



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

INSTRUCTION DIVISION

SECOND SEMESTER 2015-2016.

Course Handout (Part II)

13/01/2016

In addition to part-I (general handout for all courses in the time-table), this handout provides the specific details regarding the course.

Course No.: ME C314/ME F420
Course Title: Power Plant Engineering
Instructor-in-charge: P.SRINIVASAN.

Scope and Objective: This course has been design to make the students familiar with the Power Plant Engineering and Technology. It deals with the Thermal, Hydro, and Nuclear Power Plants. The course also discusses non-conventional power generation. The economic analysis, economic loading, load curve analysis will also be discussed.

Text Book:

Nag P.K. *Power Plant Engineering*, Tata McGraw-Hill Pub. Co. Ltd, New Delhi (Third edition), 2008.Nineteenth Reprint 2013.

Reference Books:

1. **Bernhardt G.A. Strotzki and William A. Vopat**, "*Power Station Engineering and Economy*" - Tata McGraw-Hill Pub. Co. Ltd. New Delhi , 1960
2. **M.M. El-Wakil**, "*Power plant Technology*" – McGraw-Hill International Edition, 1984.
3. **S P Sukhatme J N Nayak**, " Solar Energy Principle of Thermal Collection and storage", Tata McGrawhill 2008.
4. Basics of Boiler and HRSG Design, Brad Beukcer. 24x7 E book of BITS,Library.
<http://library.books24x7.com/toc.aspx?bookid=17316>.





Course Plan:

Lect. No	Learning Objectives	Topics to be covered	Ref to text
1.	Introduction and power scenario of India	Introduction and Selection of Power Plant	Class notes
2.	Steam power cycles	Analysis of steam cycles	Ch. 2
3.	Efficiency improvement of steam power cycles		
4.	Working of fluid power cycles	Combined cycle Power Generation	Ch. 3
5.	Binary vapor cycles		
6.	GT-ST power plant		
7.	Important fuels	Fuels and combustion	Ch. 4
8.	Stoichiometry		
9.	Control of excess air		
10.	Draught systems & fans	Draught systems and fans	Ch. 4
11.	Enthalpy value of combustion		
12.	Kinematics	Combustion mechanism, Firing methods	Ch. 5
13.	Fluidized bed combustion		
14.	Coal gasification		
15.	Types of boilers	Steam Generators	Ch. 6
16.	Efficiency improvement of boilers		





Lect. No	Learning Objectives	Topics to be covered	Ref to text
17.	Efficiency improvement of boilers		
18.	Pollution control of boilers		
19.	Nozzles	Steam Turbines	Ch. 7
20.	Turbine blading		
21.	Electrical energy generation		
22.	Condensers	Feed water, Circulating water system	Ch. 8
23.	Cooling towers		
24.	Feed water treatment	Feed water treatment	Ch. 6
25.	Power Plant layout	Power Plant layout	----
26.	Optimization of hydro-thermal mix	Hydroelectric Power Plant	Ch. 10
27.	Hydro turbines		
28.	Cavitation		
29.	Performance of turbines		
30.	Types of plants	Diesel engine, Gas Turbine Power Plants	Ch. 11
31.	Efficiency evaluation		
32.	Basics	Nuclear Power Plant	Ch. 9
33.	Nuclear reactors		
34.	Nuclear reactors		
35.	Renewable energy sources	Non-Conventional Power Generation	Class Notes
36.	Solar and Wind based power generation		





Lect. No	Learning Objectives	Topics to be covered	Ref to text
37.	Biomass , Geothermal & other sources for power generation		
38.	Load curve	Economics of power generation	Ch. 1
39.	Availability of power		
40.	Power plant economics		
41.	Electricity pricing		

Evaluation Scheme:

Components	Duration	Weightage (%)	Date & Time	Remarks
Mid semester test	90 min.	30%	18/3 2:00 - 3:30 PM	Closed Book
Case study /Field visit*.	—	10%		Open book.
Tutorial Tests*	50 min.	20%		6 best of 9 (OB)
Comprehensive Examination	3 hrs.	40	13/5 FN	Closed Book

*filed visit may be arranged for power plant if possible.

Mid-semester grading: It will be announced normally in the month of March. It is done in the same manner as that of the final grading

Chamber Consultation Hours: To be announced in the class.

Notices: All notices related to this course will be put on the Mechanical Engineering Group notice board only.





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Make-up Policy: Make-up will be given only to the genuine students. The request application for make-up test must reach the Instructor-in-charge before commencement of the scheduled test (documentary proof is essential). No make-up will be allowed for the Tutorial tests.

Prof.P.Srinivasan

Instructor-in-charge

ME C314/ME F420 Power Plant Engineering



Please Do Not Print Unless Necessary

