Graduate Certificate in Nanotechnology in Materials Development

The department of Metallurgy, Materials and Biomedical Engineering (MMBME) is offering a new certificate program, the Graduate Certificate in Nanotechnology in Materials Development, for a minimum of 15 standard credit hours (SCH, with particular emphasis on the applications of nanotechnology in the development of advanced materials. This certificate will supplement any existing Master's Degree or any other suitable graduate-level degree at the University of Texas at El Paso (UTEP) or from another institution or be a stand-alone certificate for a professional engineer or someone majoring in another STEM (non-engineering) discipline. This could enhance the professional training and skillset for any individual and enable value addition in lieu of a Master's degree.

With widespread applications in sunscreen lotions, batteries, motorcycle helmets, water treatment, virus purification, pharmaceutical and medical devices, and the nature of matter itself, nanotechnology focuses on the minutest of components and holds great promise. Through this Certificate program, a student will acquire a deeper understanding of the basic concepts in nanotechnology and will learn to apply this knowledge for the creation of new materials and devices or help design novel solutions to address challenges in medicine, engineering and the environment.

The interdisciplinary graduate certificate will aim:

- to deepen students' understanding of the technical aspects of nanoscale science, technology and engineering;
- to encourage students to pursue related interdisciplinary course work outside of their major;
- to be flexible and allow participation by students in diverse majors;
- to familiarize students with the real and perceived societal implications of nanotechnology and other emerging technologies, including economic benefits; and
- to make familiar research-related findings and understand how this can fuel new discoveries in this field and impact our society.

Each course will have a laboratory demonstration class along with classroom instructions enabling e students to be exposed to research in this area as well. Furthermore, prior and current ongoing research will be summarized and integrated into the courses for better understanding of theoretical concepts with practical research-based examples including nanostructured metallic-, polymeric (including hydrogels) and ceramic-based systems for structural and functional applications. During the lab-demo class for each course, the students will be immersed in research groups, during which time they will learn the practical aspects of each topic. The innovation of the proposed certificate is the inclusion of different subjects such as nano-electronics, nano-biomaterials, as well as 3D printing and the processing of nanocomposites.

Program and Educational Objectives

Admission Requirements- Applicants with an UG Bachelor's degree in Science or Engineering can apply to take this certificate course. Depending on their qualifications for study, students might need to complete leveling coursework at the UG level. These leveling courses will not be counted towards the certificate.

Degree Requirements

Total SCH are a minimum of 15 and minimum GPA required for admission into this program is 3.0.

Professional commitment and interest of the applicant should be clearly demonstrated by a personal statement and a letter of recommendation (from a previous mentor, supervisor or educator).

Degree Plan

Code	Title	Hours
Select at least 15 credit hours from the following:		**15**
BME 5310	Biomaterials	
MME 5390	Special Topics (Printable Materials) [1]	
MME 5390	Special Topics (Nano Functional Physical Materials) [1]	
MME 5401	Microstruc & Microchem Charac	
MASE 6305	Adv Processing of Materials	
ECE 5343 & ECE 5141	Nanoelectronics and Laboratory for ECE 5343	
Total Hours		**15**

[1] Special Topics courses can only be taken for the subjects listed above.