Electronic Multimeter – Digital Voltmeters – Component Measuring Instruments – Q-meter – Vector Impedance Meter – Vector Voltmeter RF Power and Voltage Measurement.

#### HNIT-III

Oscilloscopes – Block diagram – Cathode ray tube – electrostatic focusing-deflection system-Oscilloscope probes and transducers – Oscilloscope Techniques – observation of the wave forms – Lissajous patters. Special Oscilloscope – analog storage oscilloscope – Digital storage oscilloscope – Sampling oscilloscope.

### UNIT-IV

Signal Analysis: Wave analyzer – Heterodyne analyzer – Harmonic distortion analyzer spectrum analyzer.

### UNIT-V

**Data acquisition system** – types, components of analog and digital data acquisition system – multiplexing –use of analog and digital recorders-use of filters and sample hold circuits – Bus interface standards – IEEE-488 GPIB organization.

### Text Books:

- 1. Electrical and Electronic Measurements and Instrumentation by A.K. Sawhney, 2002 edition
- 2. Electronic Measurements and Instrumentation by B.H. Oliver and Cage McGraw Hill.

#### References:

- 1 Electronic Measurements by Terman and Pettit. McGraw Hill Publications.
- 2 Electronic Measurements, H.S. Kalsi, TMH

### EUREC611 DIGITAL SIGNAL PROCESSING LAB\*\*

## Part - I Matlab

Representation of Discrete Time Sequences and Systems, Correlation and Convolution (Linear Convolution and Circular Convolution), Filter Analysis and Implementation, Analog Filter Design, FIR Filter Design, ITR Filter Design, Transforms and Spectral Analysis.

## Part – II Programming DSP Processors

Review of DSP Processor Basics, Sampling, Aliasing Effects, Addition, Subtraction and Multiplication of Two numbers, Waveform generation (Square Wave, Triangular Wave, Sine Wave Generators), FIR Filter Implementation, IIR Filter Implementation, Quantization Noise Effect

### Text Book:

 $1. Digital\ Signal\ Processing-A\ Computer\ Based\ Approach\ By\ Sanjay\ K.\ Mitra,\ Tata\ McGraw\ Hill\ Pub.$ 

## 2.Ifeacher E.C & Jervis B.W, digital signal processing –A practical approach, Pearson Edu.

- EUREC612 COMMUNICATION SYSTEMS LAB\*\*

  1. AM generation and demodulation.
- 2. FM generation and FM demodulation (using 1496, 565 & 566 ICs)
- 3. Pre-emphasis and de-emphasis
- 4. Radio Receiver Measurements
- 5. Balanced Modulator
- 6. Frequency Multiplier
- 7. IF amplifier
- 8. SSB Generation and Detection
- 9. Transmission Lines parameters
- 10. Pulse Amplitude Modulation.
- 11. Sampling
- 12. Multiplexing & Demultiplexing
- 13. PWM & PPM.

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GITAM UNIVERSITY, HYDERABAD CAMPUS, RUDRARAM, PATANCHERU, HYDERABAD-502329





## GITAM UNIVERSITY B.TECH ECE 3<sup>rd</sup> YEAR SYLLABUS

# EUREC501 MICROPROCESSORS AND INTERFACING\*\*\*

## UNIT-I

**Intel 8085 microprocessor**: Evaluation of microprocessors, Architecture of 8085, pin diagram, addressing modes of 8085.

### UNIT-II

**Intel 8086 microprocessor:** 8086 internal architecture, addressing modes, pin diagram, minimum mode and maximum mode of operation, timing diagrams.

### **UNIT-III**

**8086 Programming:** Instruction set of 8086, assembler directives, program development steps, constructing the machine Course Codes for 8086 instructions, writing programs for use with an assembler, , writing and using procedures and assembler macros.

### UNIT-IV

8086 Interrupts: 8086 interrupts and interrupt responses, priority interrupt controller Intel 8259A.

#### IINIT<sub>-</sub>V

**Programmable devices and Interfacing of I/O:** Addressing memory and ports in microcomputer system, programmable peripheral interface 8255A, programmable timer/ counter 8253/ 8254, serial I/O 8251 USART, DMA controller 8237/ 8257, Interfacing of A/D and D/A converters to 8086 microprocessor. Interfacing a microprocessor to keyboards.

#### Text Books:

- Ramesh S Goankar, "Microprocessor Architecture Programming and Applications with the 8085, Perman International Pvt.Ltd.
- 2. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", 2<sup>nd</sup> edition, TMH.

### Reference Books:

- Micro computer systems, The 8086/8088 Family Architecture, Programming Design Y.Liu and G.A. Gibson, PHI, 2<sup>nd</sup> edition.
- Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286,80386, 80486, and Pentium processors. Architecture, programming and interfacing".
- 3. 8086 Micro Processor Kenneth J. Ayala, Penram International/Thomson, 1995.

### EUREC502 LINEAR ICs & APPLICATIONS\*\*\*

### UNIT-I

Operational Amplifiers: Concept of Direct Coupled Amplifiers. – Differential Amplifier - Calculation of common mode Rejection ratio – Differential Amplifier supplied with a constant current source – Normalized Transfer Characteristics of a differential Amplifier, Design Aspects of Monolithic Op-Amps, Ideal Characteristics of an operational Amplifier , Parameters of an Op-Amp, Measurement of Op-Amp Parameters, Frequency Compensation Techniques. UNIT-II

**Operational Amplifier Applications: Linear**: Inverting and Non-inverting Amplifiers, Differential Amplifiers, Summing, scaling and Averaging amplifiers, Integrators, Differentiators, Logarithmic Amplifiers, Instrumentation Amplifiers, Voltage to Current and Current to Voltage Converters, Rectifiers, Peak Detectors.

**Non-linear:** Comparators, Schmitt trigger, Multivibrators, Sinewave oscillators (phase-shift, weinbridge, and Quadrature), Waveform generators (triangular and sawtooth), Sample and Hold circuits, Analog multiplexers.

### UNIT-III

Other Linear IC's: 555 Timers – Monostable and Astable modes, 556 Function Generator ICs and their Applications. Three Terminal IC Regulators, IC 566 Voltage controlled oscillators, IC 565 PLL and its Applications.

#### UNIT-IV

A/D & D/A Converters: DAC characteristics D to A conversion process; multiplying DAC, 8 bit D to A converter, microprocessor compatibility, AD 558 Microprocessor Compatible DAC, serial DAC's ADC characteristics A to D conversion process; successive approximation ADC microprocessor compatibility, ADC's for microprocessors, AD 670 microprocessor compatible flash converters, frequency response of ADC's.

#### UNIT-V

Active Filters: LPF, HPF, BPF, BEF, All-pass Filters, Higher Order Filters and their Comparison. Switched Capacitance Filters.

#### Text Books:

- 1. Op-Amps and Linear ICs, Ramakanth Gayakward, Pearson Education, LPE
- 2.Op-Amps and Linear Integrated Circuits by R.F. Coughlin and F.F. Driscoll by Pearson Edu., LPE, 6<sup>th</sup> Ed.,
- 3. Operational amplifiers, George Clayton, Steve winder, Newnes, 4<sup>th</sup> edition

#### References:

- 1. Linear Integrated Circuits by S.Salivahanan, V.S.Kanchan Bhaskaran, TMH edition
- 2. Microelectronics, Jacob Millman and Arwin, W. Grasel, TMH edition
- 3. Linear Integrated Circuits, Roy Choudary and Vishal.K.Jain, New Age
- 4. Integrated electronics, Jacob Millman and Christos C. Halkias, MGH.

## EUREC503 ANALOG COMMUNICATIONS\*\*\*

### UNIT-I

**Linear Modulation Systems**: Modulation, Frequency Translation, Amplitude modulation, AM equation, Modulation index, Spectrum of AM Signal, AM generation, AM detection, DSBSC- generation & detection, SSB- generation & detection, VSB – generation & detection, power relations, Applications of linear modulation systems, Frequency division multiplexing.

#### UNIT-II

**Angle Modulation**: Angle modulation, FM, FM Equation, modulation index, frequency deviation, NBFM, WBFM, Spectrum of FM, Bandwidth of FM, Carson's rule, Phase modulation, Comparison of FM and PM, Generation of FM, Phasor representation of FM and AM, FM demodulation, Pre-emphasis and De-emphasis, power relations, stereophonic FM, Comparison of AM and FM.

### UNIT-III

**Noise:** Sources of noise, thermal noise, shot noise flicker noise, white noise, mathematical representation of noise, power spectral density, effect of filtering on noise power spectral density, linear filtering, noise bandwidth, quadrature representation of noise and their power spectral density, noise figure, effective noise temperature, noise calculations for cascade stages.

#### HNIT-IV

Noise in AM and FM: Signal power, Noise power, Signal to noise ratio for DSBSC, SSB and FM, FM threshold effect.

## UNIT-V

Radio Transmitters & Receivers: Classification of Radio Transmitters, AM Transmitters, FM Transmitters, Telegraph Transmitters, Telephone Transmitters, SSB Transmitters, Classification of Radio Receivers, TRF Receiver, Superhetrodyne Receiver, Characteristics of Superhetrodyne Receivers, Tracking, Importance of IF, Image Frequency Rejection, equation, Amplitude limiting, AGC, Delayed AGC, AFC.

#### Text Books:

- 1. Principles of communication H. Taub and Schilling McGraw Hill.
- 2. Communications Systems Simon Haykins, PHI.

TRAPATT diode, PIN diode, varactor diode, parametric amplifiers, Tunnel diode, point contact diode, Schottky barrier diode, Microwave transistors,

### UNIT-V

Microwave Measurements: Introduction, microwave bench measurement setup, Frequency and wavelength measurements, measurement of power, VSWR, impedance, coupling & directivity of directional coupler, dielectric constant and phase shift constant.

### Textbooks:

- 1. Microwave Devices and Circuits Samuel Y. Liao, PHI
- 2. Microwave & Radar Engineering M. Kulkarni.
- 3. Microwave Engineering Dharma Raj Cheruku, Scitech Publishers, Chennai 2009.

### References:

1. Foundations of Microwave Engg – R.E. Collins, TMH.

### EUREC605 ENGINEERING ECONOMICS & MANAGEMENT\*\*\*

### UNIT-I

**Fundamentals of Economics** – Scarcity and Efficiency Market, Command and Mixed Economics. Basic Elements of Supply and Demand – Law of Demand – Elasticity of Demand.

### UNIT-II

**Business Organizations** – Individual Proprietorship – Partnership – The Corporation. Statement of Profit and Loss – The Balance Sheet – Break-Even Analysis – Cost Concepts – Elements of Costs.

#### UNIT-III

**Principles and Functions of Management** – Evolution of Management Thought – Decision Making Process. Organization Theory and Process – Leadership – Motivation – Communication – Conflict Management in Organization.

## UNIT-IV

**Plant Location** – Plant Layout – Production Planning and Control – Product Design and Development – Channels of Distribution. Materials Management – Inventory Control.

### UNIT-V

Industrial Disputes and their Settlement - Provision of Factories Act and Industrial Disputes Act.

Recent Trends in Contemporary Business Environment.

### Text Books:

- Economics Paul A. Samuelson and William D. Nordhaus.
- 2. Engineering Economics Vol. 1 Tara Chand.
- 3. Financial Management S. N. Maheswari.
- 4. Essentials of Management Koontz and O'
- 5. Production and Operation Management B.

### S. Goel.

- Modern Production / Operation Management – Elwood S. Buffa, Rakesh K. Sarin.
- 7. Industrial Law S. P. Jain.
- Industrial Law R. P. Maheswari and S. N. Maheswari.
- Labour and Industrial Laws Singh, Agarwal and Goel.

### EUREC606 ELECTRONIC MEASUREMENTS & INSTRUMENTATION\*\*\*

### **UNIT-I**

**Introduction-** Measurement and error definitions, Accuracy and precision significant figures, Types of errors. Standard Analysis:- Probability errors, limiting errors. Standards of measurement, classification of standards, emf, resistance, current, induction, capacitance standards. Bridges

#### IINIT-II

**Electronic Instrumentation for Measuring basic Parameters**: Introduction – PMMC Principle – PMMC ammeters, voltmeters – extension of ranges, AC voltmeters using rectifiers – True RMS responding voltmeter –

### EUREC603 OPERATING SYSTEMS\*\*\*

### UNIT - I

**Computer System and Operating System Overview:** Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

#### UNIT - II

**Process Description** – Process Control – Process States- Process and Threads - Examples of Process description and Control. **Concurrency**: Principles of Concurrency – Mutual Exclusion – Software and hardware approaches – semaphores – Monitors – Message Passing – Readers Writers Problem. **Principles of deadlock** – deadlock prevention, detection and avoidance dining philosophers problem – example Systems.

#### UNIT - III

**Memory Management :** Memory Management requirements – loading programmes in to main memory – virtual memory – hardware and Control structures – OS Software – Examples of Memory Management.

### UNIT - IV

**Uniprocessor Scheduling :** Types of Scheduling – Scheduling algorithms – I/O management and Disc Scheduling – I/O devices – organization – of I/O function – OS design issues – I/O buffering – Disk I/O – disk scheduling Policies – examples System.

#### UNIT - V

**File Management and Security :** Overview of file management – file organization and access – File Directories – File sharing – record blocking – secondary Storage Management – example system.

Security: Security threats - Protection - intruders - Viruses - trusted System. Case studies of Linux, Unix, Windows XP, VxWorks operating systems

### Text Books:

- Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
- 2. Operating Systems' Internal and Design Principles Stallings, Fifth Edition-2005, Pearson Edu/PHI

### References:

- 1. Operating System A Design Approach-Crowley, TMH.
- 2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

### EUREC604 MICROWAVE ENGINEERING\*\*\*

## UNIT-I

**Guided EM waves and waveguides**: EM waves between parallel planes, TE, TM and TEM waves, Waves in rectangular wave guides and circular wave guides, Velocity of propagation, Cavity resonators- Rectangular and Circular cavity resonators, Quality factor of cavity resonator, Strip line and Microstrip transmission lines.

#### UNIT-II

**Microwave Tubes:** High frequency limitations of conventional tubes, Reentrant cavities, Klystrons, velocity modulation process, bunching process, output power and beam loading. Multicavity Klystron amplifiers. Applications. Reflex Klystron: Velocity modulation, power output and efficiency, electronic admittance, mode patterns. Slow wave structures, Traveling wave tube, amplification process, wave modes, gain considerations. Principle of operation, Magnetron - types, principle of operation of cylindrical magnetron, cavity magnetron, theory of oscillations, Hartee resonance condition: Pi-mode separation.

### UNIT-III

Microwave Circuits and passive components: Concept of microwave circuit, normalized voltage and current. Introduction to scattering parameters & their properties, Faraday rotation, ferrite devices, gyrators, isolators, circulators and their properties, wave meters, Scattering matrix representation of microwave junctions, bends, directional couplers, wave guide tees, magic tee, attenuator, phase shifter.

#### UNIT-IV

Microwave Solid State Devices: Classification, GUNN diode principle of operation, modes IMPATT diode,

### References:

- 1. Electronic Communication Systems G. Kennedy, McGraw Hill.
- 2. Applied Electronics and Radio Engg. GK. Mithal
- 3. Modern Digital and Analog Communications Systems B. P. Lathi, BSP.

### EUREC504 DATA STRUCTURES using 'C'\*\*\*

### UNIT-I

**Arrays:** Organization and use of one-dimensional arrays, operations, two dimensional and multidimensional arrays – Algorithms of all operations on linear arrays.

### UNIT-II

**Structures, pointers and files**: definition of structures and unions, programming examples; pointers, pointer expression, programming examples; file operations, process.

### UNIT-III

Linear Data Structures: Stack representation, operational algorithms, arithmetic expression: polish Notation. Queue representation, operations algorithms deques, priority queues, circular queues. Linked list representation operations algorithms double linked and circular lists.

### UNIT-IV

**Non-linear Data structures:** Tress, Binary tree representation, tree traversals, Huffman's algorithms conversion of general tree to binary tree. Graph representation, Warshall's algorithms, shortest paths, linked representation of a graph, operations of graph, traversing a graph.

#### UNIT-V

**Sorting, Searching and Unix operating systems**: Bubble sort, quick sort, hcap sort Linear search. Binary search. Study of Unix operating system: file system protection. Unix shell programming.

### **Text Books:**

- 1. Programming in ANSIC E Balaguruswamy
- 2. Data Structures using C, A.M. Tanebaum and others 2003

### Reference Books:

- 1. Data Structures Schaum's outline series.
- 2. An introduction to data structures with applications Trembly & Sorenson.

### EUREC505 ANTENNAS & WAVE PROPAGATION\*\*\*

### **UNIT-I**

Antenna Fundamentals: Antenna Radiation Mechanism, Properties of Antennas, Directional Characteristics of Dipole Antennas, Traveling Wave Antennas, Effect of the Feed, Standing Wave Antennas, Antenna Gain, Directivity, Effective Area, Antenna Terminal Impedance, Characteristic Impedance of Antennas, Antenna Temperature and Signal to Noise Ratio.

## UNIT-II

Radiation:Potential Functions, Electromagnetic Fields, Potentials Functions for Sinusoidal Oscillations, Alternating Current Element, Power Radiated by a Current Element, Applications to Short Antennas, Assumed Current Distributions, Radiation From Quarter Wave Monopole, Radiation from a Half-wave Dipole, Far and Near Fields.

#### UNIT-III

Antennas for Communications and Radar Applications: Concept, construction, design principle, applications, limitations and parameters of - Dipoles, Folded Dipoles, loop antennas, V - Antennas, Rhombic and Yagi-Uda Antennas, Log – Periodic, Helical Antennas, Reflector Antennas, Lens and Horn Antennas, Slot and Micro-strip Antennas. Antenna Measurements: Antenna parameter measurement test setup, anechoic chamber, GTEM cell, antenna test ranges, sources

of error in antenna measurements, measurement of - Input and Mutual Impedances, Radiation Pattern, Gain, Phase Front and Polarization.

#### UNIT-IV

Array antennas and Synthesis: Concept of Array antennas, Uniform Linear Arrays, Broadside and End-fire Arrays, Radiation Characteristics, Side-lobe and Beam-width Requirements, Multiplication of Patterns, Binomial Arrays, Effect of Earth on Radiation Patterns, Methods of Array Synthesis, Tchebyscheff Distribution, Super Directive Arrays, Fourier Transform Method, Woodward Method.

#### UNIT-V

Wave Propagation: Ground Wave Propagation, Estimation of Ground Wave Field Strength, Space Wave Propagation, Effect of Curvature of Earth, Shadow Zone and its Effects, Atmospheric Effects on Space Wave Propagation, Duct Propagation, Wave Tilt of Surface Wave, Inonospheric Wave Propagation, Inonospheric Layers, Reflection and Refraction of Wave in Ionosphere, MUF, Skip Distance, Critical Frequency, Virtual Height, Effect of Earth's Magnetic Field, Fading, LOS and Faraday's Rotation.

#### Textbooks:

1. EM Waves and Radiation Systems, E. C. Jordan and K. G. Balmain, PHI-N. Delhi, 1997

#### Reference Books

- 1. Antennas & Wave Propagation, G S N Raju, Pearson Education, 2004
- 2. Antenna Theory and Practice, Rajeswari Chatterjee, Wiley Eastern Ltd. N. Delhi
- 3. Electronic and Radio Engineering, F. E. Terman, McGraw Hill N. York,

### EUREC506 COMPUTER ARCHITECTURE & ORGANIZATION\*\*\*

#### IINIT-I

**Register Transfer and Micro operations:** Register transfer language - register transfer - bus and memory transfers - arithmetic micro operations - logic micro operations - shift micro operations - arithmetic logic shift unit

#### UNIT-II

**Basic Computer Organization:** Instruction Course Codes – computer registers – computer instructions – timing and control – instruction cycle – memory reference instructions – input-output and interrupt – complete computer description

## UNIT-III

**CPU Organization:** Introduction - general register organization - stack organization - instruction formats - addressing modes - data transfer and manipulation - program control - Reduced Instruction Set Computer(RISC) - Complex Instruction Set Computer(CISC)

### UNIT-IV

Micro programmed Control: Control memory – address sequencing – microinstruction format – vertical and horizontal microinstructions – micro program example – design of control unit

#### IINIT\_X

**Memory and I/O Organization:** Memory hierarchy – main memory – associative memory – cache memory – virtual memory, Peripheral devices – input/output interface – asynchronous data transfer – modes of transfer – priority interrupt – direct memory access .

### Text Book:

1. Mano, Morris M., Computer System Architecture, 3<sup>rd</sup> ed. Pearson Education Asia, 2000.

#### References:

- 1. Stallings W., Computer Organization and Architecture, 6<sup>th</sup> ed. Pearson Education Asia, 2000
- 2. Hamacher, V.C., Z.G. Vranesic, and S.G. Zaky, Computer Organization, 3<sup>rd</sup> ed, McGraw-Hill, 1990

### EUREC601 VLSI SYSTEM DESIGN\*\*\*

### UNIT-I

### Review of microelectronics and introduction to MOS technology:

Introduction MOS and related VLSI technology, NMOS, CMOS, BICMOS, GaAs Technologies, thermal aspects of processing, production of E beam masks.

#### UNIT-II

MOS and BICMOS circuit design process: MOS layers, stick diagrams, design rules and layout, 2μ.meter, 1. 2μ.meter CMOS rules. Layout diagrams, Symbolic diagrams.

#### UNIT-II

Basic circuit concepts: Sheet resistance, Area capacitance of layers, delay unit, wiring capacitances, choice of layers. Scaling of MOS circuits: Scaling models, Scaling function for device parameters, Limitation of Scaling.

### UNIT-IV

**Sub system design process:** Architectural issues, switch logic, examples of structural design (Combinational logic), design of ALU sub system, commonly used storage elements, and aspects of design rules.

**Test and testability:** Design for testability built in self test (BIST), testing combinational logic, testing sequential logic, practical design for test guide lines, scan design techniques, etc. **Test book:** 

- 1. Basic VLSI design by Douglas A, Pucknell, Kamran Eshraghian, Prantice-Hall,1996 3<sup>rd</sup> edition **Reference book**:
  - 1. Mead, C.A and Conway, L.A, Introduction to VLSI systems, Wesley-Wesley

### EUREC602 DIGITAL SIGNAL PROCESSING\*\*\*

### UNIT-I

Characterization of systems in Discrete Time: Impulse response and systemfunction H(z) of digital systems, Frequency response, Stability analysis, Direct form-I, Direct form-II, Cascade and Parallel realization structures of digital filters, finite word length effects, Limit cycle and Dead band effect.

### UNIT-II

**Discrete Fourier transform(DFT):** Discrete-Time Fourier transform, computation of DFT, circular convolution and linear convolution using DFT, overlap-add method, overlap-save method, Fast Fourier Transform(FFT), Radix-2 decimation-in-time and decimation-in-frequency algorithms, Inverse FFT.

### UNIT-III

**Design of IIR filters:** Design of IIR filters from analog filters, Butterworth filters, Chebyshev filters, frequency transformations, design examples, Impulse invariant and Step invariant filters, Bilinear transformation method. **UNIT-IV** 

**Design of FIR filters**, linear phase characteristics, Fourier series method, window function technique, comparison between IIR and FIR filters.

## UNIT-V

**DSP architecture** for signal processing, Harvard architecture, pipelining, hardware multiplier, accumulator, general purpose digital signal processors, Fixed point digital processors, floating point digital signal processors. **Applications of DSP:** in spectrum analysis and filtering, Application of DSP in audio applications, telecommunication and bio-medical.

#### Text Book:

- 1. Oppenheim A.V.& Schafer R.W- Digital signal processing, PHI.
- 2. Digital Signal Processing, P.Ramesh Babu, Scitech Publications

### References:

- 1. Sanjay K.Mitra- Digital signal processing- A computer based approach, TMH.
- 2. Ifeacher E.C & Jervis B.W, Digital signal processing –A practical approach, Pearson Edu.