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Penn State Offers on-line Nanotechnology Certificate Program
Courses start January 9, 2012

The College of Engineering at Penn State has announced the availability of an on-line Nanotechnology Certificate. This Certificate is composed of six 3-credit courses. The first two courses (E SC 211 and E SC 212) will be on-line in January, 2012, on Penn State’s World Campus.

The six on-line courses are open to incumbent workers with science, engineering or related degrees, as well as to students, who wish to improve their nanotechnology background knowledge and skills. The complete listing of the courses and their descriptions is at given at Nanotechnology Certificate.

The Certificate program consists of six courses (E SC 211-216). The first two courses (E SC 211 and E SC 212) will be available in January 2012, on the web and are currently open for registration. The initial course in the sequence is E SC 211 dealing with material, safety, and equipment issues in nanotechnology. An enrollee in E SC 211 must possess prerequisite entry skills (see “Prerequisite Checklist”). Enrolling in E SC 212 requires that a student have taken E SC 211 or be taking it concurrently.

The topics in E SC 211 cover safety issues dealing with nanotechnology equipment, materials, synthesis, and processing including those pertinent to glove boxes, wet benches, thermal processing tools, plasma based equipment, lithography tools, vacuum systems and pumps, gas delivery systems and toxic substance handling and detection. Specific handling procedures to be discussed will include those for nano-scale materials, corrosive, flammable, and toxic materials, biological materials, carcinogenic materials, DI water, solvents, cleaners, photo resists, developers, metals, acids, and bases.

The second course (E SC 212) is an introduction to the synthesis and fabrication involved in “top down”, “bottom up”, and hybrid nanofabrication. Topics covered include basic nanofabrication processes such as colloidal chemistry, functionalization, self-assembly, catalyzed nanoparticle growth, nanoparticle stamping, wet and dry etching, electro-chemical deposition, physical vapor deposition, and chemical vapor deposition. The course covers step-by-step descriptions of the equipment, facilities, processes, and process flows needed to fabricate devices and structures. Processing and manufacturing concerns will be discussed including process control, contamination, yield, and processing interaction. The similarities and differences in “top down” and “bottom up” equipment and manufacturing are highlighted by designing process flows for selected nano-scale systems.

The third and fourth courses (E SC 213 and E SC 214) will be offered on-line beginning in May 2012. All six courses, including the final two courses (E SC 215 and E SC 216), will available for the 2012 Fall semester.

The on-line class format is a combination of streaming video lectures, interactive lab activities, and homework. Student progress will be assessed through 4 tests, 8 homework assignments, and 7 lab activities. Grading details can be found on this link: E SC 211 Course Introduction.

The lectures can be watched via streaming video to fit the student’s schedule. Some lab activities will require a scheduled interactive session, but the majority of labs are flexible on-line tutorials scheduled to allow students to make educational progress and still attend other obligations.

To enroll, first contact the Office of Continuing and Distance Education at 814-865-7643 for admission into the course. And second, complete and submit your Registration Form via mail, fax, or in person (see the Registration Page.)

For more information about the Nanotechnology Certificate program, contact, Deb Zimmerman at dlz1@psu.edu or call toll free 1-866-570-7643.