|  |  |
| --- | --- |
| The title of the course | Materials Science: Electrospinning |
| Faculty | [Faculty of Mechanical Engineering and Computer Science](http://eng.ath.bielsko.pl/index.php/faculties/gerg) |
| The level of studies | Undergraduate (BA)Postgraduate (MA)Engineer (BSc) |
| Semester | Winter/summer |
| The form of classes and number of hours | Laboratories 15 |
| Language of instruction | English |
| The number of ECTS | 3 |
| Teacher | Izabella Rajzer, PhD |
| The aims of the course (maximum 500 characters)  | **Electrospinning - Materials, Processing, Testing and Applications.** This course focuses on hands-on experience in producing materials by electrospinning process. Working parameters are very important to understand not only the nature of electrospinning but also the conversion of polymer solutions intonanofibers through electrospinning. Each of those parameters can affect the fibres morphologies and by proper control of those parameters students will be able to fabricate electrospun fibres with desiredmorphologies and diameters. During this course students gain familiarity with electrospinning process and additionally with common tools used for materials characterization.**The main aim of the course is to provide the student hands-on experiences in materials science through laboratory experiments.**  |
| The content of the course: main topics and key ideas | Fundamentals, and Applications of the Electrospinning Technique (3h). Laboratory experiments: materials production and testing (7h)Preparation of different polymer/ceramic solutions; Selection of electrospinning parameters (applied electric voltage, polymer solution flow rate, needle-to-collector distance, solution concentration, solvent type); Optimization of the method of desired pore production in electrospun materials (electrospinning + particles leaching); Electrospinning of nanofibers; Evaluation of obtained materials. |
| Didactics methods | Laboratory – research and development of new materials. Presentations and discussions of the experimental results. |
| Course requirements | Laboratory – attendance, report, presentation and discussion of the results. |
| Literature (basic and supplementary) | 1) Wendorff JH, Agarwal S, Greiner A. Electrospinning: Materials, Processing, and Applications. Wiley 2012.2) Ikada Y. Tissue Engineering, Fundamentals and Applications. Elsevier Academic Press, 2006.3) Journal of Materials Science: Materials in Medicine.4) Materials Science and Engineering C.5) recent publications in ES. |
| The effects of the education * knowledge
* skills
* social competences
 | The aim of the course is to provide the student practical experience in the search, retrieval, and analysis of scientific information **(skills)** as well as practical experience in the acquisition, analysis and reporting /presentation of experimental results **(social competences)**. The student will also have a working engineering knowledge of sample preparation and material evaluation **(knowledge)**.In conclusion, **students will demonstrate an ability to design and carry out independent research, critically evaluate the results and discuss them in the context of current literature.** |