

**MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI**

**UG COURSES – AFFILIATED COLLEGES
B.Sc. Physics
(Choice Based Credit System with effect from 2020 - 2021)**

(With effect from the academic year 2020-2021)

	Subject Part	Subject Title	Contact Hr / Week	Credit	Exam Hrs	Marks		
						Int	Ext	Total
Semester - III	Part I	Tamil / Other Languages	6	4	3	25	75	100
	Part II	English	6	4	3	25	75	100
	Part III	<u>Core subject</u> 3. Electricity	4	4	3	25	75	100
		Practical-III	2	2	3	50	50	100
		<u>Allied Subject-I</u> (for allied subjects With theory and practical) 1.Theory-Paper-I	4	3	3	25	75	100
		2.Practical-1	2	2	3	50	50	100
		<u>Skill based subject</u> (Any one) a. Maintenance of Electrical appliances b. Instrumentation Physics - I	4	4	3	25	75	100
		Part IV	<u>Non – Major Elective</u> (Any one) a. Basic Physics – I b. Applied Physics	2	2	3	25	75
		Common-Yoga*	2	2				
		Total	32	27				

	Subject Part	Subject Title	Contact Hr / Week	Credit	Exam Hrs	Marks		
						Int	Ext	Total
Semester – IV	Part I	Tamil / Other Languages	6	4	3	25	75	100
	Part II	English	6	4	3	25	75	100
	Part III	<u>Core subject</u> 4. Electromagnetism	4	4	3	25	75	100
		Practical-IV	2	2	3	50	50	100
		<u>Allied Subject-II</u> (for allied subjects with theory and practical) 1.Theory-Paper-II	4	3	3	25	75	100
		2.Practical-II	2	2	3	50	50	100
		<u>Skill based subject</u> (Anyone) a. Maintenance of Electronic appliances b. Instrumentation Physics – II	4	4	3	25	75	100
	Part IV	<u>Non – Major Elective - Paper - II</u> (Any One) a. Basic Physics – II b. Space Physics	2	2	3	25	75	100
		Common - Computer For Digital Era*	2	2	-	-	-	-
	Part V	Extension activity	-	1	-	-	-	-
		Total	32	28				

	Subject Part	Subject Title	Contact Hr / Week	Credit	Exam Hrs	Marks		
						Int	Ext	Total
Semester – V	Part III	<u>Core subject</u> 5.Basic Electronics	6	4	3	25	75	100
		6. Spectroscopy	5	4	3	25	75	100
		7.Atomic and Nuclear Physics	6	4	3	25	75	100
		<u>Major Elective</u> (any one) a.Programming in C++ b.Communication Electronics	5	4	3	25	75	100
		Practical – V - General Practical	3	3	3	50	50	100
		Practical-VI Electronics	3	3	3	50	50	100
	Part IV	<u>Skill based subject</u> (Common) Personality development / Effective Communication / Youth Leadership	2	2	3	25	75	100
		Total	30	24				
Semester – VI		<u>Core Subject</u> 9. Quantum Mechanics	5	4	3	25	75	100
		10. Digital Electronics	5	4	3	25	75	100
		11. Solid State Physics	5	4	3	25	75	100
		<u>Major Elective</u> (any one) a.Energy Physics b.Medical Physics	5	4	3	25	75	100
		Project	4	4	3	50	50	100
		Practical-VII General Practical	3	3	3	50	50	100
		Practical-VIII Electronics	3	3	3	50	50	100
		Total	30	26				

SEMESTER - III

Core 3: ELECTRICITY

Preamble: Objective of the paper is to provide a basic knowledge about electricity and various methods of analyzing electric circuits with dc and ac sources. This paper does not require any special prerequisite except the basic ideas on electricity at the school level and learners are expected to gain knowledge to design and characterize electric circuits.

UNIT-1: ELECTRIC FIELD AND POTENTIAL

Introduction - electric charge - coulomb's law - electric field - lines of force - electric flux - Gauss's law – applications - coulomb's law from Gauss's law - electric field at a point due to point charge - line charge - spherically symmetric charge distribution - sheet of charge - electric potential - relation connecting electric field and potential - potential at a point due to point charge - collection of charges - dipole and charged spherical shell - electric potential energy

UNIT-II: THERMO ELECTRICITY

Seebeck effect - laws of thermo e.m.f – measurement of thermo e.m.f using potentiometer - Peltier effect - demonstration—Thomson effect - demonstration - thermodynamics of thermo couple – thermo electric power diagram – uses - applications-thermopile-Boy's radio micrometre –thermo-milliammeter

UNIT-III: CHEMICAL EFFECT OF ELECTRIC CURRENT

Introduction -Faradays laws of electrolysis- electrical conductivity of an electrolyte-specific conductivity- Kohlrausch's bridge method of determining the specific conductivity of an electrolyte - Arrhenius theory of electrolytic dissociation- Secondary cells- Gibbs –Helmholtz equation for a reversible cell .

UNIT-IV: STEADY CURRENT AND TRANSIENT CURRENT

Current and current density-ohm's law in vector form-conversion of galvanometer into voltmeter and ammeter-Kirchoff's laws-application to Wheatstone's network

Growth and decay of current in a circuit containing L and R with dc voltages - growth and decay of charge in a capacitance and resistance circuit- determination of high resistance by leakage – growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory –frequency of oscillation.

UNIT-V: ALTERNATING CURRENT

Alternating Current- j operator method - AC through an inductance and resistance in series- capacitance and resistance in series – LCR series resonance circuit -sharpness of resonance- parallel resonance circuit - power in an AC circuit - power factor

Books for study

1. Electricity and Magnetism -R. Murugesan (S. Chand & Co.)
2. Electricity and Magnetism - K.K.Tiwari (S. Chand & Co.)

Books for Reference

1. Electricity and Magnetism - D.N.Vasudeva (Twelfth revised edition)
2. Electricity and Magnetism - E.M.Pourcel, Berkley Physics Course, Vol.2 (Mc Graw-Hill)
3. Electricity and Magnetism -Tayal (Himalalaya Publishing Co.)
4. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and J Walker. Wiley NY2001.

PRACTICAL- III

(6 experiments compulsory)

1. Series Resonance Circuit
2. Ballistic Galvanometer – Figure of merit
3. Potentiometer–EMF of a thermocouple
4. Parallel Resonance Circuit
5. Ballistic Galvanometer – Comparison of Capacitances (C_1 / C_2)
6. Potentiometer – Calibration of low range Voltmeter
7. Newton's law of cooling - verification
8. Owen's Bridge – Determination of self-inductance of the coil

SEMESTER-III
SKILL BASED ELECTIVE
(For Physics major students only)

(Any one)

PAPER 1.a

MAINTANANCE OF ELECTRICAL APPLIANCES

Preamble: This course enables the students to understand the operations and safety handling of certain commonly used domestic appliances. The paper needs a basic knowledge in electricity and magnetism and the learners are expected to gain knowledge to design and trouble shoot electrical circuits.

UNIT-I: Active & Passive Components

Resistance - capacitance - inductance and its units - electrical charge - current - potential - units and measuring meters - Ohm's law - Galvanometer, ammeter, voltmeter and multimeter. Electrical energy - power - consumption of electrical power.

UNIT-II: Transformers

Transformer - principle and working - classification of transformers - testing of transformers - Core, Shell and Berry types, auto transformer - construction and uses. Cooling of transformers - Losses in transformer.

Unit-III: Electrical appliances

Electric bulbs – Fluorescent lamps - Street Lighting - Electric Fans - Wet Grinder - Mixer - Water Heater - Storage and Instant types-electric iron box- microwave oven - Washing Machine - Stabilizer, Fridge and Air conditioner.

UNIT-IV: AC & DC electrical circuits

AC and DC- Single phase and three phase connections - RMS and peak values-house wiring - Star and delta connection - overloading - earthing - short circuiting - color code for insulation wires

UNIT-V: Relays & Switches

Electrical protection - Relays - Fuses - Electrical switches - Circuit breakers - ELCB - overload devices - ground fault protection - Inverter - UPS - generator and motor

Books for study and Reference

1. A text book in Electrical Technology - B L Theraja - S Chand &Co.
2. A text book of Electrical Technology - A KTheraja
3. Performance and design of AC machines - M G Say ELBSEdn.
4. Semiconductor Physics and Opto Electronics by P KPalanichamy
5. Basic Electronics - B L Theraja - S Chand &Co.
6. Principles of Communication Engineering - Arokh Singh and A K Chhabra - S Chand & Co.

PAPER 1.b
INSTRUMENTATION PHYSICS - I

Preamble: This course provides an understanding of basic electronic instrumentation and measurements techniques. The paper needs a basic knowledge in basic physics and technology

UNIT I: MEASUREMENT

Definition - Units of measurement; systems of units - Length, mass and time measurements - Accuracy and precision - Significant figures

UNIT II: ERROR

Definition - Types of error (Gross error, Systematic error, Random error) - Statistical analysis (Arithmetic mean, Deviation from the mean, Average deviation, Standard deviation) - Probability of errors (Normal distribution of errors, Probable error) - Limiting errors.

UNIT III: ELECTRODES

Electrode potential - Purpose of the electrode paste - Electrode material - Types of electrodes - Microelectrodes (metal microelectrode) - Depth and needle electrodes Surface electrodes

UNIT IV: SPECIALIZED IN MEDICAL INSTRUMENTS

Angiography - Digital thermometer - Endoscopes - EEG - ECG – Computed Tomography (CT scan)

UNIT V: DISPLAYS

Classification of displays - Display devices - Liquid Crystal Diode – Incandescent display -Liquid vapour display – Light Emitting Diode (LED)

Books for study:

1. Albert D. Helfrick and William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, Prentice-Hall of India Pvt. Limited, Reprint 2002.
2. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies, Reprint 2002.
3. H.S.Kalsi, Electronic Instrumentation, Tata McGraw Hill Education Pvt. Limited, Reprint 2012.

Books for Reference:

1. P. Mani, A text book of Engineering Physics-I, Dhanam Publications, Reprint 2013.
2. G. Jose Robin and A. Ubald Raj, Applied Physics, Indira Publications, Marthandam,1998

SEMESTER III
(for those who do not study Physics as Major / Allied Subject)
NON MAJOR ELECTIVE
(Any one)
PAPER 1.a BASIC PHYSICS-1

Preamble: Objective of the paper is to provide a basic knowledge in Physics for students who do not study physics as major/allied subject

UNIT I: MECHANICS

Motion-speed, velocity, acceleration - force – equations of motion - Newton's laws - momentum - work, power and energy - conservation of energy and momentum.

UNIT II: PROPERTIES OF MATTER

Three states of matter - binding forces - fluid pressure and thrust - applications - Pascal law - Archimedes principle – surface tension-capillary action - Bernoulli's principle – Viscosity – venturimeter - pitot's tube.

UNIT III: HEAT AND SOUND

Measurement of heat and temperature - clinical thermometer - heat transfer - thermos flask - change of state - effect of pressure on boiling point and melting point - heat engines - steam engine and diesel engine-sound and music - reverberation - acoustics of building - recording and reproduction of sound in film.

UNIT IV: OPTICS

Reflection and refraction-concave and convex mirrors and lenses-dispersion- spectra-rainbow- interference-diffraction-polarization-concepts with examples- uses-double refraction-optical activity-quartz crystal

UNIT V: ELECTRICITY

Electric field - potential - Ohm's law - electrical energy and power - resistance - types of resistance - fixed resistance - variable resistance.- resistance in series and parallel -Kirchoff's laws

Books for study and Reference

1. Properties of matter by Murugesan R, S Chand & Co. Pvt. Ltd., NewDelhi
2. Text book of sound by Brij Lal & Subramaniam, Vikas Publishing House,New Delhi,1982
3. Electricity and Magnetism - R. Murugesan. (S.Chand&Co.)
4. Heat and thermodynamics - Brijlal and Subramaniyam, S Chand &Co.
- 5.Optics by Subramaniam N & Brij Lal, S Chand & Co. Pvt. Ltd., NewDelhi,1990

PAPER 1.b.
APPLIED PHYSICS

Preamble: This paper enables the students to understand variable energy sources and the need for finding alternate energy source.

UNIT-I: Conventional energy sources

Conventional energy sources – world's reserve of conventional energy sources–various forms of energy-renewable and conventional energy systems- comparison

UNIT-II: Fossil fuels

Fossil fuels – coal, oil and natural gas-availability-statistical details- applications- merits and demerits

UNIT-III: Biomass energy: Biomass energy-biomass classification-biomass conversion process-biogas plants-Deena bandhu model gas plant-wood gasification-advantages and disadvantages of biomass

UNIT-I V: Renewable energy sources

Renewable energy sources-solar energy - importance - storage of solar energy - applications of solar energy -solar pond - solar water heater-solar crop dryers-solar cookers-solar green house - solar cell

UNIT-V: Geothermal energy

Geothermal energy-Geothermal power plant-wind energy and wind farms- wind mills - types – ocean thermal energy conversion - energy from tides-energy from waves

Books for study and Reference

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, NewDelhi
2. Solar energy - M P Agarwal - S Chand & Co.Ltd.
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd., NewDelhi.

SEMESTER - IV
Core 4: ELECTRO MAGNETISM

Preamble: This course facilitates an understanding of magnetic effects of electric currents and the basics of electromagnetic waves. The paper does not need any special pre requisite except the basic ideas on electricity and magnetism at the school level and the learners are expected to know the device applications of electromagnetic induction.

UNIT-I: ELECTROMAGNETIC INDUCTION

Faraday's laws of electromagnetic induction-self induction –self inductance of a long solenoid – toroidal coil-determination of L by Owen's bridge - mutual induction - experimental determination of mutual inductance between a pair of coils using BG-co efficient of coupling- energy stored in a coil-eddy currents-uses

UNIT-II: MAGNETIC EFFECT OF ELECTRIC CURRENT

Magnetic flux and magnetic induction-relation between them- Biot Savart law- magnetic induction at a point on the axis of a circular coil carrying current- amperes circuital law-magnetic field inside a long solenoid -toroid- Lorentz force on a moving charge- direction of force-torque on a current loop in a uniform magnetic field -Moving coil Ballistic galvanometer-theory -experiment to find charge sensitivity and absolute capacity of a capacitor-Desauty bridge.

UNIT-III: MAGNETIC FIELDS AND MAXWELL'S EQUATION

The three magnetic vectors M, B, and H –relation between them- permeability and susceptibility- relation between them -B-H curve -Hysteresis- Energy loss-Displacement current-Maxwell's equations-Poynting vector-Electromagnetic waves in free space-Hertz experiment for production and detection of EM waves.

UNIT-IV: ELECTROMAGNETIC WAVES

Wave equations for Electric field and Magnetic field-monochromatic plane waves -EM waves in a matter-Reflection and Transmission at normal incidence –Polarization by reflection.

UNIT-V: APPLICATIONS OF ELECTRO MAGNETISM

Earth inductor-uses of Earth inductor-measurement of horizontal component of the Earth's magnetic field-measurement of vertical component of Earth's Magnetic field-calibration of BG-measurement of intense magnetic field using search coil and BG-induction coil and uses.

Books for study

1. Electricity and Magnetism -R. Murugesan (S. Chand & Co.)
2. Electricity and Magnetism - K.K.Tiwari (S. Chand & Co.)

Books for Reference

1. Electricity and Magnetism -D.N.Vasudeva (Twelfth revised edition)
2. Electricity and Magnetism - K.K.Tiwari (S. Chand & Co.)
3. Electricity and Magnetism -E.M.Pourcel, Berkley Physics Course, Vol.2 (Mc Graw-Hill)
4. Electricity and Magnetism- Tayal (Himalalaya Publishing Co.)
5. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and JWalker. Wiley NY2001

PRACTICAL- IV

(6 experiments compulsory)

1. Ballistic Galvanometer – Comparison of EMF's – E_1 / E_2
2. Ballistic Galvanometer – Absolute capacity of a condenser
3. M and B_H – Deflection and Vibration magnetometer
4. Anderson's bridge – Self - inductance of the coil
5. Potentiometer – Specific resistance
6. Potentiometer - Calibration of Ammeter
7. Comparison of Magnetic Moments – Deflection Magnetometer (Tan A & Tan B position)
8. Deflection Magnetometer – Horizontal Earth's magnetic induction

SKILL BASED ELECTIVE
SEMESTER-IV
(Any one)
PAPER 2.a
MAINTANANCE OF ELECTRONIC EQUIPMENTS

Preamble: Objective of this course is to provide a basic understanding of the commonly used electronic equipments.

UNIT-I: ELECTRONIC COMPONENTS

Study of electronic components - resistors - types - characteristics - colour coding – wattage rating-potential divider arrangement-capacitors - type - characteristics --working voltage-star and delta connection of resistors and capacitors -soldering and desoldering techniques-Groove board, bread board and printed circuit board

UNIT-II: MEASURING INSTRUMENTS

Practical uses of Multimeter (analog and digital) - CRO - Block Diagram - measurement of voltage, frequency and phase - waveforms and Lissajoue’s figures- Digital Storage Oscilloscopes- LCD display for instruments -A/F and R/F oscillators.

UNIT-III: TRANSDUCERS

Classification of transducers-basic requirements/characteristics of Transducers-active and passive transducers, resistive, Capacitive, Inductive & piezoelectric transducers - Light transducers (photo resistors & photovoltaic cells).

UNIT-IV: COMMUNICATION DEVICES

Basic concepts of radio transmitter and receiver - TV antennas-resonance antennas and their characteristics - Dish antenna - DTH system - Mobile communication system – MODEM - Telephone systems-cellular Telephone systems-mobile phone-principle of operation-integrated services-digital networks (ISDN)

UNIT-V: Photography

Introduction to cameras-parts of camera and accessories—lens shutter- aperture-flash photography-filters-battery-tele and wide angle lens Digital formats-data transfer to computer-ISO speed-resolution

Books for Study and Reference

1. Principles of Electronics by V K Mehta, S Chand & Co., 5th edition 2001.
2. Functional Electronics by Ramanan.
3. Elements of Electronics by Bagde and Singh
4. Monochrome and Colour TV by Gulati
5. Basic Electronics, 6th Edition by B Grob, McGraw Hill NY1
6. Integrated electronics- Millman and Halkias
7. Electronic principles - Malvino 6th Edition
8. Operational amplifier – Gyakwar
9. Basic electronics B.Basavaraj, H.N. Shivasankar University press

PAPER 2.b
INSTRUMENTATION PHYSICS - II

Preamble: This course provides an understanding of basic electronic instrumentation and measurements techniques. The paper needs a basic knowledge in basic physics and some advance technology in medical instruments

UNIT I: BASIC ELECTRONIC & DIGITAL INSTRUMENTS

Electronic multimeters – Q meters – Vector meters – RF voltage and power measurements - Comparison of analog and digital techniques – digital voltmeter – digital multimeters – frequency counters – measurement of frequency and time interval

UNIT II: TRANSDUCERS

Active transducers: Piezoelectric type transducers and Photovoltaic type transducer Passive transducer - Photoelectric type resistive transducers - Inductive transducer

UNIT III: MICROSCOPE

Optical and Electron microscope - Comparison between optical and electron microscope – Resolving power - Magnification power - Depth of focus - Types of electron microscope - TEM – SEM - Comparison between TEM and SEM.

UNIT IV: ADVANCES IN MEDICAL INSTRUMENTS

X-ray machine - Comparison of Fluoroscopy and Radiography - Computers in medicine - Lasers in medicine - Cryogenic surgery MRI (basics and instrumentation)

UNIT V: OSCILLOSCOPE

Oscilloscope - Basic principle - CRT features – Block diagram of oscilloscope - Simple cathode ray oscilloscope.

BOOKS FOR STUDY:

1. Albert D. Helfrick and William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, Prentice-Hall of India Pvt. Limited, Reprint 2002.
2. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies, Reprint 2002.
3. H.S.Kalsi, Electronic Instrumentation, Tata McGraw Hill Education Pvt. Limited, Reprint 2012.

BOOKS FOR REFERENCE:

1. P. Mani, A text book of Engineering Physics-I, Dhanam Publications, Reprint 2013.
2. G. Jose Robin and A. Ubald Raj, Applied Physics, Indira Publications, Marthandam, 1998
3. David A. Bell, Electronic Instrumentation and Measurements, Prentice Hall of India Pvt Ltd, 2003
4. B.C. Nakra and K.K. Choudhry, Instrumentation, Measurement and Analysis, 2nd Edition, TMH, 2004

SEMESTER-IV
NON MAJOR ELECTIVE
PAPER 2.a
BASIC PHYSICS-II

Preamble: Objective of the paper is to gain knowledge on Basic principles of Physics

UNIT I: NUCLEAR PHYSICS

Introduction-nuclear structure-properties of nucleus-packing fraction- binding energy-nuclear forces- Radio activity-properties of alpha, beta and gamma rays-radio carbon dating-nuclear fission-nuclear fusion

UNIT II: MAGNETIC MATERIALS

Classification of magnetic materials-para-dia and ferromagnetic materials- properties – applications-crystalline and amorphous materials-conductors- insulators-superconductors- properties –applications

UNIT III: LASERS

Introduction-absorption-spontaneous - emission-stimulated - emission-population inversion-general laser system-He-Ne laser-CO₂ laser-applications.

UNIT IV: RELATIVITY

Introduction -reference frames-postulates of the special theory of relativity- length contraction-time dilation (no derivation) - Quantum mechanics-dual nature of wave and radiation-de-Broglie waves

UNIT V: NUMBER SYSTEMS

Number systems in digital electronics-binary, decimal and hexadecimal numbers –inter conversions- binary addition and subtraction—binary coded decimal-logic gates

Books for study and Reference

1. Modern Physics- R.Murugesan, S. Chand & Co
2. Electricity and Magnetism -R. Murugesan (S. Chand & Co.)
3. Digital principles and applications -Albert Paul Malvino & Donald P.Leach
4. Mechanics and mathematical physics- R.Murugesan-S Chand & Co. Pvt. Ltd., New Delhi

PAPER 2.b
SPACE PHYSICS

Preamble: This course provides an understanding of celestial objects.

UNIT I: Universe

Planets - interior planets - exterior planets - crust, mantle and core of the earth - different region of earth's atmosphere - rotation of the earth - magnetosphere - Van Allen belts - Aurora.

UNIT II: Comets, Meteors, Asteroids

Composition and structure of comets - periodic comets - salient features of asteroids, meteors and its uses.

UNIT III: Sun

Structure of photosphere, chromosphere, corona - sunspots - solar flares - solar prominence - solar plages - satellites of planets - structure, phases and their features of moon.

UNIT IV: Stars

Constellations - binary stars - their origin and types star clusters – Globular clusters - types of variable stars - types of galaxies.

UNIT V: Origin of Universe

Big bang theory - pulsating theory - steady state theory - composition of universe expansion

Books for study and Reference

1. K.D. Abyankar, Astrophysics of the solar system, University press, India.
2. Baidyanath Basu, An introduction to Astrophysics, Prentice Hall of India, New Delhi.
3. Prof. P. Devadas, The fascinating Astronomy, Published by Devadas Telescopes, 2, Charkrapani Road, Guindy, Chennai.
4. Elements of Space Physics – R.P. Singhal, PHI.

SEMESTER-V

Core 5: BASIC ELECTRONICS

UNIT- I: **LINEAR CIRCUIT ANALYSIS**

Constant voltage source, constant current source, conversion of voltage source into current source - Maximum power transfer theorem - Thevenin's theorem - Norton's theorem - hybrid parameters – determination of h parameter - equivalent circuit – the h parameters of a transistor.

UNIT - II: **SEMICONDUCTORS DIODES AND DEVICES**

PN Junction - V – I characteristics of PN Junction - Crystal diode as a rectifier - Zener diode - V – I characteristics of Zener diode - Tunnel diode. Half wave rectifier, centre- tap full wave rectifier -Full wave bridge rectifier - Comparison of Rectifiers - Zener diode as voltage stabilizer.

UNIT - III: **TRANSISTOR AMPLIFIERS**

Transistor action - Transistor connections - common emitter - common base -common collector -Analysis of amplifiers using h- parameters - RC coupled amplifier - transformer coupled amplifier - power amplifier - classification of power amplifiers (Class A, Class B and Class C) - Push pull amplifier.

UNIT - IV: OSCILLATIONS AND WAVE SHAPING CIRCUITS

Feedback principle and Barkhausen criterion - Hartley, Colpitt's, and Phase shift oscillators using transistors – Astable - Monostable and Bistable multi vibrators using transistors - Schmitt trigger –clipping and clamping circuits – Differentiating circuit – Integrating circuit.

UNIT - V: **OPERATIONAL AMPLIFIER**

Op-Amp -pin diagram- characteristics of ideal Op - Amp - DC and A.C analysis of Op-Amp - Bandwidth of an Op-Amp - Slew rate - Frequency response - Op- Amp with negative feedback – applications –Inverting amplifier – Input and output impedance of Inverting amplifier – Non inverting amplifier- Voltage follower- Summing amplifier - Adder – Subtractor – Integrator – Differentiator – low pass, high pass and band pass filters

Books for study

1. Principles of Electronics -V.K. Mehta & Rohit Mehta - S. Chand & Co.
2. Electronic fundamentals and applications – John D. Ryder – Prentice Hall

Books for reference

1. Electronic principles - Malvino
2. Electronic devices and circuits – David Bell – Prentice Hall
3. Basic Electronics - B. Basavaraj, H.N. Shivashankar - 2ndedition – Universities press
4. Physics of semiconductor devices – Dilip K.Roy – Universities press

Core 6: SPECTROSCOPY

Preamble: This course facilitates an understanding of atomic and molecular spectra and the instrumentations. The paper needs a basic knowledge about atomic structure and the learners are expected to gain knowledge to identify materials with the help of various spectra

UNIT I: MICROWAVE SPECTROSCOPY

Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of spectral lines – Effect of isotopic substitution – Non-rigid rotator – Spectrum of a non-rigid rotator – Linear Polyatomic molecules -Techniques and Instrumentation – Chemical analysis by microwave spectroscopy

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator - Anharmonic oscillator – Diatomic vibrating rotator -Interaction of rotations and vibrations – Vibration of polyatomic molecules – Analysis by IR techniques

UNIT III: RAMAN SPECTROSCOPY

Raman effect- Discovery – Quantum theory of Raman effect – Classical theory of Raman Effect –Pure rotational Raman spectra of Linear molecules – Raman spectrum of symmetric top molecules - Vibrational Raman spectra – Rule of mutual exclusion –Structure determination from IR and Raman spectroscopy

UNIT IV: ULTRAVIOLET SPECTROSCOPY

Introduction – Principle of Ultraviolet Spectroscopy – Transmittance and absorbance – Lambert - Beer law – UV spectrophotometer and spectrum recording – shifts of bands with solvents – Analytical uses of UV Spectroscopy

UNIT V: NMR SPECTROSCOPY

Introduction – Theory of NMR spectroscopy and origin of NMR signal – instrumentation for NMR spectroscopy – Techniques and principle of NMR – Application of NMR Spectroscopy – Magnetic resonance imaging (MRI) – interpretation of NMR spectra

Books for Study

1. Fundamentals Of Molecular Spectroscopy - Colin N Banwell Elaine- M Mccash Fifth Edition Book
2. Molecular structure and spectroscopy - G. Aruldas, PHI Learning Pvt. Ltd, India
3. Spectroscopy of Organic compounds – P.S. Kalsi, New Age International Publishers, 4th Edition

Books for Reference

1. Hand book of Analytical Instruments -R.S. Khandpur, Tata MC Grow Hill Ltd.
2. Spectroscopy - G.R. Chatwal and S.K. Anand, Himalaya publishing House, New Delhi

Core 7: ATOMIC AND NUCLEAR PHYSICS

Preamble: The course provides an introductory account about the atomic and nuclear structures. This paper does not need any special prerequisite except the basic understanding of materials at the school level and the learners are expected to know about atomic models, nuclear models, X-rays, cosmic rays, nucleation reactions, detectors and accelerators etc.

Unit I: FREE ELECTRON THEORY, BAND THEORY AND POSITIVE RAYS

Free electron theory of metals – expressions for electrical conductivity – thermal conductivity -Hall effect- Classification of solids on the basis of band theory- Properties of positive rays - Thomson's parabola method - Aston's mass spectrograph.(12L)

Unit II: ATOMIC STRUCTURE

Vector atom model-Quantum numbers associated with the vector atom model- Pauli's exclusion principle-L-S coupling, j-j coupling - magnetic dipole moment due to orbital motion of the electron- Stern and Gerlach experiment- Normal Zeeman effect-theory and experiment-Anomalous Zeeman effect (Explanation only)-Stark effect. (12L)

Unit III: X-RAYS AND COSMIC RAYS

Production of X-rays – properties-absorption of X-rays-Bragg's X-ray spectrometer –Powder method – Laue's method – Rotating crystal method –Moseley's law- Cosmic rays-discovery-latitude, altitude and -north –south effects- primary and secondary cosmic rays- cosmic ray showers-Van Allen belt. (12L)

Unit IV: ATOMIC NUCLEUS, DETECTORS AND ACCELERATORS

General properties of the nucleus- binding energy curve- Liquid drop model - Shell model -Alpha,beta and gamma rays-properties- Laws of radioactive disintegration-half -life period – mean life period – α decay, β - decay - γ decay (Explanation only) -G.M.counter-Wilson cloud chamber-Cyclotron- betatron. (12L)

Unit V: NUCLEAR REACTIONS AND ELEMENTARY PARTICLES

Q-value of nuclear reaction- Nuclear fission-Chain reaction–energy released in fission- Nuclear reactor- Nuclear fusion –fusion reactor-Principle and action of atom bomb - hydrogen bomb-Classification of elementary particles - fundamental interaction- the quark model (12L)

Books for study

1. Modern Physics - R. Murugesan (S.Chand &Co.)
2. Atomic and Nuclear Physics - N.Subrahmanyam, Brijal, S. Chand & Co Ltd, New Delhi.

Books for Reference

1. Modern Physics - B.S.Agarwal, Kedarnath Ramnath, Meerut, Delhi.
2. Atomic and Nuclear Physics - Shatendra Sharma – Pearson Publications
3. Modern Physics - B.V.N Rao, Wiley Eastern Ltd, New Delhi
4. Modern Physics- Seghal Chopra & Seghal, Sultan Chand 1998
5. Perspective of Modern Physics-Arther Beiser –Tata-Mc Graw Hill Publishing Company

MAJOR ELECTIVE

(any one)

a. PROGRAMMING IN C++

Preamble: Objective of the course is to provide knowledge about the basics of Computer programming in C++ by writing programs. The paper does not need any special prerequisite and the learners are expected to come out with the ability to apply the computer language C++ to solve problems.

UNIT-I: WHAT IS C++

Introduction –comments –output operator-input operator-io stream file –tokens - keywords -identifiers and constants - declaration of variables - basic data types - operators in C++ -expressions and their type-hierarchy of arithmetic - control structures- a simple C ++ program (arithmetic operations using do while loop)

UNIT-II: ARRAYS AND FUNCTIONS IN C++

Introduction - one dimensional and two dimensional arrays - initialization of arrays – a simple matrix addition program. Functions - introduction - function prototyping - inline functions - function overloading –program to find the factorial of a number using function

UNIT-III: CLASSES AND OBJECTS

Introduction – specifying a class – defining member functions – creating objects - C ++ program with class - nesting of member functions - objects as function arguments - arrays within a class - friend functions-constructors –default constructors- parameterized constructors- copy constructor - multiple constructors

UNIT-IV: OPERATOR OVER LOADING AND INHERITANCE

Introduction – defining operator overloading-over loading unary operators –binary operators – rules for overloading operators-Inheritance - single inheritance - multiple inheritance –multi level inheritance-hybrid inheritance

UNIT-V: MANAGING CONSOLE I / O OPERATIONS

Introduction - C ++ stream - C ++ stream classes - formatted console I/O operations (width, precision, fill) - working with files - classes for file steam operations - opening and closing a file – detecting end of file - opening files using constructors and open –working with single and multiple files

Books for study

1. Object oriented Programming with C++ - E.Balagurusamy, Tata Mc Graw-Hill publishing company Ltd. New Delhi
2. Programming with C++ - D. Ravichandran, Tata Mc Graw-Hill publishing company Ltd. New Delhi

Books for reference

1. Object oriented Programming in C++- 4th Edn.Robert Lafore-Macmilan publishing company Ltd.
2. Fundamentals of Programming with C++ -Richard I. Halterman

b. COMMUNICATION ELECTRONICS

Preamble: This course enables the students to understand various modulation and demodulation techniques used for communication. The paper needs a basic knowledge in electronics and mathematics and the learners are expected to come out with the ability to choose proper modulation techniques.

UNIT-I: AMPLITUDE MODULATION AND TRANSMISSION

Introduction–amplitude Modulation–AM envelop–AM frequency spectrum and bandwidth–Phas or representation of AM with carrier – coefficient to f modulation or percentage modulation or modulation index – degrees of modulation – AM power distribution – AM Current relation and efficiency-modulation by complex information signal –double side band suppressed carrier AM - single side band suppressed carrier AM – Vestigial side band amplitude modulation – AM modulator circuits – emitter modulations or low power AM –collector modulator or medium and high power AM modulator - AM transmitters –Broadcast AM transmitters–Low level of AM transmitter–High level AM transmitter.

UNIT-II: AMPLITUDE MODULATION - RECEPTION

Comparison of AM system – Quadrature amplitude modulation – principles of AM detection – AM receivers – receiver parameters – Tuned radio frequency (TRF) receiver or straight receiver – principles of super hetrodyne – double frequency conversion AM receiver.

UNIT-III: ANGLE MODULATION – TRANSMISSION

Introduction – Frequency modulation – Phase modulation – Phase deviation and modulation index – Multi tone modulation – Transmission band width of FM –conversion of PM to FM or frequency modulator– conversion of FM to PM / phase modulators – commercial broadcast FM – phase or representation of an FM and PM – average power of an AM/FM wave – generation of FM – direct method of FM generation – reactance tube modulator– indirect method of FM wave generation – FM transmitters – indirect method – Comparison of AM and FM.

UNIT-IV: FM RECEPTION

FM detectors – Balanced slope detector – Foster seemly discriminator – ratio detector –FM super heterodyne receiver–FM noise suppression–threshold extension by FMFB technique.

UNIT-V: DIGITAL MODULATION TECHNIQUES

Introduction–BFSK–Binary phase shift keying – Quadrature PSK –Differential PSK – Performance comparison of digital modulation schemes - M ary FSK– correlative coding– Duo binary encoding.

Book For Study

- 1.Principles Of Communication Engineering - Dr. K.S.Srinivasan, Second Edition:2010.
- 2.Electronic communication systems – George Kennedy & Bernard Davis, Tata Mcgraw Hills, 4th edition, 2008

Book For Reference

- 1.Electronic communication Systems – Blake, Joseph J. Adamski, SunYifeng, Delamer publication, 2nd edition, 2012 (Rupa Publication, India).
- 2.Fundamentals of Electrical engineering – Wayonetomasi

PRACTICAL - V

GENERAL PRACTICAL

(6 Experiments compulsory)

- 1.** Conversion of Galvanometer into Voltmeter and Ammeter
- 2.** Spectrometer – Cauchy's Constants
- 3.** Young's Modulus – Elliptical Fringes
- 4.** Potentiometer – Calibration of Voltmeter (High Range)
- 5.** Potentiometer – Temperature Coefficient of Resistance
- 6.** Thevanin's and Norton's theorem – Verification
- 7.** Ballistic Galvanometer – High resistance by leakage
- 8.** Desauty's Bridge – Determination of C, C1 & C2 in series and parallel

PRACTICAL-VI

ELECTRONICS

(6 experiments compulsory)

1. V-I Characteristics of Junction diode and Zener diode
2. Transistor characteristics
3. Colpitts Oscillator
4. Single stage amplifier – with and without feedback
5. Astable multivibrator using 555 timer
6. OPAMP – Adder & Subtractor
7. OPAMP – Differentiator & Integrator
8. OPAMP – Low Pass & High Pass Filter

SEMESTER – VI

Core 9. QUANTUM MECHANICS

Unit –I: ORGIN OF QUANTUM THEORY

Black body radiation – Failure of classical Physics to explain energy distribution in the spectrum of a black body - Planck's Quantum theory–photo electric effect - Einstein's explanation for photo electric effect – The Ritz combination principle in spectra – Stability of an atom – Bohr's quantization of angular momentum and its application to the hydrogen atom.

Unit –II: WAVE PROPERTIES OF MATTER

Wave particle duality - De Broglie Hypothesis for matter waves – Concept of group velocity - Phase and Group Velocity – velocity of De Broglie Waves – Diffraction of particles – Interference of electrons – Wave packet

Unit-III: HEISENBERG UNCERTAINTY PRINCIPLE

Uncertainty Principle - Elementary Proof of Heisenberg's Uncertainty Relation- Elementary Proof of the Heisenberg's Uncertainty Relation between energy and Time - Illustration of Heisenberg's uncertainty principle by Thought experiments - Consequences of the uncertainty relation

Unit –IV: SCHRODINGER'S WAVE EQUATION

Schrodinger's one dimensional time-dependent wave equation – One dimensional Time-independent Schrodinger's wave equation – Physical Interpretation of the Wave Function ψ – Operators in quantum Mechanics, Eigen Function, Eigen value and Eigen Value equation – Expectation values – Postulates of Quantum mechanics

Unit –V: APPLICATIONS OF QUANTUM MECHANICS

Particle in a one dimensional box – Particle in a rectangular three dimensional box – Simple harmonic oscillator – One dimensional simple harmonic oscillator in quantum mechanics – Reflection at a steep potential – Transmission across a potential barrier

Book for Study

1. Elements of Quantum Mechanics, Kamal Singh & S P Singh-Chand &Co
2. Mathews P.M. and Venkatesh K. Quantum Mechanics Tata McGraw Hill Publishing Ltd

Book for Reference

1. Gupta, Kumar, Sharma - Quantum Mechanics – Jai Prakash Nath Company
2. Quantum Mechanics- G.Arul Das-PHI Private Learning Ltd.
3. Quantum Mechanics- V.Murugan – Pearson publication

4. Quantum Mechanics- Mahesh C.Jain- PHI Private Learning Ltd

Core 10: DIGITAL ELECTRONICS

Unit I: Number systems, Binary arithmetic and Codes

Decimal, binary, Octal, decimal and hexadecimal number systems and their inter- conversions -Binary arithmetic - Binary addition - binary subtraction-1's and 2's complements -- BCD codes, ASCII code, Excess-3code, Gray code.

Unit II: Boolean algebra and Logic gates

Boolean algebra-De Morgan's theorem –Positive logic and negative logic systems-Basic logic gates, OR, AND, NOT (symbol, Boolean equation, truth table, circuit diagram and working) -NAND, NOR, EX-OR (symbol, Boolean equation, truth table only) - NAND and NOR as universal building blocks.

Unit III: Arithmetic circuits, Flip-flops and multi vibrators

Half and full adders – Half and full subtractors - RS Flip-flop-clocked RS Flip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop – 555 timer –Astable multivibrator, monostable multi vibrator -Frequency divider

Unit IV: Karnaugh map and combinational circuit applications

Karnaugh map - 2, 3 and 4 variables –simplification - SOP and POS form of Boolean functions - -Don't care conditions-Multiplexer, Demultiplexer, Encoder, Decoder, parity generator and checker.

Unit V: Shift Registers and Counters

Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallel in- Serial out- Parallel in-Parallel out-Asynchronous counters and Synchronous counters- Ring counter- Binary counter- Up-Downcounter- Mod-5 counter-Mod-10 counter (decade counter) -A/D and D/A converters

Book for study

1. Digital principles and applications – Albert Paul Malvino & Donald P. Leach
2. Digital logic and computer design – Morris Mano - Prentice Hall of India, Pvt. Ltd

Book for reference

1. Gothmann W.H., Digital Electronics – Prentice Hall of India, Pvt. Ltd.
2. Metha V.K. Mehtha. R. Principles of electronics, S.Chand & Co.

3. Fundamentals of Digital Electronics and Microprocessors—Anokh Singh, A.K.Chhabra, S.Chand & Co

Core 11: SOLID STATE PHYSICS

Preamble: Objective of this paper is to introduce crystals and nano particles and to provide an understanding about different types of materials. The paper needs a basic knowledge of elements of modern physics and the learners are expected to get some ideas on Materials Research.

UNIT-I: CRYSTAL LATTICES

Introduction-seven classes of crystals - Bravais lattice in three dimensions -crystal structure -Simple cubic, Face centered cubic, Body centered cubic and Hexagonal close packed structure -Sodium Chloride, Zinc Blende and Diamond Structures. Miller Indices and crystal planes - procedure for finding Miller Indices -interplanar spacing - Diffraction of X-Rays - Bragg's Law

UNIT- II: BONDING IN SOLIDS

Types of bonds in crystals-Ionic, covalent, Metallic, Vanderwaal's and Hydrogen Bonding-Bond energy of sodium chloride molecule-Comparison between ionic and covalent solids - variation of inter atomic force with inter atomic spacing-cohesive energy-cohesive energy of ionic solids-application to sodium chloride crystal - evaluation of Madelung constant for sodium chloride.

UNIT - III: TYPES OF MAGNETIC MATERIALS

Introduction -classical theory of Diamagnetism - Langevin's theory of Para magnetism - Weiss Theory of Para magnetism - Domain theory of ferromagnetism – Anti ferro magnetism-Fundamental Definitions of Dielectrics - Different types of Electric Polarization- electronic, ionic, orientation and space charge Polarization - Dielectric Loss - Internal Field - Clausius– Mossotti Relation

UNIT-IV: SUPER CONDUCTIVITY

Introduction - General Properties of Superconductors - effect of magnetic field - Meissner effect - effect of current - thermal properties - entropy – specific heat-energy gap-isotope effect-London equations-AC&DC Joseph son effect - applications-Type-I and Type-II Super conductors-Explanation for the Occurrence of Super Conductivity- BCS theory- Application of Superconductors - High T_c superconductors.

UNIT-V: NANO TECHNOLOGY

Nanomaterials-synthesis and classification—techniques used in synthesis of nanomaterials-chemical vapour deposition-sol-gel technique-electro deposition method-ball milling method- characterization - properties and applications of nanomaterials-fullerene, graphene and carbon nano tubes

Books for Study

1. Solid State Physics -P.K. Palanisamy –SCITECH Publications Pvt. Ltd. Chennai
2. Nano-essentials and understanding - Pradeep.T.Mc-Graw-Hill Ltd.

Books for reference

1. Introduction to Solid State Physics - Kittel-Wiley and Sons, New Delhi
2. Material Science and Engineering- V. Raghavan - PHI
3. Introduction to Solids- Azaroff- TMH
4. Material Science-M. Arumugam – Anuradha Publishers
5. Solid State Physics - H.C.Gupta – Vikas publishing house Pvt. Ltd.
6. Principles of Nanoscience and technology - Shah M.A.Ahmed, Narosha Publishing House Pvt. Ltd.

MAJOR ELECTIVE

(any one)

a. ENERGY PHYSICS

Preamble: Objective of the course is to provide an understanding of the present energy crisis and various available energy sources. The paper does not need require any special prerequisite and the learners are expected to know the use of alternate energy sources

UNIT I: INTRODUCTION TO ENERGY SOURCES

World's reserve of Commercial energy sources and their availability-Variou forms of energy-renewable & non-renewable energy sources – Conventional & non-conventional energy sources–commercial & non-commercial energy sources, comparison –merits, demerits and applications of coal, oil and natural gas

UNIT II: SOLAR ENERGY

Solar energy – nature of solar radiation and its components -Basic Principles of Liquid flat plate collector –Materials for flat plate collector -Construction and working- Solar water heater - Solar crop dryer – Solar space cooling – solar ponds - solar cookers (box type) - merits and demerits of solar energy

UNIT III: PHOTOVOLTAIC SYSTEMS

Introduction – Photovoltaic principle - Basic Silicon Solar cell- Power output and conversion efficiency-Limitation to photovoltaic efficiency-Basic photovoltaic system for power generation-Advantages and disadvantages-Types of solar cells-Application of solar photovoltaic systems - PV Powered fan – PV powered area lighting system– A Hybrid System.

UNIT IV: BIOMASS ENERGY

Introduction-Biomass classification- Biomass conversion technologies-Bio-gas generation-Factors affecting bio-digestion -Working of biogas plant- floating and fixed dome type plant -advantages and disadvantage of -Bio-gas from plant wastes-Methods for obtaining energy from biomass-Thermal gasification of biomass-Working of down draft gasifier- Advantages and disadvantages of biological conversion of solar energy.

UNIT V: WIND ENERGY AND OTHER ENERGY SOURCES

Wind Energy Conversion-Classification and description of wind machines, wind energy collectors- Energy storage-- Energy from Oceans and Chemical energy resources - Ocean thermal energy conversion-tidal power, advantages and limitations of tidal power generation-Energy and power from waves- wave energy conversion devices- Fuel cells- and application of fuel cells- batteries- advantages of battery for bulk energy storage- Hydrogen as alternative fuel for motor vehicles.

Books for study

1. Rai G. D, Non conventional Energy sources, 4th Edition, Khanna Publishers,2010
- 2.Solar Energy- Principles of thermal collection and storage - S.P.SUKHAME-Tata-McGraw-Hill Publishing Company Ltd.

Books for References

1. Chetan Singh Solanki, Solar Photovoltaics Fundamentals, Technologies and Applications, 2nd Edition, PHIL earning Private Limited, 2011.
2. Kothari D.P., K.C.Singal and Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India, 2008.
3. Jeffrey M. Gordon, Solar Energy: The State of the Art, Earthscan, 2013.
4. Kalogirou S.A., Solar Energy Engineering: Processes and Systems, 2nd Edition, Academic Press, 2013.
5. Zobia A.F. and Ramesh Bansal, Hand book of Renewable Energy Technology, World Scientific, 2011

MAJOR ELECTIVE

b. MEDICAL PHYSICS

Preamble: This course facilitates an understanding of the basic concepts in Biomedical instrumentation and awareness regarding radiation hazards and safety.

UNIT-I: X-RAYS

Electromagnetic spectrum - production of x-rays - x-ray spectra –Brehms strahlung process
- Characteristic x-ray - X-ray tubes - Coolidge tube - X-ray tube design - tube cooling - stationary mode - Rotating anode X-ray tubes -Tube rating - quality and intensity of X-ray. X-ray generator circuits - half wave and full wave rectification - filament circuit - kilo voltage circuit - high frequency generator- exposure timers- HT cables.

UNIT-II: RADIATION SAFETY AND HEALTH PHYSICS

Introduction to Radio activity - Artificial and natural - radioactivity –Physical features of radiation-units of radiation- conventional sources of radiation, Interaction of different types of radiation with matter -penetration power in living cells-radiation damage to the cell-effect of radiation on cells-measurement of ionizing radiation- measurement of biological damage-Linear energy transfer (LET)-radiation risk-radiation dosimetry-security of radio-active material- radio-active waste management

UNIT-III: BIOMEDICAL INSTRUMENTATION

Development of biomedical instrumentation-biometrics-introduction to the man-instrument system-components of man-instrument system-transducers for biomedical applications-biomedical computer applications-computer analysis of ECG-computerized axial tomography (CAT) Scanners

UNIT-IV: MEDICAL IMAGING PHYSICS

Radiological imaging - Radiography - Filters - grids - cassette - X-ray film –film processing – fluoroscopy - computed tomography scanner- principle function - display - generations – mammography - ultrasound imaging - magnetic resonance imaging - thyroid uptake system - Gamma camera (Only Principle, function and display)

UNIT-V LASERSIN MEDICINE

Introduction to laser-principle and production of laser- effects of laser radiation on tissues - photo thermal effects- photo chemical effects –photo dynamic therapy-Laser applications in therapy and diagnosis-ophthalmology - Fibre optic endoscopy and dentistry-Laser as a beautician's tool-laser hazards-biological effects.

Books for study and Reference

1. Basic Radiological Physics Dr. K. Thayalan - Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)
2. The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002)
3. Biomedical instrumentation-Leslie Cromwell, Fred J. Weibel-Erich A. Pfeiffer-Pearson Publications
4. Lasersin Medicine- RW Wayanant, Plenum Publishing Co
5. Nuclear medicine physics: Chandra – Lippincot Williams and Wilkins (1998)

Project

- It must be the Group Project
- Each group consists of maximum of five students
- Project must be related to the Physics subject
- Readymade projects not allowed
- Downloaded projects not allowed
- Both experimental and theoretical projects are allowed
- Field trip visit (maximum two days) related to project allowed

PRACTICAL-VII

GENERAL PRACTICAL

(6 experiments compulsory)

1. Spectrometer - Hartmann's interpolation formula
2. Spectrometer - $i_1 - i_2$ curve
3. Spectrometer – $i - d$ curve, critical angle of a prism
4. Self-inductance – Rayleigh's Bridge
5. Spectrometer – Dispersive Power of Grating - oblique incidence
6. Impedance and power factor – LR Circuit
7. Comparison of mutual inductance M_1 / M_2 - Ballistic Galvanometer
8. Moment of Magnet - Tan C position

PRACTICAL – VIII

ELECTRONICS

(6 Experiments compulsory)

1. Arithmetic and Logic Units (ALU)
 - a. Half Adder
 - b. Full Adder
2. Mono stable multi vibrator using 555 Timer
3. Combinational Logic – To convert a Boolean Expressions (any two) into Logic Gate Circuit and assemble it using logic gate IC's
4. Universal building block - NAND gate
5. Universal building block - NOR gate
6. Verification of Boolean Algebra (any four)
7. Verification of De-Morgan's laws
8. Hartley Oscillator