

**ROWAN UNIVERSITY, STRUCTURES OF MATHEMATICS I (3 sem. hrs.)**

**SYLLABUS FOR SPRING 2012**

**MATH 01-201-4 (CRN 20633), T R 1:45 – 3:00 pm, Bozorth 129**

**INSTRUCTOR:** Dr. M. Herman  
**OFFICE:** Robinson Hall, 2nd Floor  
Mathematics Department

**EMAIL:** herman@rowan.edu  
**OFFICE HOURS:** by appointment  
(please email to set up an appointment)

**PHONE:** 256-4500 x 3539  
(Note: phone is **rarely** used)

**REQUIRED TEXTS:**

Beckmann, Sybilla. (2011). *Mathematics for Elementary Teachers with Activity Manual* (3rd Ed.). Addison Wesley.

ISBN 978-0-321-64694-1

Beckmann, Sybilla. (2011). *Mathematics for Elementary Teachers Activity Manual* (3rd Ed.). Addison Wesley.

ISBN 978-0-321-64696-5

**TECHNOLOGY:**

The Rowan Mathematics Department recommends the 34 II Math Explorer Plus (Texas Instruments) for this course, but students may request approval for other types of calculators (including graphing calculators). An approved calculator is permitted for use on all course activities, including any quiz or exam. Each student must have his/her own calculator. Calculators may *not* be shared on a quiz or exam.

Cell phones and other electronic devices are *not* permitted in class, and such technology is *not* permitted on any quiz or exam.

Email will be used as a communication tool between Dr. Herman and students. Email from Dr. Herman will be sent to students' Rowan email accounts throughout the semester.

**COURSE DESCRIPTION:**

This course is especially appropriate for those students preparing to be **Early Childhood, Elementary, or Special Education** teachers. Students in other majors should take a different math course (e.g., Contemporary Math) to satisfy their degree requirements.

The course concerns the development of number systems, including natural/counting numbers, whole numbers, integers, rational and irrational numbers, and real and complex numbers. We will use physical materials and models to explore fundamental properties of these number systems. We will also use physical materials and models to describe real-world relationships, to explore selected algebraic structures, to develop conjectures, and to reason through intuitive proofs of number theoretic properties. Students will be required to reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality, using a variety of representations of mathematical concepts and procedures.

Prerequisite: Students are expected to have completed an equivalent of Intermediate Algebra.

**GENERAL TOPICS:**

Students will understand meanings and appropriate uses of ...

1. classifications of given situations and problems.
2. problem-solving processes (e.g., Polya's four-step problem-solving process).
3. problem-solving strategies (e.g., using equivalent fractions as a strategy to add and subtract fractions).
4. various methods used to solve the same problem and comparisons therein.
5. specific sets of numbers (natural/counting, whole, integers, rational, irrational, real, prime).
6. operations on given sets of numbers, including operations completed with concrete materials and diagrams (adding, subtracting, multiplying, dividing, rounding, writing in scientific notation, demonstrating equivalence, comparing, and ordering various types of numbers).
7. properties of operations of given sets of numbers (e.g., commutative property).
8. specific algorithms for operations involving given sets of numbers.
9. fluent computations involving given sets of numbers, including computations completed with concrete materials and diagrams (e.g., area, discrete, & linear models).
10. content including the place value system (base ten and other bases), fractions and percents, rates, ratios, proportional relationships, factors and multiples, and terminating or repeating decimals.

**OBJECTIVES:**

Students will improve their understanding and use of mathematical practices. They will ...

1. look for and make use of structure, including big mathematical ideas that serve as organizers.
2. model situations and problems with mathematics.
3. make sense of problems and persevere in solving them.
4. use estimation and mental mathematics skills to check the reasonableness of solutions to problems, and attend to precision.
5. reason quantitatively and abstractly, and construct viable conjectures with supporting arguments.
6. critique other students' strategies, speculations, analyses, and evaluations as they use reasoning to consider given situations and solve problems.
7. use appropriate tools strategically.

**STUDENTS WITH DISABILITIES AND SPECIAL NEEDS:** Disabilities and special needs are documented at the Office of Disability Resources in the Academic Success Center in Savitz Hall (x4233 or x4234). Students who wish for special services must provide a Notification of Accommodation letter from the Office of Disability Resources to the instructor as soon as possible at the beginning of the semester. The instructor is not responsible for providing accommodations until she receives the notification letter.

**WITHDRAWAL POLICY:** Students will be periodically updated on their overall course grade in class and any time by request (typically on email). Dates and policies regarding withdrawal from the course will follow Rowan University protocol, including the three deadlines for withdrawal during the semester. Note that the university's policy on course withdrawals during the last four weeks of the semester is that a student may withdraw only if there are circumstances beyond his/her control which prevent him/her from completing the course requirements.

|                      |       |  |
|----------------------|-------|--|
| Jan 24 – Mar 5, 2012 | W     | Student, Professor                               |
| Mar 6 – Apr 4, 2012  | WP/WF | Student, Professor, Department Chairperson       |
| Apr 5 – May 5, 2012  | WP/WF | Student, Professor, Department Chairperson, Dean |

**ATTENDANCE:** Be in class, be on time, and be prepared!

Students are expected to attend class regularly and will sign an attendance sheet on a daily basis. Absences and/or excessive lateness may result in a lowered final grade.

As shown in the grading scheme above, exams constitute a large portion of the course grade. Attendance at all exams is required. Absence on the day of a regularly scheduled test will automatically result in a grade of zero (0). Permission to be excused from an exam will be given only when documentation of a serious reason for the absence is provided. **No make-up exams or assignments will be administered.**

Assignments are to be turned in at the start of class on specified due dates. Absentees must bring their work to the Math Dept to place in Dr. Herman's mailbox before the next class session (before other students receive their graded work). **Any graded assignments turned in late as a result of an absence will result in a grade of zero (0) up to a maximal score of half the credit of the completed work.**

**The instructor is not responsible for covering material missed when a student is absent.** That is, rather than asking the instructor to re-teach material to a student who misses a class, the student should catch up on missed notes and assignments with a classmate.

**ACADEMY HONESTY:** All work on exams must be your own. The penalty for a cheating offense will minimally be an automatic zero (0) on the related exam (or assignment), up to an automatic F in the course with a report to the Provost's Office. Procedures regarding dishonesty will follow Rowan University policies, as outlined in the Academic Honesty portion of the Student Information Guide available online.

#### **GRADING SCHEME:**

3 Exams, Individual Work  
(approx. 60% of course grade):

- Midterm 1
- Midterm 2
- Final Exam (cumulative)

Other Assessments  
(approx. 40% of course grade):

- class participation, including cooperative group work in small groups
- practice exercises in textbook(s) – check your own work
- homework problems in textbook(s) or on handouts
- quizzes
- reflective writings

Final semester grades will be reported online once finalized at the end of the semester.

Grades will follow the standard percentage scale with the following cut-off percent values:

**A 93, A- 90, B+ 87, B 83, B- 80, C+ 77, C 73, C- 70, D+ 67, D 63, D- 60.**

On all graded material, be sure that ...

- your work addresses the specific question(s) or problem(s) posed.
- supporting pictures, diagrams, or equations are used appropriately (if applicable).
- your work is clear, precise, and complete.
- your work is factually and mathematically correct.
- mathematical terms and symbols are used correctly, including superscripts and subscripts.
- your written explanations are coherent, focused, detailed, and comprehensive.
- any work done on your calculator is explained thoroughly.

The following grading rubric may help you when solving problems.

| Sample Grade | Description | General Characteristics  |   |
|--------------|-------------|--|---|
| 100 %        | Exemplary   | Work that could serve as a model for other students              | <p>The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.</p> |
| 90 %         | Very Good   | Correct work that is carefully thought out and thorough          |   |
| 80 %         | Good        | Careful, clear work that contains only a minor flaw              | <p>The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to have to make some inferences.</p>   |
| 70 %         | Competent   | Work that is largely correct but is missing important features   |   |
| 60 %         | Basic       | Work that has some merit but also has evident shortcomings       | <p>The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.</p>   |
| 50 %         | Emerging    | Work that has little merit and also has significant shortcomings |   |
| 40 %         | Limited     | Work that shows some effort but is seriously flawed              | <p>The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.</p>   |
| 0 %          | No Credit   | No work submitted or no serious work shown                       |   |