

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Fundamentals of biomedical engineering</b>		Code <b>1010322331010326097</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>Measurement Systems in Industry and</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>3 100%</b> <b>3 100%</b>
<b>Responsible for subject / lecturer:</b>  Prof. dr hab. inż. Anna Cysewska-Sobusiak email: anna.cysewska-sobusiak@put.poznan.pl tel. 616652633 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge in the scope of electrotechnics, physics, optoelectronics, and metrology.
2	<b>Skills</b>	Ability of the efficient self-education in the area concerned with the module
3	<b>Social competencies</b>	Awareness of the necessity of competence broadening and ability to show readiness to work as a team
<b>Assumptions and objectives of the course:</b> Knowledge in the scope of physical and medical bases of biomeasurements and medical engineering to understand the methods and systems applied for measurements and diagnostics.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Ability to describe the application areas and potential of the modern measurement systems - [K_W11 +++) 2. Ability to explain the principles and techniques of the measurement signals acquisition and processing for the needs of current industrial and biomedical applications - [K_W11 ++ K_W12 +]		
<b>Skills:</b>		
1. Ability to design creatively the modern measurement systems, with the use of possibilities offered by available technologies, taking into account the limitations of present status of knowledge and technique - [K_U01 +] 2. Ability to work independently and as a team in the design and construction companies, research laboratories and industrial centers - [K_U05 +]		
<b>Social competencies:</b>		
1. Understanding a need of the broad popularization of the knowledge in the area of simple and complex measurement systems used in industry and biomedical engineering - [K_K02 +]		
<b>Assessment methods of study outcomes</b>		

<p>Lectures:</p> <ul style="list-style-type: none"> <li>- evaluation of the knowledge with a written exam related to the content of lectures (test, computational and problem questions),</li> <li>- continuous estimation in all classes (awarding attendance in lectures, activity and quality of perception).</li> </ul>		
<b>Course description</b>		
<ul style="list-style-type: none"> <li>- Biomeasurements and biomedical engineering: applications, classification, specificity, the state-of-the-art and tendency to development.</li> <li>- Selected elements of physiology and anatomy.</li> <li>- Thermodynamics of biological systems.</li> <li>- Physical background of medical diagnostics.</li> <li>- Modeling of biological processes.</li> <li>- Influence of electromagnetic radiation on tissues; human organism protection from harmful factors.</li> <li>- Medical applications of lasers and fiber optics technique.</li> <li>- Biosensors and stents.</li> <li>- Selected elements of bioinformatics ? metrological and technical aspects of recognition of DNA sequences.</li> <li>- Selected questions of statistics and medical informatics.</li> <li>- Clinical engineering. Ethics of procedures used in medical examinations.</li> </ul>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Biocybernetyka i Inżynieria Biomedyczna, red. Maciej Nałęcz, Akademicka Oficyna Wydawnicza Exit, Warszawa 2001-2003.</li> <li>2. A. Cysewska-Sobusiak, Modelowanie i pomiary sygnałów biooptycznych, wyd. Politechniki Poznańskiej, Poznań 2001.</li> <li>3. R. Tadeusiewicz, Informatyka medyczna, red. R. Tadeusiewicz, W. Wajs, Uczelniane Wyd. AGH, Kraków 1999.</li> <li>4. G. Pawlicki, Podstawy inżynierii medycznej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997.</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. K. Booth, S. Hill, Optoelektronika, WKŁ, Warszawa 2001.</li> <li>2. W.Z. Traczyk, Fizjologia człowieka w zarysie, PZWL, Warszawa 1992.</li> <li>3. J. Szabatin, Podstawy teorii sygnałów, wyd. 3, WKŁ, Warszawa 2000.</li> </ol>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in lectures	30	
2. Participation in consulting with the lecturer	20	
3. Preparation to the exam	18	
4. Participation in the exam	3	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	71	3
Contact hours	53	2
Practical activities	0	0