

**PROBLEM SOLVING IN NUMBER SYSTEMS AND DISCRETE MATHAMTICS (MATH  
451)  
SPRING 2015  
TTH 5:45 - 7:00 NATURAL SCIENCES 212F**

1. IMPORTANT INFORMATION

**Instructor:** Stephen J. Young  
**Office:** Natural Sciences 114  
**Office Hours:** TBA, or by appointment.  
**E-mail:** stephen.young@louisville.edu (**Please** include “Math451” in the subject)  
**Office Phone:** (502) 852-3338  
**Course Webpage** [www.math.louisville.edu/~syoung/teaching/math451/spring15/](http://www.math.louisville.edu/~syoung/teaching/math451/spring15/)  
**Textbook** *Algebra Connections* Ira J. Papick

2. LEARNING OUTCOMES

This course is not designed to teach the Mathematics 451 student middle school mathematics procedures involving arithmetic and algebra: It is expected that the Math 451 student has already mastered these skills. Among many other things, you will learn why the procedures, algorithms, and techniques of middle-school mathematics are valid. Indeed, you will study topics directly connected to middle school math topics, but at a much more mature level. Your more profound understanding of these interesting, and sometimes subtle matters, will provide a basis for your explanations to your future students, enable you to better assess your own future students learning, help you understand and correct the of your students. From the course you will:

- ◆ develop an adult-level perspective and insight into the nature and concepts of mathematics taught in middle school;
- ◆ further develop your mathematical and critical thinking skills;
- ◆ use mathematical knowledge to solve problems;
- ◆ improve your ability to communicate mathematically;
- ◆ gain appropriate mastery over the following topics: problem-solving, deductive and inductive reasoning, numeration systems, sequences and patterns, functions, proof by mathematical induction, basic number theory, discrete mathematics, combinations, permutations, counting, algebra-geometry connections, rational and irrational numbers, solving systems of linear equations; and
- ◆ using all the above, develop your ability to understand and respond to common student mathematical mistakes.

3. GRADING SYSTEM

All exams and quizzes will be graded out of four-points on the following holistic scale:

- 4    (~ A) A correct, clear, and complete solution. A solution is correct when it is achieved by a valid mathematical process. A solution is clear when the answer and process used are easily understood by what is written. A solution is complete when every step of the mathematical procedure is appropriately explained and/or justified.
- 3    (~ B) A solution that does not warrant a 4 because of minor problems, such as not explaining or justifying a step in the mathematical process.
- 2    (~ C) Significant, but incomplete or incorrect, explanation that shows understanding.
- 1    (~ D) Progress made towards a solution but with serious problems. A correct answer with no explanation or justification usually falls into this category.
- 0    (~ F) No work, work that will not lead to a correct result, illegible, or unintelligible.

#### 4. GRADING BREAKDOWN

Final grades in this course will be determined according following, with the proviso that in order to pass the class you must pass (C- or better) the final assessment. At the judgement of the instructor and on an individual basis, course grades may be higher than the numerical calculation would yield.

**Homework and Quizzes (20%):** Homework and Quizzes will be assigned and intermittently collected/graded according to the learning needs of the class. If a particular homework assignment is not collected/graded all students will receive full credit for that assignment.

**Oral Presentation/Participation (10 %):** Throughout the semester students will be asked to present solutions to homework problems at the board or discuss them with the class. These obligations may or may not be announced in advance.

**Exams (20% )  $\times$  2:** There will be two exams during the course of the semester, tentatively scheduled for February 26 and April 21.

**Final Exam (30%):** The final exam will be on Tuesday April 28, 8:10 pm – 10:40 pm.

#### GRADE DISTRIBUTION

A+	A	A-	B+	B	B-	C+	C	C-	D	F
95	85	80	75	65	60	55	45	40	30	0

#### 5. AMERICAN DISABILITIES ACT

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact the DRC (852-6938).

#### 6. COURSE POLICIES

The expectation is that you will spend at least 2-3 hours per week on this course for every hour of class time.

- ◆ Unless otherwise specified in writing, all tests are closed book and closed notes. In order to receive credit all work must be shown and complete sentences must be used where appropriate.
- ◆ Homework problems should be neatly written. If necessary it is occasionally acceptable to email a pdf of your solutions.
- ◆ Although you may discuss work among yourselves, you must write your solutions up in your own words by yourself. In particular, the writing up of *any* part of the homework can't be done where classmates (or someone with whom you have discussed the homework) are present. This means that you may not write up homework in the classroom or hallway outside the classroom before class. It is necessary to include each problem the names of those you discussed the problem with in a substantive way.
- ◆ Please silence all cell phones and noise making devices during class. Note that some models of cell phone when put on vibrate make a significant amount of noise.
- ◆ If you believe an exam has been graded incorrectly do not mark it in any way. Submit to me, in writing, along with exam, a short statement of why your think a *particular* problem, or set of problems was graded incorrectly. Regrade requests will not be accepted later than the end of the class period after they are returned. I reserve the right to photocopy any or all of your exams in order to prevent regrade abuse.
- ◆ In order to receive full credit on exams, homework, etc. you must show all work in a clear and coherent manner. In particular, correct answers not fully supported by explanations using complete sentences, where appropriate, will not receive full credit. It is your responsibility to present your solutions in an easily understood manner.
- ◆ If you need help outside of normal office hours, please feel free to stop by my office. I may not be able to help at that moment, but we will at least be able to arrange another time to meet.
- ◆ Please keep all your exams and homework; if you believe there has been an error in the recording of your grades they are the only way to validate your claim. Also, grades will be placed on Blackboard, so please periodically check the grades posted there so we can resolve any issues quickly.

- ◆ Make up exams will be only be guaranteed to be given as required by university policy (i.e, a conflicting university sanctioned events), all other situations, such as medical procedures or emergencies, will be considered on a case by case basis. Make up exams may be required to be administered by University Testing Services, which charges a fee. There will be no make up quizzes.
- ◆ Academic dishonesty is prohibited at the University of Louisville. It is a serious offense because it diminishes the quality of scholarship, makes accurate evaluation of student progress impossible, and defrauds those in society who must ultimately depend upon the knowledge and integrity of the institution and its students and faculty. Any instances of academic dishonesty in this course will be taken extremely seriously.
- ◆ All content in this syllabus is subject to change in order to accommodate unforeseen circumstances and achieve the learning outcomes. Any changes in the syllabus will be announced in class.