# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | Code |
|---|---|
| **Basics of Machine Design** | **1010604131010640394** |

| Field of study | Profile of study (general academic, practical) | Year /Semester |
|---|---|---|
| **Aerospace Engineering** | **(brak)** | **2 / 3** |
| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
| **Aircraft Engines and Airframes** | **Polish** | **obligatory** |

| Cycle of study: | Form of study (full-time,part-time) |
|---|---|
| **First-cycle studies** | **part-time** |

| No. of hours | No. of credits |
|---|---|
| Lecture: **18** Classes: **9** Laboratory: **-** Project/seminars: **9** | **4** |

| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) |
|---|---|
| **(brak)** | **(brak)** |

| Education areas and fields of science and art | ECTS distribution (number and %) |
|---|---|
| **technical sciences** | **4 100%** |
| **Technical sciences** | **4 100%** |

**Responsible for subject / lecturer:**

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## Prerequisites in terms of knowledge, skills and social competencies:

| | | |
|---|---|---|
| 1 | **Knowledge** | knowledge of physics (statics, kinematics and dynamics), mathematics, after completing the program of study |
| 2 | **Skills** | problem-solving skills of the basics of machine design based on their knowledge, ability to obtain the information from identified sources |
| 3 | **Social competencies** | understanding of the need to broaden their competence, willingness to work together as a team |

## Assumptions and objectives of the course:

1. Provide students with knowledge of the basics of machine design
2. Develop students' skills:
- calculation and design of components and assemblies of machines,
- making and reading the technical documentation on the basis of the knowledge from the subject of Engineering Drawing
- practical use of the knowledge gained from the course: Mechanics,Strength of materials, Theory of machines, Materials.
3. Development of students' teamwork skills.

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

### Knowledge:

1. Has ordered, theoretically founded knowledge in the field of engineering graphics and machine construction: technical drawing, projection of objects, basic principles of engineering graphics, the use of graphic computer programs CAD (Computer Aided Design) in the construction of machines - [K1A_W07]

### Skills:

1. Is able to create a circuit diagram, select elements and perform basic calculations of the electrical and electronic system of sets of aircraft machines or devices - [K1A_U06]
2. Is able to organize and substantively manage the design and operation of a simple on-board device, machine or technical flying facility from the group covered by the selected specialty - [K1A_U15]
3. Is able to analyze objects and technical solutions, is able to search in catalogs and on manufacturers' websites ready components of machines and devices, including means and transport and storage devices, assess their suitability for use in their own technical and organizational projects - [K1A_U09]

### Social competencies:

| |
|---|
| 1. Understands the need to learn throughout life; can inspire and organize the learning process of other people - [K1A_K01] |
| 2. Is able to properly define the priorities for the implementation of a task set by himself or others - [K1A_K04] |

## Assessment methods of study outcomes

Forming assessment:

a) in a scope of the project: assessment of current progress of the project

b) in a scope of lectures: assessment of the answers for the questions concerning the knowledge which was presented during previous lectures

c) in a scope of classes: solving tasks by a blackboard

Summarizing assessment:

a) in a scope of project: assessment of the course of work on the project and the final result of the project

b) in a scope of lectures: written exam

c) in a scope of classes: written exam with tasks to solve.

## Course description

The basic principles of the design process, elements of the mechanism, the characteristics of workloads, defining loads and appropriate strenght conditions. Connections and their calculation: soldered, welded, glued, riveted joints, fasteners: T-slot nuts, bolt, screw connections. Screw mechanisms: examples and applications, structural calculations. Susceptible elements: springs, rubber components susceptible. Axes, shafts and their bearings. Clutches and brakes. Gearboxes in drive systems.

## Basic bibliography:

1. Praca zbiorowa pod red. Z. Osińskiego, Podstawy konstrukcji maszyn, PWN, W-wa, 1999
2. Praca zbiorowa pod red. M. Dietricha: Podstawy konstrukcji maszyn. Tom 3, WNT, Wa-wa, 1999
3. Osiński Zbigniew, Sprzęgła, PWN, Warszawa 1998
4. Dziama A., Michniewicz M., Niedźwiedzki A.: Przekładnie zębate. PWN, Wa-wa, 1989.
5. Ochęduszko K.: Koła zębate, WNT 1985.
6. Dudziak M.: Przekładnie cięgnowe. PWN, Warszawa, 1997.

## Additional bibliography:

1. Niemann G., Maschinenelemente t. I, II, III, Springer ? Verlag Berlin, 1965
2. Müller L., Przekładnie obiegowe, PWN, Warszawa, 1983
3. Bahl G., Beitz W., Nauka konstruowania, WNT, Warszawa 1984

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. Participation in lectures | 18 |
| 2. Consultations regarding lectures | 2 |
| 3. Preparation to pass the exam | 10 |
| 4. Participation in the exam | 2 |
| 5. Preparation to exercises | 10 |
| 6. Participation in exercise classes | 9 |
| 7. Consultations regarding exercise classes | 2 |
| 8. Preparation to pass exercises | 10 |
| 9. Participation in passing exercises | 2 |
| 10. Preparation to the project classes | 15 |
| 11. Participation in the project classes | 9 |
| 12. Consultations about project classes | 2 |
| 13. Preparing to pass the project | 15 |
| 14. Passing the project | 2 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 108 | 4 |
| Contact hours | 48 | 2 |
| Practical activities | 43 | 2 |