1. **Course title:** New Trends in Chemistry and Chemical Technology

2. **Course code:**

3. **Validity of course description:** 2018/2019

4. **Level of studies:** 1st cycle of higher education

5. **Mode of studies:** intramural studies / extramural studies

6. **Field of study:** Chemical Technology

7. **Profile of studies:** general academic

8. **Programme:**

9. **Semester:** II

10. **Faculty teaching the course:** Department of Physical Chemistry and Technology of Polymers (RCh4)

11. **Course instructor:** dr inż Anna Mielańczyk

12. **Course classification:** common courses

13. **Course status:** compulsory

14. **Language of instruction:** English

15. **Pre-requisite qualifications:** Basic chemical, physical and mathematical knowledge

16. **Course objectives:** To familiarize students with the role of polymers in many areas of life, and in particular with their use in nanotechnology and medicine. Thanks to the participation in the lectures, students acquire the ability to associate the properties of materials with their potential application in practice. Another goal is to familiarize the student with stochastic differential equations and fractional differential equations. The student masters their formalism and learns the applications of these equations in mass transport problems. They also learn the methods of solving problems - both numerical and, if possible, formal.

17. **Description of learning outcomes:**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Learning outcomes description</th>
<th>Method of assessment</th>
<th>Teaching methods</th>
<th>Learning outcomes reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Student has ordered knowledge in the basics of logic, linear algebra and analytic geometry, differential and integral calculus and its applications, discrete mathematics, differential equations, probability theory and mathematical statistics.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_W01 + K_U01 +</td>
</tr>
<tr>
<td>2.</td>
<td>Student has ordered knowledge in the field of: thermodynamics and statistical physics, electromagnetism, optics, basics of quantum mechanics.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_W02 + K_U05 +</td>
</tr>
<tr>
<td>3.</td>
<td>Student has basic knowledge of techniques and methods for characterizing and polymers.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_W10 + K_U05 +</td>
</tr>
<tr>
<td>4.</td>
<td>Student can acquire information from literature, databases and other sources, also in English, related to chemical sciences, integrates them, interprets and draws conclusions and formulates opinions</td>
<td>Test</td>
<td>Lecture</td>
<td>K_U01 ++</td>
</tr>
<tr>
<td>5.</td>
<td>Student has the ability to self-education.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_U05 ++</td>
</tr>
<tr>
<td>6.</td>
<td>Student knows and understands the basic concepts and principles in the field of industrial property and copyright protection; can use patent information resources.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_W10 +</td>
</tr>
<tr>
<td>7.</td>
<td>Student has basic knowledge about the life cycle of products, equipment and installations in the chemical industry.</td>
<td>Test</td>
<td>Lecture</td>
<td>K_W13 +</td>
</tr>
</tbody>
</table>
18. Teaching modes and hours
Lecture / BA / MA Seminar / Class / Project / Laboratory
Lecture 15 h.

19. Syllabus description:

Lectures:
1. Basic concepts regarding the synthesis and architecture of macromolecules and materials derived from polymers with specific physicochemical properties.
2. Polymeric carriers of active substances - preparation, pharmacokinetics, physicochemical properties, and cytotoxicity.
6. Organic Compounds Used in Organic Electronics - types of organic compounds used in organic electronics, design methods, and planning of the target application.

20. Examination: No

21. Primary sources:
1. Z. Florjańczyk, S. Penczek, (red.) Chemia polimerów, tom 1, Makrocząsteczki i metody ich otrzymywania, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1995
5. Zeew, Schuss, Stochastyczne równania różniczkowe, PWN 1989
6. Sobczyk, Stochastyczne równania różniczkowe, WNT 1996

22. Secondary sources:

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode :</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>15/15</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>-/-</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>-/-</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>-/-</td>
</tr>
<tr>
<td>5</td>
<td>BA / MA Seminar</td>
<td>-/-</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>-/-</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>15/15</td>
</tr>
</tbody>
</table>

24. Total hours: 30

25. Number of ECTS credits: 1

26. Comments: No

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 0

Approved:

(date, Instructor's signature)  (date, the Director of the Faculty Unit signature)