**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Advanced Data communication & Networks (TLEM 5101)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination

Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | Enable students to be familiar with basics of data communication concepts which eventually are required to understand the modern telecommunication networks.. |
| Objectives : | By end of this foundation course, the students would be able to   1. Know the basics of data communication. 2. Have an understanding of transmission media, local/wide area networks, and integrated services digital network. 3. Understand architecture and protocols of a communication model. 4. Have a clear concept of various data communication services. 5. Have a detailed knowledge of various circuit switched and packet switched techniques. |

**Contents:**

Data Transmission, Communication Model, Communication Tasks, Transmission System Utilization, Interfacing, Signal generation, Error Detection and Correction, Flow control, Addressing, Routing, Message formatting, Circuit Switching, Packet Switching, Frame Relay, ATM, ISDN and Broadband ISDN, Point to Point and Multipoint, Simplex, Half-Duplex and Full-Duplex Transmission, Analogue and Digital Data Transmission, Transmission Impairments, Attenuation, Delay Distortion, Noise, Channel Capacity Transmission Media-Guided Transmission, Media-Twisted Pair, Coaxial Cable and Optical Fibre, Wireless Transmission, Asynchronous and Synchronous Transmission, Line Configurations, Interfacing, Null Modem Data Link Control, Flow Control Techniques, Stop & Wait, Sliding Window, Multiplexing-Frequency Division Multiplexing, Synchronous and Statistical Time Division Multiplexing, spread spectrum techniques, Network Concepts, Network Models, LAN Technology, Physical And Logical Topologies, LAN Architecture, Ethernet and Fast Ethernet (CSMA/CD), OSI, TCP/IP, PPP, IEEE802 Family, Modems, switches, Repeaters, Routers, Public Telephone Networks, ISDN & B-ISDN.

**Suggested Text:**

* + - 1. Stallings W, Data Communications and Networks, Prentice Hall, New Jersey
      2. Forouzan, Behrouz A,, Business Data Communications, 1st ed., McGraw-Hill.

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Management (TLEM 5151)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination

Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course presents a thorough and systematic coverage of management theory and process. It focuses on the basic roles, skills and functions of management, with special attention to planning, decision making, leadership, and control methods in an organization. |
| Objectives : | Upon completion the students would be able to,   * 1. understand fundamental concepts and principles of management, including the basic roles, skills, and functions of management;   2. be knowledgeable of theoretical aspects and practice application of managerial process;   3. be familiar with interactions between the environment, technology, human resources, and organizations in order to achieve high performance; |

**Contents:**

**Introduction**: Management Concept, Definition and process, Managerial levels, roles & skills, Evolution of management thought in changing environment, management’s ethical and social responsibilities; Management Functions, Determination of Objectives & Goals, Effective goal setting, Management by objectives.

Management Functions and Management Process: Planning, Organizing, Leading and Controlling; Planning: The nature, purpose and process, Hierarchy and types of organization’s plans, Strategic planning, Environment analysis, SWOT analysis , corporate, business and functional strategies, Operational planning tools, Flow charts, the Gantt charts, the load charts, PERT, and the logical framework, Effective planning; Decision Making & Problem Solving: The rational Decision-making Model, Decision making styles, Committee and group aided decision-making, Organizing: Authority, Nature, Committee Leadership: The Nature of leadership, Leadership Theories, Styles, and Skill; Motivation: Concept, Primary and Secondary motives, Motivation theories; Elements of Controlling: An overview of control, control process, critical control points and standards, control system, Effective control system requirements, Resistance to control, Control strategy choice, and Methods of control.

**Suggested Text:**

1. Harold Knootz & Heins Weihrich: Management
2. Drucker, P.F: The Practice of Management.
3. Stephen P. Robbins and Mary Coulter: Management.

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Transmission and Switching Techniques (TLEM 5110)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination

Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course aims to provide in-depth knowledge of Transmission and switching techniques being used in modern Telecommunication networks. The course will also give an insight of various transport techniques for telecom traffic |
| Objectives : | On completion of the course the participants are expected to   1. have sufficient knowledge to differentiate various switches, their capabilities, and usage. 2. Understand the trunking methods for local and long distance communication 3. Payload (traffic) carrying techniques over the network |

**Contents:**

**TRANSMISSION TECHNIQUES**

Wavelength Division Multiplexing, Limitations on Wavelength Numbers, WDM, DWDM & CWDM, Amplified WDM Systems, Optical Time Division Multiplexing, Subcarrier Multiplexing, Unrepeated Long-Span Transmission.

**SWITCHING TECHNIQUES**

Crossbar Switching, Clos Switching, Benes Switching, Photonic Switching, elements of Optical Switch, Optical Amplifiers-based Switches, Time switch architecture and fabric, time space switching, Wavelength Switching Fabrics, Hierarchical switching (O-O & O-E-O)

**ACCESS TECHNIQUES**

Brief background of PDH, SDH/SONET, Packet switching networks, ATM, MPLS,optical burst switching.

**Suggested Text:**

1. Telecommunication Switching Systems and Networks, by T. Viswanathan, PHI Learning Pvt. Ltd 2004, ISBN: 8120307135, 9788120307131
2. Telecommunication Switching, Traffic and Networks By J.E Flood, 2nd Ed, Pearson Education India, 2007, ISBN: 8131705021, 9788131705025

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Financial Accounting (TLEM 5156)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 11TLEM Batch and onwards

Pre-requisites : Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination

Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course expands upon the underlying framework and concepts of Introductory Financial Accounting in the context of how accounting fits into the overall business environment of contemporary society. |
| Objectives : | The students will be able to   1. Analyze transactions and develop an understandable explanation of GAAP. 2. Construct financial statements and develop full and fair disclosures based on GAAP. 3. construct and present financial statements 4. understand the accounting systems. 5. have a clear understanding of corporate liabilities and earnings in a partnership scenario. 6. Classify cash flow and construct a statement. |

**Contents:**

Purpose and Nature of Accounting, Various areas of Accounting, Forms of Business enterprises, Accounting Information users, GAAP, Conventions, Business transactions and Accounting equation

**Accounting Process**: Recording changes in financial position, Double entry Accounting system, Journal, Ledger, Trial Balance, the Accounting cycle, Measuring business income, adjusting process, Completion of Accounting Cycle, Work sheet, Financial Statements, and Accounting for merchandize business;

**Accounting Systems**: Special Journals, and Internal control of Cash transactions, Bank Reconciliation, Accounts Receivables, and Inventories accounting Methods, Plant Assets, Depreciation, Intangible Assets, Amortization and Depletion Methods,

**Liabilities; Partnership**: Formation, Division of Income and Liquidation process; Corporation: Organization, Classes of Stock, Stock holder’s Equity statement, Stock value, Issuance of Stock, Stock Dividend, Treasury Stock, Stock split, Measuring Corporation Income, and Earnings Per Share;

**Measuring Cash Flows**: Statement of Cash Flows, and Classification of cash flows

**Suggested Text:**

1. Robert F. Meigs and Walter B. Meigs: Accounting: The Basis for Business Decisions
2. Flamholtz, Michael A. Diamond: Principle of Accounting
3. Frankwood: Business Accounting-I and Business Accounting-II

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Wireless Communication System (TLEM 5115)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination

Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course aims at introducing the students to some of the advanced methods for analysis of communication systems and the basic principles guiding their design. |
| Objectives : | Upon completion of this course participants are expected to   * Have understanding of wireless communications concepts. * The radio link budget and its application to design communication system. * Basic understanding of cellular communication systems, standards, * have knowledge of modern wireless communication systems such as MIMO and UWB systems. |

**Contents:**

Wireless Propagation basics & Channel models: Free space path loss, reflection and diffraction models, Multipath propagation, Fading channels, the Rayleigh fading model, channel characteristics (Doppler spread, delay spread, coherence), multipath. Error exponent, lower bound on the capacity of the channel, sphere packing bound on the error exponent.

SISO Gaussian channel: capacity with and without fading, ergodic capacity, outage and outage capacity, diversity in communication over fading channels.

MIMO communication: diversity gain, multiplexing gain (degrees of freedom), diversity-multiplexing tradeoff.

Multicarrier modulation and OFDM: water-filling over parallel Gaussian channels.

DS-SS and CDMA: spreading codes, interference and ISI rejection, Rake receiver, Comparison between CDMA and OFDM.

Cooperation in multi-user wireless networks: types of relays, achievable rates with decode-and-forward, diversity-multiplexing tradeoff for single antenna relays with decode-and-forward (full duplex vs. half duplex), clustering, virtual MIMO.

**Suggested Text:**

* Andrea Goldsmith. Wireless Communication. Cambridge University Press, 2006.
* Robert Gallager. Information Theory and Reliable Communication. Wiley, 1968.
* David Tse and PramodViswanath. Fundamentals of Wireless Communication. Cambridge University Press, 2005.
* Gerhard Kramer, IvanaMaric and Roy Yates. Cooperative Communication. Available at <http://cm.bell-labs.com/cm/ms/who/gkr>.

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**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Optical Communication (TLEM 5125)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (1st semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite: Transmission & Switching Techniques

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The main learning objective is to treat design and operating characteristics of optical fiber communication systems. Students will obtain an understanding of the dynamical behavior of; principles of optical modulation; characteristics of optical fiber waveguides and optical receivers. In addition students will gain an appreciation of the role of these components in determining the performance of practical optical communications systems. |
| Objectives : | Upon completion of this course the students will be able to :   * Understand optical fiber propagation characteristics and transmission properties, including the origin of fiber modes, multimode optical fiber, single mode optical fibers, and dispersion and loss effects. * Evaluate the performance of long haul communication fiber optic links based on the specification of the link components; * Design such fiber optic links and relate the limitations in the performance to the limitations of the components and subsystems used; * Understand the modeling of photo detectors, including shot noise and avalanche noise. * Investigate and comprehend aspects of the technology that relate to developments for the all optical network; |

**Contents:**

**Unit 01: Optical Fiber Waveguide & Transmission Characteristics**

Introduction to optical transmission and its historical evolution, Optical fibers and cables, single mode fibers, multimode fibers, Signal Attenuation, Dispersion: mathematical model and system impact, Coherency and polarization, Optical transmitters, Optical Receivers.

**Unit 02: Optical Communication System**

**Unit 02-A**: IM/DD Systems: Intensity Modulation Direct Detection (IMDD), Performance evaluation of receivers, System behavior of a cascade of optical amplifier (amplifier chain), Modulation formats alternative to IMDD.

**Unit 02-B**: Enabling Technologies: Couplers and splitters, Tuneable sources and tuneable filters, isolators, circulators, optical multiplexers, photonic switches, optical amplifiers, wavelength converters.

**Unit 02-C**: Optical Networks: Introduction to optical networks, Protocol architectures in optical networks, IP over optics: MPLS, optical digital wrapper, Broadcast-and-select networks, Optical Cross Connect architectures.

**Unit 02-D**: Wavelength division multiplexing (WDM): Broadcast-and-select networks: Topologies, medium access control and testbed examples (LAMBDANET, RAINBOW, STARNET and LIGHTNING). Wavelength routing networks: Node design, the routing and wavelength assignment problem (RWA), virtual topology design.

**Unit 02-E**: Optical access networks: Optical access architecture, fibre-to-the-curb/home (FTTC/H), hybrid fibre coaxial (HFC) approaches, passive optical networks (PONs) for access, future trends.

**Unit 02-F**: Optical Switching: Photonic Packet Switching, Optical time division multiplexing (OTDM), photonic switching node design, broadcast OTDM networks, Fault protection and recovery.

**Suggested Text:**

* John Senior, `Optical Fiber Communications' second edition, Prentice Hall (1999)
* S. O. Kasap, 'Optoelectronics and Photonics: principles and practices' Prentice Hall (2001)
* William B. Jones, 'Introduction to Optical Fiber Communication Systems' Oxford University Press, New York,

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Mobile Network Planning & Optimization (TLEM 5120)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Wireless communication systems (TLEM 5115) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The course aims to introduce the professionals with network planning. The course emphasizes the planning process itself and develops the concepts and skills that planners and managers should need. |
| Objectives : | Upon completion of this course work the students should be able to:   * Have awareness and familiarity of cellular planning concepts such as capacity and coverage plans. * Have a detailed understand the process of mobile radio planning of 2G and 3G wireless standards * Design and analyze the link budgets of GSM and CDMA systems |

**Contents:**

Brief Overview: Mobile Network Evolution, Information Theory, Network architecture of 2G/3G and 4G mobile networks.

Capacity Planning: Cell shape, Radio Cell & Wave propagation, cellular topology, cell fundamentals. Introduction to traffic modeling (Erlang model), frequency plan, reverse/forward link capacity examples, network architecture, site surveys and audits, cell site configurations.

Link Budgets: Noise figure in link budget, S/N ratio for a mobile user, receiver sensitivity, confidence cell, shadow margin and handoff gain, fade margin, interference, Forward/Reverse link range.

Coverage Planning: Coverage design, average path loss models (Hata, Cost 231 etc.), link budgets, maximum allowable path loss, link budget factors, cell site gains and losses, drive testing, identifying antenna types, antenna configurations, coverage goals, equipment characteristics, base station design, backhaul planning, spreadsheet based planning and growth planning.

Radio Network Optimization: Capacity & Coverage expansion techniques, cell splitting, use of directional antennas for cell sectoring, micro cell method, overload cells. channels allocation techniques and capacity expansion FCA, channel borrowing techniques, DCA, mobility management, radio resources and power management securities in wireless networks.

Case Study

Planning GSM Network: Review of GSM System and Architecture, Reverse and forward links, Logical and physical channels, fundamental, dedicated channels, forward and reverse traffic channel generation, channel demodulation, access channel generation. Frequency reuse, frequency allocation, frequency conflicts, handoffs, power control.

OR

Planning CDMA 2000 Network: Planning CDMA 2000: Architecture, Reverse and forward links, Logical and physical channels, RF Planning. Frequency allocation, Pilot increment & search window size, PN offset reuse patterns, PN offset planning, pilot searching process, aliasing. Soft handoffs, deploying second carrier (Hard handoff), interference mitigation, hard handoff triggers, pilot beacon.

**Suggested Text:**

* Advanced Cellular Network Planning and Optimisation Edited by Ajay R Mishra, John Wiley & Sons Ltd, 2007.
* CDMA 2000 Network Planning: Qualcomm 80-31480-1 X3, Student Guide .

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**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Marketing (TLEM 5160)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Management (TLEM 5151) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The aim is to introduce students to the basic Principles of Marketing, developing a concept of the market and its environment. |
| Objectives : | Upon completion the students would be able to   1. Understand marketing concepts. 2. Visualize the differing environment for marketing 3. Marketing for various sectors and differing products 4. latest trends in marketing |

**Contents:**

* Marketing Concept
* Marketing environment
* Planning and research in marketing
* Market segmentation and targeting
* Consumer behavior
* Industrial marketing
* Product planning
* Product-Mix
* Pricing
* Distribution, Placement
* Promotional Mix
* Marketing in global scenario

**Suggested Text:**

1. Philip Kotler : Principles of Marketing
2. Etzel Stanton, and Walker, Fundamentals of Marketing
3. McCarthy: Basic Marketing
4. Peter Rix: Fundamentals of Marketing

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Organizational Behavior (TLEM 5165)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Management (TLEM 5151) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course is to help the students develop their ability  to improve organizational performance by applying better  Management skills and techniques. |
| Objectives : | Upon completion the students would be able to   1. Understand the evolution of management theories and functions of management.   2) Understand basic concepts relevant to the study of organizational behavior and management.  3) Know the integration of human elements with structure, technology and the environment that determines the operation of the organization.  4) An organization’s culture and the management of forces for better performance. |

**Contents:**

Introduction and Background: Organizational behavior: Key concepts, An historical perspective on organizational behavior, Organizational behavior and contemporary issues.

Organization: Structure and Design: The nature and purpose of organization, The classical and modern concepts of organization, Span of control and organization structures, Authority relations: Line, staff and functional, Authority: Delegation and decentralization, Departmentalization, Organizational life cycle stages, The contingency approach of organization design, Today’s organizations and various designs, Organizational effectiveness

Organizational Culture: The dynamics of organization’s culture, the basic approaches to organizational culture, the cross-cultural awareness, total quality culture creation, changing and developing cohesive organization’s culture Organizational Change and Development: The nature and typology of organizational change, The diagnosis of forces for change, The models and dynamics of planned change, Resistance to change and its management,

Techniques for managing change, Organizational development: Objective & model, Change management and contemporary issues in TQM.

Foundations of Individual Behavior: The perception process, The attribution theory, Personality and organizational behavior, Attitudes, personal values and ethics: Learning & behavioral modification Behavior Modification: Behavioral learning models, Principles of behavior modification, the process of modifying on-the-job behavior, Behavioral self-management

Socialization and Mentoring: The organizational socialization process, The socialization techniques, Mentoring, Organizational roles and norms Work Group Behavior: Work group: Types, functions & development process, Work group structure, composition and effectiveness, Inter group interactions, Organization influence tactics, Organization’s politics, Strategies for improving work group performance Organizational Conflicts Management: The nature of conflict, Functional versus dysfunctional conflict, Approaches to effective conflict resolution, Conflict stimulation

**Suggested Text:**

1. Judith R. Gordon, Organizational Behavior, Prentice Hall.
2. Fred Luthans: Organizational Behavior
3. Davis and Newstrom, Human Behavior at Work: Organizational Behavior, McGraw Hill.
4. Robert Kreitner & Angelo Kinicki Organizational Behavior, IRWIN

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Cost Accounting (TLEM 5170)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Financial Accounting (TLEM 5156) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The aim is to teach managers that how key data can be used for planning and controlling, and costing products, services, and customers. |
| Objectives : | Upon completion of course, the student would be able to   * Identify and calculate different types of costs (direct, indirect, variable, and fixed costs). * Distinguish between job-costing, process-costing, and joint-costing systems. * Determine the product cost by means of full- costing and direct-costing methods. * Determine the product cost by means of historical (actual) and standard cost systems. |

**Contents:**

* Introduction, Organization and overview of the course, cost of good soled, cost of goods manufactured
* The nature, concepts and classification of cost,
* Product cost accumulation systems
* Costing and control of material
* Costing and control of labor
* Costing and control of factory over head
* Job Order costing system
* Process costing
* Joint product and by product costing
* Budgeting
* Direct and absorption costing
* Break-even analysis and cost- volume- profit analysis

**Suggested Text:**

1. Ralph S. Polimeni, Frank J. Fabozzi and Arthur H. Adelberg: Cost accounting
2. Hilton , Horngren: Cost accounting
3. T. Lucy: Cost Accounting
4. Matz and Usury: Cost Accounting

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Telecom Management (TLEM 5131)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisite : Co-requisite: Marketing (TLEM 5160)

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | This course aims to provide in-depth knowledge of Operation, Finance, Marketing and Management of Telecom network and services. |
| Objectives : | Upon completion of the course the participants are expected to:   * Have sufficient knowledge to work as a Telecom Operations Manager. * Have proficient understanding of the different types of billings used in telecommunication industry * Understand the marketing principles as applied to telecom engineers * Have detailed understanding of telecom revenues and their management |

**Contents:**

**Telecom Technologies**

Transmission Network Technology, Switching Technology, Internet, Broadband, IPTV, Wireless Technology (GSM Technology, CDMA Technology, 3G and NGN), VOIP, MPLS

**Billing, Budgeting and Revenues**

Landline Billing, CDMA Billing, GSM Billing, Leased Circuit Billing, IUC Billing, Overview of Convergent Billing, Financial Accounting, Internal Control Mechanism, Financial statement Analysis, Capital Budgeting, Working Capital Management, Margin Costing Analysis, Breakeven Analysis, Budgetary control, Customer Service Management System (CSMS), Collection of Telecom revenues.

**Planning:**

Junction network Planning, Traffic and Exchange Planning, Access Network Planning, BTS, Frequency Planning.

**Telecom Environment & Management**

Telecom Business Environment, Telecom Regulatory Environment. Overview of Marketing, Market Research Issues & Applications, Consumer Behavior Sales and Distribution Management, Product Management, Marketing of Services, Customer Relationship, Corporate Public Relations, Advertising Management and Marketing Communications.

**Suggested Text:**

1. Telecommunications Management, Nolan Vincent Jones, Virtualbookworm.com Publishing (August 5, 2004), ISBN-13: 978-1589396197
2. Understanding telecom management, VinayshilGautam, Sanjay Sinha, Concept Publishing Company, 2004, ISBN 9788180690938.

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**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Telecom Laws, Policies and Regulations (TLEM 5210)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (2nd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite: Telecom Management (TLEM 5130)

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | To investigate the role of institutions that affect the use of telecommunication system and industry. Sometime will be devoted to the various parts of the government that are involved in this endeavor, such as the Ministry of Telecommunication, PTA and TRAI. The major thrust of the course will be toward the role of international institutions, including the ITU. |
| Objectives : | Upon completion of this course the participants are expected to:   * Understand the structure and nomenclature of telecommunication industry * Understanding the concept of telecommunication services and their regulations * Have a detailed knowledge of the various regulatory functions involved in telecommunication system * Have detailed understanding of the spectrum management, tariffs, and billings of telecommunication systems |

**Contents:**

### A snapshot of the international standards structure. The role of ITU and other standars bodies.The standards setting process; the past, the present and the future.The difference among Policy, Recommendations, Standards and Regulation.The Pakistani Policy, Standards and Regulatory Environment.

### The Regulatory Process: Why Regulate? What to Regulate? How to Regulate? Elements of Regulatory System.The general goals of regulation.Universal Services, the specific goals of Regulatory body in Pakistan. How to ensure that the Regulatory Authority succeeds or fails?

Spectrum Management: The role of Scarcity in Spectrum Management, Licensing and Regulation. Spectrum Allocation.

### Tariffs, Billings, Arbitration, cost/ benefit analysis, QoS performance, TRAI act, Interconnect Agreement, Universal service obligation.

**Suggested Text:**

* Kenndy C.H. and Paster M.V. “An Introduction to International Telecommunication Law”, Artech House, ISBN 0-89006-835-6.
* Frieden R. “International Telecommunication Handbook” Artech House, ISBN: 089006568.
* International Telecommunication Union Handbook of Standards, www.itu.org

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Human resource management (TLEM 5255)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (3rd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Management (TLEM 5151) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | By end of the course the students will be cognizant of how the human resource function can help organizations achieve competitive advantage in the industry. |
| Objectives : | To achieve business objectives by managing the human resources employed for the business that includes:  to recruit, select and plan staff members,  to manage employees relations,  to train and develop staff; and to plan for their career development, to evaluate jobs, appraise performance and change management upon need, and to maintain discipline for the benefit of both organization and wmployees. |

**Contents:**

Introduction: Concepts of human resource management, Human Resource Challenges, Human Resource Functions, Philosophical approaches to Human Resource Management

Job Design and Analysis: An overview of Job design, Techniques of job design, Job analysis, Collection of job information, Applications of job analysis information

Human Resources Planning & Recruitment: Significance of Human Resource Planning, The planning process, the implementation of program, Recruitment & selection policy issues, Source of recruitment, Selection process & procedure, Evaluation of Human resource Planning & Recruitment

Career Planning & Development: Promotion, Anachronism, Demotion, Separation

Training and Development: Significance of training & development, Principles of training & development, Training & development methods, Evaluation of training & development Motivation and Reward System: Concept of motivation, Reward systems, Motivation through job design, Motivation through employee participation, Other motivation techniques

Performance Appraisal: Appraisal: Definition and applications, Basic consideration in appraisal, Appraisal methods, and Legal issues for appraisal, Appraisal challenges.

Compensation and Services: Objectives/Rationale of Financial compensation, Challenges affecting compensation, Wage criteria, Policy and principles, Job evaluation and its system, Compensation for administrators & professionals, Financial benefits and other services

Discipline: Concepts of discipline, Preventive & corrective discipline, Negative & positive approach, Administration of disciplinary action, Grievance handling.

**Suggested Text:**

1. William B. Werther & Keith Davis: Human Resource & Personnel, McGraw Hill.
2. Bernardin & Russell: Human Resource Management McGraw Hill.
3. Fred Luthans: Organizational Behavior. McGraw Hill.
4. Robert Kreitner & Angelokinicki: Organizational Behavior, IRWIN.

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Emerging Networks (TLEM 5215)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (3rd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Telecom Management (TLEM 5131) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The aim of the course is to make the students abreast of latest trends in the telecommunication networks. |
| Objectives : | Upon successful completion of the course, the students will have a conceptual knowledge of   1. Importance of telecom networks 2. Modernization of networks 3. Upcoming and future trends in network topologies 4. Novel concepts in networking 5. High speed wireless networks 6. Goal of resilience in the networks |

**Contents:**

* Introduction – Living in the edge of Networked Environment
* The next generation networks
  + Concepts and new communication paradigms.
* The ultra wide band networks
  + home networks, mesh networks
* Software defined radio and cognitive networks
* 3G+ (LTE) and 4G networks and services
* Moving from wired to mobile/wireless networks
  + MANET
  + Adaptive communication services
* Ubiquitous Networks
* Wireless Sensor Network
* Body Area networks
* Social Networks

**Suggested Text:**

1. LTE for UMTS - H.Holma and A.Toskala, Ed. Wiley

2. Protocols and architectures for Wireless Sensor Networks - H. Karl and A. Wilig, Ed. Wiley

3. Lecture notes.

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Telecom Management Networks (TLEM 5225)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (3rd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Telecom Management (TLEM 5131) Co-requisite:

Assessment  **: 20%** Sessional Work, **30%** mid-semester and **50%** Written Final Examination Marks : Theory: 100 Practical: 00

Credit Hours : 20

Minimum Contact Hours : 2800

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| Aims : | The Telecommunications Management Network (TMN) supports management activities associated with telecommunication networks. The aim is introduce the management requirements of Administrations to plan, provision, install, maintain, operate and administer telecommunications networks and services. |
| Objectives : | Upon completion of this course the participants are expected to:   * Understand and support the management requirements of Administering the telecommunication network and services * Have a comprehensive understanding to plan, install, maintain and operate the telecommunication networks * Know the functional reference model of TMN architecture of ITU. |

**Contents:**

Introduction to TMN, TMN interface Specification Methodology, Enhanced Telecommunication Operations Map (eTOM), Managing Next generation Networks, Generic Network Information Model, Management Services, Management capabilities at the F Interface, Simple Network Management protocol (SNMP), Common Management Interface Protocol (CMIP, X.700), Enterprise NMS Architecture, Hierarchical Approach to Network Management.

**Suggested Text:**

* The Irwin handbook of telecommunications management by James Harry Green McGraw-Hill, ISBN: 0071370587 3rd Edition. By KundanMisra.
* TMN M 3000 Series recommendations of ITU Planning Telecommunications Networks,
* IEEE Press, New York 1999, CCITT Handbook,

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**MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO**

**DEPARTMENT OF TELECOMMUNICATION ENGINEERING**

**INSTITUTE OF INFORMATION & COMMUNICATION TECHNOLOGIES**

Title of Subject : Project (TLEM 5299)

Disciplines : M.E. in Telecommunication Engineering and Management (TLEM)

Term : (3rd semester)

Effective : 14TLEM Batch and onwards

Pre-requisites : Co-requisite:

Marks : Theory: 100 Practical: 00

Credit Hours : 60

Minimum Contact Hours : 8400

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**Contents:**

The project can be engineering related or management related.

**Suggested Text:**

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