

**New Course Request**

**Indiana University**

South Bend Campus

Check Appropriate Boxes: Undergraduate credit  Graduate credit  Professional credit

1. School/Division Liberal Arts and Sciences 2. Academic Subject Code MATH  
3. Course Number M209 (must be cleared with University Enrollment Services) 4. Instructor Mathematics Faculty  
5. Course Title Technical Calculus II

Recommended Abbreviation (Optional) \_\_\_\_\_  
(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): \_\_\_\_\_

7. Credit Hours: Fixed at 3 or Variable from \_\_\_\_\_ to \_\_\_\_\_

8. Is this course to be graded S-F (only)? Yes \_\_\_\_\_ No X

9. Is variable title approval being requested? Yes \_\_\_\_\_ No X

10. Course description (not to exceed 50 words) for Bulletin publication: P: M208 or M215. This is the second semester of differential and integral calculus for today's technology students. It covers application of the integral, limit techniques, integration techniques, infinite series, differential equations, and the Laplace transform. The approach is semi-rigorous with emphasis on the applications of calculus to technology.

11. Lecture Contact Hours: Fixed at 3 or Variable from \_\_\_\_\_ to \_\_\_\_\_

12. Non-Lecture Contact Hours: Fixed at \_\_\_\_\_ or Variable from \_\_\_\_\_ to \_\_\_\_\_

13. Estimated enrollment: 30 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: Twice per yr. Will this course be required for majors? No

15. Justification for new course: Can satisfy calculus requirement for the BS in Computer Science. Also, it can satisfy calculus requirement for the Purdue Technology program students.

16. Are the necessary reading materials currently available in the appropriate library? Yes

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant. No, however, credit will not be given for M209 and M120 or M209 and M216.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:

Approved by:

[Signature] Date 9/6/02  
Department Chairman/Division Director

[Signature] Date 11/22/02  
Dean

[Signature] Date 2/02/03  
Dean of Graduate School (when required)

\_\_\_\_\_  
Chancellor/Vice-President

\_\_\_\_\_  
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

**Technical Calculus II**  
**M209**

**(3 credit hours)**

Morteza Shafii-Mousavi

Proposed August 12, 2002

For some years, Purdue Technology students on our campus have taken M119 and M120 to satisfy their calculus requirements. Since these courses were designed originally to serve business majors and social science students, our department, in consultation with the Purdue Technology faculty, has designed two new courses (M208 & M209) that will better meet those students' needs. These courses can also be used by computer science majors to fulfill their recently revised calculus requirements.

M209 is the second semester of differential and integral calculus series for *today's* technology students. It covers application of the integral, limit techniques, integration techniques, infinite series, differential equations, and the Laplace transform. The approach is semi-rigorous with emphasis on the applications of calculus to technology.

**Course Prerequisite:** M208

**CONTENTS**

**Applications of the Integral**

- Volumes of Revolution: Disk, Washer Method, and Shell Method
- Centroids
- Moments and Inertia
- Work and Fluid Pressure

**Limit Techniques**

- Indeterminate Forms
- L'Hospital's Rule and its variations

**Integration Techniques**

- Power Formula Integration using Substitution
- Integration of Logarithmic and Exponential Functions
- Integration of Trigonometric Functions
- Use technology to perform integration Limits and derivatives

**Introduction to Infinite Series**

- Maclaurin Series
- Computing using Maclaurin and Taylor Series

**Differential Equations**

- Introduction to Differential Equations
- Solving Differential Equations using Separation of Variables
- First - Order Linear Differential Equations
- Technical applications of First-Order Differential Equations
- Higher-Order Homogeneous Differential Equations
- Auxiliary Equations with Repeating and Complex Roots

**The Laplace Transform**

- Laplace transforms and Partial Fractions
- Solution of Linear Equations by Laplace Transforms

**Textbook:** Technical Calculus with Analytic Geometry, Third Edition, by Peter Kuhfittig