# Course Change Proposal

## Form A

**Academic Group (College):** NSM  
**Academic Organization (Department):** Mathematics  
**Date:** 11/11/09  
**Department Chair:** Ed Shea  
**Submitted by:** Gary Shannon

**Type of Course Proposal:** New X Change Deletion

**Does this course fulfill a requirement for single-subject or multiple subject credential students?** Yes __ No X __

**For Catalog Copy:** Yes X No ___  
**CCE (Extension):** Yes X No ___  
**Semester Effective:** Summer 2010 Fall ___ Spring ___ 2010

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This course replaces experimental course Subject Area prefix) and Catalog Nbr (course number): Math 196P

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### Change from:

**Subject Area (prefix) & Catalog Nbr (course no.):**  
**Title:**  
**Units:**

### Change to:

**Subject Area (prefix) & Catalog Nbr (course no.):** Math 51  
**Title:** Mathematics for Secondary Teachers: Algebra and Number Theory  
**Units:** 2

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**JUSTIFICATION:**

This course has been offered on an experimental basis during the last two summers as a part of two grants: a National Science Foundation Noyce Scholarship Program housed in the College of Education, and the Math Science Teacher Initiative (MSTI) project, housed in the College of Natural Sciences and Mathematics. Both grants have the goal of developing more math and science high school teachers. This course will be offered as part of an ongoing effort to develop more math and science high school teachers, and will be self-supporting (only offered through CCE).

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**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See http://www.csus.edu/acaf/univmanual/crspsl.htm - Guidelines for Catalog Course Description)

Topics from Algebra and Number Theory needed for Secondary Teachers. Specific topics include properties of fields, Rational Root Theorem, Factor Theorem, Conjugate Roots Theorem, Binomial Theorem, Fundamental Theorem of Algebra, geometric interpretation and properties of vectors, properties of matrices and determinants, properties of divisibility, Euclidean Algorithm, Fundamental Theorem of Arithmetic, properties of functions, PMI. CR/NC Grading. Prerequisite: Math 29. Only offered through CCE. Units: 2.0

**Note:**

Prerequisite: Math 29  
Enforced at Registration: Yes __ No X __  
Corequisite:  
Enforced at Registration: Yes __ No __  
Graded: Letter ___ Credit/No Credit X ___  
Instructor Approval Required? Yes X No ___  
Course Classification (e.g., lecture, lab, seminar, discussion): C2 (Lecture)  
Title for CMS (not more than 30 characters)  
Secondary Math: Alg & Num Thy  
Cross Listed? Yes __ No __ X ___  
If yes, do they meet together and fulfill the same requirement, and what is the other course.  
How Many Times Can This Course be Taken for Credit? ___1___  
Can the course be taken for Credit more than once during the same term? Yes ___ No X ___
FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:

**Description of the Expected Learning Outcomes:** Describe outcomes using the following format: "Students will be able to: 1), 2), etc." See the example at http://www.csus.edu/acaf/example.htm

Students will be able to:
1) Explain why the real and complex numbers are each a field, and explain why some specific rings are not fields
2) Apply the Rational Root Theorem, the Factor Theorem, the Conjugate Roots Theorem, and the Fundamental Theorem of Algebra
3) Prove basic properties of divisibility, as part of the proof (and application) of the Euclidean Algorithm
4) Understand and apply the geometric interpretation and basic operations of vectors in two and three dimensions, including their scalar multiples and dot and cross products.
5) Prove the basic properties of vectors (e.g. perpendicular vectors have zero dot product).
6) Understand and apply the basic properties and operations of matrices and determinants (e.g. to determine the solvability of linear systems of equations).
7) Use the Principle of Mathematical Induction to prove a variety of results.

Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not Academic Affairs.

**Assessment Strategies:** A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

- Regular homework, in-class assignments, discussion

For whom is this course being developed?

- Majors in the Dept __
- Majors of other Depts __
- Minors in the Dept __
- General Education __
- Other __X__

Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes __ No __X__

If yes, identify program(s):

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes __ No __X__

If yes, attach a description of resources needed and verify that resources are available.

Indicate which department or programs will be affected by the proposed course (if any).

The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.

**Approvals:** If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

Signatures: ____________ Date ____________

- Department Chair: ____________ 11-12-09
- College Dean or Associate Dean: ____________ 2/9/10
- CPSP (for school personnel courses ONLY)
- Associate Vice President and Dean for Academic Programs

Distribution: Academic Affairs (original), Department Chair and College Dean. Dean's office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.