

FOURTH SEMESTER

THEORY

S.No	Subject Code	Subject Name	L	T	P	IA	EE	Total
1		Electro magnetic theory.	4	0	0	20	80	100
2		Sensors and Measuring Techniques	4	0	0	20	80	100
3		Medical Physics	4	0	0	20	80	100
4		Principles of Communication Engg.	4	0	0	20	80	100
5		Pathology and Micro Biology	4	0	0	20	80	100
6		Electronic Circuits	4	0	0	20	80	100

PRACTICAL

S.No	Subject Code	Subject Name	L	T	P	IA	EE	Total
7		Electronic Circuits Lab	0	0	3	20	80	100
8		Pathology and Micro Biology Lab	0	0	3	20	80	100

SEMESTER IV

ELECTROMAGNETIC THEORY (Common to IV Sem EEE and BME)

1. ELECTROSTATICS 9
Introduction - Difference between field theory and circuit theory – Charge - Coulomb’s law - Continuous charge distribution - Electric field intensity - Electric flux - Gauss’s law – Potential - boundary value problems - Laplace and Poisson’s equations -Electrostatic energy – dielectrics - Capacitance.
2. MAGNETOSTATICS 9
Magnetic field - Magnetic flux - Magnetic flux density - Biot-Savart’s law -Ampere’s law - torque – force - vector potential - boundary value problem.
3. ELECROMAGNETIC FIELDS 9
Faraday’s law - Lenz’s law - Self inductance - mutual inductance - co-efficient of coupling - Dot rule for coupled circuits - series, parallel - inductance of solenoid, Toroid, Maxwell’s equations (boundary conditions) - displacement current - eddy current.
4. ELECTROMAGNETIC WAVES 9
Introduction - Solution of wave equation in free space - Conducting media -Uniform plane wave propagation, phase velocity, Group velocity - Conductors and transmission lines - Pointing vector - Skin effect.
5. FIELD MODELLING AND COMPUTATION 9
Problem formulation - boundary conditions – solutions - analytical methods - variables separable methods - conformal transformation - method of images - numerical methods - finite difference method - finite element method - charge simulation method

Total Hours = 45

TEXT BOOKS

1. **K.A.Gangahar, P.M.Ramanathan, “Field Theory”, Khanna Publishers, New Delhi, 15th Edition, Second Reprint, 2003.**
2. **Joseph A Edminister, ‘Theory and Problems of Electro magnetics’, Schaums outline series McGraw-Hill book company New York, 1986.**
3. **William H.Hayt, Jr., ‘Engineering Electromagnetic,’ Tata McGraw-Hill Edition, New Delhi, 1998.**

REFERENCES

1. **David J Griffith, ‘Introduction to Electrodynamics,’ Prentice Hall of India Pvt. Ltd, New Delhi, Second Edition, 1997.**

2. **Richard E. Dubroff, S.V.Marshall, G.G.Skitek, 'Electromagnetic Concepts and Applications', Fourth Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 1996.**
3. **Kraus and Fleish, 'Electromagnetics with Applications', McGraw-Hill International Editions Fifth Edition 1999.**

SEMESTER IV

SENSORS AND MEASURING TECHNIQUES

1. CONCEPTS OF MEASUREMENT 9

Measurement – Types of measurement – Instruments – Types of Instruments - static and dynamic characteristics of instruments – errors in measurements - Functional elements of an instrumentation system - standards and calibration.

2. DIGITAL INSTRUMENTS 9

Digital Voltmeters and Multimeters - Automation in voltmeters - accuracy in DVM - Guarding Techniques - Digital measurement of frequency, period, time interval and pulse width.

3. SIGNAL CONDITIONING CIRCUITS 9

DC Bridges - AC Bridges (Maxwell's Bridge, Anderson's Bridge, Hay's Bridge and Schering's Bridge) – Differential and Instrumentation Amplifiers – S/H Circuit, A/D and D/A converters - Data acquisition systems.

4. DATA DISPLAY AND RECORDING SYSTEMS 9

CRO - Single beam, dual trace – Double beam CRO – Storage CRO – Sampling oscilloscope – Magnetic disc and tape recorders – digital plotters and printers - LED, LCD and Dot matrix displays.

5. TRANSDUCERS 9

Classification of transducers – selection of transducers - resistive, capacitive and inductive transducers – Piezo electric transducers – optical, digital transducers and acoustic sensors - pH electrodes - measurement of temperature, flow and pressure using transducers.

Total Hours = 45

TEXT BOOKS

1. **A.K.Sawhney, “A Course in Electrical and Electronic Measurements and Instrumentation”, Dhanpat Rai & Sons, 2003, 17th edition.**
2. **H.S. Kalsi, ‘Electronic Instrumentation’, TMH Co., 1995.**

ReferenceS

1. **Cooper, “Electronic Instrumentation and Measurement Techniques”, Prentice Hall of India, 1998.**
2. **Doebeling, E.O., 'Measurement Systems – Application and Design', McGraw Hill Publishing Company, 1990.**
3. **Moorthy, D.V.S., 'Transducers and Instrumentation', Prentice Hall of India Pvt. Ltd., 1995.**

SEMESTER IV
MEDICAL PHYSICS

9

1. ATOMIC PHYSICS

Traditional definition of atom, periodic system of elements, mechanical properties of atom, emission of light and its frequencies. Electromagnetic spectra.

Principles of Nuclear Physics – Natural radioactivity, Decay series, type of radiation and their applications, artificially produced isotopes and its application, accelerator principles; Radio nuclides used in Medicine and technology.

2. INTERACTION WITH LIVING CELLS

9

Target theory, single hit and multi target theory, cellular effects of radiation, DNA damage, depression of Macro molecular synthesis, Chromosomal damage.

3. SOMATIC EFFECT OF RADIATION

9

Radio sensitivity protocol of different tissues in human, LD 50/30 effect of radiation on skin, blood forming organs, lenses of eye, embryo and Endocrinal glands.

4. GENETIC EFFECT OF RADIATION

9

Threshold of linear dose effect, relationship, factors affecting frequency of radiation induced mutation, Gene controlled hereditary diseases, biological effect of microwave and RF wave. Variation in dielectric constant and specific conductivity of tissues. Penetration and propagation of signals effects in various vital organs, Protection standards.

5. PHOTO MEDICINE

9

Synthesis of Vitamin D in early and late cutaneous effects, Phototherapy, Photo hemotherapy, exposure level, hazards and maximum permissible exposures.

LASER PHYSICS – Characteristics of Laser radiation, Laser speckle, biological effects, laser safety management.

Total Hours: 45

REFERENCES:

- 1. Moselly, 'Non ionising Radiation' Adam Hilgar Brustol 1988**
- 2. Branski.S and Cherski.P 'Biological effects of Microwave' Hutchinson & ROSS Inc. Strondsburg 1980.**
- 3. Glasser.O.Medical Physics Vol.1, 2, 3 year Book Publisher Inc Chicago, 1980.**

SEMESTER IV-BME
PRINCIPLES OF COMMUNICATION ENGINEERING
(COMMON TO IV SEM IT & IV SEM BME 2006-2007 BATCH)

1. INTRODUCTION OF COMMUNICATIONS SYSTEMS: 9
Communications systems, Modulation, Bandwidth requirements, Noise- External Noise, Internal Noise, Noise calculations, Noise figure, Noise temperature.
2. AMPLITUDE MODULATION: 9
Amplitude modulation theory, Generation of AM, Single- sideband techniques- Evolution and description of SSB, Suppression of carrier, Suppression of Unwanted sidebands, Extension of SSB, Radio receivers - AM receivers, Single and independent Sideband receivers.
3. ANGLE MODULATION: 9
Frequency Modulation - Theory of Frequency Modulation and Phase Modulation, Noise, Generation of Frequency Modulation, Radio receivers- FM receivers.
4. PULSE COMMUNICATIONS: 9
Information theory, Pulse modulation types -PWM, PPM and PCM, Pulse systems.
5. DIGITAL & BROADBAND COMMUNICATIONS SYSTEMS: 9
Digital technology, Fundamentals of data communications systems, Data sets and Interconnection requirements, Network and control considerations, Broadband - Multiplexing, Short and Medium haul systems, Long haul systems, Elements of Long distance telephony.

TEXT BOOKS:

1. **George Kennedy and Bernard Davis, “Electronic communication systems”, Tata McGraw – Hill Publication, 1999.**

REFERENCES:

1. **B.P.Lathi, “Analog and Digital Communication systems”, PHI, 1992.**
2. **Proakis, “Digital Communications”, Tata McGraw – Hill Publication, 1999.**

3. A.B. Carlson, "Communication Systems", Tata McGraw – Hill Publication, 1992.

SEMESTER IV
PATHOLOGY AND MICRO BIOLOGY

- 1. NORMAL CELL STRUCTURE** 9
Cell Degeneration and regeneration - Inflammations, apoptosis, Neoplasia. Classification, Difference between benign and malignant tumors – Etiology of tumors – Spread of Tumors.
- 2. FLUID AND HEAMODYNAMIC DERANGEMENT** 9
Edema, Shock, Hemorrhage – Thrombus – Embolism – Disseminated intra vascular Coagulation – Hematological disorders. Bleeding Disorders – Leukemia – lymphoma.
- 3. GENETIC DISORDERS, INFECTION AND IMMUNITY** 9
Autosomal and Sex linked disorders – Storage disorders – Types of hypersensitivity reactions – Immune deficiency Syndrome – Primary – HIV – Viral disease. Chlamydial – Bacterial – mycoplasma – Rickettsial disease – Fungal, protozoal. – Helminthic disease.
- 4. GENERAL MICROBIOLOGY** 9
General Structural Organization of Bacterial, Viral Cell – Growth and Identification of bacteria, Observation of culture.
Microscopy: - Light Microscopy – Dark field Microscopy – Phase contrast microscopy – electron microscopy.
- 5. IDENTIFICATION OF MICROORGANISMS** 9
Identification of disease producing organism, Simple Stain, Gram Stain, AFB Stain, Fluorescent techniques, Antigen – Antibody Technique.

Total Hours: 45

TEXT BOOK:

1. Robbins S.L & Ramzi S.C, "Pathologic Basis of Diseases', W.B. Saunders Co. 1999
2. Anatha Narayanan.R & Jayaram Panicker C.R, 'Text Book of Microbiology, Orient Laongman'1998.

SEMESTER IV

ELECTRONIC CIRCUITS (Common to IV Sem EEE and BME)

1. BIASING AND STABILIZATION 9
Transistor biasing - DC equivalent model - criteria for fixing operating point - methods of bias - stabilization techniques (Fixed bias, Collector to base bias, self bias) - Stabilization factors - Compensation techniques - thermal run way - condition to avoid thermal run away.
2. AMPLIFIERS 9
Small signal low frequency transistor amplifier circuits - cascading transistor amplifier - Darlington connections - analysis of class A, B and C power amplifiers - FET amplifier – FET and their analysis.
3. FEED BACK AMPLIFIER AND OSCILLATORS 9
Concept of feedback - Classification of feedback amplifiers - General characteristics of negative feedback amplifiers - voltage/current, series/shunt feedback. Positive Feedback - Condition for oscillations - Barkhausen criterion - RC-phase shift oscillators - Hartley, Colpitts and crystal oscillators - Wein bridge oscillator.
4. PULSE CIRCUITS 9
RC wave shaping circuits – diode clippers and clampers - Schmit triggers – Multivibrators – types, UJT and transistor sawtooth oscillators.
- 5 RECTIFIERS, FILTERS AND POWER SUPPLIES 9
Single phase half wave and Full wave rectifiers – Filters – inductor filter – capacitor filter - L section and Π section filters - design of Zener voltage regulators - series and shunt voltage regulators - Switched mode power supplies.

Total Hours = 45

TEXT BOOK

1. Millman and Halkias, “Electronic Devices and Circuits”, McGraw-Hill, ISE, 1991, Reprint 2004.

REFERENCES

1. Millman and Halkias, ‘Integrated Electronics’, McGraw-Hill, ISE, 1990.
2. Millman and Taub, Pulse, ‘Digital and Switching Waves forms’, McGraw-Hill, 1991.
3. David Bell, ‘Electronic devices and circuits’, 3rd edition 1999.

SEMESTER IV

ELECTRONIC CIRCUITS LABORATORY

(Common to IV Sem EEE and BME)

1. **Common Emitter and common collector amplifier**
2. **FET amplifier**
3. **Class A and Class B amplifiers**
4. **Differential amplifier**
5. **Feed back amplifier**
6. **Phase shift and Wein bridge Oscillator**
7. **Hartley and Colpitts oscillator**
8. **Astable Multivibrator**
9. **Monostable and Bistable Multivibrator**
10. **Single phase half wave and full wave rectifier**
11. **Series voltage regulator.**

Total Hours = 45

SEMESTER IV

PATHOLOGY AND MICROBIOLOGY LAB

- 1. Hemoglobin Estimation.**
- 2. Peripheral Smear Study.**
- 3. Urine Smear Study**
- 4. Cross matching of Blood.**
- 5. Simple Stain test**
- 6. Gram Stain test.**
- 7. AFB Stain test.**

Total Hours: 45