

New Course Request

Indiana University

South Bend Campus

Check Appropriate Boxes: Undergraduate credit [X] Graduate credit [] Professional credit []

1. School/Division Liberal Arts and Sciences 2. Academic Subject Code MATH
3. Course Number M208 (must be cleared with University Enrollment Services) 4. Instructor Mathematics faculty
5. Course Title Technical Calculus I

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: M115 or M125 and M126
An introduction to differential and integral calculus for today's technology students. It covers analytic geometry, limits, derivatives, applications of the derivatives, the integrals, and transcendental functions and technical applications. 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 and AS 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 M208 and M119 or M208 and M215.

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: Department Chairman/Division Director Date 9/6/02

Dean of Graduate School (when required) Date 2/2/03
Chair, Senate Curriculum Committee

Approved by: Dean Date 11/22/02

Chancellor/Vice-President Date

University Enrollment Services Date

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 I
M208**

(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.

M208 is an introduction to differential and integral calculus for *today's* technology students. It covers analytic geometry, limits, derivatives, applications of the derivatives, the integrals, and transcendental functions and technical applications. The approach is semi-rigorous with emphasis on the applications of calculus to technology.

Course Prerequisite: M115 or (M125 and M126)

CONTENTS

Introduction to Analytic Geometry

- The Cartesian Coordinate System and Distance Formula
- The Slope of a line
- The Equation and Graph of a line
- Curve Sketching [intercepts, symmetry, asymptotes, and extent]

Limits and derivatives

- Definition of a Function
- Definition and Computation of Limits
- Definition of the Derivative
- Computing the Derivative from the Definition
- Power Rule
- Instantaneous Rates of Change: Technical Applications
- Product, Quotient, and Generalized Power Rules
- Higher Derivatives

Application of the Derivatives

- Equations of the Tangent and Normal Lines to a Curve.
- The First-Derivative Test
- The Second-Derivative Test
- Technical Applications of Minima and Maxima
- Related Rates and Applications
- Differentials and Applications

The Integral

- Antiderivatives
- Find the Area under a Curve by using Limits
- The Fundamental Theorem of the Calculus
- Definition of the Definite Integral
- Basic Integration Formulas
- Area Between Curves
- Improper Integral

Derivatives of Transcendental Functions

- Derivatives of Trigonometric Functions
- Derivative of the Logarithmic Functions
- Derivative of the Exponential Functions
- Technical applications

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