COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="11">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Biomedical Engineering</td><td colspan="2">Degree level and programme type</td><td colspan="2">Bachelor/Master</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td colspan="2">Study profile</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Basics of biochemistry and biosensors</td><td colspan="2">Course code</td><td colspan="2">IS-FME-00255S</td></tr>
<tr><td colspan="2">Course type</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td colspan="2">Semester</td><td colspan="2">summer</td></tr>
<tr><td>15</td><td></td><td>15</td><td></td><td></td><td></td><td></td><td colspan="2">No. of ECTS credits</td><td colspan="2">3</td></tr>
<tr><td>Entry requirements</td><td colspan="10">Chemistry</td></tr>
<tr><td>Course objectives</td><td colspan="10">Familirization students with structure, functions and operations of biological sensors. Presentation of transducers and biological detection elements used in biosensors. Familirization with basic fast dry tests for medical diagnosis. Familirization with rules of performing analysis by using biosensors.</td></tr>
<tr><td>Course content</td><td colspan="10">Biosensors-classification, structure, functions. Implementation of transducers in biosensors. Characteristics of selected biosensors. Dry tests for fast medical analysis. Immunosensors. Biopotentials and phenomena at electrode-tissue contact. Trends in development of biosensors.</td></tr>
<tr><td>Teaching methods</td><td colspan="10">lecture, power point presentations, laboratory classes</td></tr>
<tr><td>Assessment method</td><td colspan="10">Lecture - written exam; laboratory class - evaluation of reports, class preparedness tests</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="9">Learning outcomes</td><td>Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="9">explains role of biochemistry in biosensor's development</td><td></td></tr>
<tr><td>LO2</td><td colspan="9">classifies and describes biological sensors</td><td></td></tr>
<tr><td>LO3</td><td colspan="9">lists and describes dry tests for medical diagnosis</td><td></td></tr>
<tr><td>LO4</td><td colspan="9">performs basic electrochemical reactions</td><td></td></tr>
<tr><td>LO5</td><td colspan="9">respect rules of safety work</td><td></td></tr>
<tr><td>LO6</td><td colspan="9">is able to work in a group</td><td></td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="9">Methods of assessing the learning outcomes</td><td>Type of tuition during which the outcome is assessed</td></tr>
<tr><td>LO1</td><td colspan="9">written exam, class preparedness tests</td><td>L, LC</td></tr>
<tr><td>LO2</td><td colspan="9">written exam, class preparedness tests</td><td>L, LC</td></tr>
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LO3	**written exam, class preparedness tests**	**L, LC**
LO4	**evaluation of the work during laboratory classes**	**LC**
LO5	**evaluation of the work during laboratory classes**	**LC**
LO6	**evaluation of the work during laboratory classes**	**LC**
Student workload (in hours)		**No. of hours**
Calculation	**lecture attendance**	**15**
	participation in laboratory classes	**15**
	preparation for laboratory classes	**30**
	working on reports	**20**
	participation in student-teacher sessions related to the lectures and classes	**10**
	TOTAL:	**90**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	**40**	**1,5**
Student workload – practical activities	**65**	**2**

Basic references	1. Yoon I.-Y., Introduction to biosensors - from electric circuits to immunosensors, Springer, ISBN 978-3-319-27413-3. 2. Ensafii A.A., Electrochemical biosensors, Elsevier, 2019, ISBN 978-0-12-816491-4. 3. Sadana A., Sadana N., Handbook of biosensors and biosensor kinetics, Elsevier, 2019, ISBN 978-0-444-53262-6.
Supplementary references	1. Malik P., Katyal V.,Malik V., Asatkar A., Inwati G., Mukherjee T.K., Nanobiosensors: Concepts and Variations, 2013, 327435, 1-9. **2.** Higson S., Biosensors for medical applications, Woodhead Publishing, 2012, ISBN 978-1-84569-935-2

Organisational unit conducting the course	**Institute of Biomedical Engineering**	**Date of issuing the programme**
Author of the programme	**Joanna Mystkowska, PhD Eng, DSc, Assoc. Prof.**	**29.03.2021**

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar