<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>EC – elective subjects from the discipline of Material Engineering</td></tr>
<tr><td>ECTS credit</td><td>1</td></tr>
<tr><td>Course name</td><td>Instrumental Research Methods in Fibre Physics</td></tr>
<tr><td>Course name in Polish</td><td>Instrumentalne metody pomiarowe w fizyce włókna</td></tr>
<tr><td>Language of instruction</td><td>English</td></tr>
<tr><td>Course level</td><td>8 PRK</td></tr>
<tr><td>Course coordinator</td><td>Dr hab. Michał Puchalski</td></tr>
<tr><td>Course instructors</td><td></td></tr>
<tr><td>Delivery methods and course duration</td><td>
<table>
<tr><th></th><th>Lecture</th><th>Tutorials</th><th>Laboratory</th><th>Project</th><th>Seminar</th><th>Other</th><th>Total of teaching hours during semester</th></tr>
<tr><td>Contact hours</td><td>0</td><td>0</td><td>0</td><td>5</td><td>0</td><td>0</td><td>5</td></tr>
<tr><td>E-learning</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td></tr>
<tr><td>Assessment criteria (weightage)</td><td>0</td><td>0</td><td>0</td><td>100%</td><td>0</td><td>0</td><td>100%</td></tr>
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<tr><td>Course objective</td><td>Objective of the course
The objective of the course is to enable the acquisition of knowledge including the theoretical basis and principle of work and application of selected advanced instrumental research methods applied in fibre physics in the field of evaluation of the physical structure of the fibre microstructure.</td></tr>
<tr><td>Learning outcomes</td><td>Doctoral student on completion of the course:
1. knows and understands the theoretical basis, principle of operation and area of application of instrumental research methods applied in fibre physics W1_P8S_EG
2. knows and understands the methodology of scientific research principles of dissemination of measurement results using instrumental research methods applied in fibre physics W1_P8S_EG
3. is able to develop methods, techniques and research tools for evaluating the physical structure of the fibre microstructure and creatively plan their application U1_P8S_UW</td></tr>
<tr><td>Assessment methods</td><td>Methods of verifying of learning outcomes
Learning outcomes 1, 2, 3 - presentation
Final mark consist of:
Presentation - 100%.</td></tr>
<tr><td>Prerequisites</td><td>Fibre Physics</td></tr>
<tr><td>Course content with delivery methods</td><td>Performing a project in the field of microstructure assessment of the fibre taking into account:
1. Introduction to instrumental research methods in fibre physics. Systematics of methods depending on the examined physical characteristic of the fibre microstructure.
2. Instrumental methods of evaluation of overall orientation of fibre microstructure:
2.1 Methods of evaluation of optical birefringement of a fibre;
2.2 Infrared dichroism.
3. Instrumental methods for assessing the degree of crystallinity:
3.1 Method for measuring density;
3.2 Differential scanning calorimetry method (DSC);</td></tr>
<tr><td>Basic reference materials</td><td>1. D. R. Salem ed. Structure Formation in Polymeric Fibers, Carl Hanser Verlag GmbH & Company KG, 2018.</td></tr>
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	2. M. W. Urban, T. Provde, Multidimensional Spectroscopy of Polymers, American Chemical Society 1995. 3. R. Pantani, I. Coccorullo, V. Speranza, G. Titomanlio, Modeling of morphology evolution in the injection molding process of thermoplastic polymers, Progress in Polymer Science, Vol. 30, 2005, 1185-1222 4. H. P. Fink, P. Weigel, H. J. Purz, J. Ganster, Structure formation of regenerated cellulose materials from NMMO-solutions, Progress in Polymer Science, Vol: 26, 2001, Page: 1473-1524
Other reference materials	1. M. Puchalski, I. Krucińska, K. Sulak, M. Chrzanowski, H. Wrzosek Influence of the calender temperature on the crystallization behaviors of PLA spun bonded non-woven fabrics. Textile Research Journal Vol. 83, 2013, 1775-1785. 2. J. Zhang, H. Tsuji, I. Noda, Y. Ozaki, Weak Intermolecular Interactions during the Melt Crystallization of Poly(L-lactide) Investigated by Two-Dimensional Infrared Correlation Spectroscopy. Journal of Phyical Chemistry B Vol. 108, 2004, 11514-11520. 3. S. Solarski, M. Ferreira, E. Devaux, Characterization of the thermal properties of PLA fibers by modulated differential scanning calorimetry Polymer Vol. 46, 2005, 11187-11192. 4. S. Sztajnowski, I. KrucińskaI, K. Sulak, M. Puchalski, H. Wrzosek, J. Bilska, Effects of the artificial weathering of biodegradable spun-bonded pla nonwovens in respect to their application in agriculture. Fibre and Textile in Eastern Europe Vol. 96, 2012, 89-95.
Average student workload outside classroom	15 hour
Comments	
Last update	July 2020