# Subject programme

1. Subject name / subject module: **Elective Subject: Technical mechanics**
2. Lecture language: **English**
3. The location of the subject in study plans:
   - Area or areas of the studies: **Computer Control Systems Engineering**
   - Degree of the studies: **2nd degree studies**
   - Field or fields (implementation of effects standard): **Mechatronics**
4. Supervision of subject implementation:
   - The Institute / Another unit: **The Institute of Informatics and Mechatronics**
   - The person responsible for the subject: **Szczutkowski Marek, dr inż.**
   - People cooperating in the development of the programme of the subject:
5. The number of hours and forms of teaching for individual study system and the evaluation method

| Teaching activities with the tutor | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes / Mode of study | | SOW | ECTS | Laboratory work | SOW | ECTS | ... | SOW | ECTS | ... | SOW | ECTS | ... | SOW | ECTS | ... | SOW | ECTS | ... | SOW | ECTS | ECTS |
| Full-time studies | | | | 24 | 26 | 2 | | | | | | | | | | | | | | | | **2** |
| Part-time studies | | | | | | | | | | | | | | | | | | | | | | |
| Credit rigor | ... | | | Graded assigment | | | | | | | | | | | | | | | | | | |

6. Student workload – ECTS credits balance

   *1 ECTS credit corresponds to 25-30 hours of student work needed to achieve the expected learning outcomes including the student's own work*

| **Activity**<br>(please specify relevant work for the subject) | **Hourly student workload (full-time studies/part-time studies)** |
|---|---|
| Participation in laboratory classes | **24** |
| Preparing reports | **10** |
| Preparing homeworks | **14** |
| Participation in an exam / graded assignment / final grading | **2** |
| **Total student workload** | **50** |
| **ECTS credits** | **2** |
| * Student's workload related to practical forms | **50** |
| Student's workload in classes requiring direct participation of academic teachers | **24** |

7. Implementation notes: recommended duration (semesters), recommended admission requirements, relations between the forms of classes:

   Necessary mathematics skills in order to develop knowledge in machine design.

   Recommended duration of the subject is taken from the course plan.

8. Specific learning outcomes – knowledge, skills and social competence

| Specific learning outcomes for the subject | | Form | Teaching method | Methods for testing of (checking, assessing) learning outcomes |
|---|---|---|---|---|
| Outcome symbol | Outcome description | | | |
| **Knowledge** | | | | |
| **K_W01** | **K_W01_Student is able to define the basic concepts and phenomena of engineering mechanics.** | **Laboratory work** | **Inquiry methods** | **Student learning activities** |
| **K_W03** | **K_W03_Student has an ordered, theoretically founded general knowledge that allows him to solve selected problems in the area of engineering mechanics.** | | | |
| **K_W04** | **Student can provide simple examples of the application of engineering mechanics in the field of mechatronics.** | | | |
| **Skills** | | | | |
| **K_U01** | **Student is able to gather, intergrate, interpret, analyze and present information in the area of engineering mechanics.** | **Laboratory work** | **Inquiry methods** | **Student learning activities** |

| Social competence | | | | |
|---|---|---|---|---|
| K_K02 | Student is ready to recognize knowledge in order to solve various problems in the area of engineering mechanics as well as is able to interact and work in a group trying to find the best solution. | Laboratory work | Inquiry methods | Student learning activities |

**9.** Assessment rules / criteria for each form of education and individual grades

| | | | |
|---|---|---|---|
| **0% - 50%** | ndst | **81% - 90%** | db |
| **51% - 70%** | dst | **91% - 93%** | db+ |
| **71% - 80%** | dst+ | **94% - 100%** | bdb |

| Activity | Grades | Calculation | To Final |
|---|---|---|---|
| **Reports** | **bdb(5)** | **5*50%** | **2,5** |
| **Activity during classes** | **Example: db, dst, bdb(4,3,5)** | **Avg. (4+3+5)/3=4->4*20%** | **0,8** |
| **Homeworks** | **Example: ndst, bd, dst (2, 4, 3)** | **Avg. (2+4+3)/3=3->3*20%** | **0,6** |
| **Attendance** | **On 75% of all classes** | **6/8=0,75*5->3,75*10%** | **0,375** |

**10.** The learning contents with the form of the class activities on which they are carried out

**(Laboratory work)**

**1. Basics: Object, role and structure of mechanics; Fundamental concepts and body models; Basic physical laws; Basic static concepts; Asjoys and the principle of the statics;**

**2. Force reduction: Reduction of the center force system; reduction of the flat force system; Fusges of any force reduction; Balance conditions; arrangement of two parallel forces;**

**3. Friction: Slip discs; shrink disc; rolling disc (resistance);**

**4. Mechanical geometry of flat figures and masses: Center of gravity and center of mass; Moments of inertia; Parallel degree II Transformation;**

**5. Internal forces in mechanical systems: External power of the internal forces; Internal component forces; Sign convention and relationship between internal forces;**

**11.** Required teaching aids

Laboratory classes - specialist laboratory

**12.** Literature:

**a.** Basic literature:

Marghitu D.B., Mechanical Engineer's Handbook, Academic Press, 2001

**a.** Supplementary literature:

Bird J. ,Ross C., Mechanical Engineering Principle, Newnes, 2002

Meriam J.L. , Kraige L.G. , Engineering Mechanics, Volume 1, Statics, John Wiley & Sons, 2006

**b.** Internet sources:

https://soaneemrana.org/onewebmedia/MECHANICAL%20ENGINEERS%20HANDBOOK%20BY%20BAN%20B.%20MANRGHITU.pdf, 12.2020

http://index-of.co.uk/Mathematics/Mechanical%20Engineering%20Principles.pdf, 12.2020

http://aghababaie.usc.ac.ir/files/1506464236211.pdf, 12.2020

https://www.hzg.de/imperia/md/content/hzg/institut_fuer_werkstoffforschung/wms/eng_mech_2006.pdf, 12.2020

**13.** Available educational materials divided into forms of class activities (Author's compilation of didactic materials, e-learning materials, etc.)

**14.** Teachers implementing particular forms of education

| Form of education | Name and surname |
|---|---|
| 1. Laboratory classes | Szczutkowski Marek, dr inż. |