

(Textile Engineering Department)

Graduate

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**Course Title: Technology & Production Methods of Nano-Fibrous Structures**

**Lecturer: Dr. Ali Akbar Ghare Aghaji**

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**Course Topics:**

- Introduction to various methods of nanofiber production
- Various methods of collection of nanofibers in layer form
- Principles of electrospinning-
- Theories and modeling in electrospinning
- Taylor cone formation and parameters that affects its geometry
- Electrospinning parameters and their effects on the properties of nanofibers and nanofibrous layers
- Electrospinning parameters in concern with solution, process and environment such as Viscosity , surface tension and ...
- Electrospinning parameters related to solution, process and environment - electric conductivity, hydrostatic pressure, high voltage
- - Electrospinning parameters related to nozzle distance, feeding rate, temperature, humidity, polyelectrolyte and polarity
- Composite nanofibers
- Nanofibrous yarns, technology and applications Nanofiber coating, technology and applications
- Bicomponent and poly blend nanofiber production Hybrid nanofibers principles and applications
- Governing equations in jet formation
- Various forces in jet formation
- Control of jet instability and control on the structure of nanofibrous structures

**Reading Resources:**

- Nanofibers and Nanotechnology in Textiles by: P Brown and K Stevens, Clemson University, USA Woodhead Publishing Limited, October 2007
- An Introduction to Electrospinning and Nanofibres by: K. Fujihara, W. Teo, T. Lim, and Z. Ma, World Scientific Publishing Co., Singapore, 2005
- Principles of Nanotechnology Molecular-Based Study of Condensed Matter in Small Systems by G Ali Mansoori (University of Illinois, Chicago, USA) World Scientific, March 2005
- Processing and Properties of Nanocomposites by: Suresh G Advani World Scientific, Dec. 2006
- Science and Technology of Polymeric Nanofibres by: Anthony L. Andrady Wiley Publishing Limited, September 2008
- Electrospun Nanofibres and Their Applications, by: He Ji-Huan He, Yong Li, Lu-Feng Mo, Yu-Qin Wan and Lan Xu Smithers Rapra Update, Oct. 2008
- Various Journal papers