Annotations of Doctoral Thesis Topics for Degree Course in ''Nanotechnology and Advanced Materials'' for the Academic Years since 2019/2020

Topic:	**Polyester-Elastomer Matrix Filled with Conductive Filler: A Study of Electro-Mechanical Properties of Nanocomposites.**
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Annotation:

The aim of the thesis is to study the possibility of preparing polymer blends. With the use of elastomeric modifiers (natural, silicone, nitrile rubber) reduced brittleness of the polyester resin will be achieved. Student will prepare a series of polymeric polyester elastomer blends with varying concentrations (0 to 30 wt.%) of the elastomeric component. Additionally, students will prepare and study polymeric nanocomposites based on carbon electrically conductive filler with a polyester-elastomer matrix in order to reduce the electrical percolation threshold. Prepared samples are characterized using FTIR, DMA, SEM, TEM and dielectric spectroscopy. Additionally, students will study the effect of preparation technology on the mechanical properties in order to increase impact resistance and fracture toughness.

Requirements:

Creative abilities, skills for working in laboratory.

Literature:

1. Multiphase Polymer- Based Materials: An Atlas of Phase Morphology at the Nano and Micro Scale, Publisher: CRC Press (2009), ISBN ISBN 9781420062175.
2. Functional Polymer Blends: Synthesis, Properties, and Performance, Publisher: CRC Press (2012), ISBN 9781439856697.
3. Handbook of Composites, chapter: Unsaturated Polyester Resins, Publisher: Spriger (1982) ISBN: 978-1-4615-7141-4.
4. Physical Properties and Applications of Polymer Nanocomposites, A volume in Woodhead Publishing Series in Composites Science and Engineering (2010) ISBN: 978-1-84569-672.