ANNEXURE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS
M-SCHEME
(Implements from the Academic year 2015-2016 onwards)

Course Name :All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film & TV.

Subject Code : 30024

Semester : II Semester

Subject Title : **ENGINEERING PHYSICS – II**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 15 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING PHYSICS II	5 Hrs	75 Hrs	25	75	100	3Hrs

Topics and Allocation of Hours:

Sl.No	Topic	Time(Hrs)
1	HEAT	13
2	THERMODYNAMICS, LIQUEFACTION OF GASES& NON-CONVENTIONAL ENERGY	13
3	LIGHT AND REMOTE SENSING	13
4	ELECTRICITY	13
5	ELECTRONICS	13
6	REVISION+TEST+MODEL EXAM	10
	Total	**75**

RATIONALE:

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics.

The various divisions of Physics like Heat, Optics, Acoustics, Semiconductor Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the foundation by enlightening the **Fundamental facts, Principles, Laws and Correct sequence of events** to develop the Engineering and Technology field for the prosperity of human beings.

OBJECTIVES:

At the end of the study of II Semester the student will be able to

- Identify good conductors and insulators of heat.
- Analyze the relation between pressure, volume and temperature of gas and to interpret the results.
- Understand the process of Isothermal and Adiabatic changes of gas and basic laws of thermodynamics.
- Acquire knowledge about liquefaction process of gases.
- Realize the inevitable need for tapping Alternate energy to address the looming energy crisis.
- Identify the characteristics and properties of LASER, Optical fiber.
- Acquire broader ideas about the process of remote sensing in tapping the earth resources for human benefits.
- Acquire knowledge about heating, chemical and magnetic effects of electric current.
- Gain broader ideas of capacitors, diodes, transistors, integrated circuits and logic gates.
- Identify, analyze and solve Engineering field related problems involvingexpressionsderived in all the above topics.

30024-ENGINEERING PHYSICS – II
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**HEAT**	
	1.1 TRANSFER OF HEAT	4Hrs
	Concept of Heat and Temperature - Centigrade, Fahrenheit and Kelvin scales of temperature measurement- Conduction,convection and radiation - Definitions and explanations-Coefficient of thermal conductivity-Definition and SI unit- good and poor conductors- Examples-Properties of thermal radiation.	
	1.2 KINETIC THEORY OF GASES	5Hrs
	Postulates –Mean square velocity and Root Mean Square(RMS)velocity of molecules- Definitions and expressions –Expression for the pressure of a gas on the basis of postulates of kinetic theory of gases - Relation between pressure and kinetic energy, pressure and absolute temperature of the gas– Simple problems based on the expression for the pressure of a gas.	
	1.3 SPECIFIC HEAT CAPACITY	4Hrs
	Specific heat capacity of a substance (solids and liquids) –Definition – Specific heat capacity of a gas at constant volume – Specific heat capacity of a gas at constant pressure– Ratio of specific heat capacities – Explanation for Cp is greater than Cv – Derivation of Mayer's relation – calculation of Universal gas constant R from the gas equation PV= RT. Simple problems based on Mayer's relation.	
II	**THERMODYNAMICS, LIQUEFACTION OF GASES - AND NON CONVENTIONAL ENERGY**	
	2.1 THERMODYNAMICS	5Hrs
	First law of thermodynamics – Statement-Isothermal and Adiabatic changes - Explanation – Equations for isothermal and adiabatic changes (No derivation)Simple problems..based on equations $P_1V_1 = P_2V_2$ and $P_1V_1^{\gamma} = P_2V_2^{\gamma}$Second law of thermodynamics –Clausius statement and Kelvin's statement – Working of Carnot's reversible engine with indicator diagram and its efficiency.	
	2.2 LIQUEFACTION OF GASES	5Hrs
	Critical temperature, critical pressure and critical volume – Definitions – Principle used in cascade process –Cascade process of liquefaction of oxygen –Disadvantages of cascade process - Joule Thomson effect – Temperature of inversion – Liquefaction of air by Linde's process	

	2.3 NON – CONVENTIONAL ENERGY Introduction – Non-renewable and Renewable (Alternate) energy sources – Examples – Solar energy, wind energy, – Advantages and disadvantages of renewableenergy.	3Hrs
III	**LIGHT AND REMOTE SENSING** **3.1 OPTICS** Refraction – Laws of refraction – Refractive index of a medium – Definition – Spectrometer –Derivation of refractive index of glass prism using minimum deviation-Experimental determination of refractive index using spectrometer-Fiber optics – Introduction –Phenomenon of total internal reflection –problems using the refractive index .	5Hrs
	3.2 LASER LASER – Characteristics of LASER – principle of LASER –Spontaneous emission – Stimulated emission – populationinversion – Ruby laser-Construction and working- Uses of LASER.	4Hrs
	3.3 REMOTE SENSING Remote sensing – Introduction – Active and passive remote sensing – Explanation and examples – Components of remote sensing – Data acquisition, data analysis and reference data –RADAR – principle and working with block diagram.	4Hrs
IV	**ELECRICITY** **4.1 ELECTRICAL CIRCUITS** Ohm's law – Laws of resistances – Resistivity, Conductivity,Super conductivity and Meissner effect- Definitions – Kirchhoff's current and voltage laws – Condition for balancing the Wheatstone's bridge .Simple problems based on expression for resistivity.	4Hrs
	4.2 EFFECTS OF CURRENT Joule's law of heating – Experimental determination of specific heat capacity of a liquid using Joule's calorimeter –Faraday's laws on electrolysis – Electro chemical equivalent(e.c.e) of an element – Definition – Experimental determination of e.c.e. of copper- Capacitance of a capacitor – Definition – ' farad '– Definition– expressions for effective capacitance when capacitors are connected in series and in parallel –Simple problems based on expressions for e.c.e., effective capacitance for series and parallel connections of capacitors.	4Hrs

	4.3 MEASURING INSTRUMENTS Expression for the force acting on a current carrying straight conductor placed in a uniform magnetic field – Fleming's Left Hand rule – Expression for the torque experienced by a rectangular current carrying coil placed inside a uniform magnetic field – Working of a moving coil galvanometer andits merits – Conversion of galvanometer into an Ammeter and Voltmeter. Simple problems based on conversion of galvanometer into ammeter and voltmeter.	5Hrs
V	**ELECTRONICS** **5.1 SEMI CONDUCTORS** Semi conductors – Energy bands in solids – Energy band diagram of good conductors, insulators and semi conductors– Concept of Fermi level - Intrinsic semiconductors -Concept of holes - Doping – Extrinsic semiconductors – P type and N type semiconductors.	4Hrs
	5.2 DIODES AND TRANSISTORS P-N junction diode – Forward bias and reverse bias –Rectification action of diode – Working of full wave rectifier using P N junction diodes -PNP and NPN transistors – Three different configurations –Advantages of common emitter configuration – Working of NPN transistor as an amplifier in common emitter configuration.	5Hrs
	5.3 DIGITAL ELECTRONICS Digital electronics – Introduction – Logic levels – Basic logic gates: OR, AND , NOT gates – Universal logic gates:NAND and NOR gates – Symbolic representation, Boolean expression and Truth table for all above logic gates – Integrated circuits– Levels of integration – SSI, MSI, LSI and VLSI-Advantages of ICs.	4Hrs

Text Book :

1. Engineering Physics ,DOTE, Tamil Nadu
2. Physics – Higher secondary – First & Second year– Volume I & II –TamilNadu Text Book Corporation - 2004 & 2005.

Reference Book :

1. Fundamentals of physics – Brijlal and Subramaniam.
2. Fundamentals of Electricity – D.N. Vasudeva – S. Chand & co
3. Non- Conventional energy sources – G.D. Rai.- Khanna publishers
4. Text book of Remote sensing and Geographical information systems – M. Anji Reddy BS publications.

-O0O-

Board Examination - Question paper pattern

Time: 3 Hrs. **Max.Marks: 75**

PART A - 5 Questions to be answered out of **8** for 2 marks each.

PART B - 5 Questions to be answered out of **8** for 3 marks each.

PART C - All the **5** Questions to be answered

Each question in PART C will contain **3** Sub questions, out of these **3** Sub questions **2** Sub questions is to be answered for 5 marks each.

PART A	**5** x 2 marks	**10** Marks
PART B Short answer type questions	**5** x 3 marks	**15** Marks
PART C Descriptive answer type questions Each question in PART C will contain **3** Sub questions, out of these **3** Sub questions **2** Sub questions is to be answered for 5 marks each.	**5 x 2** x 5 marks	**50** Marks
Total		**75** Marks

Out of the **3 Sub questions** in **PART C, one sub question** must be on problem based to test the analytical ability/logical ability /diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus.

Clarks table will not be permitted for the Board Examinations.