STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mechanical Structures**		Code **1010134241010130901**
Field of study **Environmental Engineering Extramural First-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**
Elective path/specialty **-**	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: **10** Classes: **-** Laboratory: **-** Project/seminars: **10**		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:

dr inż. Grzegorz Krzyżaniak
email: grzegorz.krzyzaniak@put.poznan.pl
tel. 616652034
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Responsible for subject / lecturer:

dr inż. Tomasz Kaźmierski
email: tomasz.kazmierski@put.poznan.pl
tel. 616652079
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of selected topics in mathematics, physics, engineering mechanics, materials strength and thermodynamics
2	**Skills**	Use the knowledge to explain processes and phenomena in mechanical and flow devices
3	**Social competencies**	Awareness of the need to constantly update and supplement knowledge and skills Able to share their skills with people in the group

Assumptions and objectives of the course:

1. Purchase by the students skills of resolving basic problems of mechanical strength in mechanical constructions
2. Getting to know with flow devices used in heating, ventilation and air conditioning.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Basic rules of calculation and selection of the most commonly used machine connections. - [-] - [-]
2. Types, principles and ways to adjust the fan in the ventilation and air conditioning - [-]

Skills:

1. Execution of construction drawings of single parts and assembly drawing of simple devices, - [-]
2. . Execution of installation drawings on rectangular projection construction layouts as well as in axonometric - [-]

Social competencies:

1. The student understands the importance of engineering and its impact on the environment - [-]
2. The student is able to think and act in an enterprising way - [-]
3. The student is able to prioritize appropriately in carrying out tasks - [-]

Assessment methods of study outcomes

Lectures: Written final test
Project:

Course description

Mechanical loads and stresses. Fatigue strength. Uncoupled connections - welded and rivet connections, and coupled connections ? screw connections. The function of fittings. Fans and blowers ? characteristics of devices, specific measures. Types of fans. Characteristics of centrifugal fans. Axial fans ? construction, velocity and pressure pattern, supply power. Control of axial fans.

Basic bibliography:

1. Janiak M.: Urządzenia mechaniczne w inżynierii środowiska. Cz.1. Wydawnictwo Politechniki Poznańskiej 1993.
2. Janiak M., Krzyżaniak G.: Urządzenia mechaniczne w inżynierii środowiska. Cz. 2. Wydawnictwo Politechniki Poznańskiej 1995.
3. Praca zbiorowa: Mały Poradnik Mechanika tom I i II. Warszawa 1998

Additional bibliography:

1. Stępniewski : Pompy. PWN Warszawa

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	10
2. Participation in project exercises	10
3. Participation in project exercises	3
4. Preparation (at home) for the project exercises	12
5. Participation in consultations related to the project exercises	14
6. Preparation for the final test	10
7. Final test	1

Student's workload

Source of workload	hours	ECTS
Total workload	60	4
Contact hours	20	1
Practical activities	40	3