COURSE DESCRIPTION CARD - SYLLABUS

Course name
Economical analysis of industrial processes

Course

Field of study
Chemical and Process Engineering
Area of study (specialization)
Bioprocesses and Biomaterials Engineering
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
1/2
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture
15
Laboratory classes
Other (e.g. online)
Tutorials
Projects/seminars
30

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

Students starting this subject should have basic knowledge in mathematics, physics, chemistry, engineering graphics, chemical industry equipments, chemical technology, and materials technology. They should also have the ability to use spreadsheets, and be ready to work in a team.

Course objective

The aim of the course is to gain basic knowledge in the area of the assessment of economic efficiency of investments in the chemical and related industries, including some legal and financial ecological aspects.

Course-related learning outcomes

Knowledge

1. Knows the basic concepts of financial accounting. [K_W10]

2. Knows the methods of economic assessment of investment projects taking into account the ecological effect. [K_W10] [K_W9]

3. Knows the methods of estimating investment costs in fixed assets, production costs, sales revenues and profit in the chemical and related industries. [K_W10]

Skills

1. Is able to use basic terminology in the field of financial accounting. [K_U04]

2. Is able to determine the economic efficiency of investment using static and dynamic methods. [K_U16] [K_U20]

3. Is able to estimate investment costs using methods based on historical costs. [K_U16] [K_U01] [KU17]

4. Is able to estimate: working capital, variable and fixed production costs and profit for production processes in the chemical industry. [K_U09] [K_U11] [K_U16]

Social competences

1. Student is aware of the advantages and limitations of individual and group work in solving interdisciplinary problems in industry. Is aware of the responsibility for jointly implemented tasks as part of teamwork. [K_K03]

2. The student knows the limits of their own knowledge and understands the need for continuous education and raising their professional competences. [K_K01] [K_K05]

3. Is able to think and act in a creative and entrepreneurial way. [K_K06]

4. Understands non-technical aspects and effects of engineering activities and related responsibility for undertaken decisions [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified during the test. The test consists of about 30 closed questions. Passing from 50% of points according to the following criteria: 50%-60% (3.0), 61% -70% (3.5); 71% -80% (4.0), 81% -90% (4.5), 91% -100% (5.0).

Skills and knowledge acquired during project classes are verified on the basis of the project and its presentation.

If the classes will be held remotely, the forms of course assessments will remain unchanged and will be carried out with the use of tools provided by the Poznań University of Technology (https://elearning.put.poznan.pl/), about which students will be informed as soon as possible possible.

Programme content

The following topics will be discussed as part of the course:

1. Basic concepts of financial accounting (revenues, costs, profit, tax, depreciation)

2. Economic assessment of projects

2.2. Cash flow

2.3. Basic methods of economic assessment (payback time, return on investment, break-even analysis)

2.4. Time value of money

2.5. Net present value

2.6. Internal rate of return

2.7. Equal payment streams

2.8. Project selection under limited investment resources

2.9. Sensitivity Analysis

2.10. Economic analysis of the ecological effect of the investment

3. Estimation of investment costs in fixed assets

3.2. Accuracy and purpose of capital cost estimates

3.3. Historical costs

3.4. Step counting methods

3.5. Factorial method

3.6. Estimating infrastructure investment costs

3.7. Cost escalation (inflation)

3.8. Investment location

3.9. Validity of cost estimates

4. Estimating production costs

4.1. Working capital

4.2. Variable and fixed production costs

4.3. Media cost

4.4. Consumables costs

4.5. Waste disposal costs

4.6. Labor costs

5. Estimating sales revenues and profit

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.

2. Project: multimedia presentation, illustrated with tasks solved using a spreadsheet.

Bibliography

Basic

1. Mitkowski P.T., Różański J., Analiza ekonomiczna procesów przemysłowych, Wydawnictwo Politechniki Poznańska, 2012.

2. Rekowski M., Wprowadzenie do mikroekonomii, Wydawnictwo Akademi Ekonowmicznej w Poznaniu, 2001.

3. Chadwick L., Rachunkowość zarządcza dla niewtajemniczonych, Agencja Wydawnicza Placet, 1997.

Additional

1. Gabrusewicz W., Kamela-Sowińska A., Poetschke H., Rachunkowość zarządcza, Wydawnictwo Akademi Ekonowmicznej w Poznaniu, 2001.

2. Sinnott R.K. Towler G.: Chemical Engineering Design, 5th Edition, Elsevier, 2009.

3. Solińska M., Soliński I., Efektywność ekonomiczna proekologicznych inwestycji rozwojowych w energetyce odnawialnej, Uczelniane Wydawnictwa naukowo-Dydaktyczne AGH, Kraków 2003.

4. Coulson J.M., Richardson J.F.: Chemical Engineering, vol. VI, Butterworth Heinemann, Oxford 1999-2002.

5. Perry R. H., Green D. W., Perry's chemical engineering handbook, seventh edition, McGraw-Hill, 1997.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for tests, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate