

For Committee Use Only

Course	MATH 251 (v. 2)
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Writing Intensive Course Proposal Form

NEIU Writing Intensive Program, Center for Academic Writing
Ronald Williams Library www.neiu.edu/~wip

Beginning with students who newly enroll in Fall 2008, all students must successfully complete a Writing Intensive course within their discipline in order to graduate. Successful completion of ENG 101 or its equivalent with a grade of "C" or better is a prerequisite to enrolling in a Writing Intensive course. Writing Intensive courses must be NEIU courses.

Writing Intensive courses:

- Are 200-level or 300-level courses offered relatively early in the major
- Must be a minimum of 3 credit hours
- Have an absolute maximum of 25 students so that the instructor can devote a great deal of time to provide feedback on early drafts of written work
- Have CU class-size adjustments following the contractual guidelines specified for ENG 101
- Meet the Writing Intensive Guidelines (see p. 3 or <http://www.neiu.edu/~wip> for the guidelines)

Departments and programs have several options for implementing Writing Intensive courses:

- Create a new course to add to the list of requirements for the major*
- Modify an existing course*
- Choose to offer one course that students must use to fulfill the Writing Intensive requirement or allow students to choose one of several courses that can be used to fulfill the Writing Intensive requirement
- Work with faculty in a group of departments/programs to develop a Writing Intensive course that can be used by all their majors
- Consult with the Writing Intensive Faculty Advisory Committee (WIFAC) if they wish to propose alternative ways of providing Writing Intensive courses for their majors

***Note:** Departments and programs that choose to create a new required course or modify an existing course that was not previously required will need to propose a change in the major program and submit the program change through the appropriate governing bodies.

Departments and programs are encouraged to review the *Developing Writing Intensive Courses: Questions for Departments and Programs to Think About and Discuss* document available through the Center for Academic Writing.

Support for designing Writing Intensive courses, preparing the course proposal documents, and/or designing and implementing writing assignments is available through the Center for Academic Writing.

Please contact Kate Hahn at x4490 or mk-hahn@neiu.edu with any questions or visit <http://www.neiu.edu/~wip> for more information.

Writing Intensive Course Proposal Form

INSTRUCTIONS

The following need to be submitted electronically to WIFAC at mk-hahn@neiu.edu for each course that is proposed:

- Writing Intensive Course Proposal Form
 - Available at <http://www.neiu.edu/~wip>
- Proposed Course Syllabus
- Curricular Proposal Transmission Form
- FCAA Course Proposal Checklist (and any necessary documents, e.g. proposal rationale)

Please use the "Save As" function to save this document with the Subject and Course Number of the proposed course as the document name (for example, PSYC202.doc). Provide the information requested on the following pages.

Subject: **Math**

Course #: **251**

New Course Existing Course

Credits: **3.0**

Course Abbreviated Title (29 characters max): **Discrete Mathematics**

Course Title: **Discrete Mathematics**

Average Weekly Contact Hours: **3.0**

Discussion Independent Study
 Field Experience Student Teaching
 Lecture Hybrid/Online

Course Description (100 words max; for catalog): **Introduction to basic concepts of mathematics and mathematical reasoning. Logic, sets, number theory, mathematical induction, direct and indirect formal proofs. Active instruction in mathematical writing is given throughout the course and mathematical writing (including effective and correct English expression) is a major component of the course requirements.**

WI GUIDELINES

Complete the chart below by showing how the proposed course meets each of the WI Guidelines. Please make a reference to where in the proposed syllabus this information can also be found. Refer to the complete guidelines below for more information.

1. Active instruction in disciplinary writing	Active instruction in mathematical writing is given throughout the entire course. Course begins with instruction in Logic in which translations between mathematics and English are critical, as are English justifications to a multitude of types of problems. Course continues to writing of Formal Proofs (more than half of the semester), starting with short proofs, then proceeding to longer and more complicated ones in which an outline is an essential first step (as an outline is essential for a term paper). For example, see handout on Writing Formal Proofs (handed out in week one of formal proofs), shown as last page of course syllabus.
2. Equivalent of at least 15 pages of graded writing assignments	Actual writing estimates are as follows: The 3 multiple draft assignments are expected to be 1-3 pages each per draft. The 5 quizzes are expected to be 1 page each. The 3 exams are expected to be 2-4 pages each. The comprehensive final exam is expected to be 4-6 pages. Note that the Mathematics Department expects students to be able to write effectively in both timed and untimed situations (with some leeway given in timed work in terms of both the length of the work and the possibility of very minor errors with no loss of points). Also note that all of these assignments are graded in terms of both the mathematical content and the writing content (including grammar and spelling). See Evaluation section of course syllabus for more details.
3. Multiple types of writing	<p>CAUTION: In this course we have two major types of problems that we call informal versus formal. This is not to be confused with the Informal, Ungraded Assignments used for Writing Intensive courses.</p> <p>Students will be doing at least four different types of writing:</p> <ol style="list-style-type: none">1. informal, ungraded assignments - these are the weekly homework assignments (over 200 problems) listed in the weekly schedule on the course syllabus, and many of them are discussed in depth the following week.2. informal mathematical problems (graded) - see example in next paragraph3. formal mathematical proofs (graded) - see example in next paragraph4. multiple drafts of formal mathematical proofs (graded) - see example in Formal, Graded Assignment sample later in this form <p>This course emphasizes both informal types of problems (but with English justification still required) and formal proofs/disproofs (i.e. proving that a statement is either true or false). For example, to show that the ceiling function of $(x+1)$ is equal to the ceiling function of (x) plus 1, we would expect the following: In an informal mathematics problem, students will very often look at the problem by looking at the number line and describing what happens on both sides of the equation. This justification is expected to be in complete English sentences with correct grammar and spelling. As a formal proof problem (a much longer process), students are expected to prove the statement using only the official definition of the ceiling function and other formal mathematical properties, etc. See the last</p>

	<p>page of the syllabus for a handout on Writing Formal Proofs indicating that formal proofs must be readable with complete sentences and correct grammar and spelling. The informal mathematical type of problem begin immediately at the start of the term with the chapters on logic and continues throughout the term. Students are required to justify all answers in English with complete sentences and correct grammar and spelling. Each week, when homework from the week before is discussed, these justifications are discussed in depth. Then, once formal proofs are added to the picture, we have three multiple draft assignments (worth 15% of the course grade), giving the students an opportunity for feedback before they are assigned a grade. See the Evaluation section of course syllabus for more details.</p>
<p>4. At least 50% of course grade from graded writing assignments</p>	<p>Essentially all of the graded assignments are writing (either informal mathematical justification or formal mathematical proofs). See Multiple types of writing section directly above for an example of an informal justification versus formal proof in mathematics. So all of the graded assignments are graded writing (course grade consists of 15% from multiple draft assignments, 15% from quizzes, 40% from exams, 30% comprehensive final exam). See the Evaluation section of the syllabus for more details.</p>
<p>5. Opportunities for multiple drafts</p>	<p>Three multiple draft assignments comprise 15% of the course grade. For more details, see Evaluation section of course syllabus and also see sample of the Multiple Draft Assignments in the Sample, Formal Graded Assignment section below.</p>
<p>6. Ungraded writing activities</p>	<p>Students must complete weekly homework assignments that are not graded but are discussed the following week in class (see Method of Instruction section of course syllabus for more details). Students are also given the opportunity to hand in writing and get the work evaluated before graded work takes place (see Evaluation section, Out-of-class ungraded work bullet) in course syllabus.</p>

1. The writing activities should be an integral part of the course and should be designed so that students will receive active instruction in disciplinary writing.
2. Students will write the equivalent of at least 15 pages of graded assignments over the course of the semester.
3. Each Writing Intensive course will require multiple types of writing. Writing assignments might include correspondence, memoranda, proposals, progress reports, research reports, work-logs, site descriptions, observations, case studies, lab reports, creative writing, problem-solving, or computer programming, as well as other forms of course-related writing.
4. The graded assignments, consisting of multiple types of writing, will constitute a significant portion (at least 50 percent) of the final grade for the course; the grade on each assignment will reflect effective and correct written expression as well as knowledge of content.
5. On some graded assignments, students will be provided an opportunity to produce multiple drafts, in order to learn that writing is a process as well as a tool for invention and discovery. Students will get feedback from the instructor on those early drafts of written work before the grade is assigned.
6. Each Writing Intensive course will also provide an opportunity for students to engage in ungraded assignments, such as writing-to-learn activities, in order to practice writing and also to become actively engaged in processing the information that is presented in class or in a textbook. Informal journal writing is another useful means of developing students' critical thinking skills.

SAMPLE ASSIGNMENTS

Include here at least two sample assignments: one formal, graded assignment, and one informal, ungraded assignment. For each assignment:

- Provide the information that will be given to students when the assignment is given,
- Clearly describe how each assignment will be evaluated and/or responded to, and
- Indicate how each sample assignment is connected to course objectives or learning outcomes.

To include more sample assignments, copy and paste the appropriate section below.

FORMAL, GRADED ASSIGNMENT

Student Assignment Sheet (paste the assignment handout given to students into the gray box below)
Math 251 Discrete Mathematics
Multiple Draft Assignment #2

Prove: For all real numbers x and y , $|xy|=|x||y|$.

You are not allowed to use previous theorems or problems in your proof.

- Draft #1 (outline only) due Tues March 17, 8am (returned Thurs March 19)
- Draft #2 (outline plus one case that I have marked) due Thurs April 2, 8am (returned Tues April 7)
- Final Submission (complete proof) due Tues April 14, 8am

WORK THAT DOES NOT CONFORM TO THE GUIDELINES LISTED BELOW WILL BE RETURNED UNGRADED

- Work is to be handed in on 8.5" by 11" paper with your name in the upper right corner **ON THE FRONT AND BACK**. Paper torn out of notebooks is not acceptable. If there is more than one sheet of paper, staple them together in the upper left corner.
- Work must be **NEAT AND LEGIBLE**. If you are writing anything by hand, you should use a pencil to allow erasures.
- Late papers are accepted only until they are returned to the class, lose 5% per draft/submission (e.g., if you hand in a draft late and a final submission late, you will lose 10% on your grade), and may not be evaluated before the next submission is due.
- You are allowed to work with others on these assignments. However, you are responsible for your own write-up. Just as no two people write exactly the same paragraph, no two people write exactly the same proof. Cheating is absolutely not tolerated.
- Multi-draft assignments can always be turned in early, but they will not be returned until after the due date.
- Please keep large margins on initial drafts so I have room to make comments.
- When you hand in the final submission, you must also hand in the original draft(s) with my comments (**NOT** a copy). As your grade is determined by a combination of all drafts, incomplete final submissions will not be graded.

Evaluation

Out-of-class assignments are graded on the following.

- Mathematical content
 - o Appropriate mathematics is used
 - o Mathematics is used correctly
 - o Logical flow of ideas
 - o Do not skip steps
 - o Do not combine steps
 - o Abbreviations are not allowed
- Written content
 - o Effective and correct written expression
 - Logical flow of ideas
 - Complete sentences
 - Correct spelling
 - Correct grammar

Be sure to do regular assigned homework before you start this assignment. As this assignment is an extension of regular homework, I will answer questions about regular assigned homework, but will answer only procedural questions on this multiple draft assignment (until the assignment has been completed and returned). Please note that this work should be professional. Do not wait until the last minute to do the assignment. Writing proofs (as writing term papers) is an evolutionary process. You need to write a draft, let it sit for a while, re-evaluate and rewrite, and then do it again (and again!). You also need to proof several times, once for mathematics, once for readability, once for spelling/grammar. Then start all over again!

Please note: Formatting has not been retained in the copy/paste routine....the handouts the students receive are formatted correctly and are easy to read. Also note that most of us use a mathematical software package that has outstanding mathematical features/symbols (compared to Word).

Please answer the following questions regarding this sample assignment:

How will this assignment be evaluated and/or responded to?

As indicated in the student assignment sheet, work will be graded on

- Mathematical content
 - o Appropriate mathematics is used
 - o Mathematics is used correctly
 - o Logical flow of ideas
 - o Do not skip steps
 - o Do not combine steps
 - o Abbreviations are not allowed
- Written content
 - o Effective and correct written expression
 - Logical flow of ideas
 - Complete sentences
 - Correct spelling
 - Correct grammar

This problem is a proof by parts, so an initial outline is an essential first step (as is an outline of a term paper). As indicated in the instructions, students will submit a first draft of only the proof outline which will be returned with comments from the instructor. In the second draft, students will correct their outline, and then prove one of the cases. Then, the final submission will include the complete proof. When the final submission is received, the combination of work in the two drafts and the final submission will be evaluated and a grade will be assigned.

How is this assignment connected to course objectives or learning outcomes?

This assignment includes Course Objectives 1, 2, and 5. See Course Objectives section in course syllabus (copied below).

Course Objectives: Upon successful completion of the course, the student will be able to perform the following

1. Use proper mathematical language and notation (verbal and written) in a variety of mathematical settings.
2. Use mathematical logic in a variety of mathematical settings.
3. Give an informal argument (verbal and written) in a variety of mathematical settings.
4. Read and understand formal mathematical proofs in a variety of mathematical settings.
5. Write a formal proof in a variety of mathematical settings, including direct proof, proof by contrapositive, proof by contradiction, and proof by induction.

INFORMAL, UNGRADED ASSIGNMENT

Student Assignment Sheet (paste the assignment handout given to students into the gray box below)
See Course Syllabus for the weekly list of (uncollected) homework problems. One of the problems, # 36 in Section 2.3 is as follows: Any even integer equals twice some integer. a) Rewrite the statement in formal mathematics using quantifiers and variables. b) Write a negation of the statement.

Please answer the following questions regarding this sample assignment:

How will this assignment be evaluated and/or responded to?

The answer to this problem is actually given in the back of the text. However, it is the type of problem that I always discuss the following week. If they skip step a), students tend to make mistakes in part b). So we discuss in depth the relationship between the English sentence and its mathematical interpretation, and also the negation of each form. All of these concepts are essential skills before formal proofs can be mastered.

How is this assignment connected to course objectives or learning outcomes?

This assignment includes Course Objectives #1, 2, and 3. See Course Objectives section of course syllabus (copied below).

Course Objectives: Upon successful completion of the course, the student will be able to perform the following

1. Use proper mathematical language and notation (verbal and written) in a variety of mathematical settings.
2. Use mathematical logic in a variety of mathematical settings.
3. Give an informal argument (verbal and written) in a variety of mathematical settings.
4. Read and understand formal mathematical proofs in a variety of mathematical settings.
5. Write a formal proof in a variety of mathematical settings, including direct proof, proof by contrapositive, proof by contradiction, and proof by induction.