MAHATMA GANDHI UNIVERSITY

B.TECH. DEGREE COURSE

6TH SEMESTER

SCHEME & SYLLABUS

2002

ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
# ELECTRONICS & COMMUNICATION ENGINEERING

## SCHEME

### 6TH SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Subject</th>
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<th>Uty. Exam duration (hours)</th>
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SYLLABUS

INDUSTRIAL MANAGEMENT & ECONOMICS
LA 601                3+2+0

PART A: INDUSTRIAL MANAGEMENT

Module 1

Module 2

Module 3
Marketing Management: Pricing- Promotion- Channels of distribution- Market research-Advertising. Production Management: Batch and mass production- Inventory control- EOQ-Project planning by PERT/CPM- Construction of Network (Basic ideas only).

PART B: ECONOMICS

Module 4

Module 5
Module 1

**Random Signal Theory:** Review of discrete and continuous random variables- Gaussian probability function- properties- error function- complementary error function. Base band data transmission: - Base band binary data transmission system- Inter symbol interference- Nyquist pulse shaping criteria- Optimum transmitting- Receiving filters.

Module 2

**Correlative coding:** -Duobinary Base band PAM system- Use of controlled ISI-M-ary signaling scheme (no analysis)- Binary versus M-ary signaling schemes- pre coding- Bipolar coding- Manchester coding- HDB coding- Equalization- Adaptive equalization- Eye pattern- Scrambler- Unscrambler.

Module 3

**Digital transmission:** - BPSK- DPSK- M-ary PSK- QPSK- BFSK- M-ary FSK- MSK- comparison.

Module 4

**Digital transmission of Analog signals:** - Sampling - Quantizing uniform non-uniform quantization -Comanding- A law µ law PCM system- DPCM delta modulation system- slope over loading- ADM- CVSD- Quantization noise.

Module 5

**Noise in communication system:** - Noise types- SNR- Probability of error- Effective Noise temperature- Noise figure- Detection of binary signals in Gaussian noise: -Maximum likelihood Receiver structure- Matched filter- Correlation realization of matched filter- optimizing error performance- error probability performance of binary transmission system.

References

1. Digital Communications: Sklar,Pearson Education
DIGITAL SIGNAL PROCESSING

LTA 603 3+1+0

Module 1


Module 2


Module 3


Module 4

Finite word length effects in digital filters: Introduction- Number Representation - Fixed Point- Sign-Magnitude - One’s-complement- Two’s -complement forms -Addition of two fixed point numbers- Multiplication in Fixed Point arithmetic - Floating point numbers- Block floating point numbers-quantization - truncation- rounding - effects due to truncation and rounding- Input quantization error - Product quantization error - Co-efficient quantization error-zero-input limit cycle Oscillations - Overflow limit cycle Oscillations - Scaling-Quantization in Floating Point realization IIR digital filters - Finite Word Length Effects in FIR Digital Filters- Quantization effects in the Computation of the DFT- quantization errors in FFT algorithms.

Module 5

Applications of digital signal processing: Speech Processing- speech analysis-speech coding- sub band coding- channel vecoder- homomorphic vecoder- digital
processing of audio signals- Radar signal processing- DSP based measurements systems. Equi ripple FIR design- PCM DSP chips- a general study.

References

2. Descrete time signal processing: Oppenhiem- Pearson edn.
3. Digital signal processing: Oppenhiem and Sheffer- PHI
4. Introduction to Digital signal processing: Johny R Johnson
5. Digital signal processing: Proakis and Manolakis.

RADIATION & PROPAGATION

Module 1

Retarded potentials: Radiation from an A.C current element monopoles and dipoles-power radiated from a dipole isotropic radiators- radiation pattern- radiation intensity-directive gain-power antenna efficiency-effective area-effective length and aperture-Reciprocity theorem-radiation resistance-antenna beam width.

Module 2

Antenna array: Classifications-Broad-side, End-fire arrays, Array of n- point, two point sources, multiplication of patterns -binomial array-stacked array folded dipole- reflector-Basic principles of antenna-parabolic reflector different methods- Chebyshev arrays- super directive arrays.

Module 3


Module 4

Factors involved in the propagation of radio waves: the ground wave- Reflection of radio waves by the surface of the earth-space wave propagation- considerations in space wave propagation-atmospheric effects in space wave propagation-ionosphere and its effects on radio waves -mechanism of ionosphere propagation-refraction and reflection of sky waves by ionosphere-ray paths-skip distance-maximum usable frequency-vertical and oblique incidence-fading of signals - selective fading-diversity reception, Duct Propagation.
Module 5


References

1. Antennas and wave propagation - K. D. Prasad
3. Antenna theory and design- A. Ballanis

**ELECTRONIC INSTRUMENTATION**

Module 1


Module 2

Transducers-parameters of electrical transducers-types-active and passive-analogue and digital types of transducers. Electromechanical type-potentiometric, inductive (self generating and non self generating type), capacitive, piezo electric, strain gauge, ionization and mechano electronic type. Opto electrical type-photo emissive, photo conductive and photo voltaic type. Frequency generating type-digital encoders-selection criteria for transducers.

Module 3

Intermediate elements-instrumentation amplifier, isolation amplifier. Data transmission elements-block diagram of telemetering system-classification of telemetering system-Electrical telemetering system--voltage, current and position type-RF telemetery-pulse telemetery (analog and digital)-pulse amplitude, pulse frequency, pulse duration and pulse position modulation.

Module 4

Bridge measurements - Wheatstone bridge - guarded Wheatstone bridge. AC bridges - Owen's bridge - Shering Bridge - Wein Bridge - Wagner ground connection. Recording techniques-strip chart recorders-basic principles of digital recording. Basic principles of Signal Analyzers-Distortion analyzer wave analyzer, spectrum analyzer.
Module 5
Basic measurements - Strain measurement - Pressure measurement - Flow measurement - Temperature measurement - Force & torque measurement. Multiplexing - D/A multiplexing and A/D multiplexing.

References

1. Measurement Systems - Doeblin, MGH.
2. Instrumentation-devices and systems - Rangan, Sarma & Mani, TMH.
3. Principles of Measurement & Instrumentation – Morris, PHI.
4. Transducers & Instrumentation – D.U. S Murthy, PHI.

CONTROL SYSTEMS
L 606  3+1+0

Module 1
Introduction to control system – Basic idea of control systems and their classifications – transfer function – transfer function of electrical, mechanical and electromechanical system – block diagram – signal flow graph – Mason’s gain formula.

Module 2

Module 3

Module 4

Module 5
compensator – lead compensator – lag lead compensator (design of compensators is not needed).

References

1. Modern control engineering – Katsuhiko Ogata, Pearson Edn
2. Control systems principles and design: M. Gopal, TMH.
3. Automatic control system – B.C. Kuo, PHI.
4. Control system design: Graham C Goodwin, PHI.
5. Modern Control Systems: Dorf, Pearson Education.

LINEAR IC LAB

L 607  

List of Experiments

1. Measurement of op amp parameters.
2. Active filters: LPF, HPF, BPF, All pass & notch filters.
3. Square wave, Triangular, Saw tooth generation using op amp.
4. Logarithmic amplifiers.
5. Precision rectifiers.
7. Sample and hold circuit.
8. 8038 function generators.
9. Analog to digital converters.
10. Digital to analog converters.

Note

Any experiment related to L505 may be added to the above list.

MINI PROJECT

L 608  

The mini project will involve the design, construction, and debugging of an electronic system approved by the department. There will be several projects such as intercom, SMPS, burglar alarm, UPS, inverter, voting machine etc. The schematic and PCB design should be done using any of the standard schematic capture & PCB design software. Each student may choose to buy, for his convenience, his own components and accessories. Each student must keep a project notebook. The notebooks will be checked periodically throughout the semester, as part of the project grade.

In addition to this, the following laboratory experiments should also be done in the lab.

1. Astable and mono stable multi-vibrators using 555
2. Light activated alarm circuit
3. Speed control of electric fan using triac
4. Illumination control circuits
5. Touch control circuits
7. Schematic capture software (OrCAD or similar) familiarization.
8. PCB design software (OrCAD Layout or similar) familiarization.

A demonstration and oral examination on the mini project also should be done at the end of the semester. The university examination will consist of two parts. One of the lab experiments will be given for examination to be completed within 60 to 90 minutes with a maximum of 30% marks. 70% marks will be allotted for the demonstration and viva voce on the mini project.