

Engineering Program

Specialization	Energy Technology
Course Number	020304121
Course Title	Electrical Power Plants
Credit Hours	3
Theoretical Hours	3
Practical Hours	0

Brief Course Description:

- ❖ Classification of power plants, steam power plants, Rankine cycle, reheat and regeneration, condensers, pumps and piping networks, types of steam turbines, water desalination and treatment units, operation and maintenance of steam power plants. Gas turbine power plants, combined cycle, diesel power stations, hydro-electric power stations, operation and maintenance of gas turbine based power plants, environmental impacts of power generation.

Course Objectives:

The student should be able to;

1. Explain the generation of electrical energy.
2. Describe construction & operation of steam power plants.
3. Describe construction & operation of gaseous power plants.
4. Describe construction & operation of diesel power plants.
5. Describe construction & operation of renewable power plants.

□ Detailed Course Description:

Unit Number	Unit name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> ▪ Generation of electrical energy ▪ Types of power plants. ▪ Capacity of power plant. 	
2.	Stream power plants	<ul style="list-style-type: none"> ▪ Steam generators (boilers); Types & Auxiliaries ▪ Evaporators ▪ Feed water & water heaters. ▪ Condensers; type & operation. ▪ Super heaters and reheaters ▪ Auxiliary devices; pumps, cooling towers fuel feeders. ▪ Steam turbine ▪ General plan of steam plants. 	
3	Gaseous power plants	<ul style="list-style-type: none"> ▪ Applications of gaseous power plants. ▪ Advantages & disadvantages of gaseous plants. ▪ Elements of gaseous turbine; gas turbine, compressor, combustor, open cycle & closed cycle. ▪ Auxiliary parts, lubrication & cooling 	
4	Diesel power plants	<ul style="list-style-type: none"> ▪ Advantages & disadvantages of diesel engine ▪ Applications, construction & principle of operation ▪ Fuel system, cooling system, lubrication system, general plan of diesel engine 	

5	Hydraulic power plants	<ul style="list-style-type: none">▪ Classification of hydraulic power plants.▪ Advantages & disadvantages & applications.▪ Water head, water tank & dams▪ Construction & principle of operation	
6	Economical constructions of energy generation.	<ul style="list-style-type: none">▪ production costs ; fixed costs , year costs ,▪ Total price of energy.▪ Load curves & continuous load curves.▪ Peak demand, utilization factor, diversity factor & peak diversity factor.	

□ **Evaluation Strategies:**

		Percentage	Date
1. Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Assignments	10%	
	Final Exam	50%	--/--/----

□ **Teaching Methodology:**

1. Lecture

□ **Textbook:**

Power Generation Technology; Paul Breeze , 2005 ISBN 0-7506 – 6313-8

□ **References:**

1. Wind power; renewable Energy for home, farm & Business; Paul Gipe, 2004 .
2. Renewable Energy ; Bent Sorensen , 2004
ISBN 0-12-656153 -2