SEMESTER III	
Self Study Course	**Maintenance of Electronic Equipment and Photography**
Course Code : 21UPHSS3	**Credits :2**

(Compulsory)

Objectives:

1. To know the students how to apply the electronic components in physics laboratory
2. To make the students to measure the physical quantities using measuring instruments
3. To enhance the students to know about photography

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	list the different types of capacitors (K1)	4	Re
CO –2	discuss the method of soldering (K2)	4	Un
CO –3	compare audio frequency range and radio frequency bands (K4)	4	An
CO –4	present the usage of transducers (K3)	4	Ap
CO –5	define the terms of film structure and film speed (K1)	4	Re
CO –6	select the types of filter used in photography (K5)	4	Ev

SEMESTER III	
Self Study Course	**Maintenance of Electronic Equipment and Photography**
Course Code : 21UPHSS3	**Credits :2**

Unit I: Electronic Components

Active and passive components – Resistances - Capacitors: Uses, Types of capacitors, Detecting faulty capacitors, Characteristics, Working Voltage – Soldering techniques – Groove board – Bread board – Printed circuit board.

Unit II: Measuring Instruments

Multimeter – Cathode Ray Oscilloscope – Liquid Crystal Display – Audio Frequency Oscillator.

Unit III: Transducers

Transducer: Classification, Basic requirements – Inductive transducer – Piezoelectric transducer – Capacitive transducer – Resistive transducer: Potentiomentric type, Wheatstone bridge type.

Unit IV: Photography I

Camera – Photographic camera – Parts and their functions – Camera lens: Types – Camera lens shutters: Types.

Unit V: Photography II

Film structure – Film speed – Exposure triangle – Flash photography - Camera lens filter – DSLR camera – Digital format in DSLR camera.

Text Book:

1. Jose Robin G and Ubald Raj A. *Maintenance of Electronic Equipment & Photography*. Marthandam: Indira Publications. First Edition 2017.

SEMESTER IV	
Self Study Course **Electrical Wiring and Appliances**	
Course Code: 21UPHSS2	**Credits : + 2**

(Optional)

Objectives:

1. To produce competent students to handle electrical appliances and wiring in their home
2. To equip the students with adequate knowledge and skill in the field of electrical wiring and appliances
3. To know how to handle domestic appliances effectively

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	identify the tools used at home (K1)	4	Re
CO–2	discuss the system of domestic wiring (K2)	4	Un
CO–3	explain the principle of AC (K2)	4	Un
CO–4	classify the types of street lighting (K3)	4	Ap
CO–5	experiment the working of an electric iron (K3)	4	Ap
CO–6	sketch CFL (K4)	4	An

SEMESTER IV	
Self Study Course **Electrical Wiring and Appliances**	
Course Code: 21UPHSS2 (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: Domestic Appliances - I

Tube light choke – Fluorescent light starter – Fluorescent lamp – Compact Fluorescent lamp – Street lighting – LED Street lighting – Solar street lighting system. **Unit V: Domestic Appliances - II**

Wet Grinder – Mixer Grinder – Water Heater: Storage type – Electric Iron – Washing Machine.

Text Book:

1. Jose Robin G and Ubald Raj A. *Applied Physics.* Marthandam: Indira Publications. 1998.
2. Jose Robin G and Ubald Raj A. *Maintenance of Electrical Appliances*. Marthandam: Indira Publications. First edition 2017.

SEMESTER IV			
NME II	**Applied Physics II**		
Course Code : 21UPHN41	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Objectives:

1. To enlighten students to be aware of solar energy sources
2. To make students understand the working of windmills, OTEC and Geothermal process used for power generation and biomass energy conversion
3. To enrich the knowledge of our students on communication physics
4. To make students knowledgeable on nano physics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	construct solar cookers (K3)	3	Ap
CO –2	recall conventional and nonconventional energy source (K1)	3	Re
CO –3	discuss the different types renewable energy sources (K2)	`3	Un
CO –4	understand the Physics behind EEG, ECG etc (K2)	3,4	Un
CO –5	Categorize the types of optical fibres (K4)	1	An
CO –6	Select the nanophase materials based on the applications (K5)	4	Ev

SEMESTER IV			
NME II	**Applied Physics II**		
Course Code : 21**UPHN41**	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Unit I: Energy Physics – I

Conventional and non conventional energy sources (Introduction) – Solar energy – Solar cooker(box type) – Solar ponds – Solar Crop Dryers – Solar Water Heater - Water Desalination.

Unit II: Energy Physics – II

Bio mass energy – Biomass conversion process digestion - Ocean Thermal energy - Geothermal Energy – Wind Energy.

Unit III: Medical Physics

Nuclear medicine - Radiation Therapy - Magnetic Resonance Imaging (MRI) – Endoscopy– Electroencephalogram (EEG) – Electrocardiogram (ECG) – Cardiac Pacemaker – Blood Pressure Apparatus (Sphygmomanometer).

Unit IV: Fibre Optics

Introduction – Optical fibre and cable – Total internal reflection - Principles and propagation of optical fibre – Acceptance angle – Numerical aperture – Types of optical fibres (Material and Number of modes) – Fibre optic communication system – Advantages and disadvantages.

Unit V: Nanomaterials

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

Text Books:

1. Jose Robin G and Ubald Raj A, *Energy Physics*. Marthandam: Indira Publications. First edition 2014.
2. Dr. Sr. GerardinJayam. *Physics Every day*. First Edition 2008.
3. Dr. Mani P. *A text book of Engineering Physics –I*. Dhanam Publication. Tenth Edition 2013.
4. Dr. Mani P. *A text book of Engineering Physics –II*. Dhanam Publication. Tenth Edition 2016.

Book for Reference:

1. Rai G.D. *Nonconventional Energy Sources*. Khanna Publishers. Reprint, 2014.
2. Ubald Raj A and Jose Robin G. *Solid State Physics*. Marthandam: Indira Publications. second edition 2018.
3. Murugeshan R and Kiruthiga Sivaprasath. *Optics and Spectroscopy*. S. Chand and Company Ltd. Ninth edition 2019.
4. Arumugam M. *Biomedical Instrumentation*. Anuradha Agencies. Reprint, 2002.

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 III			
NME I	**Applied Physics I**		
Course Code: 21UPHN31	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Objectives:

1. To enrich students in the field of applied physics
2. To train students in domestic wiring
3. To understand basic principle behind air conditioning
4. To understand the theory of laser and applications of laser

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	identify tools used in the home (K1)	4	Re
CO –2	discuss the systems of domestic wiring (K2)	4	Un
CO –3	sketch the refrigerating cycle (K4)	4	An
CO –4	explain the function of a compressor (K2)	4	Un
CO –5	classify the types of emission of laser (K3)	4	Ap
CO –6	apply the application of laser in various fields (K3)	4	Ap

SEMESTER III			
NME I	**Applied Physics I**		
Course Code: 21UPHN31	**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 (Electrical, Axial, Centrifugal).

Unit III: Air Conditioning

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

Unit IV: Laser

Introduction– Stimulated Absorption – Principle of spontaneous emission and stimulated emission – Concept of laser - Population inversion – Pumping action – Characteristics of laser – Basic concepts of laser.

Unit V: Applications of Laser

Laser drilling – Laser cutting– Laser welding – Spot welding – Air pollution monitoring – Water pollution monitoring – Laser remote sensing.

Text Books:

1. Jose Robin G and Ubald Raj A. *Applied Physics*. Marthandam: Indira Publications. 3rd edition 1998.
2. Dr. Mani. P *A text book of Engineering Physics-I.* Dhanam Publications. 10thedition 2013.
3. Jose Robin G and Ubald Raj A. *Laser and its Applications*. Marthandam: Indira Publications. First Edition 2003.

Book for Reference:

1. Jose Robin G and Ubald Raj A. *Maintenance of Electrical Appliances*. Marthandam: Indira Publications. First Edition July 2017.
2. Kakani S L and Shubhra Kakani. *Photonics – Optoelectronics*. CBS Publishers &Distributors Pvt Ltd. First Edition 2017.

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.