# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | | Code |
|---|---|---|
| **Computer engineering analysis** | | |
| Field of study | Profile of study (general academic, practical) | Year /Semester |
| **Mathematics in Technology** | **general academic** | **3 / 6** |
| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
| **Modelling in technology** | **Polish** | **obligatory** |

| **Cycle of study:** | **Form of study (full-time,part-time)** |
|---|---|
| **First-cycle studies**<br>**(Polish Qualifications Framework level six)** | **full-time** |

| No. of hours | | | | | No. of credits |
|---|---|---|---|---|---|
| Lecture: **30** | Classes: | Laboratory: **30** | Project/seminars: | | **5** |

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

| **Education areas and fields of science and art** | **ECTS distribution (number and %)** |
|---|---|
| **Technical sciences** | **5 100%** |
| **Technical sciences** | **5 100%** |

## Responsible for subject / lecturer:

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

| | | |
|---|---|---|
| **1** | **Knowledge** | Elementary mathematics, mechanics and physics [PQF 4], [K_W01 (P6S_WG)] |
| **2** | **Skills** | Logical thinking, using information found in the library and on the Internet [K_U15 (P6S_UU)] |
| **3** | **Social competences** | Consciousness of need of broadening his competences and of gaining new knowledge [K_K01 (P6S_KK)] |

## Assumptions and objectives of the course:

be acquainted with capabilities of SolidWorks CAE system and receive practical training in how to use this system

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

### Knowledge:

1. knows principles of CAx systems, drawing up technical documentation and modelling in 3D [K_W01, K_W02, K_W6, K_W09, K_W10, K_W11] (P6S_WG)

### Skills:

1. is able to model structure correctly in 3D systems [K_U02, K_U11] (P6S_UW)
2. is able to apply advanced SolidWorks functions to solve engineering problems [K_U03, K_U04, KU_05, K_U11] (P6S_UW)
3. follows health and safety rules when using a computer [KU_09] (P6S_UW)
4. can work individually and collectively; can estimate time spend on a project implementation [KU_14] (P6S_UO)

### Social competencies:

1. is aware of lifelong learning and improving his skills [K_K01, K_K02] (P6S_KK)
2. is aware of a social aspects of practical knowledge and its responsibility [K_K03] (P6S_KO), [K_K05] (P6S_KR)

## Assessment methods of study outcomes

Lecture:

Evaluation of the knowledge and the skills in the form of written exam

Laboratory:

Evaluation of the knowledge and the skills in the form of tests, reports and the project

## Course description

Lecture:

A review of the CAx software and its functions. Basic analyses in the CAx systems. Verification problems of virtual models. Commercial CAE softwares. CAE tools in SolidWorks. The simulation analysis types: Finite Element Analysis, Multibody Dynamics, Computational Fluid Dynamics. Discretization types of CAD models. The results interpretation: stress, strain, displacement, safety factor. Methods of results presentation. The creation of 2D drawing.

Laboratory:

1) An introduction to CAD systems and its description. A clarification of the notions: system based on operations, integrated, parametric. The system modules. The system interface: the screen layout, entering commands, work with models: display, rotate, move, magnifying glass etc. The idea and the way of creating models. The modifications of geometric model – advantages of the parametric model.

2) A creation of parametric sketches: sketching rules, sketch plane, references, sketching, modifying geometry, adding dimensions, relations, regeneration.

3) A creation of operations based on the sketch – adding or removing material: extruded, revolved, swept, lofted boss/base.

4) A creation of operations not requiring the sketch: holes, fillets and chamfers etc.

5) A creation of reference geometry: planes, axes, coordinate systems and points.

6) A modification of the model geometry: dimension change, remove of the operation, change of operation order.

7) Adding of dimension relations, using global parameters of the model

8) Types of pattern – creation and modification. Copy of operation.

9) A creation of 3D parametric parts, exercises.

10) A creation of 2D drawing of parts or assemblies from 3D models. Views and sections.

11) Inserting, removing and positioning components in an assembly

12) A motion study – animation.

13) An introduction to strength analysis

APPLIED METHODS OF EDUCATION:

Lecture – lecture with audiovisual aids supplemented with interactive, problem-based discussion.

Laboratory: - laboratory supplemented with audiovisual aids, using software available for students at home.

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## Basic bibliography:

1. Kęska P.: *Solidworks 2018: nowości w programie, porady praktyczne oraz ćwiczenia*. CADvantage, Warszawa, 2018
2. Domański J.: *SolidWorks 2017: projektowanie maszyn i konstrukcji: praktyczne przykłady*. Wydawnictwo Helion. Gliwice, 2017.
3. Lombard M.: *SolidWorks 2010 bible*. Wiley Publishing Inc., Indianapolis, 2010

## Additional bibliography:

1. https://my.solidworks.com/

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. participation in lectures | 30 |
| 2. participation in laboratory classes | 30 |
| 3. participation in consultations | 7 |
| 4. preparation for laboratory classes | 10 |
| 5. drawing up the reports | 10 |
| 6. preparation for passing the laboratory classes | 20 |
| 7. preparation for passing the final exam | 15 |
| 8. participation in the final exam | 3 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 125 | 5 |
| Contact hours | 70 | 3 |
| Practical activities | 60 | 2 |