Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / BOILERS

Course:	BOILERS			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
5660	Mandatory	1	4.5	2+2+0
Programs	MECHANICAL ENGINEERING			
Prerequisites				
Aims	On completion of this course, students should be able to do the conception and design of boilers and boiler component parts			
Learning outcomes	Upon completion of this course the student will be able to: 1. Define and classify boilers 2. Analyzes and describe different devices for combustion by fuel type 3. Execute the thermal calculation of the boiler 4. Describe and calculate the basic elements of the boiler 5. analyze the influence of operating parameters on the operational characteristics of the boiler			
Lecturer / Teaching assistant	Prof.dr Milan Šekularac, dipl.ing maš; mr Boris Hrnčić, dipl.maš.ing.			
Methodology	Lectures, exercises, projected task, consultations, field work			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction: working principle, classification of boilers, display of various design			
I week exercises	Numerical problems from lectures and instruction for project design			
II week lectures	Fuels and fuel combustion in steam boilers			
II week exercises	Numerical problems from lectures and instruction for project design			
III week lectures	Boiler combustion systems			
III week exercises	Numerical problems from lectures and instruction for project design			
IV week lectures	Thermal calculations of boilers			
IV week exercises	Numerical problems from lectures and instruction for project design			
V week lectures	Hydrodynamics of evaporating and nonevaporating heating surfaces of boiler			
V week exercises	Numerical problems from lectures and instruction for project design			
VI week lectures	Aerodynamics of air and gas tract of the boiler			
VI week exercises	Numerical problems from lectures and instruction for project design			
VII week lectures	First test			
VII week exercises	Reviewing the results of the first test			
VIII week lectures	Basic elements: furnaces, evaporators			
VIII week exercises	Numerical problems from lectures and instruction for project design			
IX week lectures	Basic elements: steam superheaters and additional superheater			
IX week exercises	Numerical problems from lectures and instruction for project design			
X week lectures	Basic elements: temperature control of superheated steam			
X week exercises	Numerical problems from lectures and instruction for project design			
XI week lectures	Basic elements: water heaters, air heaters			
XI week exercises	Numerical problems from lectures and instruction for project design			
XII week lectures	Water and steam. Preparation of water. Deposits on water-steam side			
XII week exercises	Numerical problems from lectures and instruction for project design			
XIII week lectures	Exploitation of heating surfaces. Corrosion, wearing, contamination and cleaning			
XIII week exercises	Numerical problems from lectures and instruction for project design			
XIV week lectures	Second test			
XIV week exercises	Reviewing the results of the second test			

XV week lectures	The correctional test. Consultation for the final exam
XV week exercises	Consultation for the final exam
Student workload	weekly: 4,5 ECTS x 40/30 = 6 hours Structure: 2 hours lectures 2 hours exercises 2 hours self learning

Per week	**Per semester**
4.5 credits x 40/30=6 hours and 0 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **2 hour(s) i 0 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 0 minuts x 16 =96 hour(s) i 0 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 0 minuts x 2 =12 hour(s) i 0 minuts** Total workload for the subject: **4.5 x 30=135 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **27 hour(s) i 0 minuts** Workload structure: **96 hour(s) i 0 minuts (cources), 12 hour(s) i 0 minuts (preparation), 27 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes and exercises, do home exercises and both tests
Consultations	Every working day from 12 to 14h
Literature	- Brkić Lj. idr: Parni kotlovi, Mašinski fakultet, Beograd, 2009. - Brkić Lj. idr: Termički proračun parnih kotlova, Mašinski fakultet, Beograd, 2009. - Barberton O., et al.: Steam, Its Generation and Use, B & W, New York, 1998.
Examination methods	Tests 20% each (total 40%) Two homework assignments, each to 10 % (total 20%) and are prerequisite for final exam Final exam 40% Grading Scale: 100% - 90% A; 89% - 80% B; 79% - 70% C; 69% - 60% D; 59% - 51% E; 50% - 0% F
Special remarks	
Comment	Additional information can be obtained from teacher

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points