### B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

#### IV YEAR I SEMESTER

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**Note:** All End Examinations (Theory and Practical) are of three hours duration.

**T-Tutorial** L – Theory P – Practical/Drawing C – Credits
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-I Sem

(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.

UNIT - I:

UNIT - II:

UNIT - III:

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:

TEXT BOOKS:

REFERENCE BOOKS:

Outcomes:
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 the given products appropriately.
- ensure quality for a given product or service.
- plan and control the HR function better.
- plan, schedule and control projects through PERT and CPM.
- evolve a strategy for a business or service organisation.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-I Sem

(A70442) MICROWAVE ENGINEERING

Course Objectives:

The objectives of the course are:

- To develop the knowledge on transmission lines for microwaves, cavity resonators and wave guide components and applications.
- To enable the students understand and analyze the operation of Microwave tubes like klystron, magnetron, travelling wave tube, etc.
- To familiarize with microwave solid state devices.
- To understand the scattering matrix parameters and its use.
- To introduce the student the microwave test bench for measure different parameters like attenuation, VSWR, etc.

UNIT-I:


Rectangular Guides: Power Transmission and Power Losses, Impossibility of TEM Mode, Microstrip Lines - Introduction, Z0 Relations, Effective Dielectric Constant, Losses, Q factor.

UNIT-II:

Cavity Resonators - Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q Factor and Coupling Coefficients, Illustrative Problems


Ferrites - Composition and Characteristics, Faraday Rotation, Ferrite Components - Gyror, Isolator, Circulator.

UNIT-III:


Helix TTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

UNIT-IV:

M-Type Tubes:

Introduction, Cross-field Effects, Magnetrons - Different Types, Cylindrical Travelling Wave Magnetron - Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics, Illustrative Problems


UNIT-V:


TEXT BOOKS:


REFERENCE BOOKS:


Course Outcomes:
Upon completion of the course, the students will be able to:

- Understand the significance of microwaves and microwave transmission lines.
- Analyze the characteristics of microwave tubes and compare them.
- Be able to list and explain the various microwave solid state devices.
- Can set up a microwave bench for measuring microwave parameters.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV Year B.Tech. ECE-I Sem
(A70515) COMPUTER NETWORKS

Objectives:
- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

UNIT-I

Physical Layer: Guided transmission media, wireless transmission media.
Data Link Layer – design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

UNIT-II
Multiple Access Protocols – ALOHA, CSMA, Collision free protocols, Ethernet: Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT-III
Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV
Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, connection release, Crash Recovery.

UNIT-V
The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service

Application Layer-Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

TEXT BOOKS:

REFERENCE BOOKS:

Outcomes:
- Students should understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
V Year B.Tech. ECE-I Sem

(A70434) CELLULAR AND MOBILE COMMUNICATIONS

Course Objectives:
The course objectives are:
- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non-Co-channel interferences.
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

UNIT I:


UNIT II:


UNIT III:
Cell Coverage for Signal and Traffic: Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct
and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

**Cell Site and Mobile Antennas:** Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

**UNIT -IV:**

**Frequency Management and Channel Assignment:** Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

**UNIT -V:**

**Handoffs and Dropped Calls:** Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation.

**TEXT BOOKS:**

**REFERENCE BOOKS:**

**Course Outcomes:**

By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.

- The student will be able to understand impairments due to multipath fading channel.
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:

TEXT BOOKS:

REFERENCE BOOKS:
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition

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.
- Be able to implement basic image processing algorithms in MATLAB.
- Have the skill base necessary to further explore advanced topics in 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-I Sem

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(A70443) MULTIMEDIA AND SIGNAL CODING

(Elective-I)

Course Objectives:
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:


UNIT -II:
Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT-III:
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.
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:


TEXT BOOKS:


REFERENCE BOOKS:

5. Video Processing and Communications – Yaowang, Jom Ostermann, Ya-Qin Zhang, Pearson, 2002

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.
and Multitasking, Thread Life Cycle, Creating Threads, Thread Priorities, Synchronizing Threads, Interthread Communication, Thread Groups, Daemon Threads.

Enumerations, Autoboxing, Annotations, Generics.

UNIT -IV:
Event Handling: Events, Event Sources, Event Classes, Event Listeners, Delegation Event Model, Handling Mouse and Keyboard Events, Adapter Classes.
The AWT Class Hierarchy, User Interface Components- Labels, Button, Canvas, Scrollbars, Text Components, Check Box, Check Box Groups, Choices, Lists Panels – Scrollpane, Dialogs, Menubar, Graphics, Layout Manager – Layout Manager Types – Border, Grid, Flow, Card and Grid Bag.

UNIT -V:
Applets: Concepts f Applets, Differences between Applets and Applications, Life Cycle of an Applet, Types of Applets, Creating Applets, Passing Parameters to Applets.

TEXT BOOKS:
2. Understanding OOP with Java Updated Edition, T. Budd, Pearson Education.

REFERENCE BOOKS:
3. Introduction to Java Programming, Y. Daniel Liang, Pearson Education.

Expected Outcome:
The student is expected to have
- Understanding of OOP concepts and basics of java programming (Console and GUI based)
- The skills to apply OOP and Java programming in problem solving
- Should have the ability to extend his knowledge of Java programming further on his/her own.
Jawaharlal Nehru Technological University Hyderabad

IV Year B.Tech. ECE-I Sem

(A70447) TELEVISION ENGINEERING

(Elective-II)

Course Objectives:
The objectives of the course are:
- To familiarize the students with Television transmitters and receivers and TV signal transmission.
- To make them understand different signal processing steps in monochrome television.
- To introduce colour television transmitters and receivers.

UNIT -I:

TV Signal Transmission and Propagation: Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT -II:
Monochrome TV Receiver: RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM detection, FM Sound detectors, and typical applications.

UNIT -III:
Sync Separation and Detection: TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses, AFC, single ended AFC circuit, Deflection Oscillators, deflection drive ICs, Receiver Antennas, Picture Tubes.

UNIT -IV:
Color Television: Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder,ochrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Identty and colour killer circuits, U & V demodulators.

UNIT -V:
Color Receiver: Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Digital TV: Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS:

REFERENCE BOOKS:

Course Outcomes:
Upon completion of the course, the students will be able to:
- Understand TV standards and picture tubes for monochrome TV.
- Distinguish between monochrome and colour Television transmitters and receivers.
- Analyze and Evaluate the NTSC and PAL colour systems.
(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:

UNIT-II:

UNIT-III:

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

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

UNIT-IV:

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:

REFERENCE BOOKS:

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.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-I Sem

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(A70440) EMBEDDED SYSTEMS DESIGN
(Elective – II)

Course Objectives:
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:

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.

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:

UNIT -V:
Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/
Building Vocabulary - Starting a conversation - responding appropriately and relevantly - using the right body language - Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. Activities on Reading Comprehension - General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

3. Activities on Writing Skills - Structure and presentation of different types of writing - letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing - planning for writing - improving one's writing.

4. Activities on Presentation Skills - Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ e-mails/assignments etc.

5. Activities on Group Discussion and Interview Skills - Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through teleconference & video-conference and Mock Interviews.

Minimum Requirement:
The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P - IV Processor, Hard Disk - 80 GB, RAM - 512 MB Minimum, Speed - 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

Suggested Software:
The software consisting of the prescribed topics elaborated above should be procured and used.
- Oxford Advanced Learner’s Compass, 7th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from ‘train2success.com’
  Ø Preparing for being Interviewed
  Ø Positive Thinking
  Ø Interviewing Skills
  Ø Telephone Skills
  Ø Time Management

Books Recommended:

DISTRIBUTION AND WEIGHTAGE OF MARKS:
Advanced Communication Skills Lab Practicals:
1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation
1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.
   - Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
   - Not more than two students to work on each mini project.
   - Students may be assessed by their performance both in oral presentation and written report.

Outcomes
- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities
PART – A: Microwave Engineering Lab (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering parameters of a Magic Tee
8. Measurement of Scattering parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement

PART – B: Digital Communication Lab (Any 6 Experiments):

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Time Division Multiplexing of 2 Band Limited Signals
5. Frequency shift keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. Study of the spectral characteristics of PAM, QAM
9. DPSK : Generation and Detection
10. QPSK : Generation and Detection

Equipment required for the Laboratory:

Microwave Engineering Lab:

1. Microwave Bench set up with Klystron Power Supply
2. Microwave Bench set up with Gunn Power Supply
3. Micro Ammeter

Digital Communication Lab:

1. RPS: 0-30V
2. CRO: 0-20MHz
3. Function Generators: 0-1MHz
4. RF Generators: 0-100MHz
5. Experimental Kits / Modules