

B.TECH 6th SEMESTER
BIO-MEDICAL ENGINEERING
(EIE-302-E)

L T P
4 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

Unit I

Bioelectric signals: origin, electrodes, ECG, EEG and EMG.

Physiological Transducers: Pressure & Temperature transducers. Pulse sensors, Respiration Sensors.

Unit II

Recording system: Pre amplifiers, drivers, various types of recorders - inkjet, potentiometric, UV, thermal array, electrostatic, light gate array. Electrocardiograph, phonocardiograph, Electroencephalograph, Electromyograph.

Medical display systems: Oscilloscopes, Cardioscopes, Multichannel Display & non-fade display.

Unit III

Bio-Telemetry: Wireless telemetry, single channel telemetry, Example of temperature telemetry, transmission of signals over telephone lines.

Patient safety: Electric Shock hazards, Leakage currents, Test instruments for checking safety parameters.

Unit IV

Blood Flowmeters: Electromagnetic blood flowmeter, Ultrasonic blood flowmeter

Therapeutic equipment: Pacemakers & Defibrillators.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books recommended

1. Khandpur, R. S., Handbook of Biomedical Instrumentation, Tata McGraw Hill Publication Ltd. Co.
2. Cromwell, Lesilie, Biomedical Instrumentations & Measurements, Prentice Hall of India Pvt. Ltd.

B.TECH 6th SEMESTER
MICROWAVE AND RADAR ENGINEERING
(EIE-304-E)

L T P
3 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT -- I :

MICROWAVE GENERATORS : Construction, characteristics, operating principle and typical applications

Of Klystron, Reflex Klystron, magnetron and Traveling Wave Tube

UNIT – II:

SOLID STATE MICROWAVE DEVICES: Parametric amplifiers , GUNN effect Devices , IMPATT.

TRAPATT, BARITT diodes

MICROWAVE RESONATORS : Rectangular, cylindrical, spherical and coaxial resonators, excitation and coupling of

Cavities.

UNIT – III:

MATRIX DESCRIPTION OF MICROWAVE CIRCUITS: Scattering matrix – its properties , measurement of

Scattering coefficients, scattering matrices for common microwave systems.

UNIT – IV:

RADAR: Radar Equation CW and Frequency modulated Radar, Doppler effect CW Radar, multifrequency CW Radar, MTI and pulse Doppler Radar, MTI delay lines and cancellors, range gate pulse, doppler radar, non-coherent MTI, Noise and Clutter, Radar Signal Processing, Radio aids to navigation.

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Books:

1. Liao S.Y. : Microwave Circuits & Devices, PHI.
2. Skolnik M.K. : Introduction to Radar Systems, McGraw Hill.
3. Chatterjee R. : Fundamentals of Microwave Engineering, East-West.
4. Siegman A.E. : An introduction to Lasers & Masers, McGraw Hill.

**B.TECH 6th SEMESTER
MICROPROCESSOR
(EIE-306-E)**

L T P
4 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

Unit I

Introduction: Motivation for studying microprocessors, its, advantages and limitations: various types of processors available including the special purpose the concept of stored program architecture, fetch and execute cycles; the three bus architecture; machine and instruction cycle timing; single chip vs. chip set microprocessors

Unit II

8085 CPU Architecture: Detailed description of 8085 pins, flags, registers etc; generation of system clocks, power on reset; addressing modes; instruction set; stack operations; subroutines and macros; interrupts; assembler directives; assembly language programming.

Unit III

Buses: Parallel vs. Serial; bus buffering and tristating, noise, loading and reflection problems – an introduction only; bus standards like RS 232, RS 422/432, IEEE 438.

Memory and I/O: Various kinds of memories available, interfacing a ROM and RAM – with special reference to 8755, memory and I/O mapping, memory mapped I/O, parallel I/O, programmed I/O, interrupt driven I/O:

Unit IV

Interfacing Using Special Purpose Support Devices : Brief description and interfacing of 8255 PPI, 8251 USART, and A/D, D/A Chip applications – A Temperature monitoring system and Closed Loop Control.

Introduction to other Microprocessors: Introduction to the Z 80, MC 6800 and 8086 and comparison with 8085.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books:

- 1 Malvino, A.P. : Digital Computer Electronics: An Introduction to Microcomputers, McGraw Hill.
- 2 R.Gaonkar : Microprocessor Architecture, Programming and Applications, Wiley.
- 3 M. Rafeezaman : Microprocessors and Microcomputer Based System
- 4 B. Ram : Fundamentals of Microprocessors and Microcomputers : Dhanpat Rai Publications

**B.TECH 6th SEMESTER
ROBOTICS ENGINEERING
(EIE-308-E)**

L T P
4 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

Unit I

INTRODUCTION: Terminology, Elements/Components of Robotics System, Drives, Sensors, Manipulator and control, Classification of Robotics system

KINEMATICS: Position and orientation representation, Co-ordinate frames, Translation and rotational Transformation, Homogeneous Transformation, link Parameters, examples of Manipulator Kinematics

Unit II

INVERSE KINEMATICS: Solving the Arm equation, General properties of solution. Existence of solution, Uniqueness of solution, Example: velocity of link motion.

DYNAMICS: Lagrange's approach of Dynamics, Link inertia, Lagrange's simplified dynamics models.

Unit III

CONTROL: Linear model, Linear feed back control, Single Axis PID control, Computed Torque control and Multi-variable control

Unit IV

INSTRUMENTATION AND PROGRAMMING: Sensors, Tactile sensors, Microswitch, Piezoelectric, Strain Gauge, Non contact Sensor; capacitive, inductive, Ultrasonic, Light Reflector, Lasers. End effectors. Introduction to Programming and Languages.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books for references:

1. Introduction to Robotics, Mechanics and Control by J.J. Craig, Addison Wesley Publication Co.
2. Robot Dynamics and control by W. Spong, M. Vidyasagar, John Wiley and Sons, New York.
3. Robotic Control sensory vision, Intelligence by K.S. Fu. R.C. Gonzalez and S.S.G. Lee, McGraw Hill.
4. Robot Engineering an Integrated Approach by Richard D Klafter Thomas Chmidewski, Michel Nigin by PHI.

B.TECH 6th SEMESTER
OPTO-ELECTRONIC INSTRUMENTATION
(EIE-310-E)

L T P
4 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

Unit I

Optical Fiber :

Ray Theory transmission, Numerical Aperture, Acceptance angle, Acceptance cone, Types of fiber: Cylindrical fiber, Single mode, Multimode (step-index) fiber, Graded-index fiber.

Unit II

Transmission Characteristics of Fibers:

Attenuation, material absorption, Intrinsic absorption, Extrinsic absorption, Linear and non-linear scattering losses, fiber bend loss, Dispersion (Intramodal and Intermodal).

Unit III

Optical Fiber:

Preparation, Liquid-phase melting techniques, Double Crucible method, Fiber drawing, Vapor phase deposition techniques: Vapour Axial Deposition Technique, Modified chemical Vapour Deposition Technique, PCVD, OVPO.

Unit IV

Optical Sources:

Light emitting diode (LED) and LASER power and efficiency, optical emissions from semiconductors, Double heterojunction LED & ILD (Injection Laser Mode).

Optical Detectors:

P-N Photodiode, P-I-N photodiode, Avalanche photodiode, speed of response, efficiency.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

REFERENCES:

1. Optical Fiber Communication: JOHN M. Senior (PHI).
2. Electronic Communication : Roody Coolen (PHI)
3. Semiconductors opto electronic devices: Pallab Bhattacharya.

B.TECH 6th SEMESTER
TRANSMISSION AND DISTRIBUTION OF ELECTRICAL ENERGY
(EIE-312-E)

L T P
4 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

Unit I

General Importance of electric power, power system components , growth of power system in India, power supply network, effect of voltage on conductor size, comparison of conductor vol. in typical supply systems ,elementary high voltage DC transmission and its advantages and disadvantages

Unit II

Line parameters:Evaluation of inductance, capacitance, resistance for single phase , three phase symmetrical, unsymmetrical, transposed, untransposed, single circuit, double circuit lines, skin and proximity effect

Performance of line :Classification of lines as short, medium and long representation and detailed performance analysis of these lines including ABCD Parameters, detailed measurements and universal power circle diagram

Unit III

Mechanical considerations:Various types of line conductors, line support, poles and tower, sag calculations, Effect of wind, ice and temperature, string chart, sag template, line vibrations

Insulators: Various types of insulators, voltage distribution, string efficiency, methods of increasing string efficiency

Unit IV

Corona:Phenomenon of corona, disruptive critical voltage, visual critical voltage , corona loss, radio interference.

Underground Cables:Classification and construction , insulation resistance, capacitance, capacitance determination, power factor in cables, capacitance grading, use of inter sheaths, losses, heat dissipation and temperature rise in cables ,current rating, comparison with over head lines

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books:

- 1 IJ Nagrath and DP Kothari “ Power system engineering “
- 2.A Chakraborty, ML Soni, PV Gupta, and US Bhatnagar ”Power system engineering”.
- 3.CL Wadhwa “Electric power systems”
- 4.WD Stereson “Elements of power system analysis”
- 5 “Electrical transmission and distribution”Westinghouse electric and manufacturing company.

**B.TECH 6th SEMESTER
MICROPROCESSOR LAB
(EIE-314-E)**

L T P
- - 2

Exam : 50
Sessional : 50
Time : 3Hrs

LIST OF EXPERIMENTS :

1. Write a program to perform 8-bit subtraction.
2. Write a program to perform 8-bit addition and store the result in memory.
3. Write a program to multiply two 8-bit numbers.
4. Write a program to divide two 8-bit numbers.
5. Write a program to find the smallest number.
6. Write a program to find the largest number.
7. Write a program to find two's complement of a 8-bit number.
8. Write a program to find square from look-up table.
9. Write a program to arrange a series of numbers in descending order.
10. Write a program to arrange a series of numbers in ascending order.

NOTE :

At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

B.TECH 6th SEMESTER
OPTO-ELECTRONIC INSTRUMENTATION LAB
(EIE-316-E)

L T P
- - 2

Exam : 25
Sessional : 50
Time : 3Hrs

LIST OF EXPERIMENTS :

1. To study a 650nm fiber optic Analog link.
2. To study a 650nm fiber optic Digital link.
3. To study Amplitude Modulation system using an Analog input signal.
4. To study Amplitude Modulation system using a Digital input signal.
5. To study Frequency Modulation(FM).
6. To study pulse width modulation(PWM).
7. To study the Propagation loss in optical fiber.
8. To study the bending losses in fiber optical cable.
9. To measure the Numerical Aperture (NA) of the fiber.

NOTE :

At least 9 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

**B.TECH 6th SEMESTER
MICROWAVE LAB
(EIE-318-E)**

L T P
- - 2

Exam : 25
Sessional : 50
Time : 3Hrs

LIST OF EXPERIMENTS :

- 1 To study the microwave component.
- 2 To study the characteristics of the Reflex Klystron tube and to determine its electronic tuning range.
3. To determine the frequency and wavelength in a rectangular wave guide working in TE₁₀ mode.
4. To determine the standing wave ratio and reflection coefficient .
5. To study the IV characteristics of Gunn diode .
6. To study the Magic TEE.
7. To study the isolator and attenuator.
8. To measure the coupling coefficient and directivity of a wave guide directional coupler.
- 9 To measure the polar pattern and the gain of a wave guide Horn antenna.
- 10 To measure the insertion loss and attenuation.

NOTE :

At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope