WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Department Math & Statistics Date Feb, 25, 2010

Refer to Regulation 3-4, Policy for Changing the Curriculum, for complete information on submitting proposals for curricular changes.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Numerical Reasoning for Middle School Teachers</th>
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This proposal is for (a) Undergraduate Course Graduate Course

Applies to: Major Minor University Studies* Not for USP
Required Required
Elective

Prerequisites MTED125

Grading method Grade only P/NC only Grade and P/NC Option

Frequency of offering Yearly

For University Studies Program course approval, the form Proposal for University Studies Courses must also be completed and submitted according to the instructions on that form.

Provide the following information:

A. Course Description

1. Catalog description:

   This course gives the middle school mathematics teacher a deeper understanding of number systems (integers, rational numbers, and real numbers) and number theory. Physical materials, models, technology, and middle school curricula will be used to explore fundamental properties of number systems, to model algorithms, and to explore number theory topics. Prerequisite: MTED 125

2. Course outline of the major topics and subtopics (minimum of two-level outline).

   I. COUNTING
      A. Simple Counting
      B. The Multiplication Principle
      C. The Subtraction Principle
      D. Collections
      E. Probability
      F. The Binomial Theorem
      G. Advanced Counting

   II. ARITHMETIC
       A. Divisibility
       B. Combinations
       C. Primes
       D. Factorization
       E. Consequences
       F. Relatively Prime

   III. MODULAR ARITHMETIC
        A. What is a Number?
        B. Modular Arithmetic
        C. Congruence
        D. Division
        E. Powers
        F. Roots
        G. Euler's Theorem
IV. CODES AND PRIMES
   A. Codes
   B. Public-Key Cryptography.
   C. Finding Primes
   D. Generators, Roots, and Passwords

3.a Instructional delivery methods utilized: (Please check all that apply).

<table>
<thead>
<tr>
<th>Lecture: Auditorium</th>
<th>ITV</th>
<th>Online</th>
<th>Web Enhanced</th>
<th>Web Supplemented</th>
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</thead>
<tbody>
<tr>
<td>Lecture: Classroom</td>
<td>X</td>
<td>Service Learning</td>
<td>Travel Study</td>
<td>Laboratory X</td>
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<tr>
<td>Other: (Please indicate)</td>
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3.b MnSCU Course media codes: (Please check all that apply).

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<tr>
<td>2. CD Rom</td>
<td>5. Broadcast TV</td>
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<tr>
<td>8. ITV Receiving</td>
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4. Course requirements (papers, lab work, projects, etc.) and means of evaluation.

REQUIREMENTS: attendance, hands-on investigations, use of manipulative materials and pictorial models, and discussions.

EVALUATIONS: examinations, quizzes, lab work, homework problems, and a final examination.

5. Course materials (textbook(s), articles, etc.).

ISBN:978-0131777217

6. Assessment of Outcomes: by exams, quizzes, homework, and a final exam

7. List of references:


B. Rationale

1. Statement of the major focus and objectives of the course.

   This course gives the middle school mathematics teacher a deeper understanding of number systems (integers, rational numbers, and real numbers) and number theory. Students who successfully complete this course will:

   - Have a deeper understanding of the concepts, processes and algorithms found in the middle school mathematics curriculum, with a focus on number systems and number theory.
   - Be able to approach problems involving number systems and number theory from multiple perspectives.
   - Be able to appropriately use manipulative materials, technology, and pictorial representations necessary in the development of number concepts and skills.
   - Be able to construct strategies advocated by current research for teaching number concepts to students of differing abilities.
   - Implement the five (NCTM) Process Standards: problem solving, reasoning and proof, communication, connections, and representation.

2. Specify how this new course contributes to the departmental curriculum.

   Effective Fall 2010, the State Of Minnesota requires that future middle school teachers complete a minor in their subject area. This course will be one component of this new minor.

3. Indicate any course(s) which may be dropped if this course is approved.

   No course will be dropped.
C. Impact of this Course on other Departments, Programs, Majors, or Minors

1. Does this course increase or decrease the total credits required by a major or minor of any other department? NO
   
   If so, which department(s)? N/A
   
   2. Attach letter(s) of understanding from impacted department(s).

Attach a *Financial and Staffing Data Sheet*.

Attach an *Approval Form* with appropriate signatures.

Department Contact Person for this Proposal:

Nicole Williams

Name (please print) ___________________________ Phone: 457-5380 Email: nwilliams@winona.edu

[Revised 7/5/07]
Include a Financial and Staffing Data Sheet with any proposal for a new course, new program, or revised program.

Please answer the following questions completely. Provide supporting data.

1. Would this course or program be taught with existing staff or with new or additional staff? If this course would be taught by adjunct faculty, include a rationale.

   MTED 225 would be taught with existing staff.

2. What impact would approval of this course/program have on current course offerings? Please discuss number of sections of current offerings, dropping of courses, etc.

   No real impact.

3. What effect would approval of this course/program have on the department supplies? Include data to support expenditures for staffing, equipment, supplies, instructional resources, etc.

   None.

[Revised 9-05]
<table>
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<tr>
<th>Department Recommendation</th>
<th>Date</th>
<th>2/25/06</th>
<th>e-mail address</th>
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<tbody>
<tr>
<td>Dean’s Recommendation</td>
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<td>Date</td>
<td>2-26-10</td>
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<td>Dean of College</td>
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<td>Chair of A2C2</td>
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<td>Graduate Council Recommendation</td>
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<td>Chair of Graduate Council</td>
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<td>Director of Graduate Studies</td>
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<td>Faculty Senate Recommendation</td>
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<td>President of Faculty Senate</td>
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<td>Academic Vice President Recommendation</td>
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<td>Academic Vice President</td>
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<td>President</td>
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<td>Please forward to Registrar.</td>
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<td>Please notify department chair via e-mail that curricular change has been recorded.</td>
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[Revised 7-5-07]