Name of the Programme: M. Sc. Zoology

Course Code: ZOO–622 **Title of the Course:** Biological Applications of Nanoparticles and Nanotoxicology

Number of Credits: 02

Effective from AY: 2023-24

Pre-requisites for the Course:	Basic knowledge of chemistry, physics and biology	
Course Objectives:	1. To provide knowledge of nanoscience in biology. 2. To analyze interaction of nanoparticles with biological systems. 3. To assess the applications of nanoparticles in the various areas of biology 4. To reveal the toxicity of nanoparticles used in different applications. 5. To adopt preventive measures while handling nanoparticles	
Content:	**Module 1** Overview of nanoscience, Nanoparticles. Various types of nanoparticles, chemically and biologically synthesized nanoparticles, Characterization of nanoparticles, Biocompatibility, Importance of nanoparticles in biology: medicine, drug delivery, cancer therapy, tissue regeneration, prosthesis, Recent advances in nanoscience. **Module 2** Nanotoxicology, Sources of nanoparticles, Nanopollution, Routes of exposure in aquatic and terrestrial animals, Human exposure to nanosized materials. Effect of nanoparticles in cells and biological systems. Preventive measures during nanoparticle handling, Toxicity hazards and assessment of risk, mitigating strategies	15 hours 15 hours
Pedagogy:	Lectures/tutorials/self-study/videos/presentations/mini projects/Group activities	
References/ Readings:	1. H. E. Schaefer, Nanoscience: the science of the small in physics, engineering, chemistry, biology and medicine. Springer Science & Business Media, 2010. 2. N. A. Monteiro-Riviere and C. L. Tran, Nanotoxicology: characterization, dosing and health effects. CRC Press, 2007 3. P. Houdy, M. Lahmani and F. Marano, Nanoethics and nanotoxicology. Springer Science & Business Media, 2011. 4. S. C. Sahu and D. A. Casciano, Handbook of nanotoxicology,	

	nanomedicine and stem cell use in toxicology, John Wiley & Sons, 2014. 5. S. Lindsay, Introduction to nanoscience. Oxford University Press, 2010. 6. V. Zucolotto, Nanotoxicology: materials, methodologies, and assessments. Springer Science & Business Media 2013.
Course Outcomes:	The learner will 1. Apply knowledge of nanoscience in biology 2. Assess the nanoparticles interaction with different biological systems 3. Defend the applications of nanoparticles in various fields of biology 4. Elaborate on toxicity of Nanoparticles 5. Plan preventive measures while handling nanoparticles directly or indirectly.

(Back to top)