SEMESTER IV			
Core VI	**Electronics and Communication**		
Code : 18UPHC41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Vision: To develop competent technocrats who can strive continuously in pursuit of professional excellence in the field of Electronics and Communication

Mission: Establish a unique learning environment to enable the students to face the challenges in Electronics and Communication Engineering field

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall semiconductors	2	Re
CO –2	design a voltage regulator using Zener diode.	2,4,6	Cr
CO –3	construct Colpitt's oscillator, Hartley oscillator.	2,4,6	Cr
CO –4	design a single stage transistor amplifier and an oscillator	2,4,6	Cr
CO –5	list out the types of networks	2	Re
CO –6	differentiate monostable and bistable multivibrator	2,4,6	An
CO –7	describe Satellite Communication	2	Un
CO –8	apply the principle of Doppler effect to Radar	2,3	Ap

SEMESTER IV			
Core VI	**Electronics and Communication**		
Code : 18UPHC41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Linear Circuit Analysis

Linear and non – linear circuit elements – Active and Passive elements – Ideal voltage source and current source – Superposition theorem – Thevenin's theorem – Norton's theorem – Maximum power transfer theorem – h-parameters.

Unit II: Semiconductor Devices

Diodes: Semiconductors – P and N type semiconductors – PN junction diode under forward bias, reverse bias – Silicon and Germanium diodes – Energy band diagram of PN diode – V-I characteristics of a PN diode – Experimental determination of knee voltage, ac forward resistance and reverse saturation current of a PN diode – Diode rectifier – Half wave rectifier – Expression for I_{dc}, I_{rms} , efficiency and ripple factor – Bridge rectifier – Zener diode – V-I characteristics – Voltage regulator.

Transistor: Junction transistor – Three modes of transistor connection – Relation between alpha and beta of transistor – Transistor parameter calculation for CE mode – Single stage transistor amplifier.

Unit III: Oscillators

Feedback – Negative voltage feedback amplifier – Principle – Gain – Advantages – Feedback circuit. Negative current feedback – Principle – Current gain – Effects – Emitter follower – D.C. analysis – Voltage gain – Input impedance – Output impedance – Applications – Sinusoidal oscillator – Types – Oscillatory circuit. Positive feedback amplifier – Barkhausen criterion. Colpitt's oscillator, Hartley oscillator.

Unit IV: Operational Amplifier

Operational amplifier basic ideas – Inverting amplifier – Summing amplifier – Differential amplifier – Integrator & Differentiator using Op amp – Instrumentation amplifier using Op amp – Differential Instrumentation amplifier using transducer bridge – Application to measurement of temperature and as analog weight scale – Multivibrator (Astable, Monostable and Bistable using Op amp).

Unit V: Modulation and Demodulation

Radio Amplitude modulation – Modulated power output – Single side band transmission: A.M – Frequency Modulation – FM transmitter – Demodulation – Transmission of radio waves – Reception of radio waves – Superhetrodyne Receiver – Characteristics of a receiver.

Text Books:

1. V. K. Mehta and Rohit Mehta, Principles of Electronics, S. Chand & Co. Ltd. 2006.
2. G. Jose Robin and A. Ubald Raj, Electronics (I Edition), Indira Publication, Marthandam, 2000.

Books for Reference:

1. R. S. Sedha, A text book of applied electronics, S. Chand & Co. Ltd. 2006.
2. B. L. Theraja, Basic Electronics (solid state), S. Chand & Co. Ltd. 2003.
3. N. N. Bargava, D. C. Kulshreshtha, S. C. Gupta, Basic Electronics and linear circuits, Tata McGraw Hill Publishing company Ltd, Reprint 2012.

SEMESTER III			
NME I	**Applied Physics I**		
Code : 18UPHN31	**Hrs/Week : 2**	**Hrs/Sem : 30**	**Credits : 2**

Vision: To transform our students in the field of applied physics

Mission: To train our students in domestic wiring, air conditioning and fibre and laser optics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall the tools used in the home	3	Re
CO –2	discuss the systems of domestic wiring	3	Un
CO –3	explain the principle of Air Conditioning	3	Un
CO –4	sketch the refrigerating cycle	3	Ap
CO –5	describe the function of a compressor	3	Un
CO –6	understand the theory behind the important properties of light such as reflection, refraction , interference and total internal reflection	1,3	Un
CO –7	discuss the types of optical fibers	2,3	Ev
CO –8	list out the applications of lasers	3	Re

SEMESTER III			
NME I	**Applied Physics I**		
Code : 18UPHN31	**Hrs/Week : 2**	**Hrs/Sem : 30**	**Credits : 2**

Unit I: Domestic Wiring

Introduction – Tools – Precautions in handling tools – Wires – Cables – Systems of domestic wiring (CTS wiring, conduit wiring) – Fuses.

Unit II: Electrical Appliances

Electric bell – Electric iron – Electric kettle – Hot plate – Fan – Washing machine.

Unit III: Air Conditioning

Air conditioning – Principle – Refrigerating cycle – Refrigerants – Evaporators – Function of a compressor – Freezers – Ice plant – Water coolers.

Unit IV: Fibre optics

Introduction – Principles of optical fibre – Total internal reflection – Acceptance angle – Numerical aperture – Types of optical fibres – Fibre optic communication system – Advantages.

Unit V: Laser

Basic principle – Concept of laser – Population inversion – Pumping action – Characteristics of laser – Determination of the wavelength of the given laser source of light using grating – Determination of particle size – Application of lasers.

Text Books:

1. G. Jose Robin and A. Ubald Raj, Applied Physics, Indira Publications, Marthandam, 1998
2. P.Mani, A text book of Engineering Physics-I, Dhanam Publications, 2007 Edition.

SEMESTER IV			
NME II	**Applied Physics II**		
Code : 18UPHN41	**Hrs/Week : 2**	**Hrs/Sem : 30**	**Credits : 2**

Vision: To enlighten our students to be aware of digital, energy and nano physics

Mission: To make our students knowledgeable on digital electronics, renewable energy sources and communication physics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	explain number system	2	Un
CO –2	construct logic gates	2	Cr
CO –3	construct solar ponds for water desalination, solar cookers and solar green houses	7	Cr
CO –4	assess the working of windmills used for power generation	7	Ev
CO –5	explain the applications of ultrasonics	1	Un
CO –6	define nanomaterials	3	Re
CO –7	list out Special features of nanophase materials	3	Re
CO –8	describe Pulsed laser deposition	3	Un

SEMESTER IV			
NME II	**Applied Physics II**		
Code : 18UPHN41	**Hrs/Week : 2**	**Hrs/Sem : 30**	**Credits : 2**

Unit I: Number System

Number system – Conversion of decimal number to binary number – Binary – Decimal conversion – Binary addition, subtraction – 1's and 2's complement – Hexa decimal numbers – Octal numbers.

Unit II: Logic Gates

Introduction – AND, OR, NOT, NOR, NAND, exclusive OR gate- LED – LCD – Seven segment display.

Unit III: Energy Physics

Conventional and non conventional energy sources – Solar energy – Photovoltaic effect – Solar cooker (box type) – Solar ponds – Wind energy – Power of wind – Construction and working of wind mill – Ocean energy.

Unit IV: Ultrasonics

Introduction – Properties of ultrasonics – Ultrasonics production (magnetostriction method) – Acoustic grating – SONAR – Applications of ultrasonics.

Unit V: Nanomaterials

Introduction **–** Definition – Special features of nanophase materials – Different forms of nanomaterials – Synthesis of nanomaterials (basics) – Preparation of nanomaterials: Pulsed laser deposition – Applications of nanophase materials.

Text Books:

1. G. Jose Robin, A. Ubald Raj, Applied Electronics, Indira Publication, First Edition 2008.
2. G. Jose Robin, A. Ubald Raj, Applied Physics
3. P.Mani, A text book of Engineering Physics –I, Dhanam Publication, First Edition 2007.
4. P.Mani, A text book of Engineering Physics –II, Dhanam Publication, Tenth Edition 2016.

SEMESTER III			
Core Skill Based	**Instrumentation**		
Code : 18UPHS31	**Hrs/Week : 4**	**Hrs./Sem : 60**	**Credits : 4**

Vision: To enrich our students with the knowledge of instrumentation physics

Mission: To make our students to understand the basic principles of instrumentation physics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO–1	identify the errors of instruments.	3.4	Un
CO–2	find out the arithmetic mean, deviation from the mean, average deviation, standard deviation.	3,8	Cr
CO–3	list out the characteristics of resting potential	3	Re
CO–4	compare active and passive transducers	3	Ev
CO–5	understand the working of bio medical equipments such as electron microscope.	3	Un
CO–6	read and interpret the output of bio potential recorders such as ECG and EEG.	3,6	Ev
CO–7	recall the functional elements of measuring instruments	3,6	Re
CO–8	describe the applications of Physics in the field of medicine	3	Un

SEMESTER III			
Core Skill Based	**Instrumentation**		
Code : 18UPHS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Measurement and error

Definition – Accuracy and precision – Significant figures – 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 II: Electrodes

Electrode potential – Purpose of the electrode paste – Electrode material – Types of electrodes – Microelectrodes (metal microelectrode) – Depth and needle electrodes – Surface electrodes – Chemical electrodes (Hydrogen electrode, pH electrode, pCO_2 electrode).

Unit III: Transducers and Microscope

Active transducers: Piezoelectric type transducers and Photovoltaic type transducer – Passive transducer – Photoelectric type resistive transducers – Inductive transducers – 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: Specialized and advances in medical instruments

Angiography – Digital thermometer – Endoscopes – EEG – ECG – Computed Tomography (CT scan) – X-ray machine – Comparison of Fluoroscopy and Radiography – Computers in medicine – Lasers in medicine – Cryogenic surgery – MRI (basics and instrumentation).

Unit V: Displays and Oscilloscope

Classification of displays – Display devices – Liquid crystal diode – Incandescent display –Liquid vapour display – Oscilloscope – Basic principle – CRT features – Block diagram of oscilloscope –Simple cathode ray oscilloscope.

Text Books:

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 IV			
Core Skill Based	**Physics for Competitive Examinations**		
Code : 18UPHS41	**Hrs./Week : 4**	**Hrs./Sem : 60**	**Credits : 4**

Vision: To motivate students to face and pursue higher education through competitive examinations

Mission: To equip our students with the basic principles of physics and apply the same in solving problems

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall units and dimensions	8	Re
CO –2	solve problems in gravitation and escape velocity	1,8	An
CO –3	solve problems in magnetic effect of current	1,8	An
CO –4	solve problems in Surface Tension and Viscosity	1,8	An
CO –5	solve problems related to Kirchhoff's laws & Steady current	1,8	An
CO –6	solve problems in Electrostatics & Electric potential	1,8	An
CO –7	solve problems in Electromagnetic Induction	1,8	An
CO –8	solve problems in Zener diode & Transistor	2,8	An

SEMESTER IV			
Core Skill Based	**Physics for Competitive Examinations**		
Code : 18UPHS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Fundamentals of Physics

Units – Trignometric – Numerical constants – Derivative and Integrals – Unit conversion factors – Some fundamental physical constants – Units and dimensions.

Unit II: Properties of matter

Gravitation, Escape velocity and artificial satellite – Surface Tension and Viscosity – Elasticity.

Unit III: Heat and Optics

Calorimetry – Kinetic theory of gases - Laws of thermodynamics - Conduction and radiation.

Interference – Diffraction, Resolving power (Prism & Grating) and Polarisation.

Unit IV: Electricity and Electromagnetism

Kirchhoff's laws and Steady current – Alternating Current – Electrostatics and Electric Potential .

Magnetic Properties of matter – Magnetic Effects of Current – Electromagnetic Induction.

Unit V: Electronics

Semiconductors – PN junction diode – Zener diode – Transistor: Transistor as an amplifier, Transistor as an oscillator.

Text Books:

1. Dr. S.L. Kakani, Objective Physics, Sultan Chand and sons Ltd.,10^{th} revised edition, 2001.

Books for Reference:

1. Satya Prakash, Er. Vibhav Saluja, Objective Physics, A.S.Prakashan publications, Meerut 27^{th} revised edition 2010.

SEMESTER III	
Self Study Paper **Electrical Wiring and Appliances**	
Code : 18UPHSS1 (Optional)	**Credits : +2**

Vision: To produce competent students to handle electrical appliances and wiring in their home

Mission: To equip the students with adequate knowledge and skills in the field of electrical wiring and appliances

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recall the tools used in the home	3	Re
CO –2	discuss the systems of domestic wiring	3	Un
CO –3	explain the principle of AC	1,3	Un
CO –4	sketch the refrigerating cycle	1,3	Ap
CO –5	describe the function of a compressor	3	Un
CO –6	list out the types of motor	1,3	Re
CO –7	describe a single phase a.c.motor	1,3	Un
CO –8	sketch electric kettle	3	Ap

SEMESTER III	
Self Study Paper **Electrical Wiring and Appliances**	
Code : 18UPHSS1 (Optional)	**Credits : +2**

Unit I: Domestic Wiring I

Introduction – Tools – Precautions in handling tools – Wires – Cables – General rules for wiring – Systems of domestic wiring.

Unit II: Domestic Wiring II

Tests to be carried out on wiring installation before commissioning – Good grounding and its need – Fuses – Switch wiring.

Unit III: Air Conditioning

Air conditioning – Principle – Refrigerating cycle – Refrigerants – Evaporators – Function of a compressor – Freezer.

Unit IV: Electric motors and coil winding

Electric motor – Motor classification – Motor Rating – Squirrel cage induction motor – A single phase a.c .motor – Motor winding – Coil winding.

Unit V: Electrical Appliances

Electric bell – Electric iron – Electric kettle – Hot plate – Fan – Washing machine.

Text Books:

1. G. Jose Robin and A. Ubald Raj, Applied Physics, Indira Publications, Marthandam, 1998.

SEMESTER IV	
Self Study Course	**Sensors**
Code : 18UPHSS2 (Optional)	**Credits : +2**

Vision: To enlighten our students about sensors

Mission: To make students understand the construction, principle, working and application of different types of sensors

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall the Sensor Characteristics and the fundamental principles of Sensing.	3,5	Re
CO –2	classify the types of Transducer	3,5	Re
CO –3	recognise selected chemical sensors	3,5	Un
CO –4	understand the optical sensors	3,5	Un
CO –5	acquire the knowledge of selected humidity sensors and other sensors	3,5	Un
CO –6	explain working principle of various sensors	3,5	Un
CO –7	identify sensors for humidity and liquid level measurements	3,5	Un
CO –8	explain the terminologies for different sensors and their applications	3,5	Un

SEMESTER IV	
Self Study Course	**Sensors**
Code : 18UPHSS2 (Optional)	**Credits : +2**

Unit I: Principles of Sensing

Sensor – Physical principles – Capacitance – Inductance –Mutual inductance – Resistance – Piezoelectric effect – Pyroelectric effect – Hall Effect –Seebeck effect.

Unit II: Transducers

Transducers – Electric transducers – Advantages of electric transducers – Classification of transducers.

Unit III: Chemical Sensors

Probe analyser – Differential refractometer – Spectrophotometer – Chromatography – Electrochemical sensor.

Unit IV: Optical Sensors

Optical transducers: Vacuum type photocell – Gas filled photo – Emissive tube – Semiconductor photoelectric transducer: Photo conductive cell – Photo voltaic cell.

Unit V: Measurement of Liquid Level, Thickness and Humidity

Liquid level: Sensitive method, Inductive method, Ultrasonic method – Thickness: Ultrasonic vibration and Nuclear radiation methods – Humidity: Resistive Hygrometer.

Text Book:

1. A.K Sawhney, A course in electrical and electronic measurements and instrumentation,Dhanpat Rai & Co.(P) LTD, Reprint 2010.