

Winter University Programme – Course Outline

Module: Mechanical Engineering in Modern Power Plants

CLASS HOURS

Consult programme schedule

PROFESSORS

Academic Directors

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1) INFORMATION ON THE COURSE CONTENT

COURSE DESCRIPTION

The module will provide a survey about modern thermal power generation and the topics and limitations of mechanical engineering herein.

Although seeming to be rather complicated power plants are developed strictly by optimization of their efficiency. According to this students will be introduced into the major components of steam plants, gas turbine plants and combined cycle arrangements. Thermodynamic influences and calculations are shown as well as the importance of materials development and limitation by production facilities and reliability demands.

The course is completed by lectures about materials and failure analysis, vibrations, production and modern technologies of carbon mitigation. An excursion to a modern combined-cycle-power plant is provided.

LEARNING OBJECTIVES

Students are provided an introduction to the structure and components, development and limitations of modern thermal power plants.

They are able to recognize a given plant as being a state of the art one, an old fashioned type or a highly innovative plant with all consequences on operating these different types.

Students are able to do basic calculations regarding power, fuel consumption and efficiency of the different plant types.

They are also able to identify global possibilities and risks of the operation of the different power plant types.

COURSE MATERIALS

Handouts to be prepared and distributed among the participants.

TENTATIVE CLASS SCHEDULE

Part 1: Steam Plants, gas turbine plants, combined cycle arrangements

Part 2: Technical conditions of modern power plants (development of material, failure analysis, material testing, analysis of vibrations in rotating and still components, production of metallic component, possibilities and limits of cutting and non-cutting manufacturing techniques.

2) INFORMATION ON CLASS PARTICIPATION, ASSIGNMENTS AND EXAMS

ASSIGNMENTS

Active participation and group work on a regular basis.

EXAMS

A written or oral exam (depending on the number of participants) at the end of the program.

PROFESSIONALISM & CLASS PARTICIPATION

Students are expected to attend the classes and dedicate 1-2 hours a day for preparation through reading and self-study. The participation and self-study will enable the students to answer questions, lead discussions and to contribute with own ideas and opinions.

MISSED CLASSES

No more than 10% of the contact hours can be missed for successful completion of the course module. If students miss a lecture or workshop it is their own responsibility to obtain information on the topics.

In the event of sickness a medical certificate must be presented to the Winter University Programme coordinator.

3) INFORMATION ON GRADING AND ECTS

ACADEMIC STANDARDS

Upon successful completion, 4 ECTS will be awarded for the class.

According to the rules of ECTS, one credit is equivalent to 25-30 hours student workload.

GRADING SCALE

Percentage	Grade		Description
90-100%	15 points	1.0	very good: an outstanding achievement
	14 points		
	13 points	1.3	
75-90%	12 points	1.7	good: an achievement substantially above average requirements
	11 points	2.0	
	10 points	2.3	
60-75%	9 points	2.7	satisfactory: an achievement which corresponds to average requirements
	8 points	3.0	
	7 points	3.3	
50-60%	6 points	3.7	sufficient: an achievement which barely meets the requirements
	5 points	4.0	
0-50%	4 points	5.0	not sufficient / failed: an achievement which does not meet the requirements
	3 points		
	2 points		
	1 point		
	0 points		

This course description was issued on February 2, 2017. The program is subject to change.