

**Introduction to Real Analysis 1**  
**MAA 4102**  
**Spring 24**

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**Classroom:** MAT 119

**Instructor:** Dr. Konstantina Christododouloupoulou

**Office Location:** LIT 365

**Office Hours:** M4, W5, F3, and by appointment.

**Open Door Policy:** You are welcome to drop by to discuss any aspect of the course, anytime.

**All course materials will be posted in e-Learning Canvas**

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**Meeting Times:** MWF 7

**Office Phone:** (352) 294-2315

**Email:** kchristod@ufl.edu

**Required Text:** *Witold A. J. Kosmala, A Friendly Introduction to Analysis, Pearson, Prentice Hall, Upper Saddle River, NJ 07458.* We will cover most of Chapters 1, 2, 3, 4, & 5.

**Course Description:** MAA4102 is the first course in a two course sequence. In this sequence, we present a rigorous mathematical treatment of the fundamental ideas of calculus (real numbers, sequences, functions, limits, continuity, differentiation and integration). The emphasis of the course is on theory and proofs. Because the concepts covered in this course play an important role in the physical sciences and engineering, students in these areas may choose to take this course. However, no particular applications are discussed in the course. Students in mathematics, education, and other areas may also choose to take this course.

**Course Objectives:** The primary goal of the course is to obtain a sound understanding of the basic mathematical concepts of calculus. In this course, students will examine in an accurate and rigorous manner familiar calculus concepts such as the real numbers and their properties, functions of one variable, sequences, limits, continuity, and differentiability. Students will develop proficiency in reading and writing rigorous mathematical proofs and communicating mathematical ideas clearly and precisely,

**Office Hours:** I encourage you to take advantage of my office hours and my **open door** policy. You are welcome to drop by my office to talk about the course anytime I am in my office and my door is open. In addition, I will hold regular office hours for your convenience. If you cannot make my posted hours I will also be happy to set a meeting time that is convenient for the both of us.

**Course Web Page:** I will update Canvas regularly with class announcements, homework assignments, and additional materials. All grades are posted in the Canvas Gradebook. You are responsible for verifying that those grades are accurate. **You have one week after a score has been posted to contact me to resolve any grade concerns. We will not consider any grading disputes nor make any grade adjustments at the end of the semester.**

**Please review the UF Resources and Policies for available technical assistance, resources and UF policies.**

**Grading:**

<b>Homework</b>	25%
<b>Three Exams</b>	75% (25% each)

The following grading scale applies.

A	$\geq 90\%$	C	$\geq 70\%$
A-	$\geq 87\%$	C-	$\geq 67\%$
B+	$\geq 84\%$	D+	$\geq 64\%$
B	$\geq 80\%$	D	$\geq 60\%$
B-	$\geq 77\%$	D-	$\geq 56\%$
C+	$\geq 74\%$	E	$< 56\%$

**Grades will not be rounded and there will not be any extra credit assignments to raise your grade.**

**Homework:** Homework assignments will consist of problems to be submitted for grading and a list of recommended problems. I expect all homework solutions to be written in full sentences and to be grammatically correct. Each homework solution will be graded based on the following rubric (out of 5 points):

<b>5 points</b>	Correct mathematical solution and very well written.
<b>4 points</b>	Small errors such as incomplete sentences, imprecise definitions, or overlooking trivial cases.
<b>3 points</b>	Contains an outline of a correct solution and several steps toward this solution, but the writing is unclear or there are gaps in the solution.
<b>2 points</b>	Some original steps toward a correct solution but with significant mathematical errors.
<b>1 point</b>	No original steps toward a correct solution.

You may work with your peers on homework problems but you must write up solutions individually. Do not turn in Xerox copies of each other's homework or copied from an online resource. Late homework submissions will only be accepted if there is an acceptable excuse consistent with university policies <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx> and appropriate documentation is provided in a timely fashion.

**In addition, I expect you to work on the recommended problems for each lecture and ask questions in office hours, in class, etc., if you need help.**

**Submitted Work Expectations:** Submitted assignments should be neat, organized, and clearly presented. Submissions not meeting these standards may have the scores reduced or may not be accepted for grading.

**Using the Web:** Please refrain from searching for proofs on the internet or using someone's notes from a previous semester. Your job in this course is to write proofs in analysis, not learn how to do a web search. It is very obvious to me when you have a proof that you did not write yourself, and this will not help you succeed in the course. It is also a violation of the UF Honor Code to present other people's work as your own and all such behaviors will be reported to SCCR office: <https://sccr.dso.ufl.edu/>. If you are having trouble with a proof ask me for help.

**Exams:** Two mid-term exams and a final exam are scheduled for this course. The midterm exams will be during our regular class period and are scheduled for Wednesday, February 14, and Wednesday, March 20, and the final exam is scheduled for Wednesday, May 1st, 10AM-noon. **The exams cannot be rescheduled unless you meet the University requirements;** see <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>. Absolutely no collaboration on exams is allowed.

**Make-up policies:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: [catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/](https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/)

Make-up assignments will be allowed in the following cases:

- In case of illness, upon receipt of a medical excuse note or equivalent, or by following the procedure outlined here: <https://care.dso.ufl.edu/instructor-notifications>.
- In case of religious holidays, by informing me via e-mail ahead of time.
- In case of military duty, jury duty, participation in academic conferences, or participation in official university or UAA events, by providing appropriate evidence ahead of time.
- In case of family emergencies or other extenuating circumstances, by following the procedure outlined here: <https://care.dso.ufl.edu/instructor-notifications>.

In all other cases, or if you are unsure, please email me as soon as feasible. Absences are generally not excused for non-emergency travel and personal schedule conflicts. Students are still responsible for submitting assignments on time unless an extension has been requested via email and approved by the instructor prior to the deadline. In case of true documented emergencies, the instructor will waive this requirement.

**Technical difficulties are not generally an excuse for missing an assessment or assignment; students should have contingency plans in case any such issues arise.**

**Incomplete:** A student who has completed a major portion of the course with a passing grade but is unable to complete the final exam or other course requirements due to illness or emergency may be granted an incomplete, indicated by a grade of "I". This allows the student to complete the course within the first six weeks of the following semester. You must contact me before the final exam to sign an incomplete grade contract (<https://math.ufl.edu/wp-content/uploads/sites/124/incomplete-grade-contract.pdf>) and you must provide documentation of the extenuating circumstances preventing you from taking the final exam. The grade of "I" is never used to avoid an undesirable grade, and does not allow a student to redo work already graded or to retake the course. See the official policy at <http://www.math.ufl.edu/departments/incomplete-grades/>.

**Students with Disabilities:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. Click here to get

started with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**Academic Honesty:** UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code." On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

**Online Course Evaluation:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students here: <https://gatorevals.aa.ufl.edu/public-results/>.

### **Campus Resources:**

#### **Health and Wellness**

*U Matter, We Care:* If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit <https://umatter.ufl.edu/> to refer or report a concern and a team member will reach out to the student in distress.

*Counseling and Wellness Center:* Visit <https://counseling.ufl.edu/> or call 352-392-1575 for information on crisis services as well as non-crisis services.

*Student Health Care Center:* Call 352-392-1161 for 24/7 information to help you find the care you need, or visit <https://shcc.ufl.edu/>.

#### **Academic Resources**

*E-learning technical support:* Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

*Career Connections Center:* Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

*Library Support:* Various ways to receive assistance with respect to using the libraries or finding resources.

*Teaching Center:* Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.

**This syllabus is subject to change. You will be notified if any changes are made. Version 1**

## MAA4102 Introduction to Real Analysis 1 Schedule of Topics

The actual pace of the course and assignment dates may be slightly different than listed in the weekly calendar below. It will depend on the students' response to the material. Course materials and assignments are posted in Canvas.

	<b>Topic(s) &amp; Assignments</b>
<b>Week 1</b>	Mathematical Induction, Proof Techniques, the Fibonacci Sequence
<b>Week 2</b>	Ordered Fields, the Real Numbers, Properties of the Real Numbers Homework 1
<b>Week 3</b>	Sequences, Convergence, Finite Limits Homework 2
<b>Week 4</b>	Monotone Sequences, Cauchy Sequences Homework 3
<b>Week 5</b>	Subsequences, the Number $e$ Homework 4
<b>Week 6</b>	Limits of functions, Sided limits Exam 1
<b>Week 7</b>	Continuity, Properties of Continuous Functions
<b>Week 8</b>	Uniform Continuity/Catch-up Homework 5
<b>Week 9</b>	Compact Sets, Euler's $\varphi$ -function Homework 6
<b>Week 10</b>	No Class. Happy Spring Break!
<b>Week 11</b>	Derivatives, Properties of Differentiable Functions Exam 2
<b>Week 12</b>	Mean Value Theorems
<b>Week 13</b>	Higher-order Derivatives, L'Hopital's Rule Homework 7
<b>Week 14</b>	Taylor's Theorem and Applications Homework 8
<b>Week 15</b>	Approximation of Derivatives, Convex Functions Last Homework
<b>Week 16</b>	Catch-up/Review

**Exam 1-Wednesday, February 14, during class (MAT119)**

**Exam 2-Wednesday, March 20, during class (MAT119)**

**Final Exam-May 1st @ 10-noon in MAT119**