



MODULE SPECIFICATION

Faculty of Engineering

Last Updated 29th July 2017

1. Module Title
Power Plant Engineering

2. Module Code
EM4201

3. Number of credits
20

4. Level
4

5. Semester
7

6. Pre-requisites for admission to the module
Normal progression rules

7. Module Coordinator
Dr. Md. Gholam Yazdani

8. Aims
This module is designed for the students to acquire knowledge on power producing plants, based on turbomachinery and heat transfer applications.

9. Summary of Contents

- **Steam power plants:** Aspects of steam power plant design; Steam generators and auxiliary equipment– Co-generation.
- **Gas turbine power plants:** stationary and aircraft gas turbines; working fluids in open and closed cycles; component matching and off-design operation.
- **Combined Cycles power plant:** Gas and steam power plant; Gas and other working fluids; Heat recovery steam generator.
- **Diesel Power plant:** Different types; Application of diesel power plant in industries, general layout of diesel power plant components.
- **Nuclear Power Plant:** Theory of nuclear power generation; Mechanisms for reaction control; Different types of Reactors.
- **Environmental Impact:** Greenhouse effect; Acid Rain; Particulate emission and control; Nuclear Radiation and waste.
- **Hydroelectric Power Plant:** Principles of hydro power generation; Site Selection; layout of hydroelectric power plant components; Sizing the Turbine
- **Non-Conventional Power Generation:** Magnetohydrodynamic, Thermionic, Fuel Cells, Geothermal.

- **Energy Storage:** Pumped Hydro, Compressed Air, Electrochemical, Magnetic, Thermal, Chemical, Hydrogen.
- **Economics of power plants:** Load Duration Curve; Location of power plant.

10. Module Intended Learning Outcomes (MILOs)

Upon successful completion of this module, students will be able to:

No.	MILOs	Weightage (%)
1	Apply principles of thermodynamics and fluid mechanics to thermal power systems	25
2	Explain the working principles of nuclear, hydroelectric and non-conventional Power Plant	30
3	Analyse the environmental impact of power generation	20
4	Compare different types of energy storage	10
5	Explain the economics of power plants	15

11. Teaching and Learning Activities (TLAs)

MILO No.	TLAs	Functions	Hours/Week
1-6	Lecture	Present and convey critical information and theories on power generation	3
1-6	Tutorial	Interactive problem solving session used for transfer of knowledge by example through a set of instructions to complete a task	3
1,2,4,6	Industrial Visit	To verify the theory by relevant experiments performed in industry	1 day per semester

12. Assessment Tasks/Activities

MILO No.	Type of Assessment Tasks/Activities	Weightage (%)
1- 5	University Examination	60
1,2,4,5	Industrial Visit report (1)	20
2,5	Assignments (2)	20

Assessment Criteria:

Assessment components of the module shall be University Examination and Coursework. To achieve a pass in the module students must obtain a minimum overall mark of 40% and a minimum of 30% in each assessment component.

Resit: Students eligible for resit shall be assessed according to the programme area examination board recommendation.

13. Attendance Requirements

Students are required to attend all lectures, tutorials and laboratory sessions.

14. Contribution to Programme Intended Learning Outcomes

	Knowledge & Understanding	Application	Analysis & Evaluation	Creativity & Design
Maths and Science Underpinning Science and Mathematics for the study of Engineering	✓	✓	✓	
Core Engineering The main principles and core subjects of the relevant Engineering Discipline	✓	✓	✓	✓
Computing and IT Computer-based methods for the analysis and modeling of Engineering problems				
Communication Skills Communicate effectively using a variety of techniques both written and oral	✓			
Engineering Practice Practical application of engineering skills combining theory and experience	✓	✓	✓	
Design Creation, design and development of a product, process or system	✓	✓		
Management & Economics Management and financial methods to achieve objectives in production and projects	✓	✓	✓	
Social & Environmental Professional and ethical conduct; sustainable development; health and safety; environmental impact	✓	✓	✓	

15. Grading of Student Achievement

Letter Grade	% Mark	Grade Definitions
A+	90-100	Excellent
A	85-89	
A-	80-84	
B+	75-79	Good
B	70-74	
B-	65-69	
C+	60-64	Adequate
C	55-59	
C-	50-54	
D+	45-49	Marginal
D	40-44	
F (Fail)	<40%	Fail

16. Resources

Primary text

No	Name of Author	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	P.K. Nag	2014	Power Plant Engineering	4th	Tata McGraw-Hill Education Pvt. Ltd	9789339204044

Secondary text

No	Name of Author	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	R.K. Rajput	2008	A Textbook of Power Plant Engineering	4th	Laxmi Publications	9788170086529

Note:

- Module specification valid for BEng Mechanical Engineering Intake 06 and 07.
- BEng Mechanical Engineering Intake 08 will use the updated grading system of 16th May 2017.