Note: This syllabus is tentative and should not be considered definitive. The instructor reserves the right to modify it (including the dates of the tests) to meet the needs of the class. It is the student responsibility to attend class regularly and to make note of any change.

Instructor: Dr. Rochus Boerner
Class Time and Location: ED 216, TTh 7.30 to 8.45
Email: rboerner@asu.edu

Please use only your official ASU email to contact me and put "MAT 243 C" into the subject line. FERPA does not allow instructors to tell you or discuss grades by email!

Office: ECA 205
Office Hours: Monday 2:20 to 2:50 or by appointment, subject to availability.

Course Description: Logic, sets, functions, elementary number theory and combinatorics, recursive algorithms, and mathematical reasoning, including induction. Emphasizes proofs and connections to computer science.

Prerequisites: Minimum sophomore standing; MAT 210, 251, 265, or 270 with a grade of C or better.

Textbook: Discrete Mathematics and its Applications by Kenneth Rosen (7th edition)

Additional Content may be posted on the Canvas page for our class.

Calculators: A graphing calculator is recommended for this class, though not allowed on Test 1. If you already own one, you may use it, but keep in mind that calculators with QWERTY keyboards or that can do symbolic algebra are not allowed for tests and quizzes. For example. TI83/84, TI-nspire CX or Casio fx-9750 Plus are allowed; but TI89, TI 92, TI-nspire CAS, Casio FX2 Casio 9970Gs are NOT. If in doubt - ask your instructor.

Cellphone Policies: Students are asked to turn off electronic devices such as cell phones and laptops, and put them away during class. Please do not just put them into standby, but power them down.

Any student who accesses a phone or any internet-capable device during an exam for any reason receives a score of zero on the exam. All such devices must be turned off and put away and made inaccessible during the exam.

Grading: The grade will be computed from the Final Exam (25%), 3 Midterm Tests (50%), HW & Quizzes (20%) and Paper on Structural Induction (6%).

Grading Scale:
A-, A+: 90-92.9, 93-96.9, 97-100% ; B-, B, B+: 80-82.9, 83-86.9, 87-89.9% ;
C, C+: 70-75.9, 76-79.9%; D 60%–69.9%; E: 59.9% or less.

Please take these cutoffs literally. A- from 90 to 92.9 means that a 92.9 is an A-. Please do not attempt to negotiate the cutoffs. They had to be set somewhere, and this is how they are set.

Academic Status Reports: may be provided during the semester in case your performance up to that point is unsatisfactory, indicating a probable failing grade. Students can view ASRs in My ASU within 24 hours after each weekly reporting period closes on Sundays. If you receive a status report alerting
you that your performance is not good, especially if the report states that you should contact your instructor, you should act on it promptly and show up to the office hours within a week of receiving the report. Status reports are not a real-time running tally of your grades in the class and are not updated to reflect grades earned after the report has been issued. They are simply an ALERT to hopefully make you work harder and prevent failure. They are not recorded in your transcript.

Homework will consist of two portions: one with problems from the textbook (assignments will posted on Canvas together with directions regarding the presentation of your work) and the other portion will be completed and graded online (in the WeBWorK system). WeBWorK can be accessed directly at http://webwork.asu.edu and choosing your instructor's class.

Due dates for WeBWorK will be listed in the system. No late assignments will be accepted in either portion of the homework, but there is a chance that one assignment in each portion will be dropped.

A special homework will be a Paper on Recursion and Structural Induction, which require students to show proficiency in understanding recursion and be able to apply the method of structural induction to prove properties of objects defined by recursion.

Quizzes: Quizzes may be either announced or unannounced, and are given at the discretion of the instructor. Quizzes usually cover material that has recently been discussed in class. No make-up quizzes will be given; nevertheless, the lowest quiz grade will be dropped.

Midterm Tests: Three tests will be given during the semester. The best possible preparation for all tests is regular attendance and completion of assigned homework. The tests will be administered in the regular classroom, during class time, on the dates indicated in the tentative schedule below. The tests are closed-books, closed-notes. Some formulas may be provided if deemed necessary and you will be made aware of the specifics in advance. When the calculators are allowed, they should have a “clear memory”. Make-up tests are to be given at the discretion of the instructor and only in the case of verified medical or other reasonable emergency. The instructor must be notified before the test occurs. E-mail instructor or call the Undergraduate Math Office (480-965-3951).

Final Exam: The final exam is minimally comprehensive (the portion after and including Section 5.1 will be covered more heavily) and will be administered in the regular classroom. The ASU final exams schedule lists our final exam on Tuesday, April 30 7:30 - 9:20 AM.

The schedule will be strictly followed. Except to resolve those situations described below, no changes may be made in this schedule without prior approval of the Dean of the college in which the course is offered. Under this schedule, if a conflict occurs, or a student has more than three exams on one day, the instructors may be consulted about an individual schedule adjustment. If necessary, the matter may be pursued further with the appropriate dean(s). This procedure applies to conflicts among any combination of Downtown Phoenix campus, Tempe campus, Polytechnic campus, West campus, and/or off campus class. Make-up exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester plans.
**Attendance** is essential to pass the class. This statement alone is the biggest advice for any math class, even more so in this class! Also, the university rules allow a maximum of SIX missed classes (equivalent of 2 weeks of instruction) during a semester; exceeding this number, you can be penalized, including getting a grade of E.

**Course Policies:** Students are responsible for assigned material whether or not it is covered in class and for material covered in class whether or not it is in the text. Working regularly on assigned problems and attending class are essential to survive. You are expected to read the text, preferably before the material is covered in class.

**Extra Support:** To supplement your instructor’s lectures and office hours, ASU has a vast system of tutoring options.

- Here is the link to the schedule and location for the free Math Tutor Centers on campus: https://math.asu.edu/resources/math-tutoring-center
- The Engineering Tutor Center (free of charge, as well) is in ECF 102.
- Online tutoring: https://studentsuccess.asu.edu/onlinetutoring.
- Many residence halls and the Memorial Union also offer evening or weekend free tutoring to all ASU students as part of the ASU Learning Support Services.

In order to be admitted to the Tutor Centers students must present their valid ASU Sun Card.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Sections</th>
<th>Description of subjects/activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 7</td>
<td>1.1, 1.2</td>
<td>Introductions, Propositional Logic, Applications of Propositional Logic</td>
</tr>
<tr>
<td>January 14</td>
<td>1.3, 1.4</td>
<td>Propositional Equivalences, Predicates and Quantifiers</td>
</tr>
<tr>
<td>January 21</td>
<td>1.5, 1.6</td>
<td><em>(Mon, Jan 21 no classes: Martin Luther King Jr. Day)</em> Nested Quantifiers, Rules of Inference (and Formal Proofs)</td>
</tr>
<tr>
<td>January 28</td>
<td>1.7</td>
<td>Introduction to Proofs</td>
</tr>
<tr>
<td>February 4</td>
<td>Review for Test 1, <strong>Test 1</strong>, 2.1</td>
<td><strong>Test 1</strong> Thur of this week, Sets</td>
</tr>
<tr>
<td>February 11</td>
<td>2.2, 2.3, 2.4</td>
<td>Set Operations, Functions, Sequences and Summation</td>
</tr>
<tr>
<td>February 18</td>
<td>(3.1 and) 3.2</td>
<td>(Algorithms and) The Growth of Functions</td>
</tr>
<tr>
<td>February 25</td>
<td>3.3, 4.1, 4.2</td>
<td>Complexity of Algorithms, Divisibility and Modular Arithmetic, Integer Representation and Algorithms</td>
</tr>
<tr>
<td>March 4</td>
<td></td>
<td>No classes: <em>Spring Break (March 3 – March 10)</em></td>
</tr>
</tbody>
</table>
### TENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 11</td>
<td>4.3</td>
<td>Primes &amp; Greatest Common Divisor (&amp; Euclid’s Alg)</td>
</tr>
<tr>
<td>March 18</td>
<td><strong>Test 2, 5.1</strong></td>
<td><strong>Test 2</strong> Thur of this week, Mathematical Induction</td>
</tr>
<tr>
<td>March 25</td>
<td>5.3</td>
<td>Recursive definition and Structural Induction</td>
</tr>
<tr>
<td>April 1</td>
<td>5.3 , 8.2</td>
<td>Recursive definition and Structural Induction (cont’d), Solving Linear Recurrence Relations</td>
</tr>
<tr>
<td>April 8</td>
<td>6.1, 6.2, 8.5, 6.3</td>
<td>The Basics of Counting; The Pigeonhole Principle; Inclusion-Exclusion Principle; Permutations, Combinations <em>(Paper on Recursion and Structural Induction due)</em></td>
</tr>
<tr>
<td>April 15</td>
<td>Review for Test 3, <strong>Test 3, 9.1</strong></td>
<td><strong>Test 3</strong> Thur of this week, Relations and Their Properties</td>
</tr>
<tr>
<td>April 22</td>
<td><strong>9.5 , Review for Final</strong></td>
<td>Equivalence Relations</td>
</tr>
<tr>
<td>April 29</td>
<td><strong>FINAL EXAM</strong></td>
<td>Final Exam: Tuesday, April 30 7:30 - 9:20 AM.</td>
</tr>
</tbody>
</table>

**Withdrawal Deadlines:**

Course Withdrawal Deadline: March 30th, 2019  
Complete Withdrawal Deadline: April 26, 2019

**Course Withdrawal:** A student may withdraw from a course with a grade of W during the withdrawal period. The instructor’s signature is not required. It is a student’s responsibility to verify that they have in fact withdrawn from a class.

**Instructor-Initiated Drop:** At the instructor’s discretion, any student who has not attended class during the first week of classes may be administratively dropped from the course. However, students should be aware that non-attendance will NOT automatically result in their being dropped from the course. Thus, a student should not assume they are no longer registered for a course simply because they did not attend class during the first week. It is the student's responsibility to be aware of their registration status.

**The grade of Incomplete:** A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who performed at a passing level up to that point from completing a small percentage of the course requirements. The student must provide written documentation and be passing the class at the time to receive an Incomplete. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed. The Dean of the student’s college must approve any exceptions to these rules.

**Academic Dishonesty:** Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity.
Disability Accommodations: Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me at the beginning of the semester either during office hours or by appointment. Note: Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required. Disability information is confidential.

Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. Their office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: 480-965-1234 (V), 480-965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc. Their hours are 8:00 AM to 5:00 PM, Monday through Friday.

Policy on Threatening Behavior: All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. If either office determines that the behavior poses or has posed a serious threat to personal safety or to the welfare of the campus, the student will not be permitted to return to campus or reside in any ASU residence hall until an appropriate threat assessment has been completed and, if necessary, conditions for return are imposed. ASU PD, the Office of the Dean of Students, and other appropriate offices will coordinate the assessment in light of the relevant circumstances.

Classroom behavior: Make sure you arrive on time for class. Excessive tardiness will be subject to sanctions. Under no circumstances should you allow your cell phone to ring during class. Any disruptive behavior, which includes ringing cell phones, listening to your mp3/iPod player, text messaging, constant talking, eating food, reading a newspaper will not be tolerated. The use of laptops (unless for lecture note taking), cell phones, music players, etc. are strictly prohibited during class.

Students are requested to turn all electronic devices off while in class, i.e. power them down (not just put them into stand-by). Students who wish to use an electronic device for note taking should talk to the instructor in person first.

Students who engage in disruptive classroom behavior may be subject to various sanctions. The procedures for initiating a disruptive behavior withdrawal can be found at https://clas.asu.edu/resources/disruptive-behavior (Links to an external site.).

Absences related to religious observances/practices: If you will be absent from class due to a religious observance or practice, it is your responsibility to inform the instructor during the first week of class. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

Absences related to university sanctioned events and activities: If you will be absent from class due to participation in a university sanctioned event/activity, it is your responsibility to inform the instructor during the first week of class. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

Preferred Names and Pronouns policy: The School of Mathematical and Statistical Sciences encourages faculty to address and refer to students by their preferred name and gender pronoun. If your preferred name is different than what appears on the class roster, or you would like to be addressed using a specific pronoun, please let your instructor know.
**Fragrances:** Fragrance sensitivity is an emerging public health crisis. The instructor requests and encourages students to abstain from wearing perfumes, colognes and clothes with laundry or dryer sheet fragrances to class. Please read the presentation [Fragrances in the College Classroom](https://example.com) for a full explanation of this request.

**Final ADVICE:** Plan on spending 6 -7 hours a week outside class on MAT 243. Read class notes, read the book, peruse the materials uploaded on Blackboard, write down definitions and properties, redo with your own hand (and head!) the proofs we had gone over in class. Be active during lectures, ask questions and answer questions. Do the homework ahead of time, not at the last minute. Use instructor’s office hours wisely and try the problem(s) yourself before asking for help from instructor or tutor. Do your best to UNDERSTAND. Try to explain it to others - this is the ultimate check for understanding!