

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B. Sc. PHYSICS - SEMESTER – III

TYPE OF COURSE: SKILL ENHANCEMENT COURSE

PROGRAMME CODE: SCIUG101

COURSE CODE: SC23SECPHY306

COURSE NAME: ENERGY TECHNOLOGY

(Effective from June 2024 Under NEP – 2020)

Total Credits: 02	THEORY	External Marks – 25
Teaching Hours per Week: 02	SEC I	Internal Marks - 25
Teaching Hours per Semester: 30		

Course Objective:

- To understand several forms of Conventional (Non-renewable) and Renewable energy sources as well as energy technology.
- To develop knowledge about the close relationship among energy, energy conversion processes and environment and To learn demand of energy and how to do its management.
- To learn about the efficiency of geothermal power plants and merits and limitations of wind energy.

Course outcome:

At the end of the course students will able to

- Get knowledge of Coal energy, Natural gas energy, Nuclear energy, Solar energy, Geothermal energy, Hydro energy, Wind energy and Develop the knowledge of energy technology.
- Understand close relationship among energy, energy conversion processes and environment.
- Develop knowledge of demand of energy and its management. Also understand about efficiency improvement in power geothermal power plants and applications of wind energy.

:: Syllabus ::

Unit No.	Content	Credit	Hrs30
Unit-1	Introduction to Energy Technology: What is energy? Energy Science and Technology, Energy, man and environment, Some well known forms of energy, Energy Resources and forms of energy, Energy demand, Energy Routes for Conventional energy resources, National energy strategies, and energy plan, Energy management, Cost comparison of energy resources and conversion, Energy Conservation opportunities. Environmental aspects of energy: Introduction, Pollution from use of energy, Combustion Products of Fossil Fuels, Particulate Matter, Electrostatic Precipitator(ESP), Fabric Filter and Baghouse.	1	15
Unit-2	Geothermal Energy: Introduction, Applications, Utilization of Geothermal Energy, Geothermal Energy Resources, Hydro Geothermal Resources, Hot Dry Rock Geothermal Resources. Merits and demerits of Petro Geothermal energy Power Plant, Geothermal Electrical Power Plants, Classification and types of Geothermal Power plants, Wind Energy: Introduction, Applications of Wind Energy and Historical Background, Merits and limitations of Wind energy Conversion, Nature and Origin of Wind, Wind Energy Quantum, Variables in Wind Energy Conversion systems, Wind power density, Power in wind Stream, Wind turbine Efficiency. Types of wind Turbine-Generator Units, Characteristics of wind turbine generator, Mono-blade HAWT, Twin-blade HAWT	1	15
Reference: (1) Energy Technology by S.Rao and Dr. B.B. Parulekar, Khanna Pub.-1995 1st edition (2) Solar Energy conversion, An introductory course By A. E. Dikon and J. D. Loslie (3) Principles of Energy Conversion			

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B. Sc. PHYSICS - SEMESTER – III

TYPE OF COURSE: SKILL ENHANCEMENT COURSE

PROGRAMME CODE: SCIUG101 COURSE CODE: SC23SECPHY306A

COURSE NAME: VACUUM PUMPS, PRESSURE GAUGES AND INSTRUMENTS

(Effective from June 2024 Under NEP – 2020)

Total Credits: 02	THEORY	External Marks – 25
Teaching Hours per Week: 02	SEC II	Internal Marks - 25
Teaching Hours per Semester: 30		

Course Objective:

- To understand principles of vacuum technology, concept of pressure and vacuum levels.
- To familiarize about vacuum pumps and pressure gauges available, their working principles.
- To know the operation of vacuum pumps, pressure gauges and aware the errors in measurements.
- To understand Optical instruments and its applications and the basic principle of electrical measurement

Course outcome:

At the end of the course students will able to

- Understand principles of vacuum technology, concept of pressure and vacuum levels.
- Familiarize about vacuum pumps and pressure gauges available, their working principles.
- Get knowledge about operation of vacuum pumps, pressure gauges
- Understands the mechanism of Optical as well as electrical instruments and their applications

:: Syllabus ::

Unit No.	Content	Credit	Hrs 30
Unit-1	Vacuum Pumps, Pressure Guages: Exhaust Pumps and their characteristics(15.1), Rotary Oil Pumps(15.2), Molecular Pump(15.3), Diffusion Pump(15.4), Other methods of Producing Low Pressures(15.5), Pressure Gauges - McLeod Guage, Pirani Guage, Thermocouple Guage, Ionization Gauge,(15.7). Errors in measurement: Errors of observations, Types of errors, Normal law of errors, Average, standard and probable errors, Percentage error.	1	15
Unit-2	Optical Instruments: Travelling Microscope, Cathetometer, and Optical bench. Objective and Eyepiece, Kellner's Eyepiece, Huygens Eyepiece, Ramsden Eyepiece, Comparision of Ramsden Eyepiece and Huygens Eyepiece, Gauss Eyepiece, Telescopes, Refracting Astronomical Telescope, Reflecting Telescope, Newton's Telescope, Other reflecting Telescopes. Electrical Instruments: Moving coil Galvanometer, Ballistic Galvanometer, Calibration of Ballistic Galvanometer using different methods, Multimeters, Digital multimeter, Earphone and Headphone.	1	15

Reference: Basic Reference

1. An Advanced Course in Practical Physics by D.Chattopadhyay, P.C. Rakshit, B.SAHA, New Central Book Ltd.
2. A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu S.Chand
3. Mechanics by D.S.Mathur S.Chand.(For Vacuum pumps)