NEW COURSE –OR– REVISION TO EXISTING COURSE PROPOSAL

Please use this form to: add a new course, or to revise the title or content of an existing course, including changes to co-requisite and pre-requisite unit values.

Before you proceed, please review the approval process in advance and leave time for each involved person or committee to review the proposal.

DATE: November 26, 2006
DEPARTMENT/SCHOOL: Mathematics, College of the Pacific
CONTACT PERSON: Walter Zimmermann
PHONE: 6-3087
BLDG & ROOM NO: CR 101-C

New Courses: Please complete this entire section (items 1-18)
Revisions to Courses: Please complete items 1-4 and only those items 5-18 that are being revised.

1. Please complete a. or b., not both.
   a. New Courses:
      • Proposed Course Subject/Number/Title/Prerequisites/Units (e.g., HIST 035: History of... : prerequisites - none : 4 units):

   For approval of new course numbers: Send the request to this email: registrar@pacific.edu. The request needs to include the department, the course title, and a suggested discipline & number. Please attach the email approving the new course number to this proposal.

   b. Revision to Existing Course:
      • Current Course Subject/Number/Title/Prerequisites/Units (e.g., HIST 035: History of... : prerequisites - none : 4 units):

         MATH 152 – Applied Analysis. Prerequisites: MATH 55. (4)

      • Proposed new Course Subject/Number/Title/Prerequisites/Units (if applicable):

         MATH 152 – Vector Analysis. Prerequisites: MATH 55. (4)

2. Please attach syllabus with all required elements, including course learning objectives, (see Faculty Handbook 11.7 for Syllabus requirements).
3. Please provide the copy as it is to appear in the catalog. This includes the course description, specific prerequisites, co-requisites, and any restrictions on registration (e.g., majors only). Note: Unless indicated here, a passing grade for a prerequisite course is considered a "D."

CATALOG COPY:

MATH 152. Vector Analysis (4)


DEGREE AUDIT INFORMATION

4. Does this course satisfy undergraduate General Education requirements?  
   □ No  □ Yes  
   If yes, what area does it satisfy (e.g. IA)?

5. Was this course ever offered under a Special Topics number?  
   □ No  □ Yes  
   If yes, provide info below.
   
<table>
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<th>Special Topics Subject/Course #</th>
<th>Last year taught</th>
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<tbody>
<tr>
<td>Course title</td>
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6. Does this course fulfill General Education or major requirements for your program?  
   □ No  □ Yes  
   If yes, then what area/requirement does it fulfill?

   This course is acceptable as an elective for the B.A. or B.S. in Mathematics and the B.S. in Applied Mathematics.

7. Does this course fulfill undergraduate minor requirements for your program?  
   □ No  □ Yes  
   If yes, then what area/requirement does it fulfill (e.g. upper division elective)?

   This course is acceptable as an elective for the Mathematics minor and the Applied Mathematics minor.

REGISTRATION INFORMATION

8. Units: 4
9. Grading options available to students who enroll (check all that apply):
- [X] Letter (A-F)
- [ ] Pass/No Credit
- [ ] Audit

10. Schedule Type (check all that apply):
- [X] Lecture
- [ ] Lab
- [ ] Discussion
- [ ] Seminar
- [ ] Research/Independent Study
- [ ] Thesis/Doctoral Project
- [ ] Internship, Co-op, Fieldwork
- [ ] Applied Music
- [ ] Studio Instruction
- [ ] Activity Course
- [ ] Practicum
- [ ] Correspondence
- [ ] Other
- [ ] On-line

11. Expected Enrollment: 8 - 12

12. Is a special fee to be charged?
- [X] No
- [ ] Yes
  If yes, list the charge and fee code:
  - [ ] Per unit
  - [ ] Flat fee

RELATIONSHIP TO OTHER COURSES

13. Is this course cross-listed with others?
- [X] No
- [ ] Yes
  If yes, which courses?

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14. Course Similarities
   a. Is this course similar in content to course(s) in another school or department?
   - [X] No
   - [ ] Yes
   If yes, which course(s)?

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   b. If yes, how is this course distinctive?

15. Will other courses be deleted as a result of this proposal when this course is created?
   (Note: if course is still being taught in the future do not delete it here.)
   - [ ] No
   - [ ] Yes
   If yes, which course(s)?

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16. Is the deleted course cross-listed with other courses?
- [ ] No
- [X] Yes
  If yes, which course(s)?
17. What is the anticipated impact on resources (e.g., faculty, funds, facilities, library, technology, etc.)

None

18. Will University computer labs be needed?

☐ No ☐ Yes

If yes, what software will be needed?

Please remember to make the corresponding changes to your program's catalog copy when you receive page proofs for next year's catalog.

NEW COURSE —OR— REVISION TO EXISTING COURSE PROPOSAL

APPROVAL SHEET

DATE: November 26, 2006

DEPARTMENT/SCHOOL: MATHEMATICS, COLLEGE OF THE PACIFIC

CONTACT PERSON: Walter Zimmermann

PHONE: 6-3087

BLDG & ROOM NO: CR 101-C

Please obtain signatures in the order they appear below, as applicable.

1. ☐ DEPARTMENT CHAIR: [Signature] DATE: 12/15/06

2. ☐ CHAIRS OF OTHER INVOLVED DEPARTMENTS (if applicable): [Signature] DATE: 

3. ☐ CHAIR, SCHOOL/COLLEGE CURRICULUM COMMITTEE: [Signature] DATE: 12-20-06

4. ☐ DEAN OF SCHOOL/COLLEGE: [Signature] DATE: 12-20-06

5. ☐ GENERAL EDUCATION COMMITTEE (if applicable): [Signature] DATE: 

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6. □ DEAN OF THE LIBRARY: [Signature]  DATE: 12/31/06

7. □ DIRECTOR, EDUC. TECH. SERVICES (if computer lab, software needed):
   N/A  DATE: ________

8. □ GRADUATE STUDIES COMMITTEE (if applicable):
   N/A  DATE: ________

9. □ REGISTRAR: [Signature]  DATE: 1-07-07

□ ACADEMIC AFFAIRS COMMITTEE:  DATE: ________
Math 152. Vector Analysis.

Instructor: ____________________________

Class Schedule: ____________________________

Office hours: ____________________________

Text: H.M. Schey, Div, Grad, Curl and all that. (Fourth Edition). You will also need a standard multivariable calculus textbook, such as the text you used for Calculus III. If you don't have this book, let me know. I may be able to find one to lend you.

Calculators: A graphing calculator is required. Calculators will be required for some homework assignments and some quizzes. Calculators will not be used on exams.

Prerequisites: To take Math 152 you must have passed Math 55, Calculus III, at UOP, or an equivalent course elsewhere, with a grade of C- or above. It is Mathematics Department policy to enforce prerequisites. If you are in doubt about whether you qualify, please check with me right away.

Assignments: Problems will be assigned daily and will be collected. Selected problems will be graded. Quizzes may be based on homework problems (see below).

Quizzes: There will be frequent short quizzes. Quizzes may be given at the beginning of the period or the end, and will take about 10 minutes. These will generally be unannounced. Quizzes will usually be based on recent homework problems, textbook examples or examples from recent lectures. The lowest 25% of your quiz scores will be dropped. (E.g. if there are 16 quizzes, your lowest 4 scores will be dropped). This policy makes allowance for occasional absences. There will be no make-up quizzes.

Exams: Exams are scheduled as follows:

Exam I:

Exam II:

Final Exam:

If you cannot attend an exam due to illness, you must discuss this with me before the time of the exam (by phone, if necessary). If you fail to do so, you may get a score of zero on the exam. If you have any questions about your score on an exam, you should present these within a week after the exam is returned.

Please keep all of your returned exams and quizzes. They will be very useful for review purposes. Also, if you feel there has been an error in recording your grades, this may only be corrected if you have the relevant papers.
Grading guidelines

Two exams (100 points each): 200 points
Quizzes: 100
Final exam: 200
Assignments 50
Participation 25
TOTAL: 575 points

90% - 100% A
75 - 89% B
60 - 74% C
50 - 59% D
< 50% F

Note: This scale is a guideline. I reserve the right to make minor adjustments.

The last day to drop is October 18.

Student expectations. Class activities -- lectures, problem solving, discussion, quizzes, etc. -- will be critical for your success in the class. Regular attendance is a course requirement. If you are frequently absent, I’ll confer with you about this. If absences continue, you may be required to drop the course, or a grade penalty may be assigned. Exceptions may be made in case of special circumstances.

This is a small class, allowing for participation and discussion. Your active participation is strongly encouraged. My evaluation of your participation will make up 25 points of your grade (out of 525 points).

Academic Honesty. The first course requirement is to participate conscientiously and honestly, and to follow the University Honor Code. Cheating is unacceptable. Any student found to have cheated may receive an F in the course. The matter will also be referred to the Dean of Students, and to the student’s academic dean, for any further action they may consider appropriate.

General course objectives:

1. To consolidate and extend your understanding of topics from Calculus III, including concepts of vectors, curves and surfaces in 3-dimensional space, the directional derivative and the gradient, double and triple integrals, and cylindrical and spherical coordinates.

2. To introduce and explore the concept of a vector field and its applications.

3. To develop the main topics of vector differential calculus, including the gradient of a scalar field and the divergence and curl of a vector field.

4. To develop the main topics of vector integral calculus, including line integrals, surface integrals, Stokes Theorem, the Divergence Theorem and related topics.

5. To explore the applications of these mathematical concepts and principles. Applications selected from the theory of electricity and magnetism and fluid dynamics.

More specific objectives are reflected by the course outline, below:
Course Outline

Unit I: Preliminaries

1. Vectors and vector algebra
2. Lines and planes
3. Vector functions and parametric equations
4. Cylindrical and spherical coordinates
5. Vector fields
6. The gradient; gradient fields
7. Parametric surfaces

First exam

Unit II: The Divergence and the Curl; Integral Theorems. (Chapter II and III)

1. Surface Integrals
2. The Divergence
3. The Divergence Theorem
4. Line Integrals
5. The Curl
6. Stokes’ Theorem
7. Vector identities

Second exam

Unit III. Further topics and applications

1. Path Independence
2. The potential function
3. Conservative fields
4. Applications to Electromagnetic Theory. Maxwell’s Equations

Final Exam: