

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Heat, Momentum and Mass Transfer		Code 1010634151010630266
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty Thermal Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 18 Classes: 8 Laboratory: 12 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: Prof.P.P., dr hab. inż. L.Bogusławski email: leon.boguslawski@put.poznan.pl tel. 2212 Wydział Maszyn Roboczych i Transportu http://www.fwmt.put.poznan.pl/		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of heat and mass transfer processes in thermal engineering
2	Skills	Is able to calculate heat flux in different surface and flow configurations
3	Social competencies	Is able to improve professional competencies and be ready to collaborate in team
Assumptions and objectives of the course: Introduction of heat, momentum and mass transfer processes. Ability to calculate heat flux in conduction, convection and radiation.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a basic knowledge of heat and mass transfer processes - [K1A_W08]		
Skills:		
1. Is able to perform technical calculations in heat transfer - [K1A_U17]		
Social competencies:		
1. Understand the need and knows the possibility of lifelong learning - [K1A_K01,]		
Assessment methods of study outcomes		
exam		
Course description		
Introduction. Conduction-differential equations, boundary conditions. Thermal properties of materials. Conduction in fins. No stationary conduction. Numerical methods. Convection. Models of turbulence. Convection in channels. Convection from different surfaces. Radiation. Heat transfer at boiling and condensation. Heat exchangers.		

Basic bibliography:		
1. Brodowicz K.: Teoria wymienników ciepła i masy, PWN 1982		
2. Hobler T.: Ruch ciepła i wymienniki, WNT 1979		
3. Kostowski E.: Przepływ ciepła, Wyd. P. Śl. 1991		
4. Kostowski E.: Zbiór zadań z przepływu ciepła, Wyd. P. Śl. 1988		
5. Staniszewski B. Red.: Wymiana ciepła ? zadania i przykłady, PWN 1965		
6. Staniszewski B.: Wymiana ciepła, PWN 1979		
7. Wiśniewski St., Wiśniewski T.: Wymiana ciepła, WNT 1997		
8. Holman J.P., Heat transfer, London McGraw-Hill 1992		
Additional bibliography:		
1. Madejski J.: Teoria wymiany ciepła, Szczecin, WUPSz 1998		
2. Bejan A.: Heat Transfer, John Wiley & Sons, Inc., New York 1993		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lecture	30	
2. Preparing to lecture	5	
3. Fixation of the lecture	5	
4. Consultation	2	
5. Preparing for exam	20	
6. Participation in the exam	3	
Student's workload		
Source of workload	hours	ECTS
Total workload	70	4
Contact hours	40	0
Practical activities	20	0