

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ETM-I Sem

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## (A70014) MANAGEMENT SCIENCE

**Objectives:**

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

[www.universityupdates.in](http://www.universityupdates.in)

**UNIT -I:**

**Introduction to Management and Organisation:** Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory - Fayal's Principles of Management - Maslow's theory of Hierarchy of Human Needs - Douglas McGregor's Theory X and Theory Y - Herzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

**UNIT -II:**

**Operations and Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control- EOQ- ABC Analysis, Purchase Procedure, Stores Management and Stores Records -JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

[www.universityupdates.in](http://www.universityupdates.in)

**UNIT -III:**

**Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

**UNIT -IV:**

**Project Management (PERT/CPM):** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**UNIT -V:**

**Strategic Management and Contemporary Strategic Issues:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

**TEXT BOOKS:**

[www.universityupdates.in](http://www.universityupdates.in)

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhajili, Cengage Learning India Pvt Ltd, 2012.

**REFERENCE BOOKS:**

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Wehrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management – Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management, Frank Bros. 2012.
9. Aryasri: Management Science, McGraw Hill, 2012.

**Outcomes:**

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By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation.
- carry out production operations through Work study.
- understand the markets, customers and competition better and price



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**(A70443) MULTIMEDIA AND SIGNAL CODING****Course Objectives:**[www.universityupdates.in](http://www.universityupdates.in)

The course is designed:

- To provide an introduction to the fundamental principles and techniques in Multimedia Signal coding and compression.
- To give an overview of current multimedia standards and technologies.
- To provide techniques related to computer and multimedia networks.
- To provide knowledge related to Multimedia Network Communications and Applications.

**UNIT -I:**

**Introduction to Multimedia:** Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

**Color in Image and Video:** Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L\*A\*B\* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

**UNIT -II:**

**Video Concepts:** Types of Video Signals, Analog Video, Digital Video.

**Audio Concepts:** Digitization of Sound, Quantization and Transmission of Audio.

**UNIT -III:**[www.universityupdates.in](http://www.universityupdates.in)**Compression Algorithms:**

**Lossless Compression Algorithms:** Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression.

**Lossy Image Compression Algorithms:** Transform Coding: KLT And DCT Coding, Wavelet Based Coding.

**Image Compression Standards:** JPEG and JPEG2000.

**UNIT -IV:**

**Video Compression Techniques:** Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and Inter-Frame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

**UNIT -V:**

**Audio Compression Techniques:** ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

[www.universityupdates.in](http://www.universityupdates.in)

**TEXT BOOKS:**

1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009.

**REFERENCE BOOKS:**

1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zerans. Bojkoric, Dragorad A, Mlovanovic, 1st Edition, 2002.
2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5. Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson, 2002.

[www.universityupdates.in](http://www.universityupdates.in)

**Course Outcomes:**

- Upon completing the course, the student will be able to:
- Understand the fundamentals behind multimedia signal processing.
- Understand the fundamentals behind multimedia compression.
- Understand the basic principles behind existing multimedia compression and communication standards.
- Understand future multimedia technologies.
- Apply the acquired knowledge to specific multimedia related problems and projects at work.
- Take advanced courses in this area.

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**(A70433) ADVANCED TELECOMMUNICATION TECHNOLOGIES****Course Objectives:**[www.universityupdates.in](http://www.universityupdates.in)

The course objectives are:

- To provide a solid foundation about ISDN & B-ISDN network concepts.
- To provide knowledge to the students about ATM design goals and layering.
- To inculcate students regarding SONET, SDH and their network configurations.
- To provide a detailed description of ATM switching, transmission, traffic and congestion control.
- To provide knowledge regarding network management in ATM, VOIP and WLL.

**UNIT-I:**

**BISDN Architecture** : B-ISDN standards, Broadband Services, Conversational services, Messaging services, Retrieval services, Distribution services, Business and residential services, Requirements, Architecture, Functional architecture, UNI, Transmission structure.

**BISDN Network Concept** : Networking techniques, Signaling principles, General aspects, Capabilities for ISDN signaling, Signaling virtual channels, Broadband network performance, Traffic management aspects, Operation and maintenance, customer network aspects.

**UNIT-II:**[www.universityupdates.in](http://www.universityupdates.in)

**BISDN User Network Interface & Protocols**: B-ISDN protocol reference model, Layered architecture, Relationship between B-ISDN PRM and OSI reference model, B-ISDN PRM description, layer functions, Relationship between OAM functions and B-ISDN PRM, General aspects of UNI, Physical layer of UNI at 155/622 mps, Additional UNIs.

**ATM Layer**: Cell Structure, cell header, ATM layer connections, ATM adaptation layer, AAL layers, AAL type 0, AAL type 1, AAL type 2, AAL type 3, AAL type 5.

**UNIT-III:**

**ATM Switching**: Switching elements – Matrix type switching elements, Central memory switching element, Bus type switching element, Ring type

switching element, Performance aspects, Technological aspects. Switching Networks – Single stage Networks, Multistage networks, Cell header processing in switch fabrics, Multicast functionality, Switches and cross connects- Generic system structure, System building blocks.

#### UNIT-IV:

**Network Management:** What is network management, the bigger picture, Traditional breakout by tasks, Survivability-where network management really pays, System depth-A network management problem, Network management from a PSTN perspective, Network management systems in enterprise networks, Telecommunication management network, Network management in ATM.

[www.universityupdates.in](http://www.universityupdates.in)

#### UNIT-V:

**Voice-Over IP:** Data Transmission versus Conventional Telephony, Drawbacks and Challenges for Transmitting Voice on Data Packets, VoIP, Introductory Technical Description, VoIP Gateway, An IP Packet as Used for VoIP, The Delay Trade-off, Lost Packet Rate, Echo and Echo Control, Media Gateway Controller and its Protocols, Overview of the ITU-T Rec. H.323 Standard, Session Initiation Protocol (SIP), Media Gateway Control Protocol (MGCP), Megaco or ITU.

**Last-Mile Broadband Connectivity and Wireless Local Loop (WLL):** Background and chapter objective, Conventional wire pair in the last mile, Wire pair in equipped with DSL modems, Digital loop carrier, Broadband microwave/millimeter wave last-mile transmission, CATV as a basic transport medium for the last mile.

#### TEXT BOOKS:

1. ATM Networks, Concepts, Protocols and Applications - Rainer Handel, Manfred N Huber, Stefan Schroder, Addison - Wesley, 3<sup>rd</sup> Edition, 1999.
2. ISDN and broad band ISDN with frame relay and ATM -William Stallings Fourth Edition. Prentice Hall, Pearson Education Asia, 2002.
3. Telecommunication System Engineering-Roger L.Freeman, 4<sup>th</sup> Edition, 2004.

[www.universityupdates.in](http://www.universityupdates.in)

#### REFERENCES:

1. ATM Networks - Othmar Kyas, Thomson Computer Press, 2nd Edition 1998.
2. Introduction to data communications and networking - Behrouz Forouzan TMH, 2<sup>nd</sup> Edition 2002.

[www.universityupdates.in](http://www.universityupdates.in)

### Course Outcomes:

Upon completion of the course:

- Students will be able to understand different ISDN & B-ISDN concepts.
- Students will exhibit knowledge about ATM design goals and layering.
- Students will be able to analyze traffic and congestion control, ATM switching and transmission.
- Students will demonstrate knowledge about interworking of ATM with existing networks.
- Students will exhibit knowledge about network management in ATM, VOIP and WLL.



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**(A70422) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION****Course Objectives:**[www.universityupdates.in](http://www.universityupdates.in)

This course provides:

- An introduction to measurement techniques and instrumentation design and operation.
- The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
- To use different measuring techniques and the measurement of different physical parameters using different transducers.

**UNIT -I:**

**Block Schematics of Measuring Systems:** Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D'Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

**UNIT -II:**

**Signal Analyzers:** AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. **Signal Generators:** AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, Video Signal Generators, and Specifications.

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**Oscilloscopes:** CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

**Special Purpose Oscilloscopes:** Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

**UNIT -IV:**

**Transducers:** Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric

Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

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#### UNIT -V:

**Bridges:** Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

**Measurement of Physical Parameters:** Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

#### TEXT BOOKS:

1. Electronic Instrumentation: H.S.Kalsi – TMH, 2<sup>nd</sup> Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbins, W.D. Cooper: PHI 5<sup>th</sup> Edition 2003.

#### REFERENCE BOOKS:

[www.universityupdates.in](http://www.universityupdates.in)

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
3. Measurement Systems – Ernest O. Doebelin and Dhanesh N Manik, 6<sup>th</sup> Ed., TMH.
4. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
5. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

#### Course Outcomes:

Upon a successful completion of this course, the student will be able to:

- Describe the fundamental concepts and principles of instrumentation.
- Explain the operations of the various instruments required in measurements.
- Apply the measurement techniques for different types of tests.
- To select specific instrument for specific measurement function.
- Understand principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter.
- Learners will apply knowledge of different oscilloscopes like CRO, DSO.
- Students will understand functioning, specification, and applications of signal analyzing instruments.

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**(A70436) DIGITAL IMAGE PROCESSING**  
**(Elective-I)**

**Course Objectives:**

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The objectives of the course are to:

- Provide the student with the fundamentals of digital image processing.
- Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
- Introduce the students to some advanced topics in digital image processing.
- Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

**UNIT -I:**

**Digital Image Fundamentals & Image Transforms:** Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels.

**Image Transforms:** 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

**UNIT -II:**

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**Image Enhancement (Spatial Domain):** Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood Operation, Median Filter, Spatial Domain High-Pass Filtering.

**Image Enhancement (Frequency Domain):** Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

**UNIT -III:**

**Image Restoration:** Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

**UNIT -IV:**

**Image Segmentation:** Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region Oriented Segmentation.

**Morphological Image Processing:** Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

**UNIT -V:**

**Image Compression:** Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

**TEXT BOOKS:**

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008.
2. Digital Image Processing- S. Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

[www.universityupdates.in](http://www.universityupdates.in)

**REFERENCE BOOKS:**

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - Scotte Umbaugh, 2nd Ed, CRC Press, 2011.
2. Digital Image Processing using MATLAB - Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Fundamentals of Digital Image Processing - A.K.Jain , PHI, 1989.
4. Digital Image Processing and Computer Vision - Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition.
6. Introduction to Image Processing & Analysis - John C. Russ, J. Christian Russ, CRC Press, 2010.
7. Digital Image Processing with MATLAB & Labview - Vipula Singh, Elsevier.

[www.universityupdates.in](http://www.universityupdates.in)

**Course Outcomes:**

Upon successfully completing the course, the student should:

- Have an appreciation of the fundamentals of Digital image processing including the topics of filtering, transforms and morphology, and image analysis and compression.

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- Be able to implement basic image processing algorithms in MATLAB.
- Have the skill base necessary to further explore advanced topics of Digital Image Processing.
- Be in a position to make a positive professional contribution in the field of Digital Image Processing.

At the end of the course the student should have a clear impression of the breadth and practical scope of digital image processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.



and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

#### UNIT –IV:

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**Analog Devices Family of DSP Devices:** Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

#### UNIT –V:

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**Interfacing Memory and I/O Peripherals to Programmable DSP Devices:** Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

#### TEXT BOOKS:

[www.universityupdates.in](http://www.universityupdates.in)

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009.
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007.

#### REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing – Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI.
5. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997.





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**(A70446) SPREAD SPECTRUM COMMUNICATIONS****(Elective-I)****Course Objectives:**[www.universityupdates.in](http://www.universityupdates.in)

The objectives of the course are:

- To understand the principles of spread spectrum systems, including the Global Positioning System.
- To understand the principles of finite fields, orthogonal codes, and pseudorandom noise sequences.
- To use generator functions to generate pseudorandom codes.
- To develop a fundamental understanding of spread spectrum communication systems.
- To develop an understanding of the ability of spread spectrum to combat jamming, combat fading and prevent intercept.

**UNIT -I:**[www.universityupdates.in](http://www.universityupdates.in)

**Introduction to Spread Spectrum Systems:** Fundamental Concepts of Spread Spectrum Systems, Pseudo Noise Sequences, Direct Sequence Spread Spectrum, Frequency Hop Spread Spectrum, Hybrid Direct Sequence Frequency Hop Spread Spectrum, Code Division Multiple Access.

**Binary Shift Register Sequences for Spread Spectrum Systems:** Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

**UNIT -II:**

**Code Tracking Loops:** Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non-Coherent Tracking Loop, Double Dither Non-Coherent Tracking Loop.

**UNIT -III:**

**Initial Synchronization of the Receiver Spreading Code:** Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

**UNIT -IV:**

**Cellular Code Division Multiple Access (CDMA) Principles:** Introduction, Wide Band Mobile Channel, The Cellular CDMA System, Single User Receiver in a Multi User Channel, CDMA System Capacity.

**Multi-User Detection in CDMA Cellular Radio:** Optimal Multi-User Detection, Linear Suboptimal Detectors, Interference Combat Detection Schemes, Interference Cancellation Techniques.

#### UNIT -V:

**Performance of Spread Spectrum Systems in Jamming Environments:** Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding.

**Performance of Spread Spectrum Systems with Forward Error Correction:** Elementary Block Coding Concepts, Optimum Decoding Rule, Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

#### TEXT BOOKS:

[www.universityupdates.in](http://www.universityupdates.in)

1. Rodger E ziemer, Roger L. Peterson and David E Borth, "Introduction to spread spectrum communication- Pearson, 1<sup>st</sup> Edition, 1995.
2. Mosa Ali Abu-Rgheff, " Introduction to CDMA wireless communications." Elsevier publications, 2008.

#### REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem, " Modern Communication and Spread Spectrum," McGraw Hill, 1986.
2. Andrew j. viterbi, " CDMA Principles of spread spectrum communication," Pearson Education, 1<sup>st</sup> Edition, 1995.
3. Kamilo Feher, " Wireless Digital Communications," PHI, 2009.
4. Andrew Richardson, " WCDMA Design Handbook," Cambridge University Press, 2005.
5. Steve Lee - Spread Spectrum CDMA, McGraw Hill, 2002.

#### Course Outcomes:

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Upon completing this course student should be able to:

- Understand the basic concepts and elements of a spread-spectrum system and a CDMA system.
- Understand the characteristics of spread-spectrum signal waveforms.
- Apply their knowledge of communications technology to CDMA and wireless systems.
- Understand the methods for spread-spectrum and CDMA system performance analysis.
- Capture most recent development in CDMA and its role in 3G wireless system.

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**(A70444) OPTICAL COMMUNICATIONS****(Elective-II)****Course Objectives:**

The objectives of the course are:

- To realize the significance of optical fibre communications.
- To understand the construction and characteristics of optical fibre cable.
- To develop the knowledge of optical signal sources and power launching.
- To identify and understand the operation of various optical detectors.
- To understand the design of optical systems and WDM.

**UNIT -I:**

**Overview of Optical Fiber Communication:** - Historical development, The general system, Advantages of Optical Fiber Communications, Optical Fiber Wave Guides- Introduction, Ray Theory Transmission, Total Internal Reflection, Acceptance Angle, Numerical Aperture, Skew Rays, Cylindrical Fibers- Modes, Vnumber, Mode Coupling, Step Index Fibers, Graded Index Fibers.

Single Mode Fibers- Cut Off Wavelength, Mode Field Diameter, Effective Refractive Index, Fiber Materials Glass, Halide, Active Glass, Chalcogenide Glass, Plastic Optical Fibers.

**UNIT -II:**

**Signal Distortion in Optical Fibers:** Attenuation, Absorption, Scattering and Bending Losses, Core and Cladding Losses, Information Capacity Determination, Group Delay, Types of Dispersion - Material Dispersion, Wave-Guide Dispersion, Polarization Mode Dispersion, Intermodal Dispersion, Pulse Broadening, Optical Fiber Connectors- Connector Types, Single Mode Fiber Connectors, Connector Return Loss.

**UNIT -III:**

**Fiber Splicing:** Splicing Techniques, Splicing Single Mode Fibers, Fiber Alignment and Joint Loss- Multimode Fiber Joints, Single Mode Fiber Joints, Optical Sources- LEDs, Structures, Materials, Quantum Efficiency, Power, Modulation, Power Bandwidth Product, Injection Laser Diodes- Modes, Threshold Conditions, External Quantum Efficiency, Laser Diode Rate Equations, Resonant Frequencies, Reliability of LED & ILD.

**Source to Fiber Power Launching:** - Output Patterns, Power Coupling,

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Power Launching, Equilibrium Numerical Aperture, Laser Diode to Fiber Coupling.

#### UNIT -IV:

**Optical Detectors:** Physical Principles of PIN and APD, Detector Response Time, Temperature Effect 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.

#### UNIT -V:

**Optical System Design:** Considerations, Component Choice, Multiplexing, Point-to- Point Links, System Considerations, Link Power Budget with Examples, Overall Fiber Dispersion in Multi-Mode and Single Mode Fibers, Rise Time Budget with Examples.

Transmission Distance, Line Coding in Optical Links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye Pattern.

#### TEXT BOOKS:

1. Optical Fiber Communications – Gerd Keiser, TMH, 4th Edition, 2008.
2. Optical Fiber Communications – John M. Senior, Pearson Education, 3rd Edition, 2009.

#### REFERENCE BOOKS:

1. Fiber Optic Communications – D.K. Mynbaev, S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal, John Wiley, 3rd Edition, 2004.
4. Introduction to Fiber Optics by Donald J. Sterling Jr. – Cengage learning, 2004.
5. Optical Communication Systems – John Gowar, 2nd Edition, PHI, 2001.

#### Course Outcomes:

At the end of the course, the student will be able to:

- Understand and analyze the constructional parameters of optical fibres.
- Be able to design an optical system.
- Estimate the losses due to attenuation, absorption, scattering and bending.
- Compare various optical detectors and choose suitable one for different applications.

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## (A70435) DIGITAL CONTROL SYSTEMS

(Elective-II)

## Course Objectives:

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The course is aimed at:

- Understanding the concepts of sampling, reconstruction, its analysis using Z-transform.
- Representation of systems using state space model and equations.
- Concepts of controllability, observability, and stability analysis.
- Design of discrete time control systems.
- Design of state feedback controllers, observers and concepts of Kalman filters.

## UNIT – I:

**Sampling and Reconstruction:** Introduction, sample and hold operations, Sampling theorem, Reconstruction of original sampled signal to continuous-time signal.

**The Z – Transforms:** Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms.

**Z-Plane Analysis of Discrete-Time Control System:** Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane: Primary strips and Complementary Strips.

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## UNIT – II:

**State Space Analysis:** State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and its Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

## UNIT – III:

**Controllability and Observability:** Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

**Stability Analysis:** Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion. Stability analysis using Liapunov

theorems.

#### UNIT – IV:

##### **Design of Discrete Time Control System by Conventional Methods:**

Design of digital control based on the frequency response method – Bilinear Transformation and Design procedure in the W-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers. Design digital control through deadbeat response method.

#### UNIT – V:

**State Feedback Controllers and Observers:** Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

Introduction to Kalman filters, State estimation through Kalman filters, introduction to adaptive controls.

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#### TEXT BOOKS:

1. K. Ogata, "Discrete-Time Control systems" - Pearson Education/PHI, 2<sup>nd</sup> Edition.
2. M. Gopal, "Digital Control and State Variable Methods"- TMH.

#### REFERENCE BOOKS:

1. Kuo, "Digital Control Systems"- Oxford University Press, 2<sup>nd</sup> Edition, 2003.
2. M. Gopal, "Digital Control Engineering".

#### Course Outcomes:

Upon completion of the course, the student will be able to:

- Understand the concepts of sampling, reconstruction, its analysis using Z-transform.
- Represent the systems using state space model and equations.
- Understand the concepts of controllability, observability, and stability analysis.
- Design discrete time control systems.
- Design state feedback controllers, observers and concepts of Kalman filters.

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## (A70440) EMBEDDED SYSTEMS DESIGN

(Elective – II)

### Course Objectives:

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For embedded systems, the course will enable the students to:

- Understand the basics of an embedded system
- Program an embedded system
- To learn the method of designing an Embedded System for any type of applications.
- To understand operating systems concepts, types and choosing RTOS.
- Design, implement and test an embedded system.

### UNIT -I:

**Introduction to Embedded Systems:** Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

### UNIT -II:

**Typical Embedded System:** Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

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### UNIT -III:

**Embedded Firmware:** Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

### UNIT -IV:

**RTOS Based Embedded System Design:** Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

### UNIT -V:

**Task Communication:** Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/

Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

**TEXT BOOK:**

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

**REFERENCE BOOKS:**

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013.
4. An Embedded Software Primer - David E. Simon, Pearson Education.

**Course Outcomes:**

Upon completion of this course, the student will be able to:

- Understand and design embedded systems.
- Learn basic of OS and RTOS.
- Understand types of memory and interfacing to external world.
- Understand embedded firmware design approaches.



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**(A70594) COMPUTER NETWORKS LAB****Course Objectives:**

- To study the routing protocols- RIP ,OSPF,BGP
  - To study Wireless LAN & Mobile Wireless Networks
  - To study Ethernet ,Token Ring
  - To study Switched LANs, Network Design
  - To study Queuing Disciplines
1. **Ethernet** : A Direct Link Network with Media Access Control
  2. **Token Ring** : A shared-Media Network with Media Access Control
  3. **Switched LANs** : A set of Local Area Networks Interconnected by Switches
  4. **Network Design** : Planning a Network with different users, Hosts and Services
  5. **ATM**: A connection oriented cell switching technology
  6. **Routing Information Protocol (RIP)**: A Routing Protocol based on the distance vector Algorithm
  7. **OSPF** \* Open Shortest Path First: A \* Routing Protocol based on the Link State Algorithm
  8. **Broader Gateway Protocol (BGP)**: An Inter-domain Routing Protocol
  9. **Transmission Control Protocol (TCP)**: A Reliable connection oriented byte stream service Queuing disciplines
  10. **Queuing Disciplines** : Order of Packet Transmission and Dropping
  11. **RSVP**: Resource Reservation Protocol : Providing QoS by reserving resources in the network
  12. **Firewalls and VPN** : Network Security and Virtual Private networks
  13. **Applications** : Network Applications, Performance and Analysis
  14. **Wireless Local Area Networks** : Medium Access control for wireless connected stations
  15. **Mobile Wireless Networks** : A wireless Local Area Network with mobile stations

**Note:** (i) The Experiments can be performed using software's like NETSIM, OPNET, NS2 / QUALNET or Equivalent Software.

(ii) Minimum of 12 Experiments are to be performed.

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**(A70495) ADVANCED TELECOMMUNICATIONS LAB****Course Objective:**

- To study the bending and transmission losses, numerical aperture of optical fibre
- To study the digital switching system and EPABX
- To study different ISDN layers
- To study LAN Routing protocols using N-SIM
- To study LAN Topologies and CSMA protocols using L-SIM

**Minimum of 12 experiments to be performed**

1. Console Programming in Digital Automatic Telephone Exchange
2. Routing in Digital Automatic Telephone Exchange
3. Study of Digital Switching mechanism in EPABX
4. Analysis, Simulation and Study of ISDN layers
5. Routing Algorithms in Network Simulators
6. Simulation of different protocols using LAN Simulator
7. T-S-S-T Switching and Generation of Time Switching Signal using Multiplexer, Spaced Switched Signal, Observe Cross talk
8. Crossbar Switching
9. Measurement of Losses in Optical Fiber
10. Characteristics of Fiber Optic LED
11. Simulation of LAN Topologies
12. Simulation of Congestion Control Algorithms in LAN Environment
13. Simulation of TCP/IP Model Protocol
14. Simulation of Signaling in ISDN
15. Simulation of Circuit Switching
16. Study of Features of Voice over Internet Protocol
17. PC-PC Communication using Fiber Optics

[www.universityupdates.in](http://www.universityupdates.in)**Course Outcomes:**

- Students will be able to calculate the numerical aperture and losses of optical fiber
- Students will be able to analyze the different switching techniques like routing and console programming. They will be able to analyze enhanced features of an automatic branch exchange
- Students will be able to analyze and simulate different ISDN layers
- Students will be able to analyze and simulate different ISDN layers