

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (THERMAL ENGINEERING) (21)

THERMAL AND NUCLEAR POWER PLANTS

SUBJECT CODE: 2712107

M.E. 1st SEMESTER

Type of course: Major Elective - 1

Prerequisite:

Rationale: The course is prepared to provide the detailed insight of Thermal & Nuclear power plants

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
					ESE	OEP	PA	RP		
4	2	0	5	70	30	30	0	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction: Types of Power plant, thermal & nuclear power plants in India, comparison of thermal & nuclear power plants, Layout of thermal & nuclear power plants, recent developments in power generation.	4	5
2	Steam power plant: Main elements and working of steam power plant, thermodynamic analysis of simple Rankine cycle, performance enhancement methods; regeneration (up to 3-stages), reheat, thermal analysis of steam condenser & cooling tower, recent development and advancement in steam power plant engineering, maintenance as well as safety measure of components of steam power plant.	15	30
3	Gas turbine power plant: Elements of gas turbine power plant, thermal analysis of simple gas turbine power plant, performance enhancement methods; intercooling, reheat & regeneration, cogeneration, combined cycle power plant, waste heat recovery systems, maintenance as well as safety measure of components of gas turbine power plant, the concept of fluidized bed combustion and recent developments.	15	30
4	Nuclear power plant: Nuclear reaction, Nuclear Reactor, Classifications, Types of reactors, Site Selection, Method of enriching uranium, Nuclear Power Plant Safety, Bi-Product of nuclear power generation, Nuclear power plant in India, three stage program, Future of nuclear power.	10	25
5	Power plant instrumentations: Pressure measuring instruments, Temperature measurement and Flow Measurement, pollution types, methods of control, factors affecting the economics, loading factors, utilization factor, performance and operating characteristics of power plant.	8	10

Reference Books:

1. Power Plant Engineering by P.K. Nag, McGraw-Hill, New Delhi
2. Steam Turbine Theory and Practice by W. J. Kearton, CBS Publishers
3. Power Plant Engineering by R.K.Rajput, Lakshmi Publications
4. Power Plant Engineering by P.C.Sharma, / Kataria Publications
5. Power Plant Technology by El-Wakil, McGraw-Hill , New Delhi

Course Outcome:

After learning the course the students should be able to:

1. Carry out energy analysis of thermal & nuclear power plants