NANOTECHNOLOGY SYSTEMS AND DEVICE DEVELOPMENT GRADUATE CREDIT CERTIFICATE PROGRAM

Person-in-Charge: Victor Pasko
Program Code: NANOSD
Campus(es): University Park

The goal of the program is to prepare students to develop nanotechnology-enabled components, including wearable systems for simultaneously monitoring the medical condition of the wearer and the surrounding environment. The monitored data is transmitted in real time to a local base station (e.g. smartphone) that forwards it to a remote facility for further processing and action decisions. The ultimate purpose of these systems includes medical monitoring for diagnosis of environmentally related diseases, environmental monitoring to warn that the local environment contains allergens or other factors to be avoided.

Effective Semester: Fall 2014
Expiration Semester: Summer 2019

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students) for more information.

Ordinarily, an entering student must have completed in a satisfactory manner a minimum of course work in an Engineering or Science discipline that is equivalent to a Penn State major in those areas. Applicants must have a 3.0 or higher undergraduate GPA.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-212-postbaccalaureate-credit-certificate-programs).

The exact course selection shall be determined in advance by the student and the student's adviser following the guidelines below. Students shall provide written input to their adviser describing proposed course(s) and how the courses will contribute to the requirements of the certificate. Students must receive a C or better in each course included for the certificate, and must achieve an overall 3.0 GPA for the certificate courses.

The certificate requires a minimum of 12 credits, as described below. At least 50% of the total number of credits must be taken at the 500 level.

Required Courses

Select 3 credits from the following list:
- EE 442 Solid State Devices
- EE 441 Semiconductor Integrated Circuit Technology
- EE 542 Semiconductor Devices
- MATSE 413 Solid-State Materials
- MATSE 510 Surface Characterization of Materials

Select 3 credits from the following list:
- EE 541 Manufacturing Methods in Microelectronics
- ESC 481 Elements of Nano/Micro-electromechanical Systems Processing and Design
- ESC 577 Engineered Thin Films
- MATSE/ESC 450 Synthesis and Processing of Electronic and Photonic Materials

Select at least 2 credits from the following list:
- ENGR 486 Business Opportunities in Engineering
- ENGR 411 Entrepreneurship Business Basics
- ENTR 430 Entrepreneurship and New Product Development

Electives

The balance of the required credits shall be determined in advance by the student and his/her graduate adviser. Examples of acceptable courses (a current list of potential elective courses will be maintained by and available from the head of the certificate program):
- EE 546 Field-Effect Devices
- ESC 482 Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics
- ESC 484 Biologically Inspired Nanomaterials
- MATSE 400 Crystal Chemistry
- MATSE/ESC 483 Simulation and Design of Nanostructures
- MATSE 511B Transmission Electron Microscopy
- MATSE 514 Characterization of Materials

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

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