



UCC Addendum

May 2013

Approval:

Date of circulation: May 21, 2013

Date of effective approval if no Challenge received: June 4, 2013

Agriculture and Bioresources Prerequisite Changes

The following changes should have been submitted to the May UCC for approval, rather than for information, because they involve prerequisite courses from another college.

ANBI 420.3, *Comparative Animal Endocrinology*, Prerequisite: (VBMS 324 and 325) or Biology 317 or permission of the instructor.

Change to Biology 224.3 and 60 credit units, or permission of the instructor.

BPBE 434.3, *Economic Methods of Project Analysis*, Prerequisite: BPBE 315.3 and ECON 214.3 or permission of the instructor

Delete ECON 214.3

EVSC 420.3, *Environmental Fate and Transport of Toxic Substances*, Prerequisite: Math 104 or 110; Physics 115 or EVSC 210; successful completion of 60 credit units.

ADD Math 125 as an option with Math 104 and 110.

PLSC 240.3, *Plant Metabolism*, Prerequisite: Biology 120 and 121 and one of Chem 250 or BMSC 200.

Delete Biology 121 from the list of prerequisites.

Graduate Studies & Research New Courses

PHYSICS

New Graduate Course

PHYS 816.3 – Electrodynamics

Prerequisites/ Restrictions: an undergraduate Electromagnetics course or equivalent

Calendar Description: This course provides advanced treatment of electromagnetic waves in matter, radiation and relativistic electrodynamics.

Rationale: In recent years, diversity of research fields and that of students entering programs in our department have increased dramatically. While all graduate students require fundamental

training in electrodynamics, some students with research in areas related to electromagnetic theory require much higher levels of competence in this subject. Another category of students, who specialize in areas other than electrodynamics, e.g. synchrotron, material science, nuclear science, etc. require specialized courses in their discipline, without having to get a deeper understanding of electrodynamics. The existing PHYS 812 along with the proposed PHYS 816 cater to the needs of these two categories of students. PHYS 816 will be a required course for all graduate students unless a similar course was taken at graduate or senior undergraduate level at our University or elsewhere. For M.Sc. and Ph.D. students in areas other than electrodynamics, this will be the only required course in electrodynamics. PhD. students who specialize in areas requiring electrodynamic theory will have better background preparation before they move into the advanced PHYS 812, which will be focused specifically for their needs dealing with electromagnetic theory.

New Graduate Course

PHYS 873.3 – Statistical Mechanics

Prerequisites/ Restrictions: an undergraduate course in Statistical Mechanics and Quantum Mechanics

Calendar Description: Three basic ensembles of both classical and quantum statistical mechanics are reviewed, and Fermi and Bose systems are studied. Critical phenomena and various tools of analysing phase transitions are discussed in detail.

Rationale: This course will be used to enhance the knowledge and skills of graduate students in the general subject of Statistical Mechanics which is important for a number of new research areas in the Department, particularly material science and synchrotron sciences.

New Graduate Course

PHYS 886.3 – Relativistic Quantum Mechanics

Prerequisites/ Restrictions: PHYS 883.3 or PHYS 481.3 or equivalent

Calendar Description: The course continues the study of topics in advanced quantum mechanics with a focus on relativistic quantum mechanics: Quantization of electromagnetic fields, photon emission and absorption, scattering of photons, Klein-Gordon equation, Dirac equation, non-relativistic limit of the Klein-Gordon and Dirac equations, relativistic corrections to the Schrodinger equation, quantization of the Klein-Gordon and Dirac fields, and scattering cross sections in quantum electrodynamics.

Rationale: Compatibility and competitiveness of our graduate programs in Physics and Engineering Physics requires us to offer 6 credit units on Quantum Mechanics. This course will complement our existing course PHYS 883.3 (which focuses on non-relativistic quantum theory) to meet this requirement. This course will provide foundational training for Ph.D. students specializing in theoretical physics, cosmology, and particle physics.

Graduate Course Modification (for information only)

PHYS 812.3 – Electromagnetic Theory

Current Prerequisites/ Restrictions: None.

Proposed Prerequisites/ Restrictions: PHYS 816.3 or equivalent

Rationale: New graduate course PHYS 816 is an intermediate graduate course in electrodynamics which will serve as a preparatory course for Ph.D. graduate students taking PHYS 812.