New Course Request

Check Appropriate Boxes:

- Undergraduate credit [X]
- Graduate credit [ ]
- Professional credit [ ]

1. School/Division: Purdue School of Science
2. Academic Subject Code: MATH

3. Course Number: 231 (must be cleared with University Enrollment Services)
4. Instructor: L. Rubchinsky

5. Course Title: Calculus for the Life Sciences I

Recommended Abbreviation (Optional): (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2007

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: 154 or 159 (with a minimum grade of C-) or equivalent and one year of geometry. Limits, derivatives, and applications. Exponential and logarithmic functions. Integrals, antiderivatives, and the Fundamental Theorem of Calculus. Examples and applications are drawn from the life sciences.

11. Lecture Contact Hours: Fixed at [ ] 3 [ ] or Variable from ________ to ________

12. Non-Lecture Contact Hours: Fixed at [ ] 0 [ ] or Variable from ________ to ________

13. Estimated enrollment: [ ] 35 [ ] of which [ ] 0 [ ] percent are expected to be graduate students.

14. Frequency of scheduling: Semester [ ] Will this course be required for majors? [ ]

15. Justification for new course: A calculus course for life sciences rather than the physical sciences.

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.

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:

[Signature]
Department Chairman/Division Director

Date 1/10/07

Approved by:

[Signature]
Dean

Date 2/10/07

Dean of Graduate School (when required)

Date

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.

UPS 724

University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow;
Department/Division—Pink; University Enrollment Services Advance—White
MATH - 231

Course Syllabus

General Information

Text: Marvin L. Bittinger, Neal Brand, John Quintanilla
      Calculus for the Life Sciences
      Addison Wesley, 2006

Calculator: A scientific calculator. **Graphing calculators are not allowed**

Prerequisites: Math 154 or 159

Additional information can be found on the Math Home Page
http://www.math.iupui.edu

Course Objective

The objective of Math 231 is to provide a solid, practical, working knowledge of calculus and its applications to various scientific and technical fields. Particular attention is focused on applications in the Life Sciences.

Course Outline

1. Introduction to Functions and Graphs
2. The Trigonometric Functions
3. Basic Trigonometric Relations
4. Limits
5. Continuity
6. Average Rate of Change of a Function
7. The Derivative as the Slope of a Tangent Line
8. The Derivative as an Instantaneous Rate of Change
9. Growth and Decay
10. Derivatives of Polynomials, Products and Quotients of Functions
11. Derivatives of Trigonometric Functions
12. Derivative of a Power of a Function
13. The Chain Rule
14. Higher Derivatives
15. Maximum and Minimum Values
16. Using Derivatives in Curve Sketching
17. Applied Maximum and Minimum Problems, Optimization
18. Approximation of Values Using Derivatives
19. Implicit Differentiation
20. Related Rate Problems
21. Exponential Functions
22. Logarithmic Functions
23. Applications to Growth and Decay
24. Differentiation of Exponential and Logarithmic Functions
25. Antiderivatives
26. Indefinite Integrals
27. Areas and Accumulations
28. The Fundamental Theorem of Calculus
29. Definite Integrals and Their Properties
30. Basic Integration Formulas
31. Integration Methods, Substitution, Integration by Parts
32. Integration Using Tables and Computers
33. Areas and Volumes by Integration
34. Improper Integrals
MATH - 231

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