SUNY OLD WESTBURY

Department of Mathematics, Computer & Information Science

Transitions to Advanced Mathematics, a writing intensive section
MA3520 • SYLLABUS FALL 2016

Professor: **Frank Sanacory**
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Course Web Site: **sanacory.net** *Office Hours:* **TR 1-2:30, W 3:50-4:50**

TEXTBOOK: Mathematical Proofs, 3rd Edition, Chartrand, Polimen and Zhang, Pearson 2013 ISBN: 978-0-321-79709-4.

PREREQUISITES: Grade of C or higher in Calculus II (MA 2320) and in Discrete Mathematics (MA 3030).

COURSE DESCRIPTION: An introduction to concepts commonly used in advanced mathematics with an emphasis on writing proofs. Topics include logic, set theory, relations, functions, and cardinality as well as selected topics from other areas of advanced mathematics such as number theory, abstract algebra, topology, and real analysis.

COURSE OBJECTIVES: The main goal of this course is to prepare students for higher level courses in mathematics. This is done by engaging students in problem solving techniques and mathematical reasoning that presage higher level topics. Through examples and exercises, students will develop their mathematical reasoning ability – the ability to read and write proofs. The mathematical reasoning is practiced on fundamental topics that are needed for success in advanced mathematics courses. These topics include sets, relations, functions, properties of numbers, and cardinalities of sets. After successful completion of the course students should be able to demonstrate the ability to write mathematical proofs that are convincing, readable, notational consistent, and grammatically correct.

COURSE EVALUATION & GRADING: Your grade for the course will be based on your homework/quiz performance (25%), two tests (40%) and a comprehensive final exam (35%).

CALCULATOR: No calculator is allowed nor needed.

WRITING INTENSIVE COURSE SYLLABUS STATEMENT: This special writing intensive section of the course will provide students with opportunities to support and develop their writing, critical thinking abilities, and engagement in the course materials. Students will write regularly over the course of the semester, completing a mix of short , informal assignments and longer more formal assignments. Some attention will be paid to the importance of revisions well as to the conventions of writing and discipline specific formats. For more information about writing intensive courses offered at SUNY college at Old Westbury and for Writing Resources for Students, visit www.OldwestburyWAC.com.

COLLEGE WRITING CENTER SYLLABUS STATEMENT: Visit the Writing Center for help brainstorming or organizing your ideas or for feedback on a draft. You can make an appointment online at https://oldwestbury.mywconline.com or stop by th Writing Center located in room L-242 on the main floor of the Library in Campus Center. Hours Mondays and Tuesdays, 11am-9:30 pm and Wednesdays and Thursdays, 10am-7pm. Phone: (516) 876-3093.

OLD WESTBURY COLLEGE-WIDE POLICY ON ACADEMIC INTEGRITY: Plagiarism and cheating are condemned at all institutions of higher learning. These acts detract from the student's intellectual and personal growth by undermining the processes of studying, reading, note-taking and struggling with one's own expression of ideas and information. Moreover, cheating inevitably involves secrecy and exploitation of others.

Plagiarizing means "presenting somebody else's words or ideas without acknowledging where those words and ideas come from" (Ann Raimes, Keys for Writers, 5th ed., 127). Examples include:

- copying material from the Internet or other sources and presenting it as your own
- using any author's words without quotation marks; using any quotation without credit
- changing any author's words slightly and presenting them as your own
- using ideas from any published sources (even in your own words) without exact credit
    - **Note:** This includes all material from the Internet or electronic databases.
- using long passages in a paper that have been written or rewritten by a friend or tutor
- turning in any assignment written by someone else

However, using quotations or borrowed ideas while giving exact credit is good academic procedure.

Other types of academic dishonesty include unauthorized collaboration or copying of students' work (cheating); falsifying grades or evaluations; and others. They are treated as equivalent to plagiarism.

When detected and verified, plagiarism and other academic dishonesty will be punished severely. Normally, the first offense will result in a failure on the specific assignment; a second offense or a particularly flagrant first offense will result in an F for the course. A second verified instance of plagiarism, after report of a first verified instance, will normally result in failing the course in which the second instance occurs. In cases of multiple reports, where the faculty member, Chair, and Dean recommend suspension or dismissal from the College, the final decision will be determined by an Academic Grievance Committee (AGC) drawn from the Faculty Rights and Responsibilities Committee. The AGC decision is final.

Know what plagiarism is and how to avoid it; for guidance, see Raimes or any other college writing handbook. Please note: in this matter, **ignorance is never an acceptable excuse.**

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:
If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact Stacey DeFelice, Director, The Office of Services for Students with Disabilities (OSSD), NAB, 2065, Phone: 516-628-5666, Fax (516) 876-3005, TTD: (516) 876-3083. E-mail: defelices@oldwestbury.edu.
The office will help you determine if you qualify for accommodations and assist you with the process of accessing them. All support services are free and all contacts with the OSSD are strictly confidential. SUNY/Old Westbury is committed to assuring that all students have equal access to all learning activities and to social activities on campus.

TUTORING: Tutoring is available in the Mathematics Learning Center in **the library**.

RESPECT: No cell phones in class and no texting.

FINAL EXAM: Will be held Tuesday December 20, 2016 in our regular classroom at the regular class time.

Topics Covered

- Basic proof review
  - Induction
  - Proof types
  - Writing a proof
- Relations
  - Properties of a relation
  - Equivalence relations
  - Congruence mod n
- Functions
  - injective, surjective and bijective
  - inverse functions
  - permutations
- Cardinality
  - definition
  - countable sets
  - uncountable sets
  - Schroeder – Bernstein Theorem
  - cardinality is an equivalence relation
- Number Theory
  - divisibility
  - division algorithm
  - gcd and the Euclidean algorithm
  - The fundamental theorem of arithmetic
- Group Theory
  - groups
  - permutation groups
  - properties of groups
  - subgroups
  - isomorphisms
- Analysis
  - Limits of sequences
  - Infinite series
  - Limits of functions
  - Continuity
  - Differentiability