

DALHOUSIE UNIVERSITY
Department of Mechanical Engineering
MEECH4840
STEAM PLANT ENGINEERING
WINTER 2004

[Please review this carefully and get back to me if you have any suggestions.]

Instructor:

Prabir Basu, Room C 301 or F 105B. **Telephone** 494 3227

Email: Prabir.basu@dal.ca

Assistant:

Sravanthi & Eugene Room:CFB Lab, F-Building, phone 494 6208

Lecture/Tutorial/Laboratory#:

SECTION- 1 (Mechanical, Industrial, Mining & Metallurgical)

	Tutorial/Design	Lecture	Lecture
Room	D413	A103	A103
Time	02:35-04:25	08:35-09:55	08:35-09:55
Day	Monday	Tuesday	Thursday

#Internal adjustment of tutorial/lecture classes may be made.

Textbook:

Boilers & Burners -Design and Theory

Basu, P.,C. Kefa, & L. Jestin, Springer & Verlag, New York, 1999

Reference Book

Circulating fluidized bed Boilers – Basu & Fraser, Butterworths Heinemann, 1991

1.0 COURSE OBJECTIVES:

To provide an introduction to the theory, design and operation of Thermal power plants which would allow a Mechanical Engineering graduate to enter a career with power plant manufacturing, consulting, utility or environment industries with a good background

2.0 COURSE STRUCTURE:

This course will be taught in an interactive fashion with emphasis on deep student involvement both in the format of instruction and content of the course. There will be lectures, tutorials and or designs. Plant visits will be organized where possible

The course will have the following components:

1. Lectures
2. Tutorials
3. Video Films (if available)

Following tests will be taken:

1. Mid Term
2. Final

To challenge the students intellectually and to develop their spirit of exploration of new things bonus quizzes may be given on topics not necessarily covered in the class.

Tutorials/Design:

In order to help the learning by the students, we will conduct a design/tutorial session. This class is designed to supplement the topics learnt in the lecture class.

Late assignments are not allowed. Under exceptional circumstances special permission of the Instructor is required.

Attendance at the Tutorial/Design class is mandatory.

Consultation Hour:

The Marking Assistant and the course instructor will be available for consultation on any problem the students may have on the course. Students are encouraged to discuss

Surprise Quiz & Class participation:

You are encouraged to take active part in the class by joining discussions. You may be asked questions to assess your general depth and breadth of knowledge in related fields. There will not be any advance notice for such quiz

Grading:

Class participation & surprise quiz	10%
Mid Term Exam	30%
Design/Tutorial	10%
Final Exam	50%

Only students who have submitted all the assignments of the Design/Tutorial class are eligible to write a supplementary examination and the mark obtained will replace the final examination's marks only.

3.0 LECTURE SCHEDULE

(The order and content of the lectures may change)

<u>Topics</u>	<u>Units</u>	<u>Recommended Sections</u>
Introduction to the course	1	
Basic concepts and units	2	1-1
Classification of boilers	3	1-2
Boiler specification	4	2-1, 2-2
Fuel types	5	3-1,
Stoichiometric calculations	6	3-2
Steam cycle	7	
Reheaters & reheat cycle	8	
Regenerative heating and Heaters	9	
Steam turbine, Condensers	10	
Heat balance	11	3-4
Performance test	12	3-4-5
Coal preparation	13	4-1-1, 4-2
Pulverizers	14	4-4
Oil burners	15	5-1, 5-2
Oil burner	16	5-3
Design of pulverized coal fired furnace	17	6-1
Pulverized coal burner	18	10
Tangential firing	19	10-1, 10-8
Natural circulation design	20	12-1
Forced circulation & supercritical boiler	21	13-3, 13-4
<i>Circulation Review</i>	22	
Fluidized bed boilers	23	11-1, 11-2
Bubbling fluidized bed boilers	24	11-4
Fluidized bed fuel preparation	25	4-1-24-7
Circulating fluidized bed boilers	26	11-5
Fluidized bed boiler	27	11-8-3
Fan selection	28	16-1, 16-6
Emission of gaseous and solid pollutants	29	3-5
Air pollution standards	30	
Low NOx burners	31	9-9
Steam plant economics	32	
Tariff calculation	33	
Introduction to ASME & other code	34	17-4-1
Introduction to pressure part design	35	17-5
<i>Advanced power system</i>	36	
Gas Turbine Cycle	37	

Review	38	
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