Information.
Instructor: Dr. S. Muir
Office: Loyola Science Center (LSC) 271
Office Hours: MF: 2 – 2:50 p.m., W: 3:30 – 5:30 p.m.
Office Phone: 570-941-6580
Electronic Mail: stacey.muir@scranton.edu
Web Address: www.scranton.edu/faculty/muirs2/
Class Meetings: MWF 1:00 – 1:50 p.m., LSC 125

Important Dates.
August 25: First day of class
August 29: Last day to add a class
September 1: Labor Day, no class
September 4: Holy Spirit Liturgy
September 24: Last day to drop a class with no grade
October 13–14: Fall break, no class
October 15: Midsemester grades submitted
November 10: Last day to withdraw with a “W” grade
November 26–28: Thanksgiving break, no class
December 8: Last day of class
December 10: Final Exam (tentative) 12:45 – 2:45 p.m.

Textbook: The required textbook for this course is Understanding Analysis by Abbott.

Catalog Description: (Prerequisite: MATH 222 and MATH 299) Topics include: the algebra and topology of the real numbers, functions, sequences of numbers, limits, continuity, absolute and uniform continuity, and differentiation.

A few (or more!) words: Many of the results in this course will seem familiar because you have studied calculus. At the same time, this course is quite different than your calculus classes because we will be building, step by step, a foundation of results and will go beyond the basics of those courses as expected in an advanced undergraduate course!

It is expected that students will spend a reasonable amount of time outside of the scheduled class time (typically at least two to three hours outside class for each hour inside class) reading the text, mastering terminology and notation, solving problems, and improving proof writing. In particular, the time spent on homework is an important aspect to the course. The homework is not merely an exercise in matching a problem to and repeating an algorithm/proof presented in class. Some problems require you to spend time thinking about the concepts, putting together several definitions and/or theorems, and even adding a bit of creativity! It is important to start the homework early as you may need some saturation time to grasp the material and are likely to need multiple attempts to complete some problems. It is important to be patient and diligent as you experience the learning
process inherent in homework in advanced courses. Please utilize my office hours! These are times you should feel comfortable dropping in without notice. If you are unavailable during my scheduled office hours, do not hesitate to contact me as I am available more often than just the times listed. In fact, feel free to stop by my office and see if the door is open as I am on campus quite a bit!

**Student Learning Outcomes:** By the end of this course, students should, among other things, be able to

- demonstrate knowledge of basic topological concepts such as open, closed, connected, and/or compact sets by proving a set possesses certain topological properties, by applying these properties to prove other results, and/or by providing examples of sets with given topological characteristics.

- demonstrate knowledge of the theory of convergence of real sequences by using definitions and/or appropriate theorems to prove convergence and/or divergence results.

- demonstrate knowledge of definitions and theorems relevant to the theory of continuity of real functions by proving the continuity/discontinuity of a real function, by applying the theory of continuity to prove other results, and/or by providing examples of functions with various levels of discontinuity.

- demonstrate knowledge of definitions and theorems relevant to the theory of differentiation of real functions by proving the differentiability/non-differentiability of a real function and/or by applying the theory of differentiation to prove other results.

Selected questions on exam(s), which will consist of previously unseen problems, will be used to assess some of these outcomes. You may find it necessary to seek additional help to meet these expectations and objectives.

**Grading:** There will be three exams each worth 16% and a comprehensive final worth 24%. Graded homework will accounts for 24% of the course grade. Note that the homework and the final are each weighted at one and half times an in class exam. The remaining 4% of the grade will come from pop reading/theorem/definition quizzes in class and/or online assessments. Exam dates will be announced in class. What percentage is necessary for a particular letter grade will be determined as the course progresses, but it is expected that the standard 10 point scale breakdown will be adjusted down.

**Homework:** Homework will be collected and graded regularly and is worth 24% of the course grade. It is due at the start of class on the assigned due date or at a time specified in class. Late homework may not be accepted. *On the due date, no questions may be asked of me regarding the assignment due that day.* These are typically weekly homework assignments and the day an assignment is due is not the day to be figuring out a problem. Please see the section on resources and collaboration below for more information related to the homework.

Keep in mind that you may not immediately know the “answer” to or how to prove every assigned problem. It is important to start the homework early to give yourself time to ask questions as you are moving through this learning process, but it is a good idea to spend time alone on each
problem before you consult with anyone (see more below about collaboration) and of course, before
the day it’s due! You should not turn in work that you did not contribute to substantially. You are
expected to write up your homework independently, and you must always indicate with whom you
worked on each problem.

Working diligently and frequently is a key to success in this course. Because the process of
applying reasoning to solve problems and communicating arguments is fundamental to this course,
unsupported answers and arguments may receive no credit. To facilitate this process, the following
requirements are made of the graded homework.

• Problems should be clearly labeled and numbered on the left side of the page and written in
the order they are assigned. There should also be a visible separation between problems, and
you should leave the left margin and the back of every page blank so that the space may be
used for scoring and comments.

• Because there is a difference between “scratch work” and your final solution/argument, cross
outs and excessive eraser marks should not be found throughout your work.

• Use complete sentences when communicating an argument-proof, and of course, proofs should
be written in paragraphs with calculations/equations and diagrams centered as needed. Look
to your text for examples of appropriate mathematical writing. The proofs there are not
strewn with symbols nor are they in a two-column format!

• You must always indicate with whom you worked on each problem. Simply write the name
of your collaborators to the left of the problem number in the margin. This is the exception
to leaving the left margin blank!

• Staple all pages together before class and remove “rough” edges.

One last tip that isn’t required: Beginning each solution/proof with the original problem statement
makes it easier to study from your work later and allows me to address different aspects of the
problems in my comments to you when needed.

You most definitely do not need to type up your homework, but if you so wish, a L\TeX template
is available on my web page.

Reading/Theorem/Definition Quizzes: While homework will typically be collected once a
week, to get the most out of our time in class together it is important to stay on top of the reading,
terminology, notation, and results. Throughout the semester, pop quizzes will be given in class on
the terminology, notation, and named theorems. During any given class period, you may be asked
to define terms and/or state named theorems covered at any time prior to the start of that class
period. Additionally, there may be occasional online assessments over the reading, terminology,
notation, and theorems some of which may be due prior to the class period in which material may
be covered. These quizzes and assessments will account for 4% of the total course grade.

Electronic Devices: No calculators, electronic devices, or computational software of any kind
may be used on any graded assignment unless stated otherwise in class. Students should not come
to rely on calculators too heavily outside of class as all work on graded material must be supported.
While you may consider yourself an expert multi-tasker and while you may not intend it to be, texting and other cell phone usage is disruptive and disrespectful to your fellow classmates (and to me!). Thus, cell phones must be put away during class and should be silenced, set to vibrate, or turned off. If there is a real need to have access to your phone (e.g. family illness/emergency), please inform me before class.

**Attendance/Missed Assignments:** Go to class. I expect you to be in attendance for every class. If you miss for any reason, you are still responsible for all announcements made and all material presented. Make-up privileges for absences may be extended at the discretion of the professor. *It is your responsibility to contact me to request alternative arrangements.* If at all possible, contact should be made prior to the absence and contact is expected to be made within one class period of an absence except under unusual circumstances.

You are free to choose not to attend class, but if you attend class, you are expected to maintain a certain level of decorum that includes, but is not limited to, the cell phone usage expectation above. If need be, additional cell phone and other policies will be implemented throughout the semester.

**Permissable Resources and Collaboration:** Resources acceptable for use are your or a current classmate’s personal course notes, documents distributed by me during this semester, and the required textbook. You may only consult with other members of this class and with me on the graded assignments. Moreover, you should not turn in work that you did not contribute to substantially. A good measure for this is whether you could explain the solution in your own words or explain if called on in class, and so it is best to write your solutions independently. You must always indicate with whom you worked on each problem. You are not to use other sources of potential solutions. This includes, but is not limited to, other texts, the internet, software/programs with “checking” and computational capabilities (e.g. Maple, Wolfram Alpha, Lurch, etc.), other notes or documents not given out by me this semester, other faculty, students, tutors, etc. If you are ever in doubt about what you can and cannot use, ask and ask before you use it! Any use of materials outside of those discussed here and not cleared with me before use will be considered a violation of the course grading policy and hence the Academic Code of Honesty.

**Cheating:** Copying or cheating on any graded work is not allowed! Keep in mind this includes homework and copying does not equal collaboration. Cheating may result in a failing grade in the course and the student being reported to appropriate administrators. *Whenever you turn in any work to be graded, you are implicitly stating that you abided by the the conditions stated in this syllabus, in class, and in the Academic Code of Honesty.* For more information, see the Academic Code of Honesty at [www.scranton.edu/academicintegrity](http://www.scranton.edu/academicintegrity).

**Other stuff:** When writing email, please use capitalization, punctuation, and complete sentences. I will use your university email account as needed and so you should check this regularly.

In order to receive appropriate accommodations, students with disabilities must register with the Center for Teaching and Learning Excellence (CTLE) and provide relevant and current medical documentation. Students should contact Mary Ellen Pichiarello (Ext. 4039, LSC 577) or Jim Muniz (Ext. 4218, LSC 580) for an appointment. For more information, see [www.scranton.edu/disabilities](http://www.scranton.edu/disabilities).