Detailed course description
(SUBJECT CARD)

Course title: **Engineering graphics**
Course code:
Affiliation to a course group:
Course type: field-specific
obligatory
Field of study: Industrial and Engineering Chemistry
Level of study: first-cycle programme
Study profile: general academic
Mode of study: full-time programme
Specialty (specialisation): n.a.
Year of study: 1st
Semester: 1st
Teaching modes and teaching hours:
lectures – 15h;
laboratory – 30h;
Language/s of instruction: **English**
Number of ECTS credits *(according to the study programme)***: 5**
** – leave the appropriate option*

1. Course objectives:

   Main objective of the course is to provide practical fundamentals of reading and creation of technical documentation describing chemical apparatus as well as environmental protection apparatus, compliant with relevant standards. The scope includes creation of assembly drawings, workshop drawings and technological diagrams.

2. Relating the field-specific learning outcomes to teaching modes, verification methods and assessment of student's learning outcomes:

symbol	**assumed learning outcomes** *a student who completed the course:*	**teaching modes**	**verification methods and learning outcome assessment**
Knowledge: a student knows and understands			
K1A-W14	Student knows the basic methods, techniques, tools and materials used to solve simple engineering tasks related to technology and chemical engineering.	Lecture and laboratory	Project book, observation
Skills: a student can			
K1A-U01	Student acquires information from literature, databases and other sources related to chemical sciences, integrates them, interprets and draws conclusions and formulates opinions.	Lecture and laboratory	Project book, observation
Social competences: a student is able to			
K1A_K07	Student is aware of the importance of behavior in a professional manner and compliance with the rules of professional ethics.	Laboratory	Observation

3. Study programme contents ensuring the learning outcomes *(according to the study programme)*:

   Student has a basic knowledge within the descriptive geometry

   Student can solely develop a complete technical drawing compliant with relevant standards

   Student is well prepared to self-reliant work, demonstrates commitment and follows the ethic rules

4. Description of methods to determine the ECTS credits:

Type of activity	Number of hours / ECTS credits
Number of course hours regardless of a teaching mode	45/2
Preparation to the classes	45/1
Elaboration of individual drawings	60/2
Other**	
Total hours:	**150**
Number of ECTS credits allocated for a course	**5**

Description:

* – student workload, types of activities need to be provided, e.g. preparation for the course, interpretation of results, preparation of a course report, preparation for the examination, getting familiar with the literature, preparation of a project, presentation, written work, report, etc.
** – other e.g. additional course hours

5. Summary indicators:
   - number of course hours and ECTS credits at the course with a direct participation of academic teachers or other persons teaching the course and students: 45h, 2ECTS
   - number of course hours and ECTS credits at the course related to the scientific activity conducted at the Silesian University of Technology in a discipline or in disciplines to which a field of study is assigned- in the case of studies with a general academic profile: 45h, 5 ECTS
   - number of course hours and ECTS credits at the course shaping practical skills- in the case of practical studies:
   - number of course hours conducted by academic teachers employed by the Silesian University of Technology as their primary workplace: 45h
6. Persons conducting particular types of courses (name, surname, academic degree or degree in arts, title of professor, business e-mail address):

   Lecture and laboratory:

   Robert Kubica, dr hab. inż., robert.kubica@polsl.pl
7. Detailed description of teaching modes:

   1) lectures:
      - detailed programme contents:

        The basics of 2D drawing are introduced namely technical writing, dimensioning, axonometrics, dimetrics, orthographic projection, sectioning, revolved sections, geometry of chemical apparatus shells, technological diagrams. The scope includes drawing standards, geometrical procedures, drawing of flat elements and representation of spatial geometries. Students practice on separate working stands to deliver their jobs, which are introduced and described before each practical classes. The set of exemplary jobs include assembly and workshop drawings of selected chemical and processing apparatus as well as auxiliary equipment, schematic diagrams.
      - teaching methods, including distant learning:

        Lectures provided in the form of multimedia presentation
      - form and criteria for successful semester completion, including retakes, as well as the conditions for admission to the examination:

        Final grade is derived based on the separate grades of individual drawings. Each individual topics rated under the presence of student. The work is assessed for compliance with relevant standards and requirements as well as the drawing quality. Theoretical background of the student can be also checked and rated if applicable.

        Insufficient grade resulting from both not submitting the final work or not passing the assessment of the drawing compliance can be improved only by preparing a new task with changed input data.
      - course organisation and rules of participation in the course, with an indication whether a student ‘s attendance is obligatory

        Lecture 1h per week, laboratory 2h per week. Introduction to laboratories provided during the lecture. Optional consultation possible in a set hours aside of the course. Obligatory attendance to laboratories.

   2) description of other teaching methods:

      Laboratory:

      The scope includes drawing standards, geometrical procedures, drawing of flat elements and representation of spatial geometries. Students practice on separate working stands to deliver their jobs, which are introduced and described before each practical classes. The set of exemplary jobs include assembly and workshop drawings of selected chemical and processing apparatus as well as auxiliary equipment, schematic diagrams. The classes include elaboration of 5 individual topics, drawings, based on individual sets of input data.
8. Description of the method to determine the final grade (rules and criteria for evaluation, as well as a calculation method for the evaluation in the case of a course which includes more than one teaching mode, including all teaching modes and all examination and credit dates including retake examinations):

   Final grade is a weighted average of 5 partial marks for separate drawings, where weights used for drawing from1 to 5 are respectively, 15%, 25%, 25%, 25%, 10%.
9. Method and procedure for filling up arrears resulting from:

   - student's absence from the course,

     Absences according to the course rules, sole replenishing of lost classes with the possible consultation within the timeframe set by tutor.
   - differences in study programmes for persons changing a field of study, changing university or resuming studies at the Silesian University of Technology,

Sole replenishing of lost classes with the possible consultation within the timeframe set by tutor.

10. Prerequisites and additional requirements, taking into account the course sequence:

    No

11. Recommended sources and teaching aids:

    Colin H Simmons, Dennis E Maguire, Manual of Engineering Drawing, Elsevier Newnes Linacre House, Jordan Hill, Oxford, Second edition 2004

    Auxiliary materials in English prepared by tutor in electronic form.

12. Description of teacher's competences (e.g. publications, professional experience, certificates, trainings etc. related to the programme contents implemented as part of the course):

    Dr hab. inż. Robert Kubica

    Publications:

    1. M.Gądek, R.Kubica, A.Jędrysik, "Production of Methanol and DME from biomass derived syngas – a comparison of different synthesis pathways by means of flowsheet simulation"; Proceedings of the 23rd European Symposium on Computer Aided Process Engineering – ESCAPE 23 June 9-12, 2013; Elsevier B.V.; June 9-12, 2013, Lappeenranta, Finland, 978-0-444-63234-0978-0-444-63241-8, 55-61,

    Selected projects and implementation works:

    1. Określenie możliwości technicznych odzysku ciepła w układzie odprowadzenia gazów spalinowych z komór polimeryzacyjnych linii 02 – O8, etap 1 i 2, U-675/RCh-3/2014, na zlecenie PAROC Polska,
    2. Ocena gospodarki odpadami stałymi, na zlecenie PAROC Polska, 2015
    3. Opracowanie koncepcji modernizacji oraz projektu technicznego układu odciągów miejscowych z linii O2 i O3, na zlecenie PAROC Polska, 2015,
    4. Opracowanie kalkulatora emisji zanieczyszczeń z instalacji spalania małej mocy U-605/RCh-3/2015, na zlecenie Instytutu Ekonomii Środowiska, 2015
    5. Elektrofiltry kominowe dla instalacji spalania opalanych paliwami stałymi. NB-203/RCh3/2016 na zlecenie Grupa CZH S.A. 2016-2018,
    6. Optymalizacja konstrukcji typoszeregu pięciu wkładów kominkowych z zamkniętą komorą spalania o innowacyjnej konstrukcji dla uzyskania maksymalnych parametrów energetyczno-emisyjnych, na zlecenie NORDFLAMM Sp. z o.o. S.K., 2017,
    7. Wdrożenie innowacyjnej technologii produkcji octanu n- butylu w oparciu o destylację reaktywną, SOLVENT WISTOL S.A. 2014,
    8. Opracowanie techniki i instalacji ograniczenia zadymienia i emisji żywic z polimeryzacji
    9. i produkcji otuliny wełny mineralnej, Paroc Polska Sp.z o.o.2016,
    10. Kolumna wysokosprawna ze stabilizacją piany do destylacji mieszanin cieczy pianotwórczych, SOLVENT WISTOL S.A., 2017,

    Relevant experience:

    1. 1997 – 2003: instruktor programów CAD, CAE w:
        a. NorPar A.S., NorPar Online, Oslo, Norwegia,
        b. Wojciech Dzik Oprogramowanie CAD, Katowice,
        c. WinklerCAD, Katowice,

    Competences:

    1. Instruktor AutoCAD dla Wojciech Dzik oprogramowanie CAD, Winkler CAD
    2. Instruktor ChemCAD, TRIFLEX, CaDPipe, Plan4F, WerCo, dla NorPar a.s. oraz Wojciech Dzik oprogramowanie CAD
    3. Certyfikat szkolenia „Komputerowe wspomaganie projektowania procesów i systemów technologicznych" – symulator procesowy Aspen, 2014
    4. Biegła znajomość j. angielskiego

13. Other information:
    None