COURSE DESCRIPTION CARD - SYLLABUS

Course name
Engineering graphics and CAD [S1Bud1>GICAD2]

Course

Field of study
Civil Engineering

Year/Semester
1/2

Area of study (specialization)
–

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
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Tomasz Gajewski
tomasz.gajewski@put.poznan.pl

Lecturers

Prerequisites

KNOWLEDGE: Basic knowledge of geometry and descriptive geometry. SKILLS: The ability to obtain information from the indicated sources. SOCIAL COMPETENCES: Awareness of the need to acquire and expand knowledge. Willingness to cooperate in a team.

Course objective

To familiarize students with the elements of computer graphics in a two-dimensional approach. To acquaint students with the basics of creating construction and building documentation based on three-dimensional geometry supplemented with information about the represented object.

Course-related learning outcomes

Knowledge:
They know the rules of technical drawing for creating and reading architectural and construction drawings.

Skills:
They can read architectural and construction drawings and prepare graphic documentation with the use

of applicable markings and dimensions.
Uses information technologies, Internet resources and other sources to obtain information; is able to integrate and interpret the obtained information.

Social competences:
They are able to define priorities in the implementation of tasks set by himself and others.
They are responsible for the reliability of the obtained results and for their interpretation.
They are aware of the need to improve professional and personal competences.
They are ready to critically evaluate his knowledge and received content, as well as to critically evaluate the results of his own work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The course assessment is based on the outcomes of independent work in a computer environment.

The student is required to prepare several simple drawings as well as a drawing/drawings of a single-family house using Computer Aided Design (CAD) software.
The drawings will be evaluated according to:
- completeness,
- correctness in applying standard technical drawing principles,
- appropriate selection and use of CAD tools (including layers, blocks, etc.),
- readability, consistency, and aesthetic quality.

The total number of points for drawings is 8 (3 points for drawings completed during classes and 5 points for drawings of the single-family house).
To receive a passing grade, the student must submit all drawings by the deadline specified by the instructor.

The verification of acquired digital construction drawing skills is conducted through a colloquium. The maximum number of points for the colloquium is 5.

The student is also required to create a 3D model of a single-family house and generate construction drawings based on the model, which will be subject to evaluation. The total number of points for drawings generated from the 3D model is 2.

The maximum total number of points is 15, including: 8 points for drawings,
5 points for the test and 2 points for drawings generated from the 3D model.

The final grade is determined based on the total number of points obtained from the assessed drawings and the test, according to the following percentage thresholds:
<100-90%> – 5.0
(90-80%> – 4.5
(80-70%> – 4.0
(70-60%> – 3.5
(60-50%> – 3.0

Programme content

LABORATORY:
Students work in a computer laboratory using CAD software (eg AutoCad, Revit). The following issues are discussed and practiced:
1. 2D
1.1. Create basic objects: line, polyline, point, circle, ring, arc, area, ellipse, rectangle, polygon.
1.2. Object Editing: Modify toolbar - erase, copy, mirror, offset, array, move, rotate, scale, trim, extend.
1.3. Dimensioning: dimension tools - linear, normal, coordinates, radius, diameter, angular, reference line, center mark, base, serial.
1.4. Layers: hide, lock in viewports, lock, color, linetype, lineweight.
1.5. Object snap modes: end, symmetry, center, point, quadrant, intersection, extension, perpendicular, tangent, near, apparent, parallel.
1.6. Text input.

1.7. Hatch: selection of hatch area and pattern, hatch preview, scale.
2. 3D
2.1. Project organization: buildings, levels, ...
2.2. Working planes,
2.3. Creating and editing basic objects: walls, windows ...
2.4. Generating project documentation.

Course topics

1. 2D construction documentation in a CAD Environment
Review of the principles for creating basic geometric objects (e.g. polyline, circle/arc, ellipse, rectangle, polygon).
Advanced editing of existing objects (e.g. mirror, offset, rectangular array, polar array and path array, rotate, scale, trim/extend).
Advanced dimensioning of construction drawings (e.g. linear/aligned dimensions, diameter/radius, angular dimensions, leader lines, baseline/continued dimensions).
Creating and editing layers (e.g. hiding, locking, freezing, lineweights and linetypes).
Object snap modes (e.g. endpoint, midpoint, center, point, quadrant, intersection, extension, perpendicular, tangent).
Entering and editing text (e.g. setting text styles: font size and type).
Hatching (e.g. different methods of creating hatches, selecting scale, direction and hatch pattern, preview).
Preparing documentation for printing (e.g. adjusting sheet size).

2. 3D building modeling in a BIM Environment
Project organization (e.g. levels/floors, sections).
Work planes (e.g. defining and managing them).
Creating and editing basic building elements (e.g. structural/partition walls, windows/doors, foundation walls/footings, creating slabs and roofs).
Generating project documentation (e.g. 2D drawings based on a 3D model).

During the course, students will work in a computer laboratory where they will practice the above topics using CAD software. Participants will have the opportunity to practically apply their skills in creating and editing 2D and 3D projects, as well as generating professional technical documentation.

Teaching methods

Exercise method
Demonstration method
Design method

Bibliography

Basic
1. PN-ISO 6707-1:2008 Budownictwo. Terminologia. Terminy ogólne
2. PN-EN ISO 5457:2002 Dokumentacja techniczna wyrobu. Wymiary i układ arkuszy rysunkowych
3. PN-EN ISO 128-23;2002 Rysunek techniczny. Ogólne zasady przedstawiania. Część 23: Linie na rysunkach budowlanych
4. PN-EN ISO 3098-0:2002 Dokumentacja techniczna wyrobu. Pismo. Część 0: Zasady ogólne
5. PN-B01030:2000 Rysunek budowlany. Oznaczenia graficzne materiałów budowlanych
6. PN-B-01025:2004 Rysunek budowlany. Oznaczenia graficzne na rysunkach architektonicznobudowlanych
7. PN-ISO 7518:1998 Rysunek techniczny. Rysunki budowlane. Uproszczone przedstawianie rozbiórki i przebudowy
8. PN-B-01029:2000 Rysunek budowlany. Zasady wymiarowania na rysunkach architektonicznobudowlanych
9. PN-ISO 129:1996 Rysunek techniczny. Wymiarowanie. Zasady ogólne. Definicje. Metody wykonania i oznaczenia specjalne.
10. Rysunek techniczny budowlany - E. Miśniakiewicz, W. Skowroński, Warszawa, Arkady 200711.
Rysunek techniczny w budownictwie - J. Bieniasz, B.Januszewski, M.Piekarski, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 2009

Additional
1. PN-EN ISO 5455:1998 Rysunek techniczny. Podziałki
2. PN-ISO 128-30:2006 Rysunek techniczny. Zasady ogólne przedstawiania. Część 30: Wymagania podstawowe dotyczące rzutów
3. PN-EN ISO 5456-1,2,3:2002 Rysunek techniczny. Metody rzutowania

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
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)	25	1,00