



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Engineering Drawing (CAD) [S1Lot2-SLiPL>RTCAD]

### Course

Field of study

Aviation

Year/Semester

2/3

Area of study (specialization)

Aircraft Engines and Airframes

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

0

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr inż. Maciej Berdychowski

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### Lecturers

### Prerequisites

Basic knowledge of elementary geometry and stereometry. Basic knowledge of mechanical engineering and machine parts

### Course objective

Mastering the basic rules of constructing images of spatial formations on a plane. Developing spatial imagination. Learning the methods and principles of recording constructions. Acquiring practical skills in creating drawing documentation and the ability to "read" drawings.

### Course-related learning outcomes

Knowledge:

1. has an ordered, theoretically founded knowledge in the field of engineering graphics and machine construction: technical drawing, object projection, basic principles of engineering graphics, the use of CAD (Computer Aided Design) graphic programs in the construction of machines
2. the student has knowledge of aviation safety and management. The student knows the concept of the human factor and methods of assessing human reliability, has detailed knowledge related to selected issues in

the field of human capabilities and limitations during aircraft operation in flight, its impact on health and the

3. has the ability to self-study with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books

Skills:

1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate
2. is able to properly use information and communication techniques, applicable at various stages of the implementation of aviation projects
3. can see legal aspects in the process of formulating and solving tasks in air transport, in particular, use the aspects of European and national aviation law regulations
4. can assess - at least in a basic scope - various aspects of the risk associated with a logistics undertaking in air transport
5. is able to organize, cooperate and work in a group, assuming various roles in it, and is able to properly define priorities for the implementation of a task set by himself or others
6. is able to plan and implement the process of own permanent learning and knows the possibilities of further education (2nd and 3rd degree studies, postgraduate studies, courses and exams conducted by universities, companies and professional organizations)

Social competences:

1. is able to think and act in an entrepreneurial way, incl. finding commercial applications for the created system, bearing in mind not only the business benefits, but also the social benefits of the activity
2. is aware of the social role of a technical university graduate, in particular understands the need to formulate and provide the society, in an appropriate form, with information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the engineer profession
3. correctly identifies and resolves dilemmas related to the profession of an aerospace engineer

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam on the lecture, assessment of laboratories based on completed tasks/exercises.

### Programme content

Basics of preparing technical documentation - technical drawing.

Types of technical drawings, diagrams, their symbols, dimensions, tolerances and projections; Information identifying drawing plates;

Specification 100 of the American Air Transport Association (ATA);

Aviation and other applicable standards

### Course topics

1. Introductory information, standardization in the notation of structures.
2. Methods of mapping three-dimensional objects on the drawing plane.
3. Representation of the internal structure of an object using cross-sections, types of cross-sections.
4. Representation of the cross-section of an object using excerpts.
5. Application of geometric structures to drawing utility objects.
6. Interpenetration lines of intersecting typical solids.
7. Notation of dimensions.
8. Tolerances on manufacturing drawings and fits on assembly drawings.
9. Geometric structure of the GSP surface.
10. Manufacturing drawings of parts of the shaft and sleeve class. Splines.
11. Manufacturing drawings of parts of the wheel class; gear wheels.

12. Assembly drawings of threaded and splined connections.
13. Simplifications in drawing rolling bearings.
14. Principles of drawing welds and welded joints.
15. Designing a bearing node.
16. Analysis ("reading") of assembly drawings.

PART - 66 (PRACTICE - 11.25 hours)

#### MODULE 7A. TECHNICAL SERVICE ACTIVITIES

##### 7.5 Machine drawings, charts and standards

Types of technical drawings, charts, their symbols, dimensions, tolerances and projections;

Identification information for drawing plates;

Microfilms, microcards and computer presentations;

Specification 100 of the American Air Transport Association (ATA);

Air and other applicable standards including ISO, AN, MS, NAS and MIL;

Electrical installation charts and schematic diagrams. [2]

##### 7.6 Fit and tolerances

Drill sizes for bolt holes, fit classes;

Commonly used fit and clear system;

Fit and clear schedule for aircraft and engines;

Bend, twist and abrasion limits;

Standard methods for checking shafts, bearings and other parts. [2]

### Teaching methods

1. Lecture: multimedia presentation, supplemented with examples given on the board
2. Laboratories: Illustrated didactic boards or multimedia presentations, supplemented with examples on the board; performing tasks given by the instructor practical exercises

### Bibliography

Basic:

1. Dobrzański T., Rysunek techniczny maszynowy, WNT, W-wa 1997.
  2. Lewandowski T., Rysunek techniczny dla mechaników, WSiP, W-wa 2009.
  3. Bajkowski J., Podstawy zapisu konstrukcji, Oficyna Wyd. Polit. Warszawskiej, 2014
  4. Bober A, Dudziak M., Zapis konstrukcji, PWN, W-wa 1999.
  4. Jankowski W. Geometria Wykreślna. Wydawnictwo P.P. 1999 r.
  6. Korczak J., Prętki Cz. Przekroje i rozwinięcia powierzchni walcowych i stożkowych. Wydawnictwo P.P. 1999 r.
  7. Loska J., Zbiór zadań ćwiczeniowych z rysunku technicznego, Wyd. Politechniki Śląskiej, Gliwice 1982
- Complementary
1. Freuch T.E., Vierck C.I., Fundamentals of engineering drawing, McGraw-Hill Book Co., New York 1960.
  2. Freuch T.E., Vierck C.I., Engineering drawing and graphic technology, McGraw-Hill Book Co., New York 1972.

Additional:

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### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,50