I. **Course Number and Title:**
MHF 2191 – Mathematical Foundations

II. **Prerequisites for the Course:**
MAC 2312 with a minimum grade of C.

III. **General Course Information:**
Introduction to axiomatic systems and techniques of proof, in preparation for upper-level study in mathematics. Topics may include: symbolic logic, boolean algebra, set theory, countable and uncountable sets, techniques of proof, functions and relations, mathematical induction, group axioms. Emphasis is on preparing the student to read and write mathematical proofs, and to work with abstract definition and axioms.

IV. **Requirements for the Students:**
The student should read all new topics *before* they are discussed in class and complete the homework assignments on time. Some assignments will be done in small groups. During *Problem Sessions*, students will then demonstrate their solutions on the board.

    *Students are strongly encouraged to participate in classroom discussions and to be prepared to demonstrate their solutions to assigned homework problems in front of the class.*

V. **Absence Policy:**
Students are expected to attend all class periods. There are no “allowable cuts”. Students should recognize the very important sequential nature of this course, and that each absence tends to create a learning gap which can be very difficult to bridge. An absence in a three hour course that meets twice a week can have a disastrous effect on the student’s progress and understanding in the course.

VI. **Grading Procedure:**
A. **Grading Criteria:**
   - Exams (2 @ 20%) 40%
   - Final 20%
   - Class/Homework 40%
B. Percentage Ranges for Letter Grades
Grading Scale: (intervals are of the form [a,b))

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>93 up</td>
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<tr>
<td>A-</td>
<td>90 to 93</td>
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<tr>
<td>B+</td>
<td>87 to 90</td>
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<tr>
<td>B</td>
<td>83 to 87</td>
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<tr>
<td>B-</td>
<td>80 to 83</td>
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<tr>
<td>C+</td>
<td>77 to 80</td>
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<tr>
<td>C</td>
<td>70 to 77</td>
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<tr>
<td>D</td>
<td>60 to 69</td>
</tr>
<tr>
<td>F</td>
<td>0 to 60</td>
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</tbody>
</table>

C. Incompletes (I):
Incompletes will be given only for extreme emergency conditions and must be approved by the professor before the final examination begins. The student must be doing passing work at the time the request is made, and must reasonably expect to complete the work within three weeks after the close of the semester.

D. Course Work:
All homework must be submitted on date due. Homework submitted after that date will not be accepted. If you are unable to attend class, you may fax your homework to the number found in VIII of the syllabus. All assignments must be submitted at the time of the final exam in a binder.

E. Make-Up Exam:
The midterms may be made up, with a 10 percent penalty. There is no make-up for the final exam.

F. Special Needs:
Students with special needs must make them known to the professor at the beginning of the semester.

VII. Textbook Requirements:

VIII. Contact Information

- Professor: Dr. Richard Schnackenberg
- Professor office: Whitaker Hall 261, Florida Gulf Coast University, 10501 FGCU Blvd S, Fort Myers, FL 33965-6565
- Professor phone number: (239) 590-7435; fax: (239) 590-7200
- Professor email address: rschnack@fgcu.edu
- Professor’s web site: http://ruby.fgcu.edu/courses/rschnack
- Professor office hours: Monday, Wednesday 11:00-2:00; or by appt.
# TENTATIVE SCHEDULE

1. 8/26  Chapter 1.1 – Propositions and Connectives
2. 8/28  Chapter 1.2 – Conditionals and Biconditionals
3. 9/2  Chapter 1.3 – Quantifiers
4. 9/4  Chapter 1.4 – Basic Proof Methods I
5. 9/9  Chapter 1.5 – Basic Proof Methods II
6. 9/11  Chapter 1.6 – Proofs Involving Quantifiers
7. 9/16  Chapter 1.7 – Additional Examples of Proofs
8. 9/18  Problems Chapter 1
9. 9/23  Problems Chapter 1
10. 9/25  Test 1
11. 9/30  Chapter 2.1 – Basic Concepts of Set Theory
   Chapter 2.2 – Set Operations
12. 10/2  Chapter 2.3 – Extended Set Operations and Indexed Families of Sets
13. 10/7  Chapter 2.4 – Induction
14. 10/9  Chapter 2.5 – Equivalent Forms of Induction
15. 10/14  Fall Break – no class
16. 10/16  Problems Chapter 2
17. 10/21  Chapter 3.1 – Cartesian Products and Relations
18. 10/23  Chapter 3.2 – Equivalence Relations
19. 10/28  Chapter 3.3 – Partitions
20. 10/30  Problems Chapter 3
21. 11/4  Test 2
22. 11/6  Chapter 4.1 – Functions as Relations
   Chapter 4.2 – Constructions of Functions
23. 11/11  Veterans Day – no class
24. 11/13  Chapter 4.3 – Functions That Are Onto; One-to-One Functions
25. 11/18  Problems Chapter 4
26. 11/20  Chapter 6.1 – Algebraic Structures
27. 11/25  Chapter 6.2 – Groups
28. 12/2  Chapter 6.3 – Subgroups
29. 12/4  Chapter 6.4 – Operation Preserving Maps
30. 12/9  Problems Chapter 6
31. 12/16  FINAL 10:30-1:15

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1 The instructor reserves the right to change this schedule at anytime. Appropriate announcements will be made in class.