

## COURSE SYLLABUS

### 1. Information about the study program

|                                   |   |
|-----------------------------------|---|
| 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

|                                  |  |              |   |                         |         |                    |    |
|----------------------------------|--|--------------|---|-------------------------|---------|--------------------|----|
| 2.1 Subject title                | <b>Development activities -applications II – CME6124</b> |              |   |                         |         |                    |    |
| 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                | 1  | 2.5 Semester | 2 | 2.6. Type of assessment | Midterm | 2.7 Subject regime | Ob |

### 3. Total estimated time (teaching hours per semester)

|  |     |                          |   |                          |       |
|--|-----|--------------------------|---|--------------------------|-------|
| 3.1 Number of hours per week   | 7   | Out of which: 3.2 course | - | 3.3 seminar / laboratory | 7     |
| 3.4 Total number of hours in the curriculum  | 98  | Out of which: 3.5 course | - | 3.6 seminar / laboratory | 98    |
| Time distribution:   |     |                          |   |                          | hours |
| Study based on textbook, course packet, references and lecture notes   |     |                          |   |                          | 2     |
| Additional research in the library, on specialist electronic platforms (databases) and through field activities. |     |                          |   |                          | 8     |
| Preparing seminar/laboratory work, homework, reports, portfolios and essays.                                     |     |                          |   |                          | 14    |
| Tutoring   |     |                          |   |                          | -     |
| Assessment (examinations)  |     |                          |   |                          | 3     |
| Other activities   |     |                          |   |                          | -     |
| 3.7 Total hours for individual study   | 27  |                          |   |                          |       |
| 3.8 Total hours per semester   | 125 |                          |   |                          |       |
| 3.9 Number of credits  | 5   |                          |   |                          |       |

**4. Pre-requisites** (where applicable)

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

**5. Conditions** (where applicable)

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

**6. Specific competences**

|                                 |  |
|---------------------------------|--|
| <b>Professional competences</b> | <ul style="list-style-type: none"> <li>• Identifying and defining a research subject in the area of chemical process engineering, elaboration and implementation of a plan to achieve the proposed objectives and capitalization of the results of the scientific research.</li> <li>• Applying the thorough knowledge and the specific research methods in the chemical processes engineering.</li> <li>• Detailed and pertinent use of the experiment as an assessment method and foundation of the decisions.</li> <li>• Designing, executing and capitalizing the results of the scientific research specific to process engineering.</li> </ul> |
|---------------------------------|--|

|                         |   |
|-------------------------|---|
| Transversal competences | <ul style="list-style-type: none"> <li>• 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.</li> <li>• Demonstrating the capacity of coordination of the activity, analytical thinking, adaptability and flexibility.</li> <li>• Self-assessment of the professional efficiency 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.</li> <li>• Ability to conceive and prepare a scientific paper.</li> <li>• Ability to defend a scientific presentation in a foreign language.</li> </ul> |
|-------------------------|---|

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

|                                 |  |
|---------------------------------|--|
| 7.1 Subject's general objective | <ul style="list-style-type: none"> <li>• Development by specific documentation means and preliminary studies of the capacity and competences of application of the chemical process engineering knowledge in the realization of the proposed goals in the chosen research subject to achieve and capitalize the presumed results of the scientific research.</li> </ul>  |
| 7.2 Specific objectives         | <ul style="list-style-type: none"> <li>• Selection and realization of the research plan proposed by undergoing an extended research of the literature corresponding to the research subject, organization and synthesis of the data with acquiring the domain-specific terminology; knowledge of the general and specific research methods; realization of preliminary studies.</li> <li>• Realization a preliminary research plan and making preliminary experimental tests related to the selected research subject.</li> <li>• Use of the specialized knowledge to establish the research strategy and the program of experiments and simulations; explanation and partial interpretation of results.</li> <li>• Use of the conceptual and methodological research apparatus in order to develop new/original theoretical approaches and products/technology with practical applications.</li> <li>• 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.</li> <li>• Use of fundamental and applicative concepts in the development of the research projects.</li> </ul> |

## 8. Content

| 8.1 Laboratory   | Teaching methods  | Observations |
|--|---|--------------|
| 8. 1. 1. Documentation in the subject of the proposed dissertation in specialized libraries (printed format)   | Explanation; Conversation; Description; Conceptualization | 10           |
| 8. 1.2. Documentation in the subject of the dissertation by accessing of electronic international documentation sources (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, Proquest Journals, etc.)  | Explanation; Conversation; Description; Conceptualization | 10           |
| 8. 1.3. Selection of the adequate methods, techniques, and instruments for observation, measuring, experimenting, control, optimization and modeling.  | Explanation; Conversation; Description; Conceptualization | 10           |
| 8.1.4. Preliminary tests of the selected methods, techniques, and instruments.   | Explanation; Conversation; Description; Conceptualization | 46           |
| 8. 1. 5. Elaboration of the preliminary research plan to realize the dissertation.   | Explanation; Conversation; Description; Conceptualization | 6            |
| 8. 1. 6. Hearing scientific defenses (conferences, symposiums, public defenses of doctoral theses).  | Explanation; Conversation; Description; Conceptualization | 6            |
| 8. 1. 7. Presentation of the results of the experimental tests/preliminary applications, and analysis of the future research directions.   | Explanation; Conversation; Description; Conceptualization | 10           |
| <b>References</b> <ol style="list-style-type: none"> <li>1. Bibliographical sources mentioned in the course syllabus of the curriculum for the Advanced Chemical Process Engineering program.</li> <li>2. Chemical Abstracts Analytical Abstracts, Beilstein.</li> <li>3. Electronic databases (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, Proquest Journals, etc.)</li> <li>4. The bibliographical sources indicated by the scientific advisor of the dissertation.</li> </ol> <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"> <li>• The content of the discipline is in agreement with required competencies from Diploma supplement and ANC's qualifications.</li> </ul> |
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**10. Assessment (examination)**

| Type of activity  | 10.1 Assessment criteria  | 10.2 Assessment methods   | 10.3 Weight in the final grade |
|---|---|---|--------------------------------|
| 10.5 Seminar / laboratory   | Presentation of the papers with the data from the literature specific to the selected subject.  | Assessment of the papers presented with the data from the literature.   | 20%                            |
|   | Acquiring the adequate methods, techniques, and instruments for observation, measurement, experimenting, control, optimization and modelling, selected for the selected research subject. | Assessment of the (selected) techniques and instruments for observation, measuring, experimenting, control, optimization and modeling.  | 20%                            |
|   | Correctness, completeness, and argumentation of the systematization of the information collected from the literature.   | Evaluation of the correctness, completeness, and argumentation of the systematization of the information collected from the specialized literature.   | 10%                            |
|   | Presentation of the preliminary research plan and the results of the experimental tests/preliminary applications.   | Assessment of the integration of the documentation of the data collected from the literature with the selected dissertation subject and assessment of the results of the experimental tests/preliminary applications. | 50%                            |
| 10.6 Minimum performance standards  |   |   |                                |
| <ul style="list-style-type: none"> <li>The mark 5 (five) for the assessment of each of the assessment criteria.</li> <li>Knowledge of the main means to achieve and present the research results in the field of computer assisted chemical process engineering.</li> </ul> |   |   |                                |

Date of filling  
15.04.2020

Signature of the  
course professor

Signature of the  
seminar professor

Signature of the  
scientific advisor of  
the dissertation

Date of approval by  
the Department  
16.04.2020

Head of Department  
signature

Prof. dr. ing. Turdean  
Graziella

