Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please Indicate

X NEW
MODIFY
DELETE

Local Unit
Physics and Astronomy
Graduate Council Approval Date

Course Abbreviation
PHYS
Course Number 722

Full Course Title
Classical Electrodynamics II

Abbreviated Course Title
C L S C L I E L E C T R O D Y N A M I C S I I I

Credit Hours
3
Program Record
PhAE

Repeatable for Credit

D = Yes, not within same term
T = Yes, within the same term
X N = Cannot be repeated for credit
Up to ________ hours
Up to ________ hours

Activity Code
X Lecture (LEC)
Lab (LAB)
Radiation (RCT)
Seminar (SEM)

Studio (STU)
Internship (INT)
Independent Study (IND)

Catalog Format
3 : 3 : 0
Course Level
GF (500 - 600)
X GA (700+)

Maximum Enrollment
20
For New courses, first term offered
209676

Catalog Description (35 words or less). Please use catalog format and attach a copy of the syllabus for new courses.

Advanced topics in electrodynamics, radiation, scattering and diffraction, special relativity, relativistic particle dynamics, Lorenz transformation, 4-vectors, transformation of fields, charges and currents, Thomas precession, retarded potentials, and radiation from moving charges.

For MODIFIED or DELETED courses as appropriate:

Last term offered
Previous course abbreviation
Previous number

Description of Modification

APPROVAL SIGNATURES

Submitted by
Rickie Mahoney
email rickie@gmu.edu

Department / Program

Date 10-15-05

College Committee

Date

Graduate Council Representative

Date
Graduate Course Proposal

I. Course Designation: Classical Electrodynamics II

II. Catalog description: (see PHYS 522)
   a. Course Designation: Physics 722 - Classical Electrodynamics II
   b. Credit Hours: 3
   c. Prerequisites: Physics 622 or permission of the instructor
   d. Description: This course deals with advanced topics in electrodynamics, including radiation, scattering and diffraction, special relativity, relativistic particle dynamics, Lorenz transformation, 4-vectors, transformation of fields, charges and currents, Thomas precession, retarded potentials, and radiation from moving charges.

V. Justification of the Proposal:
   a. Course objectives: For graduate students to master the physical principles in advanced electrodynamics, thus giving them a firm foundation upon which to base their research in physics.
   b. Necessity or desirability of adding this course: Electrodynamics is one of the foundation courses in every graduate physics program throughout the country. This is the second course in a two semester sequence covering the classical topics of electrodynamics.
   c. Relationship of this course to any similar course: This course is unlike any other course which is offered at George Mason.

IV. Departmental Recommendations:
   a. Department: Physics and Astronomy
   b. Date: 10.07.05
   c. Possible Instructors: Professors Karen Sauer, Neil Goldman

V. Semester and Year for Planned Initial Offering: Spring Semester 2007

VI. Sample Student Syllabus:
   a. Course Designation: Physics 622 - Classical Electrodynamics I
   b. Proposed Course Content (for a fourteen week semester)
      i. Radiating systems, Jackson Chapter 9
      ii. Scattering, Jackson Chapter 10
      iii. Diffraction, Jackson Chapter 10
      iv. Special Theory of Relativity, Jackson Chapter 11
      v. Relativity and Electromagnetic Fields, Jackson Chapter 11
      vi. Dynamics of Relativistic Particles and Electromagnetic Fields, Jackson Chapter 12
      vii. Lagrangian and Hamiltonian Formation, Jackson Chapter 12
      viii. Midterm
      ix. Collisions, Energy Loss, and Scattering of Charged Particles, Jackson Chapter 13
x. Cherenkov and Transition Radiation, Jackson Chapter 13
xi. Radiation by Moving Charges, Jackson Chapter 14
xii. Bremsstrahlung, Jackson Chapter 15
xiii. Method of Virtual Quanta, Chapter 15
xiv. Radiating Damping, Jackson Chapter 16

c. Reading and Reference Materials

d. Grades will be determined by evaluation of midterm, final, and homework.