

**T.E (Electrical/Electronics/Instrumentation/Biomedical/Electronics and
Telecommunication)
SEM VI**

Sub: Industrial Economics and Management

- 1. Nature and significance of economics, Science, engineering, technology and their relationship with economic development, appropriate technology for developing countries.**
- 2. Demand, supply, Elasticity of demand and supply, Competition, monopoly, oligopoly, monopolistic competition, causes creating categories of monopoly organization, price determination under perfect competition and monopoly, Price discrimination, equilibrium of firm under competition and monopoly.**
- 3. Functions of money, supply and demand for money, money price level and inflation, black money, meaning, magnitude and consequences.**
- 4. Functions of commercial banks, multiple credit creation, banking system in India, Shortcomings and improvement.**
- 5. Central Banking, Function of central banking illustrated with reference to RBI, Monetary policy- meaning, objectives and features.**
- 6. Sources of Public revenue, principles of taxation, direct and indirect taxes, distribution of incidence, Tax structure, reform of tax system.**
- 7. Theory of International Trade, balance of trade and payment, theory of protection, tariffs and subsidies, foreign exchange control, devaluation.**
- 8. New Economic Policy: Liberalization, extending privatization, globalization, market-friendly state, export-led-growth.**
- 9. Causes of underdevelopment, determinations of economic development, economic and non-economic factors, stages of growth, strategy of development, big push, balanced and unbalanced, critical minimum effort strategy.**
- 10. Management functions, responsibilities of management to society, development Of management thought, contribution of F.W Taylor, Henri Fayol, Elton Mao System Contingency approaches to management.**
- 11. Nature of Planning, decision making process, management by objectives.**
- 12. Organization: Line and Staff Authority relationships, de-centralization and delegation of authority, span of management, flat organization.**
- 13. Communication process, media channels and barriers to effective communication.**
- 14. Maslow, Herzberg and Macgregor's theory of motivation, McClelland's achievement motivation, Blanchard's situational leadership theory.**
- 15. Production Management: Production Planning and control, inventory control**
- 16. Project Management: Project Development life cycle, project feasibility, project planning, organization and control. Tool of project management, CPM, PERT, Project Information System.**

17. Need for good cost accounting system, cost control, techniques of financial control, financial statements, financial ratios, break even analysis, budgeting and budgetary control.
18. Marketing Functions, management of sales advertising, marketing research.
19. Human resource management: Function application of industrial psychology for selection, training, machine design and man-machine system.
20. Engineering economics: Investment decisions, present worth, Annual worth and rate of return methods. Payback Time.

Recommended Books:

1. Economics: Samuelson
2. Modern Economic Theory: Dewet & Warma
3. Indian Economy : A.N Agrawal
4. Essentials of Management: Koonz and Odonnel
5. Marketing Management: V.S Ramaswamy
6. Finance for non-finance managers: B.K Chaterji
7. Management: Hampton David
8. Project Management: Prasanna Chandra

T.E Electronics Semester VI
Microwave and Fiber Optic Communication

Introduction to Microwave Communication, Microwave frequencies, Microwave devices and systems, Microwave applications.

Microwave waveguides and Cavities, phase velocity and group velocity in waveguide. TE and TM modes in rectangular waveguides. Circular waveguides. Rectangular cavity resonator. Circular cavity resonator, Q factor of a cavity resonator.

Microwave components. S parameters. Properties of S parameters attenuators. Tees. Directional Couplers. Circulators, Isolators – principle of working, S matrix representation.

Microwave vacuum tube devices. Limitations of conventional vacuum tubes. Two cavity Klystron Amplifier, Reflex Klystron- Operation, Mathematical analysis, performance and applications cylindrical magnetron, Helix TWT- Operation, performance and applications.

Microwave solid state devices, Diode detectors, Diode Mixer, Gunn diode, IMPATT and TRAPATT diodes, Parametric Amplifier.

Microwave measurements, Power, Frequency, VSWR

Introduction to Optical Fiber Communication. Communication systems applications in the electromagnetic spectrum, elements of an optical fiber transmission link, Advantages of optical fiber communication.

Optical Fiber waveguides, Fiber Types, Ray theory transmission, Mode theory for circular waveguides, TE, TM and Hybrid modes, Single-mode and multi-mode fibers. Fiber materials, Fiber fabrication, Attenuation in optical fibers, Dispersion, Measurement of attenuation and dispersion.

Optical Devices, LEDs and Laser Diodes- Working principle, structures, characteristics, modulation PIN and APD-working principle, characteristics, couplers, splices, connectors

Optical fiber systems, Analog systems, Digital systems, multiplexing, Link power budget, Rise time budget.

Text Books

- 1. Samuel Y Liao- Microwave Devices and circuits. Prentice Hall Of India. Third edition 1997**
- 2. John M Senior- Optical Fiber Communications, Prentice Hall of India, 1985**

Additional Reading

- 1. Annapurna Das, Sisir K Das- Microwave Engineering, Tata McGraw Hill, 2000**
- 2. Mynbaev and Scheiner- Fiber Optics Communications Technology- Pearson Education, 2001**
- 3. Gred Keiser- Optical Fiber communications, McGraw Hill second edition, 1991**

Termwork:

The Termwork shall consist of at least eight experiments covering the whole syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

T.E Electronics Semester VI Analog Integrated Circuits & Applications

Operational Amplifier Fundamentals

Basic Op Amp Configurations. Ideal Op Amp Circuits Analysis, Negative feedback, Feedback in Op Amp Circuits, the Loop Gain, Op Amp Powering.

Circuits with Resistive Feedback

Current-to-Voltage Converters, Voltage-to-currents Converters, Current Amplifiers, Difference Amplifier, Instrumentation Amplifier, Instrumentation Applications, Transducer Bridge Amplifiers.

Active Filter

The Transfer Function, First order Active Filters, Audio Filter Applications, Standard second-order responses, KRC Filters, Multiple Feedback Filters, State Variable and Biquad Filters. Sensitivity Filter approximations, cascade design, generalized impedance converters, direct design, switched capacitor filters.

Static Op Amp Limitations

Simplified Op Amp Circuits Diagram, Input Bias and Offset Currents, Low-input-bias-Current Op Amps, Input Offset Voltage, Low-input-offset-Voltage Op Amps, Input Offset-error compensation, Maximum Ratings.

Dynamic Op Amp Limitations

Open-Loop Response, Closed Loop Response, Input and Output Impedances, Transient Response, Effect of finite GBP or Integrator circuits. Effect of finite GBP on Filters, Current-Feedback Amplifiers.

Noise

Noise properties, Noise Dynamics, Sources of Noise, Op Amp Noise, Noise in photodiode amplifiers, Low noise Op Amps.

Stability

The Stability problem, Stability in Constant GBP Op Amps circuits, Internal Frequency Compensation, External Frequency Compensation, Stability in CFA circuits, Composite Amplifiers.

Nonlinear Circuits

Voltage Comparators, Comparator Applications, Schmitt Triggers, Precision Rectifier, Analog Switches, Peak Detectors, Sample- and- Hold Amplifiers.

Waveform Generators

Sine Wave Generators using Op-Amps, Multivibrators using Op-Amps, Monolithic Timer- NE555 Triangular Wave Generator using Op-Amps, Saw tooth Wave generators using Op-Amps, Monolithic Waveform Generator- ICL8038, V-F and F-V Converters.

Voltage References and Regulators

Performance Specifications, voltage references, voltage reference applications, linear regulators, linear regulator applications, switching regulators, monolithic switching regulators.

D-A and A-D Converters

Sample and Hold Circuits, D-A Conversion techniques, multiplying DAC applications, A-D Conversion techniques, performance specifications, over sampling converters.

Non linear Amplifiers and phase-locked loops

Log/Antilog Amplifiers, Analog Multipliers, Operational Trans-conductance amplifiers, phase locked loops, monolithic PLLs.

Operational Amplifier Circuit Design

Introduction, Differential Amplifier, current mirror, output stage, General Op-Amp Circuit Design. Detailed circuit description and working of 741 Op-Amp, small signal analysis, frequency response.

Text Books

1. Sergio Franco. Design with operational amplifiers and analog integrated circuits. Third edition, McGraw Hill International Edition, 2002.
2. James.M.Fiore. Op Amps and Linear Integrated Circuits, first reprint. Thomson Asia Pte Ltd.2001
3. Robert Coughlin and F Driscoll. Operational Amplifiers and Linear Integrated Circuits, sixth edition, Pearson Education Asia, 2001

Additional Reading

1. Donald A Neamen, Electronic Circuit analysis and design, second edition, McGraw Hill International Edition 2001.

Term work:

The Term work shall consist of at least six laboratory experiments covering the whole syllabus, duly recorded and graded as well as the latest four computer simulations using EDA tools like PSPICE duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

T.E Electronics (SEMESTER VI)

Communication systems

***Antennas* The half wave dipole, Antenna characteristics, Ground effects, Effects of Antenna height, Antenna coupling, Antenna arrays, Special purpose Antennas, UHF and microwave antennas.**

***Television principles* Television system and standards, The composite video signal, Blanking and synchronizing pulses, Monochrome Television transmission and**

reception. Horizontal and Vertical deflection circuits, Synchronizing circuits, Colour transmission, Colour reception, Cable TV, Digital TV, HDTV

Satellite Communication Kepler's Laws, Satellite orbits, Spacing and frequency allocation, Look angles, Orbital perturbations and corrections, satellite launching, Spacecraft subsystems, Satellite system link models, Link equations, multiple access, Direct broadcast satellite services. Applications of LEO, MEO and Geo-stationary satellites.

Radar systems Basic principles, Radar performance factors, MTI and Pulse Doppler radar, Continuous wave Doppler radar, radar antenna, phased array radars.

TEXT BOOKS:

1. Wayne Tomasi- Electronic communication systems, Pearson Education, fourth edition, 2001
2. Kennedy , Davis- Electronic communication systems, Tata McGraw Hill, fourth Edition 1999
3. Roy Blake- Electronic Communication systems, Thomson Learning, second edition, 2002.
4. Gulati- Monochrome and colour Television, New Age International (P) Limited, 1983.

Additional Reading:

1. Pratt, Bostian- Satellite communication, John Wiley and sons, 1986
2. Dennis Roddy- Satellite communication, McGraw Hill, third edition, 2001.
3. Skolnik- Introduction to Radar systems, McGraw Hill, third edition, 2001.
4. Gulati- Colour Television principles and practice, New Age International (P) Limited, 1988
5. Jordan, Balmian- Electromagnetic Waves and Radiating Systems, PHI, second edition, 1988

TERM WORK

The Term work shall consist of at least four experiments and four assignments duly recorded and graded which shall carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

T.E (Electronics) SEM VI

Discrete Time Signal Processing

1. Discrete Time(DT) signals & systems
 - Signal classifications manipulations

- **Signal periodicity in DT domain**
 - **Concept of system and system classification**
 - **System Representation as a difference equation**
 - **Impulse Response**
 - **Finite Impulse Response (FIR) & Infinite Impulse Response (IIR) systems**
 - **Convolution**
 - **BIBO stability**
- 2. Z Transform**
- **Two sided Z Transform and Region of Convergence (ROC)**
 - **Properties of Z transform**
 - **Relationship with Laplace Transform and mapping**
 - **One-sided Z Transform**
 - **Inverse Z Transform**
- 3. Time Domain Analysis of DT Systems**
- **System Transfer function, System realizations using direct, cascade, parallel & Lattice forms.**
 - **System Analysis: Impulse response, zero input and zero state response**
 - **Signal generation**
- 4. Frequency Domain Analysis of DT systems**
- **System Transfer function and Pole-Zero representation**
 - **Frequency domain analysis using Analytical & graphical techniques.**
 - **System classification based on pass-band as Low pass, High pass, all pass, Band pass, Band Reject**
 - **System classification based on phase response as Minimum phase, Maximum phase, mixed phase or linear phase systems.**
 - **Stability Analysis.**
- 5. DT signal Analysis & computation of spectra**
- **DTFS definitions from orthogonal complex exponentials**
 - **CTFS & DTFS and Properties of DTFS**
 - **Power Density Spectrum**
 - **DTFT and Properties of DTFT**
 - **Energy Density Spectrum**
 - **Relationship between DTFT & Z transform**
- 6. Discrete Fourier Transform (DFT)**
- **DTFT, DFT and DFT properties**
 - **Block convolution using DFT by Overlap-add & Overlap-save methods**
 - **Fast Fourier transform (FFT)**
 1. **Cooley-Tulkey Algorithms**
 2. **Prime Factor Algorithms**
 - **Quantization effects in Fixed point FFT algorithms**

- DFT Analysis of Sinusoidal signals
7. DSP Processors
- Need for Special Architecture
 - Difference between DSP Processor & microprocessor
 - A general DSP Processor

Text Books

1. Ashok Ambardar, Analog and Digital Signal Processing, Thomson Learning Publication, second edition, first reprint, 2001.
2. Oppenheim & Schafer with Buck, Discrete- Time Signal Processing, Prentice Hall, Signal Processing series, second edition, 2000.
3. S.K Mitra, Digital Signal Processing, Tata McGraw Hill Publication.

Additional Reading:

1. T.J Cavicchi, Digital Signal Processing, Wiley Publications, 2002

Term Work:

The Term work shall consist of at least six experiments and at least four comprehensive assignments covering the whole syllabus duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

T.E Electronics SEM-VI Computer Organization

Performance measure- Definition, Throughput and Response time, measuring performance (MIPs, FLOPs etc)

Preliminaries- Computer Arithmetic- Number representation and Arithmetic, Floating point representation, Multiplication and Division Algorithms and circuits. Operation on Data structures like Arrays, Lists, Stacks and Queues.

Instruction types and sequencing, addressing modes with case study for Pentium processor

Input/Output Organization- I/O Devices types and access methods, interrupts, DMA, I/O Processors, types of busses and bus arbitration, various bus standards, I/O interface- serial and parallel ports.

Basic Processing Unit- The data path and components of Instruction Execution, Bus Organization, Hardwired Control, Micro programmed control, Exceptions and

their handling, Performance Enhancement using pipelining- Pipelining introduction, Instruction Set, hazards, case study.

Memory Organization- RAM organization- SRAM and DRAM, ROM and Flash memory, addressing, Cache- mapping, handling cache miss, multi level caches, virtual memory- concept address translation, paging, TLB, Segmentation

Peripherals- Storage Devices- Organization, Access Techniques, Input and Output devices, Organization, Access techniques, Network Devices- modems, serial communication links.

Multiprocessor systems- (Introduction Only) Connection techniques, Cache Issues.

TEXT BOOKS

- 1. Hamacher, Vranesic, Zaky, Computer Organization, Fifth Edition, Tata McGraw Hill, 2002**

Additional Reading:

- 1. Patterson & Hennessy, Computer Organization, Second Edition, Morgan Kaufmann Publishers, 1998.**
- 2. John Carpinelli, Computer systems Organization and Architecture, first Indian reprint, Addison Wesley Longman- Indian Branch, 2001.**

Term work:

The Term work shall consist of at least four experiments covering the whole syllabus duly recorded and graded as well as six comprehensive tutorials. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.
