

**Annotation of Doctoral Thesis Topics for Degree Programme: Material Sciences and Engineering, course in „Biomaterials and Biocomposites“ for the Academic Year 2019/2020**

<b>Topic:</b>	<b>Composite macro-nano Hydrogels as Biosensors</b>
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**Annotation:**

Smart composite hydrogels will play a key role in next-generation biomedicine, for instance as platform materials for drug delivery. A line of research with technological utilization of molecular interactions integrated in a composite hydrogels for drug delivery and biosensors is of high interest that would be performed. In addition, to tailor making of nano composite hydrogel materials to act as biological signal transducers acts as acceptor – receptor, this line of research takes advantage of a highresolution composite hydrogel thermo-magneto sensing technique for responsive gels. The spherically encapsulated nanohydrogel will be fabricated. The experimental work in this project would involve the synthesis, processing and up scaling of well-defined novel polymeric materials; their physico-chemical characterization; interaction and the formation of responsive sensitive composite materials of the hydrogels with magnetic nanoparticles.

**Requirements:**

Knowledge of general and macromolecular chemistry and physics at the university level. Good knowledge of the English language or a potential to the improvement. Basic manual and laboratory work skills. Ability to work independently.

**Literature:**

1. Dalwadi, C.; Patel, G. Application of nanohydrogels in drug delivery systems: recent patents review. *Recent Pat. Nanotechnol.* 2015, 9, 17–25.
2. Roy, N.; Saha, N.; Kitano, T.; Saha, P. Development and characterization of novel medicated hydrogels for wound dressing. *Soft Mater.* 2010, 8, 130–148.
3. Ray, A.; Chaudhary, V.; Wang, Z. P.; Ramanujan, R. V Surfactant Free Room Temperature Synthesis of Iron Oxide Magnetic Nanoparticles in Microchannels. *J. Nanofluids* 2016, 5, 783–789.