

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No. ^{18-9b.} 09-36d.	UWUCC Action-Date: AP-11/17/09	Senate Action Date: App 10-5-10
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Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit Mathematics	Phone 724-357-2608

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply) <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input checked="" type="checkbox"/> Course Revision <input type="checkbox"/> Course Number and/or Title Change <input checked="" type="checkbox"/> Catalog Description Change	
MATH 480 Senior Seminar	
<i>Current Course prefix, number and full title</i>	<i>Proposed course prefix, number and full title, if changing</i>
2. Additional Course Designations: check if appropriate <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course.	
3. Program Proposals <input type="checkbox"/> New Degree Program <input type="checkbox"/> Program Title Change <input type="checkbox"/> Program Revision <input type="checkbox"/> New Minor Program <input type="checkbox"/> New Track	
<i>Current program name</i>	<i>Proposed program name, if changing</i>
4. Approvals	
Department Curriculum Committee Chair(s)	<i>Kentley J. Burk</i> 4/22/09
Department Chair(s)	<i>[Signature]</i> 4/21/09
College Curriculum Committee Chair	<i>[Signature]</i> 10/16/09
College Dean	<i>Mary Zimmerman</i> 10/19/09
Director of Liberal Studies *	
Director of Honors College *	
Provost *	
Additional signatures as appropriate: (include title)	
UWUCC Co-Chairs	<i>Gail Schuist</i> 9-22-10

* where applicable

Part II. Description of Curricular Change

1. Syllabus of Record

I. Catalog Description

MATH 480 Senior Seminar

3c-01-3cr

Prerequisites: Senior Status 91+ credits

Assesses the effectiveness of the mathematics curriculum and provides mathematics majors with a culminating mathematical experience. In addition, the course will focus on synthesizing mathematics skills while researching, developing, and presenting a mathematical topic. Students will solve practical problems, use various mathematical software packages, give oral presentations, and prepare technical reports.

II. Course Outcomes:

Students will be able to:

1. demonstrate written and oral presentation skills
2. demonstrate the ability to apply skills learned in a variety of courses to solve problems
3. demonstrate mastery of core mathematics concepts
4. demonstrate ability to read and understand mathematical research
5. improve independent self-learning skills
6. solve practical problems
7. demonstrate competency in an experience similar to a professional working environment
8. develop expertise beyond basic knowledge in some area of mathematics

III. Course Outline

This course is discussion, project and assignment driven. It will be run in seminar style, with students providing the majority of the content. The semester will be structured as follows:

1. Introduction (3 academic hours)
 - i.) Discussion of the nature of mathematics.
 - ii) Discussion of interrelationships within mathematics and across the arts and sciences.Students will do short presentations on various areas of mathematics and applied mathematics based on their investigation.
2. Group work on an open ended problem. (6 academic hours)
 - i) Group presentation of results to the class
 - ii) Peer review of group members addressing ethical and behavioral consequences of individuals' decisions and actions
3. Discussion of mathematical extension, generalization and related problems (3 academic hours)
 - i) Motivate students to read and understand mathematics at a higher level
 - ii) Require a formal written and oral proposal for student research project (Feedback from the instructor)
4. Student presentations on self-selected mathematical research papers (3 academic hours)
 - i) Require a written summary exhibiting intellectual honesty

5. Student Research Project (21 academic hours)
 - i) Oral report on preliminary results and progress
 - ii) Draft of the final written report (Feedback from the instructor)
 - iii) Discussion of presentation skills and techniques toward different audiences (with or without mathematical background)
 - iv) Stress the importance of concisely presenting the problem or results visually using software packages as appropriate
 - v) Final Oral Presentation of individual student research project and written report

6. Program assessment (3 academic hours)
 - i) Completion of standardized mathematical content exam.
 - ii) Discussion of program effectiveness, jobs, perceived preparation and evaluation

7. Career Preparation (3 academic hours)
 - i) Create and/or refine resume
 - ii) Explore employment resources

Presentations of the Student Research Project will also occur during the final exam period.

IV. Evaluation Methods

The seminar is graded on participation and successful completion of assignments and projects. Participation in the standardized exam is required, but the score is not factored into the course grade. The final grade will be determined as follows:

Writing Assignments	20%
(Summary for a research paper, Research project: proposal, draft for final report, final report)	
Problem assignments	25%
Oral presentations	45%
(One individual presentation on various areas, One group presentation, Individual research project: oral proposal, oral report on progress, formal final presentation)	
Participation/Group discussion contribution	10%

V. Grading Scale

Grading Scale: A: $\geq 90\%$ B: 80-89% C: 70-79% D: 60-69% F: $< 60\%$

VI. Attendance Policy

Although there is no formal attendance policy for this class, student learning is enhanced by regular attendance and participation in class discussions.

[Note: It is recommended that an attendance policy be developed by individual faculty and included in student syllabi. (See undergraduate catalog for Undergraduate Course Attendance Policy.)]

VII. Required textbooks, supplemental books and readings

Mathematics journals available in the library, either traditional bound volumes or electronic versions

VIII. Special resource requirements

None.

IX. Bibliography

Readings on the nature of mathematics taken from

Hersh, R. and Davis P., "The Mathematical Experience" Houghton Mifflin, 1981.

Other material will be from current mathematical journals. For example:

American Mathematical Monthly, Mathematical Association of America

College Mathematics Journal, Mathematical Association of America

Journal of the American Statistical Association, American Statistical Association

Journal of Computational and Graphical Statistics, American Statistical Association

Mathematics Magazine, Mathematical Association of America

SIAM Journal on Applied Mathematics, Society for Industrial and Applied Mathematics

SIAM Journal on Optimization, Society for Industrial and Applied Mathematics

SIAM Review, Society for Industrial and Applied Mathematics

2. Summary of the proposed revisions.

We propose to change this course from a one credit course that involved student readings and assessment of our program to a three credit course that still does these things but also gives students a fuller culminating experience. Students will research, develop, and present an independent project.

In the course outline, topics 2, 3, and 5 are new to the course.

3. Justification/rationale for the revision.

This course is designated for mathematics and applied mathematics majors and is designed as their capstone experience. It is extremely important for Applied Mathematics students who do not have internship experience. The primary focus of this course is student research and project presentation, similar to that which they would gain in a traditional internship. Since the focus is on student research, this will benefit Mathematics students as well.

4. Old syllabus of record.

Unable to locate.

Course Analysis Questionnaire

Even though this is not necessary for a course revision, we feel the revision is significant enough to warrant its inclusion.

A. Details of the Course

A1. How does this course fit into the programs of the department? For which students is the course designed? (majors, students in other majors, liberal studies). Explain why this content cannot be incorporated into an existing course.

This course is designated for mathematics and applied mathematics majors and is designed as their capstone experience. It is extremely important for Applied Mathematics students who do not have internship experience. The primary focus of this course is student research and project presentation, similar to that which they would gain in a traditional internship. Since the focus is on student research, this will benefit Mathematics students as well.

A2. Does this course require changes in the content of existing courses or requirements for a program? If catalog descriptions of other courses or department programs must be changed as a result of the adoption of this course, please submit as separate proposals all other changes in courses and/or program requirements.

Yes

A3. Has this course ever been offered at IUP on a trial basis (e.g. as a special topic) If so, explain the details of the offering (semester/year and number of students).

Not in this form. This course has been offered previously as a 1 credit course.

A4. Is this course to be a dual-level course? If so, please note that the graduate approval occurs after the undergraduate.

No

A5. If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student? Who will make this determination and by what procedures?

No

A6. Do other higher education institutions currently offer this course? If so, please list examples (institution, course title).

Southern Utah University

Math 4990 Capstone Seminar 3 credits

Description: The seminar gives the students the opportunity to research and write a mathematical paper, and make oral presentations of the results. The course will develop the student's research skills and ability to write and present mathematical topics. Projects that solve mathematical problems posed by external sponsors from industry are encouraged.

Southern Polytechnic State University

Math 4451 Capstone Mathematics Project 3 credits

This capstone course gives students the opportunity to pursue a course of independent study/research. Each student works under the guidance of a faculty member on a project containing significant mathematical content. Written and oral presentations of findings are required.

South Dakota State University

MATH 401 Senior Capstone and Advanced Writing

(Two Semester Course, 1 credit each semester)

Two semester course: In the first semester, students will carry out activities which are designed to refresh mathematics skills and develop skills such as research, writing, and presenting which will prepare them for the second semester in which they will write a major paper under faculty supervision and given a presentation based on that paper.

Bryant University

MATH 490 - Applied Mathematics and Statistics Capstone Seminar 3 cr

The students will be required to research and write an applied mathematical or statistical thesis, and make oral presentations of the results. This course will develop the student's research skills and ability to write and present applied mathematical or statistical topics. Projects that solve problems of an interdisciplinary nature are encouraged. Prerequisite: Senior standing and permission of the instructor.

A7. Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency? If so, please provide documentation.

The content and skills of this proposed course are recommended by two professional societies.

Society for Industrial and Applied Mathematics (SIAM) Report on Mathematics in Industry

The Mathematical Association of America- MAA Notes #61- Changing Core Mathematics

The Mathematical Association of America-Undergraduate Programs and Courses in the Mathematical Sciences: CUPM curriculum Guide 2004

Section B: Interdisciplinary Implications

B1. Will this course be taught by instructors from more than one department or team taught within the department? If so, explain the teaching plan, its rationale, and how the team will adhere to the syllabus of record.

No.

B2. What is the relationship between the content of this course and the content of courses offered by other departments? Summarize your discussions (with other departments) concerning the proposed changes and indicate how any conflicts have been resolved. Please attach relevant memoranda from these departments that clarify their attitudes toward the proposed change(s).

N/A.

B3. Will this course be cross-listed with other departments? If so, please summarize the department representatives' discussions concerning the course and indicate how consistency will be maintained across departments.

No.

B4. Will seats in this course be made available to students in the School of Continuing Education?

No.

Section C: Implementation

C1. Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty. What will be taught less frequently or in fewer sections to make this possible? Please specify how preparation and equated workload will be assigned for this course.

Faculty resources are adequate. This course is offered every spring semester. The program change takes effect with the Fall 2010 freshman class, but this revised course will not be offered until those students are juniors.

C2. What other resources will be needed to teach this course and how adequate are the current resources? If not adequate, what plans exist for achieving adequacy? Reply in terms of the following:

The Mathematics Department has adequate resources. In most semesters, to accommodate a 1 credit course we often have to underload a faculty member to teach the course. Also, because we still have some 4 credit lecture classes, by judicious scheduling of these courses, we can pick up the extra two credits in a year necessary to run this course.

C3. Are any of the resources for this course funded by a grant? If so, what provisions have been made to continue support for this course once the grant has expired? (Attach letters of support from Dean, Provost, etc.)

No, N/A

C4. How frequently do you expect this course to be offered? Is this course particularly designed for or restricted to certain seasonal semesters?

This course will be offered every spring semester.

C5. How many sections of this course do you anticipate offering in any single semester?

1 section.

C6. How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?

15.

C7. Does any professional society recommend enrollment limits or parameters for a course of this nature? If they do, please quote from the appropriate documents.

No.

C8. If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.