic Networks. Princeton U. Press, 2008. ISBN: 978-0-691-14820-5.

**Reference Books**

[R1] Social Network Analysis (Google eBook), John Scott, SAGE, 2012

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**SOFT COMPUTING****Paper Code: ETIT-410****Paper: Soft Computing**

L	T/P	C
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 various concepts of neural networks and fuzzy logic.*

**UNIT-I****Neural Networks:**

History, overview of Biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms-perceptions Training rules, Delta Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

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

**UNIT-II****Fuzzy Logics**

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation

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

**UNIT-III****Fuzzy Arithmetic**

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Quantifiers, Fuzzy Inference, Uncertainty based Information:

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

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

**UNIT-IV****Introduction of Neuro-Fuzzy Systems:**

Architecture of Neuro Fuzzy Networks

**Application of Fuzzy Logic:**

Medicine, Economics etc.

**Genetic Algorithm:**

An Overview, GA in problem solving, Implementation of GA.

[T1, T2][No of Hrs 11]

**Text Books:**

- [T1] Hertz J. Krogh, R.G. Palm III, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
- [T2] G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
- [T3] Melanie Mitchell, "An Introduction to Genetic Algorithms", PHI, 1998.
- [T4] F. O. Karray and C. de Silva, "Soft computing and Intelligent System Design", Pearson, 2009.

**Reference Books:**

- [R1] "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
- [R2] Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).

**BIOINFORMATICS**

**Paper Code: ETIT-412**  
**Paper: Bio Informatics**

L	T/P	C
3	0	3

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

- 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.
- 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 Bioinformatics using Machine Learning.*

**UNIT- I**

**Introduction:** Biological data in digital symbol sequences, genomes, proteins and proteomes, biological sequences, molecular function and structure. Biological Databases: Sequence databases, mapping databases, information retrieval, genomic databases.

**Machine Learning Foundations:** The probabilistic framework and examples.

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

**UNIT- II****Machine Learning**

Algo thms

$$\int_0^{\pi/2} \cos^n \theta d\theta$$

Introduction, dynamic programming, gradient descent, EM/GEM algorithms, Markov-Chain Monte Carlo methods, simulated annealing, evolutionary and genetic algorithms, learning algorithms.

**Neural Network:** Theory and Applications. Hidden Markov Models: Theory and applications

[T1][No. of hrs. 12]

**UNIT- III**

Probabilistic graphical models in bioinformatics, Markov Models and RNA stemmatics, gene finders, hybrid models and neural network parameterization of graphical models, single model case, bidirectional recurrent neural networks for protein secondary structure prediction.

Probabilistic models of evolution: Phylogenetic trees.

[T1] [No. of hrs. 11]

**UNIT-IV**

Stochastic grammars and linguistics: Introduction, formal grammars, Chomsky hierarchy, applications of grammars, learning algorithms, applications of CGH, Gene Microarrays and gene expression: Introduction. Probabilistic modelling of array data, clustering, gene regulation.

[T1][No. of hrs. 10]

**Text Books:**

[T1] P.Baldi, S.Brunak, "Bioinformatics: The machine learning approach" 2<sup>nd</sup> Edition, MIT Press.

[T2] A.D.Baxevanis, B.F. Quellette, "Bioinformatics: A Practical guide to the analysis of genes and proteins" 3<sup>rd</sup> Edition, Wiley-Interscience.

**References Books:**

R1] TK Attwood & DJ Parry-Smith, "Introduction to Bioinformatics", Pearson Education

R2] Edward Keedwell and Ajit Narayanan, "Intelligent Bioinformatics" John Wiley & Sons, Ltd.

R3] A Tramontano, "Introduction to Bioinformatics", Chapman & Hall/CRC.

R4] D.Roy, "Bioinformatics", Narosa Publishing House

R5] David Mount. "Bioinformatics: sequence and genome analysis". Cold spring harbour Lab

**WEB APPLICATION DEVELOPMENT USING .NET****Paper Code: ETIT-414****L T/P C****Paper: Web Application Development Using .NET****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: This course teaches how to develop business applications using .NET 3.5. It starts with C# and VB.NET languages and then move on to developing web applications using ASP.NET. It teaches LINQ and AJAX, new extensions to ASP.NET 3.5*

**UNIT I**

**Introduction to .NET 3.5:** Introduction to .NET Framework, Components of .NET - CLR and Class Library (MSIL, CTS etc).

**Introduction to C# 3.0:** Language elements of C#, OOP with C#, Properties and static members, Inheritance, overriding and shadowing, Runtime polymorphism - virtual and abstract methods, Boxing, unboxing, Interfaces and structures, Exception Handling. Introduction to VB.NET 9.0: structure of VB.NET, Control structures, OOP with VB.NET Properties, Default properties, Inheritance, overriding and shadowing, Interfaces, structures and Exception handling

**[T1, T2][No. of Hrs. 12]****UNIT II**

**Fundamentals of ASP.NET:** Server-side scripting, create simple ASP.NET, Server-side event processing, Validation Controls, Search Controls and Navigator related controls, Master pages and themes, Cookies and their application, Sessions and Applications, Working with GLOBAL.ASAX, Error handling, Debugging and tracing, Page output caching, Data caching.

**MS SQL Server:** Architecture of SQL Server, Using Query Analyzer, Working with Transact SQL, stored procedures and functions, creating database triggers.

**ADO.NET:** Introduction, SQL Connection and, SQL Data reader object to access SQL Server, connect to Ms Access, and Oracle, Data set, Data Table etc. Retrieving and manipulating data using Grid View, Details View, List View, Form View and Data List, Calling stored procedures of SQL Server.

**[T1, T2][No. of Hrs. 12]****UNIT III**

**XML:** introduction, well-formed XML and valid XML, SOAP and SAX, XML Reader and writer, Validating XML with Schema and DTD, Loading data from XML to Database, Writing data from Database to XML, Transforming XML content using XSLT.

**Web Services:** introduction, role in web applications, Component and protocols - SOAP, WSDL, Proxy class, create web service, Web services accessing database.

**Advanced Programming:** Operator overloading, Conversion operators, Delegates, Multithreading, Event Handling, Generics, Iterators, Auto properties, Lambda Expressions.

**[T1, T2][No. of Hrs. 11]****UNIT IV**

**LINQ:** Language Integrated Query: LINQ to Objects, LINQ to SQL, Object-Relational Mapping, LINQ to XML.

**AJAX:** What is AJAX, related technologies, Using ASP.NET AJAX – Script Manager, Update Panel, Timer, Update Progress etc., Using ASP.NET AJAX Control Toolkit – Always Visible Control, AutoComplete, Confirm Button, Filtered Text Box etc., Calling Web Services using AJAX.

**[T1, T2][No. of Hrs. 10]****Text Books:**

- [T1] Stephen Walther, "ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Sams Pearsons Publication,
- [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy Edition
- [T3] Chris Love, Marco Bellinaso, "ASP.NET 3.5 Website Programming Problem - Design – Solution," Wrox publication 2012



**Reference Books:**

- [R1] George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy Edition
- [R2] Imar Spaanjaars, "Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009
- [R3] Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," wiley publication, 2008
- [R4] Matthew MacDonald, "The Complete Reference. ASP.NET", Tata McGraw Hill, 2002.
- [R5] Jason N. Gaylord et al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013



**GURU GOBIND SINGH  
INDRAPRASTHA  
UNIVERSITY**

VLSI DESIGN

Paper Code: ETIC-414

Paper: VLSI Design

L	T/P	C
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 Q. 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 prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.*

**UNIT I**

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances. NMOS inverter, CMOS inverter,  $t_{C}$  characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effects, latch up in CMOS.

[T1, T2][No. of Hours: 11]

**UNIT II**

Stick diagram and design rules, EDA based design rules, switching characteristics & interconnection effects: rise time, fall time delay, propagation delay. CMOS logic gates: NAND, NOR, OR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor logic, transmission gate designs, Pseudo NMOS logic.

[T1, T2] No. of Hours: 11]

**UNIT III**

Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

[T1, T2][No. of Hours: 11]

**UNIT IV**

VLSI designing methodology, design flow, design hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer-aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

[T1, T2][No. of Hours: 11]

**Text Books:**

- [T1] Basic VLSI Design - Pucknell Douglas A., Eshraghian Behnam, PHI Learning Pvt Limited, 2013.  
 [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective - 4th Edition", Pearson Education, India

**Reference Book:**

- R1] S. M. Kang, Y. Leblebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3<sup>rd</sup> Edition.  
 R2] Digital Integrated Circuit Design- Ken Martin, Oxford University Press  
 R3] The MOS Transistor- Yanis Tsividis and Chm Zorandev, Oxford University Press, 2013  
 R4] J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India  
 R5] J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY  
 R6] Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14

**INFORMATION THEORY AND CODING****Paper Code: ETIT-416****Paper: Information Theory and Coding**

L	T/P	C
3	0	3

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

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

*Objective: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.*

**UNIT-I**

Review of Probability Theory, Random Variables and Random Process, Information Theory Introduction, Uncertainty, Information, and Entropy, Information Rate, Conditional and Joint Entropies, Source Coding Theorem, Data Compaction, Prefix Coding, Kraft McMillan Inequality, Huffman Coding, Lempel Ziv Coding, Discrete Memoryless Channels, Mutual Information, Markov Sources, Channel Capacity.

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

**UNIT-II**

Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem for multi-carriers, Information Capacity of a colored noise channel. Discrete Memoryless Channels and Channel Coding theorem revisited.

[T1, T2, R1, R5][No. of Hrs. 10]

**UNIT-III**

Linear Block codes, Cyclic Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

[T1, R2, R4][No. of Hrs. 11]

**UNIT-IV**

Decoding of Convolutional Codes, Viterbi algorithm, Maximum likelihood decoding, Interbit algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes, Introduction to Cryptography.

[T1, R2, R3, R5] [No. of Hrs. 11]

**Text Books:**

- [T1] Simon Haykins, "Communication Systems", 4<sup>th</sup> Edition, Wiley, 2001.  
[T2] J G Proakis, "Digital Communications" Mc Graw Hill, 2001.

**Reference Books:**

- [R1] T M Gover, J M Thomas, "Elements of Information Theory", Wiley, 1999  
[R2] Arijit Saha, Nilotpa Majumdar, Surjit Mandal, "Information Theory, Coding and Cryptography", Pearson Education, 2013.  
[R3] Schaum's Outlines, Analog and Digital Communications, Second Edition  
[R4] Amitabha Bhattacharya, "Digital Communications", TMH, 2006  
[R5] J. H. van Lint.. Introduction to Coding Theory, Springer -Verlag.



**HUMAN COMPUTER INTERACTION****Paper Code: ETCS-404****L T/P C****Paper: Human Computer Interaction****3 0 3****INSTRUCTIONS TO PAPER SETTERS:  
MARKS: 75****MAXIMUM**

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

*Objective: To introduce the students about the interaction between and computer and human being.*

**UNIT I**

**Introduction:** The Human, The Computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles and Theories.

**Design Process:** Interaction design basics, HCI in the software process, Design roles, Implementation support, Evaluation techniques, Universal design, User Support.

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

**UNIT II**

**Models and Theories:** Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction.

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

**UNIT III**

**Interaction Style:** Interaction and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command Languages, Interaction Devices, Collaboration and Social Media Participation.

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

**UNIT IV**

**Design Issues:** Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization.

**Outside the Box:** Group ware, Ubiquitous and augmented realities, Hypertext, Multimedia and the World Wide Web.

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

**Text Books:**

- [T1] Alan Dix, Janet Finlay, "Human Computer Interaction", ISBN: 978013017035 Pearson Education, 2004.
- [T2] Ben Shneiderman, "Designing the User Interface-Strategies for Effective Human Computer Interaction", ISBN:9788131732557, Pearson Education, 2010

**Reference Books:**

- R1] Usability Engineering: Scenario-Based Development of Human-Computer Interaction, by Rosson, M. and Carroll, J. (2002)
- R2] The Essentials of Interaction Design, by Cooper, et al., Wiley Publishing (2007)
- R3] Usability Engineering, by Nielsen, J., Morgan Kaufman, San Francisco, 1993. ISBN 0-12-518406-9
- R4] The Resonant Interface: HCI Foundations for Interaction Design, by Heim, S., Addison-Wesley. (2007)
- R5] Usability engineering: scenario-based development of human computer interaction, By Rosson, M.B & Carroll, J.M., Morgan Kaufman.(2002).

**DIGITAL IMAGE PROCESSING**

**Paper Code: ETIT-418**  
**Paper: Digital Image Processing**

L	T/P	C
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.

*Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.*

**UNIT- I:**

**Introduction and Digital Image Fundamentals:** The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures, Image Arithmetic, Linear and Non Linear Operations.

**Image Enhancement in the Spatial Domain:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Color Image Enhancement Methods. [T1, T2][No. of Hrs: 10]

**UNIT- II:**

**Filtering in the Frequency Domain:** Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Processes, Noise Models, Restoration in the presence of Noise Only, Spatial Filtering, Image Restoration by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations. [T1, T2][No. of Hrs. 12]

**UNIT- III:**

**Image Compression:** fundamentals of compression, coding redundancy, lossy and lossless compression, Spatial and temporal redundancy, Image compression models, Some basic compression methods

**Image Segmentation:** Detection of Discontinuities, edge finding and boundary detection, Region Oriented Segmentation, Motion based segmentation. [T1, T2][No. of Hrs. 12]

**UNIT- IV:**

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

**Object Recognition:** Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods. [T1, T2][No. of Hrs: 10]

**Text Books:**

- [T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3<sup>rd</sup> edition, Pearson, 2002.  
 [T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

**Reference Books:**

- [R1] Bernd Jahne, "Digital Image Processing", 5<sup>th</sup> Ed., Springer, 2002.  
 [R2] William K Pratt, "Digital Image Processing: Pks Inside", John Wiley & Sons, 2001.

**NEXT GENERATION NETWORKS****Paper Code: ETIT-420****L T/P C****Paper: Next Generation 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.

*Objectives: The objective of this paper is to introduce the students about the advanced and next generation networks and wireless access and transportation technologies.*

**UNIT I****Converged Services for Next Generation Networks**

GSM/UMTS Network protocols: SS7 and ITU-T standards basics, Supplementary Services, UMTS procedures, Intelligent Networks, IN principles, CAMEL, Services: what are the challenges?, Integration, deployment issues, Next Generation Networks: IMS: the convergence, NGN architecture, NGN control architectures and protocols, Multi-access to the services: 3G, WiFi, DSL, Cable, TISPAN, SIP, Service architectures, Transition of networks (PSTN, IP-based) to NGN, IPv6-based NGN, MEGACO, H.248, P2P systems, P2P SIP, Social Networks: Web-NGN convergence, Telco 2.0, IPTV, RCS, UMTS ITU-T standardized on at 3GPP: Standardisation process and principles in ETSI and 3GPP, Evolved functionalities ITU-T standardized in UMTS from Release 99 to Release 9, Latest 3GPP updates: what happens in 2014.

**[T1, T2][No. of Hrs. 12]****UNIT II****Wireless Access and Transport Technologies**

RAN architecture: Radio Access Network Architecture for GSM, GPRS and UMTS, network devices, interfaces and protocols, QoS definition and management in GPRS and UMTS, Access methods and radio resource management in mobile networks, mainly for: TDMA systems, CDMA systems and OFDMA systems. Scheduling issues for GPRS, UMTS and WiMAX: downlink and uplink logical to physical channel mapping: for GSM, for UMTS Procedure and protocol for resource allocation, RPF Context and TBF allocation.

**[T1][No. of Hrs. 12]****UNIT III****WPAN, WLAN, WMAN and Broadcast technologies**

WLAN, WPAN, WMAN, DVB-H Introduction, WiFi: Standards, performance, usage and applications, new evolutions, WiMAX, DVB-H: Standards and standard, Security: Basics, architectures, algorithms, Bluetooth: Standard, performance, usage and applications, ZigBee, UWB: Standards and usage, Service discovery in wireless Networks (jxta, UPnP,...), Security in Wireless Networks: PANs, LANs and cellular Wireless Networks Simulation (tools and methods)

**[T1][No. of Hrs. 10]****UNIT IV****Optimization: Theory and Network applications**

Graph algorithms, linear programming basic, Introduction to Integer programming, Traffic engineering, Network topology calculus, Network optimal routing and dimensioning, Frequency assignment, Pricing, Game theory.

**[T2][No. of Hrs. 10]****Text Books:**

- [T1] Next Generation Network Services: Technologies & Strategies by Neill Wilkinson, Publication, 2002 ISBN-10: 0471486671 | ISBN-13: 978-0471486671 | Edition: 1.
- [T2] Next Generation Networks: Perspectives and Potentials by Jingming Li Salina, Pascal Salina, Publisher: John Wiley & Sons, 2008, ISBN: 0470724471, 9780470724477.

**Reference book:**

- [R1] Next-Generation Network Services: By Robert Wood, Published Nov 1, 2005 by Cisco Press. Part of the Networking Technology series
- [R2] Best Practices for Implementing Next Generation Networks (NGN) in the Asia and Pacific Region, International Telecommunication Union, Telecommunication Development Bureau, June 2012.



**GPS AND GIS****Paper Code: ETIT-422****L T/P C****Paper: GPS and GIS****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

*Objectives: To study the fundamentals and scope of Global Information System and Global Positioning System.*

**UNIT- I**

**Global Information System (GIS):** Introduction, scope and benefits of GIS; application areas of GIS; functional components and elements of GIS; geographic objects: scale, accuracy and resolution.

**GIS Cartography and Maps:** Digital cartography; selection, classification and simplification; exaggeration and symbolization for cartographic abstraction; Types of Maps; map elements: projection, direction, scale and co-ordinates; Geodatabases; GIS map outputs; Topographic mapping.

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

**UNIT- II**

**Geographic Data:** Spatial and attribute data; vector and raster models; points, lines, polygon features; computed and associated attributes; grids, cells and image data; linking spatial and attributed data.

**Geoprocessing:** Geographical information system: latitudes and longitudes; Geoids Spheroids ellipsoids and datum's; projection systems.

[T1,T2][No. of Hrs: 10]

**UNIT- III**

**Global Positioning System (GPS):** Introduction; GPS components: systems, scales and codes; error and accuracy of GPS observation; Differential GPS.

**Fundamentals of Satellite Orbits:** Orbital Mechanics, Constellation Design

**Remote Sensing (RS):** Introduction, application of RS; electromagnetic radiation; spectral signatures; aerial/satellite image characteristics; remote sensing radiometric and temporal.

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

**UNIT- IV**

**Statistics:** Spatial statistics; independent and dependent variables; continuous data: sampling, correlation, regression, frequency and descriptive analysis; discrete data.

**Interpolation:** Characteristic interpolation; deterministic interpolators; even gridding interpolators.

[T1,T2][No. of Hrs: 10]

**Text Books:**

**Note: There is no single textbook for this course. Suggested Readings:**

- T1] Burrough, P.A. and P. A. McDonnell, Principles of Geographic Information System, Oxford University Press, Oxford.
- T2] Chang, K.T., Introduction to Geographic Information System, Tata Mc Graw-Hill, New Delhi.
- T3] Heywood, I. et. al., An Introduction to Geographic Information Systems, Pearson Education, Delhi.
- T4] Clarke, K., Analytical and Computer Cartography, 2<sup>nd</sup> Ed. Upper Saddle River.
- T5] Garmin Corporation., GPS Guide for Beginners available at <http://www.garmin.com/manual/gps4beg.pdf>
- T6] LLiffe, J.C., Datum and Map Projections for remote Sensing, GIS and Surveying. New York : CRC Press.
- T7] Curran, Paul J., Principles of Remote Sensing, Longman, London & New York.
- T8] Lillesand, T. and R. Kiefer, Remote Sensing and Image Interpretation, Wiley, New York.

SATELLITE COMMUNICATION

Paper Code: ETEC-404

Paper: Satellite Communication

L	T/P	C
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.

*Objectives: To study the most relevant aspects of satellite communication with emphasis on the most recent application & developments. It covers orbital mechanics, launching techniques, satellite link design, earth & space segment, error control coding and different multiple access techniques.*

**UNIT- I**

**Principles of Satellite Communication:** Evolution & growth of communication satellites, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite applications of satellite communication, Synchronous satellite, Satellite Launch.

**Satellite Orbits:** Introduction, Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo-stationary and non Geo-stationary orbits, LEO, MEO, Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage.

[T1, T2, R1][No. of Hrs. 11]

**UNIT- II****Satellite Link Design**

Basic transmission parameters, temperature, G/T ratio, design of down links, uplink design, design of specified C/N, Atmospheric attenuation, Rain induced attenuation.

**Space Segment:** Power Supply, Altitude Control, Station Keeping, Thermal Control, TT&C sub system, Transponders, Antenna Sub system.

**Earth Segment:** Subsystem of earth station, Transmit-Receive Earth Station, different types of earth stations, frequency coordination.

[T1, T2, R1][No. of Hrs. 11]

**UNIT- III**

**Multiple Access Techniques:** FDMA, FDMA down link analysis, TDMA, Satellite-switched TDMA, code division multiple access, DS-SSMA, On board signal processing for FDMA/TDMA Operation.

**Error Control for Digital Satellite Links:** Error detection and correction for digital satellite links, error control coding, Convolutional codes, satellite links concatenated coding and interleaving, Automatic Repeat Request (ARQ).

[T1, T2, R2][No. of Hrs. 10]

**UNIT- IV**

**Interconnection of Satellite Networks:** Interconnection with ISDN, Interconnection of television networks.

**Satellite Applications:** Satellite mobile services, VSAT, GPS, Radarsat, INMARSAT satellite navigational system. Direct broadcast satellites (DBS)- Direct to home Broadcast (DTH), Worldspace services, Business TV(BTV)

[T1, R2, R3][No. of Hrs. 10]

**Text Books:**

- [T1] Dennis Roddy, "Satellite Communication", McGraw Hill International.  
 [T2] T. Pratt, "Satellite Communication", John Wiley and Sons (Asia) Pvt. Ltd.

**Reference Books:**

- [R1] T. Ha, "Digital Satellite Communication", McGraw Hill.  
 [R2] Bruce R. Elbert, "The Satellite Communication Applications Handbook", Artech House Boston.  
 [R3] Mark R. Chartrend, "Satellite Communication" Cengage Learning  
 [R4] Handbook of Satellite Communication, Wiley.

**E-COMMERCE AND M-COMMERCE****Paper Code: ETIT-428****Paper: E-Commerce and M-Commerce**

L	T/P	C
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 impart knowledge about the fundamentals and advancements in the fields of Electronic Commerce (E-Commerce) and Mobile Commerce (M-Commerce) with the aim of enabling the students to explore the possibilities of practical applications and research aspects in the field of integrating business with Information Technology.*

**UNIT I**

Introduction and Concepts: Networks and commercial transactions – Internet and other novelties, networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; prominent cryptographic applications.

Electronic Payment Methods: Integrating traditional transactions; secure online transaction models; Online commercial environment; digital currencies and payment systems; Offline secure processing; private data networks.

[T1] [T2] [R1] [R4] [No. of Hrs. 10]

**UNIT II**

Protocols for Public Transport of Private Information: Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non technical provide.

Electronic Commerce Providers: On-line Commerce options: Company profiles.

Electronic Payment Systems: Digital payment systems; First virtual payment system; cyber cash model.

On-line Commerce Environments: Commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.

Digital Currencies: Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus internet and EDI over internet.

Strategies, Techniques and Tools: Internet Strategies, Internet Techniques, Shopping techniques and online selling techniques; Internet tools.

[T1] [R5] [No. of Hrs. 11]

**UNIT III**

Supply chain management: Introduction, What is supply chain management? Focus on the value chain, Option for restructuring the supply chain, Using e-business to restructure the supply chain, Supply chain management implementation.

E-procurement: Introduction, What is e-procurement?, Drivers of e-procurement, Focus on estimating e-procurement cost savings, Risk and impact of e-procurement, Implementing e-procurement, Focus on electronics B2B marketplaces, The future of e-procurement? Customer relationship management: Introduction

What is e-CRM?, conversion marketing, the online buying process, customer acquisition management, focus on marketing communications for customer acquisition, customer retention management focus on excelling in e-commerce service quality, customer extension Analysis and design: Introduction, process modeling, Data modeling, Design for e-business, Focus on user –centered site design, Focus on security design for e-business.

Implementation and maintenance: Introduction, Alternatives for acquiring e-business systems, Development of web based content and services, focus on developing dynamic web content, testing, Changeover, Content management and maintenance, Focus on measuring and improving performance of e- business systems.

[T2] [R2] [R3] [No. of Hrs. 10]



**UNIT IV**

Introduction to M-commerce: Emerging applications, different players in m-commerce, M-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management.

Management of mobile commerce services, Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services; emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services.

[T2] [R1] [R4] [No. of Hrs. 10]

**Text Books:**

- [T1] Ravi Kalakota, Andrew B. Whinston, "Frontiers of E-Commerce", 1<sup>st</sup> Edition, Sept. 1996, Addison Wesley Longman
- [T2] Dave Chaffey, "E-Business and E-Commerce Management", 3<sup>rd</sup> Edition, 2009, Pearson Education.

**References Books:**

- [R1] Henry Chan, Raymond Lee and etl., "E-Commerce Fundamental and Applications", 1<sup>st</sup> Edition, Nov. 2001, Wiley
- [R2] Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group, 2003.
- [R3] Nansi Shi, "Mobile Commerce Applications", IGI Global, 2004.
- [R4] Gary P. Schneider, "Electronic Commerce", Tenth Edition, May 2012, CENGAGE Learning India
- [R5] K. K. Bajaj, D. Nag "E-Commerce", 2<sup>nd</sup> Edition, Sept. 2005, McGraw Hill Education.
- [R6] P. T. Joseph, "E-Commerce an Indian Perspective", 4<sup>th</sup> Edition, July 2013, PHI Publication.
- [R7] Bhaskar Bharat, "Electronic Commerce - Technology and Application", 4<sup>th</sup> Edition, May 2013, McGraw Hill Education.



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**DISTRIBUTED SYSTEMS**

**Paper Code: ETIT-430**  
**Paper: Distributed Systems**

L	T/P	C
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 networking, operating systems and various issues.*

**UNIT-I****Fundamentals of Distributed Computing:**

Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing.

**Distributed Operating Systems:**

Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.

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

**UNIT-II****Communication:**

Layered protocols, RPC, RMI, Remote objects. Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Message Passing, PVM and MPI.

**Process Concepts:**

Threads, Clients and Servers, Migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

[T1][No. of Hours 10]

**UNIT-III****Synchronization:**

Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems.

**Distributed Databases:**

Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

[T2][No. of Hours 11]

**UNIT-IV****Processing:**

Basic Concepts: Introduction to processing, processing terminology, Design of algorithms, Design of Parallel Databases, Parallel Query Evaluation.

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

**Text Books:**

[T1] Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002

[T2] Elmars, Navathe, Ramyayulu, Gupta, "Fundamentals of Database Systems", 4<sup>th</sup> Edition, Pearson Education, 2007

**Reference Books:**

R1] Tanenbaum, A, "Modern Operating Systems", 2<sup>nd</sup> Edition, Prentice Hall India, 2001.

R2] Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994

R3] Attiya, Welch, "Distributed Computing", Wiley India, 2006

R4] Coulouris, Dollimore and Kindberg, "Distributed Systems", Pearson, 2009.

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**SELECTED TOPICS OF RECENT TRENDS IN INFORMATION TECHNOLOGY****Paper Code: ETIT-432****L T/P C****Paper: Selected Topics of Recent Trends in IT****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 data warehousing and its types, design and concepts of Big Data.*

**UNIT I Data Warehousing**

**Introduction to Data Warehousing:** Evolution of Data Warehousing, Data Warehousing concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Problems of Data Warehousing.

**Data Warehousing Architecture:** Operational Data and Data store, Load Manager, Warehouse Manager, Query Manager, Detailed Data, Lightly and Highly summarized Data, Archive/Backup Data, Meta-Data, architecture model, 2-tier, 3-tier and 4-tier data warehouse, end user Access tools.

**[T1][No. of Hours 10]****UNIT II Data Warehousing Tools and Technology**

**Tools and Technologies:** Extraction, cleaning and Transformation tools, Data Warehouse DBMS, Data Warehouse Meta-Data Administration and management tools, operational vs. information systems OLAP & DSS supported database.

**Distributed Data Warehousing:** Types of Distributed Data Warehouses, Nature of development Efforts, Distributed Data Warehouse development, Building the Warehouse on multiple levels.

**[R1][R2][No. of Hours 12]****UNIT III Types of Data Warehouses & Data Warehouse Design**

Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

**Data warehousing Design:** Designing Data warehouse Database, Database Design Methodology for Data Warehouses, Data Warehousing design using Oracle, OLAP, Data Mining: Online Analytical processing, Data mining.

**[T1][R1][No. of Hours 10]****UNIT IV Introduction to Big Data**

**Big Data:** Definitions, characteristics, Challenges of Conventional Systems, Web Data, Evolution Of Analytic Scalability, Analytic Processes and Tools - Analysis vs Reporting, Modern Data Analytic Tools, Statistical Concepts: Sampling Distributions, Re-Sampling, Statistical Inference, Prediction Error.

**[T2][R3][R4][No. of Hours 12]****Text Books**

[T1] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2003.

[T2] Adam Jorgensen, James Rowland-Jones, John Welch, Dan Clark, Christopher Prices, Brian Mitchell "Microsoft Big Data Solutions" Wley India.

**Reference Books**

[R1] W. H. Inmon, "Building the operational data store", 1<sup>st</sup> Ed. John Wiley, 1999.

[R2] Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd., 2001

[R3] Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012

[R4] Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011



**MOBILE COMPUTING LAB****Paper Code: ETIT-452****L T/P C****Paper: Mobile Computing Lab****0 2 1****List of Experiments:**

The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Converter, phone book, Text Editor etc.,

Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

For MANETS, use of NS2/NS3 is recommended for two experiments.

**Reference Books:**

- R1] Donn Felke, "Android Application Development for Dummies", Wiley, 2010
- R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. To Programmer Series.
- R3] Ed Bennett, "Hello, Android: Introducing Google's Mobile Development Platform" third edition Pragmatic Programmers, 2012
- R4] Jerome (JF) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- R5] Reza Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and JML", Cambridge University press, 2005.
- R6] R. Rags, A. Taivalsaari, M. VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-13-027-1, Addison Wesley,, 2001.

NOTE:- At least \_\_\_\_\_ of the list must be done in the semester.



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ADHOC AND SENSOR NETWORKS LAB

Paper Code: ETEC-458

Paper: Ad Hoc and Sensor Networks Lab

L	T/P	C
0	2	1

Ad Hoc and Sensor Networks Lab Experiments based on syllabus ETEC-406.

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



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GPS AND GIS LAB

Paper Code: ETIT-458(ELECTIVE-II)

L T/P C

Paper: GPS and GIS Lab

0 2 1

**Softwares for GPS:**

- a. openGIS
- b. GPSTk

**Softwares for GIS:**

- a. QGIS
- b. GRASS GIS
- c. GeoTools
- d. ArcView GIS

**List of Experiments****First Set of Experiments:**

1. Using Handheld GPS for location & recording points
2. Recording point positions and data
3. Importing Juno Data into ArcMap
4. Set up a work area with basemap data
5. Entering data into Excel and Adding as Events to ArcMap
6. Using Pathfinder to download saved file from the GPS
7. Execute ArcMap
8. Loading the data points into the Juno

**Second Set of Experiments:**

1. Introduction to mapping, Triangulation & Navigation using ArcView GIS
2. GPS/GIS Data Conversion and Map Construction
3. GPS Data Gathering
4. DGPS Post Processing and GIS Data Transfer
5. ArcView processing and visualization

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

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NEXT GENERATION NETWORKS LAB

Paper Code: ETIT-458(ELECTIVE-II)

L T/P C

Paper: Next Generation Networks Lab

0 2 1

List of Experiments:

1. Overview of IP Address
2. Design Ethernet Cables : Cross Cable, Straight Cable, Rollover Cable
3. Demonstrate to connect two computer without connecting devices
4. Demonstrate to connect two computer with connecting devices
5. Demonstrate to establish client-server connection with using of windows server 2008
6. Use of policies in Windows Server 2008
7. Overview of Router
8. Demonstrate the use of router to make a connection
9. Introduction to Network Address Translation
10. Overview of different interfaces in router
11. Implement IP Subnetting in IPV4
12. Implement IP routing using RIP
13. Implement IP routing using IGRP
14. Implement IP routing using EIGRP
15. Implement IP routing using OSPF
16. Configuration of VLAN
17. Configuration of VTP
18. Managing traffic with Standard IP Access List
19. Managing traffic with Extended IP Access List
20. Overview

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



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