**MCS New Course Proposal Form**

**Course Title:** Introduction to Differential Equations

**Instructors:**

**Course Number:** 21-632  
**Cross Listing:** Click here to enter text.

**Prerequisites/Corequisites:** None

**Semesters Offered:**
- X Fall  
- ☐ Spring  
- ☐ Summer-All  
- ☐ Summer 1  
- ☐ Summer 2

**Semester Length:**
- ☐ Mini 1  
- ☐ Mini 2  
- ☐ Mini 3  
- ☐ Mini 4  
- X Full Semester

**Course Offering Frequency:** Yearly.

**Suggested Days and Times:** MWF any time.

**Course Evaluation type:** X Letter Grade  
☐ Pass/Fail

**Course Unit Justification:**
- **Total Units:** 12
  - In Class Hours: 3  
  - Recitation Hours: 0  
  - Lab Hours: 0.  
  - Out of Class Hours: 9

**Target Population:** First year graduate students in mathematics, physics, and engineering. Advanced undergraduates with a strong background in analysis.

**Anticipated Enrollment:** 15

**Rationale for Course (Background):** The Applied Analysis Graduate Curriculum Committee has been appointed to examine the graduate curriculum for students in the Ph.D. Program in Mathematical Sciences specializing in applied analysis.

Differential equations are of fundamental importance in mathematics and applied sciences. This new course is intended to serve as a broad introduction to the subject, accessible to a wide audience including advanced
undergraduates. The existing courses (21-732 and 21-832) offered by the department require a greater degree of mathematical sophistication and technical background, and are necessary preparation for students pursuing research in applied analysis. The proposed course will serve as a bridge to the existing courses.

**Special Facilities Needed:** None

**Textbooks and/or Other Materials:** None.

**Assessment:** Homework and written examinations.

**Topics Covered:** Essentials of Ordinary Differential Equations. Origins of Partial Differential Equations. Study of model problems, including the Poisson and Laplace equations, the heat equation, the transport equation, and the wave equation.

**Course Catalog Description:** This course serves as a broad introduction to Ordinary and Partial Differential Equations for beginning graduate students and advanced undergraduate students in mathematics, engineering, and the applied sciences. Mathematical sophistication in real analysis at the level of 21-355/356 is assumed.

Topics include: essentials of Ordinary Differential Equations, origins of Partial Differential Equations, the study of model problems including the Poisson and Laplace equations, the heat equation, the transport equation, and the wave equation.

**Learning Objectives:** Students will learn the fundamental techniques in ordinary and partial differential equations and develop a thorough understanding of important model equations. Students will enhance their ability to read, write, and understand mathematical proofs.

**Departmental Approval Date:** Click here to enter text.

**CUA Recommendation Date:** Click here to enter text.

**College Council Approval Date:** Click here to enter text.

**Date Sent to Enrollment Services:** Click here to enter text.

**Comments:** Click here to enter text.
* Please attach a copy of the proposed syllabus