

2. p-Spice

- a. 2nd order Butter-worth Notch Filter.
- b. Clipper Circuit.
- c. Buffer design using SPICE.

2
0

Ref. Book:

1. Electronic Design Automation For Integrated Circuits Handbook, by Lavagno, Martin, and Scheffer, CRC.
2. The Electronic Design Automation Handbook, by Dirk Jansen et al., Kluwer Academic Publishers
3. p-Spice manual.
4. <http://www.ecircuitcenter.com/index.htm>

ELC 104: ELECTRONICS PRACTICALS –I

1. Design of 4-bit UP-DOWN Counter.
2. Design of variable voltage supply @ 2 Amps.
3. Temperature Controller using 741.
4. Design of Power Amplifier 10 Watts.
5. Design of Stepper driver using Monoshot & 555 Timer.
6. Design of Function Generator.
7. DS-CDMA simulation.
8. Error detection and correction Algorithm
 - a. CRC
 - b. Hamming code
9. Channel Coding methods.
 - a. Convolution
 - b. Block code
10. Implementation of MSK modulation and demodulation.
11. ASK, FSK, QPSK, modulation & demodulation.
12. QPSK, modulation & demodulation.

UEL101: ADVANCED DIGITAL COMMUNICATION SYSTEMS

Introduction to Mobile and Cellular Communication Systems: Main Definitions, impact of Mobile and Cellular Radio Communication Historical overview. Fundamental of Radio Mobile and Cellular Practices Radio mobile links and cells, Frequency re-use, Principles of Cellular Com. Mobile Telephone Switching Subsystem, The mobile frequency spectrum, Hand-off, Cochannel and adjacent channel interference limitations, Near-far problem, Power Control.

6

Mobile Communication Channel including antennas: The mobile wireless propagation channel, Notions on antennas especially the near and far field concept, Line of Sight (LOS) propagation, Multipath fading and shadowing and over the horizon propagation, outdoor and Indoor Propagation, Flat and selective fading, Special antennas for base stations and headsets, Deterministic, Empirical and Statistical Methods for propagation link computations.

1

Overview of Mobile and Cellular Radio Communication Modulation and Detection Techniques: Analog modulations and detection: AM, FM, PM, ACSB, Hybrid and Digital modulation: PCM, ASK, FSK, QPSK, QAM, MSK, etc, Coherent and noncoherent detection, C/N, S/N, Eb/No and BER relations, Probability concepts, Mobile Radio links parameters.

2

Overview of Multiple Accesses Techniques: Simplex, Duplex TDD and Time Division Duplex, Time division multiple access (TDMA) FDMA and OFDM, Code Division multiple access (CDMA), Hybrid multiple access, Management of voice, Data and Video (Multimedia) information. 1

Modern Digital Radio Systems: standards, proposals and comparisons GSM (Europe and all over the world) - TDMA, IS-54 (U.S.A.)- TDMA, IS-95 (U.S.A., Korea) CDMA-, PHS (Japan) - TDMA, Frequency Hopping (FH) (U.S.A.) - CDMA, Short Range Distance Nanocells and Picocells Systems, PCS, PCS Cordless telephone 2nd generation (CT-2), Cellular digital packet data (CDPD), and Wireless LAN, New standard trends Edge, 3rd and 4th generation beginning. 0 8

Mitigation Techniques for Mobile System: Overview of Natural and manmade external noise sources, Radiation hazards effects from base stations, Mobile and portable equipments. 0

Diversity Techniques for Mobile Radio Systems: Dispersive channels, Space diversity, Frequency diversity, Polarization diversity, Hybrid and quadruple diversity, Equalizer techniques 5

Trends in Mobile and Cellular Communications Multimedia: 3rd and 4th Generation. Global Mobile systems using GEO and LEO. SQSP Platforms and Terrestrial links. Novel Localization Techniques. 0 4

Tutorials:

1. Study of Global Positioning system working principle. 0
2. Study of mobile Service providers in Goa Region. 4
3. Study of AIR station Bambolim, Goa.
4. Study of Distance Education Infrastructure Setup (DEITE) at Goa University.
5. Study of various interfacing of mobile set eg. Bluetooth. 0

Reference Books:

1. Steele, R., Hanzo, L., "Mobile Radio Communication" 2nd Edition Wiley 1999.
 2. Hess G.C., "Land Mobile Radio System Engineering", Artech 1997.
 3. Rappaport, T.S., "Wireless Communications", J. Wiley 2nd edition, 1998.
 4. Jakes WC., "Microwave Mobile Communications", J. Wiley 2nd edition 1998.
 5. Vaughan, R., Bach - Anderson, J., "Propagation and Antennas for Mobile Communication" IEE Publishers 2002.
- Gibson, E., "The Mobile Communications Handbook" CRC Press 2nd Edition 1999 4

Semester II

ELC 201: EMBEDDED SYSTEMS DESIGNS

Architectures: RISC/CISC and Harvard/Princeton Architectures(4); Types of Memories (3), Introduction to 8-bit Micro controllers (4), Timers/Counters, UART, SPI, PWM, WDT,(6) Input Capture, Output Compare Modes,(3) I2C, CAN, Interfacing LED, Switches, ADC, DAC, LCD, RTC,(8) Emerging Bus Standards (USB, Compact PCI) ,(4) Programming in Assembly and C (GNU Tools),(5) Introduction to 16/32-bit Processors,(4) ARM Architecture & Organization, (5)ARM/THUMB Programming Model, ARM/THUMB Instruction Set, ARM Exception Handling, ARM/THUMB Assembly & C Programming (GNU Tools)(8) .

Tutorials

1. Programming of EEPROM memory.
2. Subsystem SBI.

3. Communication of SPI with RTC Chip
4. ST Series Microcontrollers study.
5. Motorola Series Microcontrollers study.

Reference Books:

1. Jivan Parab et al., Exploring C for microcontroller (Springer 2007)
2. Lipovski G. J. Single and multiple Chip Microcontroller interfacing. Prentice Hall, USA 1998.
3. Malvano W. J. Embedded microcomputer system, Brooks / Cole, USA, 1999.
4. Embedded Systems Handbook Edited by: Richard Zurawski CRC Taylor & Francis Group.
5. Embedded Systems: Architecture, Programming and Design By Raj Kamal, McGraw Hill
6. Building Embedded Linux Systems, by Karim Yaghmour, O'Reilly

ELC 105: OPERATING SYSTEM AND RTOS

Introduction to Computer Organization and Architecture: hardware vs software - the virtual machine concept, concept of von Neumann architecture, hardware components and functions, trends in hardware development, system configurations and classifications. 6

Process Description and Control: Processes, process states, processor modes, context switching, CPU scheduling algorithms, threads. 5

Concurrency Control: Concurrent processes, critical section problem and solutions, mutual exclusion solution requirements, semaphores and monitors. 5

Deadlocks: Characterization, detection and recovery, avoidance, prevention. 3

Inter Process Communication: classical IPC problems and solutions, IPC techniques. 6

The Input/Output and File Subsystem: I/O devices, controllers and channels, bus structures, I/O techniques (programmed, interrupt driven and DMA), I/O subsystem layers. Concepts of files and directories, issues and techniques for efficient storage and access of data. I/O and file system support for graphics, multimedia, databases, transaction processing and networking. 8

The Memory Subsystem : Memory types and hierarchy, module level Organization, cache memory. Memory partitioning, swapping, paging, segmentation, virtual memory. 6

The Central Processing Unit: CPU components, register sets, instruction cycles, addressing modes, instruction sets, concept of micro-programming ,Basics of RISC approach, pipelined and super-scalar approaches, vector processors and parallel processors, hardware support for the OS.

µCOS case study 3

Tutorial

1. Implementing Lower Level Shell
2. Implementing Signal in Unix
3. Hard disk partitioning in Linux

Text/Reference Books:

1. Operating system principles, 3rd Edition, by Willian Stallings –PHI(1998)
2. Operating system concepts by Silberchatz and Galvin -Addision wesley
3. Operating system by Tanaumbuam, PHI New Delhi

ELC207: OPTICAL COMMUNICATION SYSTEMS

Light Propagation in Optical Fiber: Geometric picture, Pulse spread due to material dispersion, loss mechanism, Theory of Optical waveguides, methods of waveguides analyses , modes in steps and graded index fiber, new types of optical fibers 1