COURSE DESCRIPTION CARD - SYLLABUS

Course name
Geometry and engineering graphics [N1Energ2>GiGI]

Course

Field of study
Power Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes
0

Other (e.g. online)
0

Tutorials
10

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr hab. inż. Michał Śledziński
michal.sledzinski@put.poznan.pl

Lecturers

Prerequisites

Basics of engineering. Elementary knowledge of structure and operation of machines and devices. Geometry. Principles of projection. Spatial imagination. Sketching skills. Unaided solving of problems.

Course objective

Transfer of theoretical and practical knowledge of descriptive geometry and engineering graphics. Learning of principles of graphical engineering record in the system of orthogonal projections. Development of spatial imagination and reading of engineering drawing. Improvement of unaided preparation of engineering drawings of machines and machine elements.

Course-related learning outcomes

Knowledge:
1. Knowledge of graphical engineering record, axonometric projections and geometrical constructions.
2. Selection of methods of solids penetrations, sections and polyhedron developments.
3. Recognition and selection of methods of presentation of machine elements in orthogonal projections.
4. Identification of simplified representation of standard elements.
5. Knowledge of principles of dimensioning, tolerance and fit.

6. Has knowlede about necessity of using normed symbols in graphic engineering.
7. Has knowledge of the technique of writing and completing technical and design documentation.
Knows the basic principles of organizing and conducting research in the field of energy problems and presenting the results of their work.

Skills:
1. Draw of connections and machine elements such as: shaft, sleeve, lever, gears etc.
2. Making use of standards and standard elements selection.
3. Dimensioning of machine elements with taking into account the manufacturing technology, and taking into consideration toleracne and fit of machine elements.
4. Notation of form and position tolerances and roughness of surface.
5. Preparation of assembly and production drawings.
6. Is able to develop documentation regarding the implementation of an engineering task using appropriate methods and tools, including advanced information and communication techniques (ICT); is able to prepare a text discussing the results of this task.

Social competences:
1. Perception of the influence of knowledge and occupational improvement on the level of life and society.
2. Pro-ecological thinking.
3. Understands the need and knows the possibilities of continuous training, raising professional, personal and social competences (e.g. through second and third cycle studies, postgraduate studies, courses); and is ready to critically assess knowledge, recognizes its importance in solving cognitive and practical problems.
4. Is aware of the social role of a technical university graduate, and in particular understands the need to formulate and convey to the public (including through mass media), information and opinions on the achievements of the energy sector and other aspects of the activity of an engineer-energy industry; makes efforts to provide such information and opinions in a manner that is universally understandable.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: Assessment of knowledge and practical skills during written exam. Additional points for knowledge, activity, interest and creativity.
Tutorials: verfication of drawings during classes. Assessment of knowledge and practical skills of drawing of machine elements, spatial imagination and methodology of work. Assessment of project, assembly and production drawings of a part of gear transmission. Additional points for activity, creativity, unaided work and methodology of work. Assessment of drawings, homeworks.

Programme content

1) Graphical representation of constructions
2) Technical diagrams and mechanical schematics
3) Orthographic and axonometric projections
4) Geometric constructions, intersections, and of polyhedral nets
5) Views and sections
6) Drawing simplifications and standardised elements
7) Dimensioning, tolerances, and fits
8) Surface finish indications
9) Technical documentation

Course topics

Lecture programme covers the following topics:
1. Standardised elements of machine technical drawings and their applications
2. Types of graphs, principles of their development, drawing lines and scales
3. Layout of orthographic projections, principles of selecting the principal view
4. Types of axonometric projections, coordinate axis layout, representation of machine components
5. Constructions of selected curves found in machine components: ellipse, sine wave, screw thread, involute

6. Solids in Monge's projections. Intersection and developments of polyhedral elements
7. Types of sections, their marking and hatching, principles of creating sections of symmetrical, partial, and auxiliary objects
8. Principles of creating removed and revolved sections, their types and applications
9. Simplified drawings illustrating connections and machine parts and assemblies
10. Standardised elements and principles of their selection
11. General and ordinal principles of dimensioning. Dimension bases. Dimensioning of machine elements. Examples of dimensioning various shapes. Dimensioning of machine parts
12. Principles of dimension tolerance, shape and position deviations, fittings, and methods of their marking on drawings
13. Marking and symbols of the surface roughness
14. Principles of technical documentation development and creation of assembly and detailed drawings
Exercise programme covers the following topics:
1. Drawing solids and machine elements in orthographic and axonometric projections
2. Constructing geometric shapes
3. Drawing objects in sections on assembly and detailed drawings, including dimensioning, shape and position tolerance annotation, and surface roughness symbols
4. Drawing simplified connections and machine assemblies
5. Utilising standards and catalogues and selecting standardised elements

Teaching methods

Lecture: multimedia presentation and examples solved by the teacher. Tasks for individual or group solution.
Tutorials: multimedia presentation and examples solved by the teacher or by students on the board. Tasks to be solved during classes or at home.

Bibliography

Basic:
1. Dobrzański T.: Rysunek techniczny maszynowy. WNT Warszawa 2009.
2. Lewandowski T.: Rysunek techniczny dla mechaników. WSiP Warszawa 2010.
3. Bober A., Dudziak M.: Zapis konstrukcji. PWN Warszawa 1999.
4. Jankowski W.: Geometria Wykreślna. Wydawnictwo Politechniki Poznańskiej 1999.
5. Bajkowski J.: Podstawy zapisu konstrukcji. Wydawnictwo Politechniki Warszawskiej 2014.
6. Figurski J., Popis S.: Rysunek techniczny zawodowy w branży mechanicznej i samochodowej: podręcznik do nauki zawodu technik mechanik, technik pojazdów samochodowych. WSiP Warszawa 2016

Additional:
1. Korczak J., Prętki Cz. Przekroje i rozwinięcia powierzchni walcowych i stożkowych. Wydawnictwo P.P. 1999.
2. Kochanowski M. :Zapis konstrukcji z geometrią wykreślną. Wydawnictwo Politechniki Gdańskiej Gdańsk 2002
3. Rysunek techniczny i rysunek maszynowy. Zbiór Polskich Norm
4. French T.E., Vierck C.I.: Engineering drawing and graphic technology. McGraw-Hill Book Co. New York 1972.

Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00