Institute for Nanoscience and Nanotechnology (INST)

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INST was established in 2005 as an independent center in the university following a two year study of its mission and organization. It includes faculty members from various the departments of Physics, Chemistry, Materials Science, Chemical Engineering, Electrical Engineering, Civil Engineering and Mechanical Engineering. The institute started its PhD program soon after its conception in October 2005 and is currently home to 52 doctoral students. An additional 36 graduates have completed their PhDs in the institute. INST is a rapidly growing institute whose rise of importance has resulted in being designated the «Center of Excellence» (CoE) in the field of nanostructures. Over 600 publications have been published in reputable international journals over the past ten years. The bi-annual international conferences on nanostructures organized by the institute draw participants and contributors from all corners of the globe. Additionally, the institute organizes general and specialized courses and seminars in various fields of nanoscience and nanotechnology, including nanoparticles, nano-powders, coatings, nano-devices, nano-computation, modeling, and nano-biotechnology.

The main goals of the institute are: Fundamental and applied research in nanoscience and nanotechnology, Multidisciplinary projects and activities, Serving as a hub for nanotechnology research activities and strategy planning in the country, and Collaborating with international institutes for the advancement of applied nanoscience

PhD Program

The institute's PhD program is one of its main activities. The taught courses in this program are outlined below.

Compulsory Courses

- Nanotechnology 1 and 2
- Characterization Methods of Nanomaterials 1 and 2
- Basic Methods of Nano computation
- General Seminar
- Professional seminar
- PhD Thesis

Elective Courses

- Advanced Topics in Nano electronics
- Advanced Topics in Nanophysics
- Colloidal Nanoparticles
- Advanced Topics in Nanomaterials
- Advanced Topics in Computational Nanoscience
- Mechanical Properties Nanomaterials
- Nano thermodynamics, Electronic and Transport
- Methods of Nanomaterial Synthesis
- Advanced Thin Films, Nano chemistry
- Nanomaterials Chemistry
- Nano Drug Delivery
- Nano-electronics
- Nanophotonic
- New Devices of photonic and Electronic
- Nanofabrication

• Nano Electromechanical Systems
• Surface Science and Technology
• Advanced surface processes
• Chemical Mechanisms of Nanostructures Covering
• Nano ceramic
• Nano composites
• Multiscale Modeling
• Crystallography and Structural Analysis of Nanomaterials
• Nano solar cell
• Multi Scale Modeling
• Applied Mathematics
• Introduction to Thermodynamic and Kinetic
• Special Topics on Nanoscience

Research in INST

Selected Research Fields:
• Synthesis of nanostructured materials by novel methods
• Biomedical applications of iron oxide nanoparticles for targeted drug delivery
• Nanomaterials in photo-thermal and hyperthermia for cancer therapy
• Synthesis and study of polymer based Nano composites as smart materials
• Continuum models for computational Nano mechanics
• Simulations of macromolecules and proteins in Nano-scales
• Modeling of light interaction (linear and nonlinear) with nanostructured systems
• Gas sensors based on nanostructured metal oxides, fibers, carbon nanotubes graphene and new 2D Materials
• Designing and fabrication of microfluidic biosensor
• Fabrication of graphene-like electrodes for electrochemical bio sensing
• Synthesis and study of photo-catalytic materials for air and waste water treatment
• Electrochemical investigation of super capacitors
• Liquid and solid state nanostructured solar cells based on Dye, thin films, perovskite material and QDs
• Hybrid LED using Luminescent nanocrystals
• Nanostructured thin films for anticorrosion applications and memristor
• Preparation of Nanostructures for Enhanced Oil Recovery
• Oxygen impermeability in active/passive Nano composite polyethylene films

INST Laboratories:

Research in INST is conducted in the following facilities: Chemical and Physical synthesis of nanostructures Lab, Analysis and Spectroscopy Lab, Nano-biotechnology Lab, and Nano computation Lab.