

Course code																																	
Type and description	EC – Elective Course																																
ECTS credit	1																																
Course name	Instrumental Research Methods in Fibre Physics																																
Course name in Polish	Instrumentalne metody pomiarowe w fizyce włókna																																
Language of instruction	English																																
Course level	8 PRK																																
Course coordinator	Dr hab. Michał Puchalski prof. PŁ																																
Course instructors	Dr hab. Michał Puchalski prof. PŁ																																
Delivery methods and course duration	<table border="1"> <thead> <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> </thead> <tbody> <tr> <td>Contact hours</td> <td>0</td> <td>0</td> <td>0</td> <td>15</td> <td>0</td> <td>0</td> <td>15</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> </tbody> </table>		Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester	Contact hours	0	0	0	15	0	0	15	E-learning	no	no	no	no	no	no	no	Assessment criteria (weightage)	0	0	0	100%	0	0	100%
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Course objective	<p>Objective of the course</p> <p>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.</p>																																
Learning outcomes	<p>Doctoral student on completion of the course:</p> <ol style="list-style-type: none"> 1. knows and understands the theoretical basis, principle of operation and area of application of instrumental research methods applied in fibre physics 2. knows and understands the methodology of scientific research principles of dissemination of measurement results using instrumental research methods applied in fibre physics 3. is able to develop methods, techniques and research tools for evaluating the physical structure of the fibre microstructure and creatively plan their application <p>W4, U4, K1</p>																																
Assessment methods	<p>Methods of verifying of learning outcomes</p> <p>Learning outcomes - presentation</p> <p>Final mark consist of:</p> <p>Presentation - 100%.</p>																																
Prerequisites	Fibre Physics																																
Course content with delivery methods	<p>Performing a project in the field of microstructure assessment of the fibre taking into account:</p> <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 2.1 Methods of evaluation of optical birefringence of a fibre; 2.2 Infrared dichroism. 3. Instrumental methods for assessing the degree of crystallinity: <ol style="list-style-type: none"> 3.1 Method for measuring density; 3.2 Differential scanning calorimetry method (DSC); 																																
Basic reference materials	<ol style="list-style-type: none"> 1. D. R. Salem ed. Structure Formation in Polymeric Fibers, Carl Hanser Verlag GmbH & Company KG, 2018. 2. M. W. Urban, T. Provde, Multidimensional Spectroscopy of Polymers, American Chemical Society 1995. 																																

	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 Physical 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. Krucińska, 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	March 2023