Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCYD521	Nanomaterials for Advanced Applications	3	0	0	3

Course Objective
• With this course student will learn various strategy for control synthesis of nanomaterials and their applications in biotechnology.
Learning Outcomes
• Students will learn shape and size control synthesis of metallic, inorganic and magnetic nanomaterials. • Applications of these nanomaterials in the field of biotechnology, photonics, imaging and sensors will be introduced to the students.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	The interface of bioscience, nanotechnology and photonics, Quantum dots for bioimaging, Metallic nanoparticles and nanorods for biosensing, Upconverting nanophores and Inorganic nanoparticles for nanosensors for In vitro bioanalysis and optical diagnostics.	21L	Students may learn the ability to develop case studies of nanomaterials with a focus on fundamentals, fabrication, characterization, and applications.
2	Magnetic targeting, magnetic separation and detection, Magnetic tweezers, Chemo therapy, MRI, Magnetic contrast agents, Hyperthermia, Application of various nanomagnetic materials in biotechnology, core-shell structures and their applications. Nanoelectronics, Micro and nano electromechanical systems. Nanophotonics.	21L	Students may learn an understanding of approaches to engineering nanomaterials for different applications.

Text Books:

1. Nanoscale Technology in Biological Systems, Edited by Ralph S. Greco, Fritz B. Prinz, R. Lane Smith, CRC PRESS, Boca Raton London New York Washington.

Reference Books:

1. Introduction to Nanophotonics, Sergey V. Gaponenko, Cambridge University Press, New York, (2010)
2. Nanofabrication towards Biomedical Applications, Techniques, Tools, Applications, and Impact. C. S. S. R. Kumar, J. Hormes, C. Leuschner, 2005, WILEY -VCH Verlag GmbH & Co. KGaA, Weinheim, ISBN-13 978-3-527-31115-6.