

COURSE SYLLABUS

1. Information about the study program

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| 1.1 University | “Babeş-Bolyai” University |
| 1.2 Faculty | Faculty of Chemistry and Chemical Engineering |
| 1.3 Department | Department of Chemical Engineering |
| 1.4 Field of study | Chemical Engineering |
| 1.5 Program level (BA or MA) | Master |
| 1.6 Study program / Qualification | Advanced Chemical Process Engineering |

2. Information about the subject

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| 2.1 Subject title | Development activities - applications III – CME6137 | | | | | | |
| 2.2 Course activities professor | Scientific advisor of the dissertation | | | | | | |
| 2.3 Seminar activities professor | Scientific advisor of the dissertation | | | | | | |
| 2.4 Year of study | 2 | 2.5 Semester | 3 | 2.6. Type of assessment | CA | 2.7 Subject regime | DS/Obl. |

3. Total estimated time (teaching hours per semester)

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|--|-----|--------------------------|---|----------------|-------|
| 3.1 Number of hours per week | 6 | Out of which: 3.2 course | - | 3.3 laboratory | 6 |
| 3.4 Total number of hours in the curriculum | 84 | Out of which: 3.5 course | - | 3.6 laboratory | 84 |
| Time distribution: | | | | | hours |
| Study based on textbook, course packet, references and lecture notes | | | | | 6 |
| Additional research in the library, on specialist electronic platforms (databases) and through field activities. | | | | | 8 |
| Preparing seminar/laboratory work, homework, reports, portfolios and essays. | | | | | 24 |
| Tutoring | | | | | - |
| Assessment (examinations) | | | | | 3 |
| Other activities | | | | | - |
| 3.7 Total hours for individual study | 41 | | | | |
| 3.8 Total hours per semester | 125 | | | | |
| 3.9 Number of credits | 5 | | | | |

4. Pre-requisites (where applicable)

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| 4.1 Curriculum | <ul style="list-style-type: none"> Not applicable |
| 4.2 Competences | <ul style="list-style-type: none"> Not applicable |

5. Conditions (where applicable)

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| 5.1 For course development | <ul style="list-style-type: none">• Not applicable |
| 5.2 For seminar/laboratory development - applications | <ul style="list-style-type: none">• The students will attend the program of application development program established by the scientific advisor of the dissertation• The students will prepare the documentation using the existing sources both in the specialized libraries, in the international electronic databases, and in those provided by the scientific advisor of the undergraduate dissertation.• The students will attend the laboratory with safety equipment (overall, gloves, goggles).• The students will know the goals, means, instrumentation and the stages of laboratory works they are going to attend.• The papers will be presented and delivered to the scientific advisor of the dissertation paper. |

6. Specific competences

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|--------------------------|---|
| Professional competences | <ul style="list-style-type: none">• Identifying and defining a research subject in the area of chemical process engineering, elaboration and implementation of an achievement plan of the proposed objectives and capitalization of the results of the scientific research.• Applying the thorough knowledge and the specific research methods in the chemical processes engineering.• Detailed and pertinent use of the experiment as an assessment method and foundation of the decisions.• Designing, executing and capitalizing the results of the scientific research specific to process engineering. |
| Transversal competences | <ul style="list-style-type: none">• Preparing independently complex professional tasks and autonomous development of research-design activities, using computer assisted technology and complying with the norms of professional ethics and moral conduct.• Demonstrating the capacity of coordination of the activity, analytical thinking, adaptability and flexibility.• Self-assessment of the professional performances and establishing the needs of continuous formation, permanent information and documentation in the field of activity and related areas, in correlation with the needs of the labour market.• Ability to conceive and prepare a scientific paper.• Ability to defend a scientific presentation in a foreign language. |

7. Course objectives and learning outcomes (deriving from the acquired competences)

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| 7.1 Subject's general objective | <ul style="list-style-type: none"> • Development of the capacity and competences of applying the chemical process engineering knowledge in the realization of the proposed research goals to achieve and capitalize the presumed results of the scientific research. |
| 7.2 Specific objectives | <ul style="list-style-type: none"> • Realization of the research plan proposed by undergoing the experimental tests/elaborating the applications corresponding to the selected research subject. • Use of the specialized knowledge in order to establish the research strategy and the program of experiments and simulations; explanation and partial interpretation of results. • Use of the conceptual and methodological research apparatus in order to develop new/original theoretical approaches and products/technology with practical applications. • Proper selection and use of the assessment methods for the pertinent interpretation of the results of the research by drawing conclusions and arguing the proposed solutions. • Use of fundamental and applicative concepts in the development of the research projects. |

8. Content

| 8.1 Laboratory | Teaching methods | Observations |
|---|---|--------------|
| 8. 1. 1. Preparing the experimental activities/applications (devices, glassware, reactants, computing systems and programs) | Explanation; Conversation; Description; Conceptualization | 6 |
| 8. 1.2. Performing the experimental activities / applications specific to undergoing the selected subject. | Explanation; Conversation; Description; Conceptualization | 46 |
| 8. 1.3. Collecting and interpreting the partial experimental data / results of the applications. | Explanation; Conversation; Description; Conceptualization | 6 |
| 8.1.4. Analysis and systematization of partial experimental data. | Explanation; Conversation; Description; Conceptualization | 6 |
| 8. 1. 5. Locating the obtained data in the context of the literature. | Explanation; Conversation; Description; Conceptualization | 6 |
| 8. 1. 6. Hearing scientific defenses (conferences, symposiums, public defenses of doctoral theses). | Explanation; Conversation; Description; Conceptualization | 6 |

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| 8. 1. 7. Presentation of the partial experimental results/used applications. | Explanation; Conversation; Description; Conceptualization | 8 |
| <p>References</p> <ol style="list-style-type: none"> 1. Bibliographical sources mentioned in the course syllabus in the curriculum of the ICAP program. 2. Chemical Abstracts Analytical Abstracts, Beilstein. 3. Electronic databases (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, Proquest Journals, etc.) 4. The bibliographical sources indicated by the scientific advisor of the dissertation paper. <p>Note: The bibliographical elements can be consulted at the Library of the Department of Chemical Engineering, at the Library of the Faculty of Chemistry and Chemical Engineering – extension of the “Lucian Blaga” Central Library of the “Babeş-Bolyai” University., and the “Lucian Blaga” Central Library.</p> | | |

9. Corroboration / validation of the subject’s content in relation to the expectations coming from representatives of the epistemic community, of the professional associations and of the representative employers in the program’s field

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| <ul style="list-style-type: none"> • The content of the curricula is in accordance with the partial competences required for the possible occupations and the competences and qualifications have been established in accordance with the competences in the Diploma Supplement and the qualifications of the NCA. |
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10. Assessment (examination)

| Type of activity | 10.1 Assessment criteria | 10.2 Assessment methods on-line or on-site | 10.3 Weight in the final grade |
|---------------------------|--|--|--------------------------------|
| 10.5 Seminar / laboratory | Acquiring the adequate methods, techniques, and instruments for preparing and achieving the objectives of the selected research subject. | Assessment of the selected techniques and instruments for preparing and achieving the objectives of the selected research subject. | 10% |
| | The manner of realizing the research works, collecting and interpreting partial experimental data/results of the applications | Assessment of the manner of realizing the research works, collecting and interpreting partial experimental data / results of the application | 60% |
| | Correctness, completeness, and argumentation of the analysis and systematization of the partially obtained results. | Evaluation of the correctness, completeness, of the analysis and systematization of the partially obtained results | 10% |
| | Presentation of the papers with partial experimental data/partial results of the applications specific to the selected research subject. | Assessment of the presentation of the papers with partial experimental data/partial results of the applications, specific to the | 10% |

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|---|--|---------------------------|--|
| | | selected research subject | |
| 10.6 Minimum performance standards | | | |
| <ul style="list-style-type: none"> • The mark 5 (five) for the assessment of each of the assessment criteria. • Knowledge of the main means to achieve and present the research results in the field of computer assisted chemical process engineering. | | | |

Date of filling
10.04.2024

Signature of the
course professor

Signature of the
seminar professor

Signature of the scientific
advisor of the dissertation

Date of approval by
the Department
22.04.2024

Head of Department signature

Prof. dr. ing. Turdean Graziella
