

# Course Change Request

## New Course Proposal

Date Submitted: 11/13/19 2:28 pm

Viewing: **MATH 300 : Introduction to Advanced Mathematics**

Last edit: 11/13/19 2:28 pm

Changes proposed by: csausvil

Catalog Pages referencing this course	<a href="#">Department of Mathematical Sciences</a> <a href="#">Mathematics (MATH)</a>
Other Courses referencing this	As A Recommended Prerequisite:

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2019

Subject Code: MATH - Mathematics

Course Number: 300

Bundled Courses:

Is this course replacing another course? Yes

Equivalent Courses: MATH 290 - Introduction to Advanced Mathematics

Catalog Title: Introduction to Advanced Mathematics

Banner Title: Intro to Advanced Mathematics

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

### In Workflow

1. **MATH Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost- Undergraduate
5. Registrar-Courses
6. Banner

### Approval Path

1. 11/13/19 3:20 pm  
David Walnut  
(dwalnut):  
Approved for MATH  
Chair

**Hours of Lecture or Seminar per week:** 3

**Repeatable:** May be only taken once for credit, limited to 3 attempts (N3) **Max Allowable Credits:** 9

**Default Grade Mode:** Undergraduate Regular

**Recommended Prerequisite(s):**

**Recommended Corequisite(s):**

**Required Prerequisite(s) / Corequisite(s) (Updates only):** add "AND (Math 125 C or better OR Math 125T OR Math 175 C or better)" to existing prerequisites

**Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):**

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?
	(	MATH 114	C	UG		
Or		MATH 114T	T	UG		
Or		MATH 116	C	UG	)	

**Registration Restrictions (Updates only):**

**Registrar's Office Use Only - Registration Restrictions:**

**Field(s) of Study:**

**Class(es):**

**Level(s):**

**Degree(s):**

**School(s):**

**Catalog Description:** Introduction to proofs and the language of mathematics. Topics include induction, equivalence relations, cardinality and basic properties of the real numbers. Designated as a writing intensive course for mathematics majors. Notes: Primarily intended for mathematics majors.

**Justification:** This is the writing intensive course for our major. By increasing the course number to 300 (from 290) we are making the course more in alignment with other WI courses throughout the university. We are also adding a mandatory prerequisite of Math 125/175.

**Does this course cover material which crosses into another department?** No

**Learning Outcomes:**

**Attach Syllabus** [290-002 Walnut.pdf](#)

**Additional Attachments**

**Staffing:** All tenure Math faculty should be able to teach this course.

**Relationship to Existing Programs:** This course will act as the writing intensive course for all Mathematics BA and BS degrees.

**Relationship to Existing Courses:** This will count as the prerequisite for any course that requires Math 290 as prerequisite. It will also require Math 114 (old requirement) and Math 125/175 (new requirement) as prerequisite.

**Additional Comments:**

**Reviewer Comments**

**Math 290–002 (Introduction to Advanced Mathematics)  
Spring 2019**

**Instructor:** David Walnut

**Office:** Exploratory Hall, room 4402

**Phone:** 703 993 1478 (voice); 703 993 1491 (fax)

**email:** [dwalnut@gmu.edu](mailto:dwalnut@gmu.edu)

**Office hours:** TR 1:00pm–2:30pm, and by appointment.

**Text:** D. Smith, M. Eggen, R. St. Andre, *A Transition to Advanced Mathematics* (eighth edition)

**Topics:** The course will cover portions of Chapters 1–5 in the text.

**General Comments:**

The main purpose of this course is to teach the student how to write, read, and recognize correct mathematical proofs. Along the way, the student will be introduced to some elementary concepts of advanced mathematics including elementary propositional logic, set theory, relations, functions, and cardinality.

This course has been designated by the Math Department as a writing-intensive course. Therefore much emphasis will be laid on correct grammar, good organization and clarity of expression as well as correct logic in all graded work.

Content for this course will be delivered in the form of both in-class lectures and recorded lectures that are to be watched outside of class. This means that there will be some work done in class that may be collaborative in nature. Details on this will be provided as needed. Recorded lectures will be made available through BlackBoard.

A BlackBoard page will be set up for this course. This page will contain announcements, handouts, solutions to exams, class notes, and other important information. You should check BlackBoard regularly to avail yourself of these helpful resources.

You are required to be familiar with some flavor of the mathematical typesetting software TeX, such as LaTeX. You are not expected to come in with this familiarity, but it is required that you typeset solutions to the homework sets using TeX. More details on this will be available on the BlackBoard page for this course.

This class is identified as a Students as Scholars Scholarly Inquiry course. Through the individual written assignments and group work, emphasis will be placed on learning the type of thinking that is involved in understanding advanced mathematical concepts, and in furthering the mathematical enterprise. This includes learning how to formulate conjectures and proof strategies based on evidence gathered from examples. In addition, the student will learn the value of the proper formulation of a definition. All of these are basic skills required to understand the motivations and techniques that inform all mathematical research. Finally, students will learn how to write mathematics using the TeX software package which is how virtually all professional mathematics is written.

**Grading:**

*Homework Exercises:* Included with this syllabus is a list of homework exercises for the course taken from the exercises at the end of each section of the book. Students are expected to complete these homework problems in a timely fashion as the corresponding sections are covered in class. These exercises will not be collected. Collaboration is *encouraged* on these assignments.

*Graded Writing Assignments:* There will be approximately 10 short writing assignments given throughout the semester. The assignments will involve writing mathematically and grammatically

correct solutions to problems, usually involving proofs. Your grade for these assignments will be based on the correctness of your proofs and clarity and correctness of your writing. You will receive feedback on your writing assignments which will total at least 3500 words according to the guidelines of the Writing Across the Curriculum Committee. Precise assignments and due dates will be given on BlackBoard. Collaboration is **not permitted** on these assignments.

The student should be aware of the following requirements for all homework sets:

- No late assignments will be accepted under any circumstances.
- All assignments are to be typed up using some flavor of TeX, such as LaTeX, and are to be submitted to me electronically through BlackBoard as a *pdf* file (no other file format is acceptable).
- The *pdf* file submitted will follow the following naming convention:
  - For written assignments: `LastName-HWnumber.pdf`, for example: `Jones-HW04.pdf`.
  - For in-class assignments that are to be written up and handed in: `LastName-InClassHWnumber.pdf`, for example: `Jones-InClassHW04.pdf`.
- Your name and the assignment number will appear at the top of your submitted *pdf* file.
- You will retype each question being asked into the body of your solution file. I will give you the `.tex` file of each assignment so this will be a simple cut-and-paste.

If any one of these rules is violated, the assignment will not be accepted. *You have been warned.* The average of your written homework assignment scores will count for 40% of the final grade.

*In-Class Work:* As mentioned above, there will be some graded assignments that will be done in-class, some of which may be collaborative in nature. Details will be provided on the nature of these assignments on Blackboard close to the time each is assigned. Your average score on these assignments will count for 15% of the final grade.

*Semester Project:* You will be required to submit a semester project consisting of (1) a written paper of around 2500 words (so around 5-6 pages) on a mathematical topic of your choosing (but approved by me). The goal of the project will be for you have the experience of investigating and understanding a somewhat advanced mathematical topic to sufficient depth to write an expository paper on that topic. You will receive feedback on this assignment before the final version is handed in according to the guidelines of the Writing Across the Curriculum Committee. Details and due dates will be posted on Blackboard. Your grade on the project will count for 10% of your final grade.

*Midterm Exams:* One midterm exam will be given which will take the full class period, on Tuesday November 6. The midterm exam will count for 15% of the final grade. Makeup exams will be given only in cases of extreme hardship and then only when the student has **contacted me in advance**. If I am not contacted in advance, no makeup will be given.

*Final Exam:* There will be a **cumulative final exam** given on Tuesday, May 14, 2019, 10:30am–1:15pm in the same room where we have class. The final exam will count for 20% of the final grade.

The grading scale is as follows, and is based on your correctly rounded semester average. There will be no curve.

A+:	98+	A:	93 - 97;	A-:	90 - 92;
B+:	88 - 89;	B:	83 - 87;	B-:	80 - 82;
C+:	78 - 79;	C:	73 - 77;	C-:	70 - 72;
D:	60 - 69;	F:	0 - 59		

### Homework Exercises

#### Section Exercises

- 1.1 1(a)-(e), 2(a)-(f), 3(a)-(g), 4(a)-(g), 5(a)-(c), 6(a), 6(d), 8(a)-(b), 10(a)-(c)
- 1.2 1(a)-(e), 2(for parts (a)-(e) of 1), 3(a)-(d), 4(a)-(e), 5(a)-(d), 6(a)-(c), 12(a)-(c), 16(a)-(d)
- 1.3 1(a)-(e), 2(for parts (a)-(e) of 1), 5, 8(a)-(e), 10(a)-(d)
- 1.4 3, 5(a)-(e), 6(a)-(d), 7(a)-(e), 9(a)-(b)
- 1.5 3(a)-(d), 4(a)-(c), 6(a)-(b), 7(a)-(c)
- 1.6 1(a)-(f), 2(a)-(c), 4(a)-(e)
- 1.7 1(a)-(f), 2, 3(a)-(e), 5(a)-(e), 7(a)-(b), 8(a)-(c), 9(a)-(c)
- 1.8 6(a)-(c), 7(a), (b), (d), 9(a)-(b), 10, 11, 13, 15, 17(a)-(c)
- 2.1 1(a)-(e), 4(a)-(e), 5(a)-(g), 6(a)-(c), 7, 8, 9, 14(a)-(d), 15(a)-(g), 17(a)-(f)
- 2.2 1(a)-(e), 2(a)-(e), 6(a)-(e), 9(a)-(d), 10(a)-(c), 11(a)-(c), 15(a)-(d), 17(a), (b)
- 2.3 1(g), (i), (n), (o), (p), 7, 8, 9(a), (b), 10, 16(a)-(c)
- 2.4 1(a)-(c), 2(a)-(c), 4(a)-(e), 5(a)-(c), 6(a)-(c)
- 2.5 1(a)-(c), 3, 2, 5(a)-(b), 7(a), (b), (d), 9, 13(a)-(b)
- 3.1 1(a)-(b), 2(a)-(e), 6(a)-(d), 7(a)-(c), 8(a)-(d), 9(a)-(d)
- 3.2 1(a)-(e), 2(a)-(d), 5(a)-(b), 6(a)-(c), 8(a)-(c), 11, 15(a), 17, 18
- 3.3 2(a)-(c), 3(a)-(c), 4(a)-(c), 6, 10
- 3.4 3, 8(a)-(b), 9(a)-(b), 10
- 3.5 1(a), (b), (c), (f), 2(a)-(c), 3, 4, 8, 9(a)-(b)
- 4.1 1(a), (b), (d), (i), (j)-(e), 13(a)-(c), 14(a)-(c), 15(a)-(c)
- 4.2 5(a)-(b), 9(a)-(b), 12
- 4.3 1(a)-(f), 2(for parts (a)-(f) of 1), 4, 5, 6, 9(a)-(d), 12(a)-(b)
- 4.4 1, 3(b), (d), 4, 5(a), 6, 8
- 4.5 1(a), 2(a)-(d), 4(a)-(d), 7(a)-(c), 10(a)-(b), 12(a)-(c), 13(a)-(b), 14(a)-(b)
- 5.1 4, 7(a)-(b), 8(a)-(b), 10, 12, 13, 17, 18(a)-(b), 19(a), (e)
- 5.2 1, 3(a)-(c), 4(a)-(c), 10, 11
- 5.3 5(a), (b), (d), 6, 7, 9(a)-(c), 11, 12(a)-(b), 14(a)-(b)2, 8(a)-(c), 10, 12, 13(a), 14(a)-(b)
- 5.4 3(a)-(b), 4(a)-(c), 5, 7, 9(a)-(c), 13(a)-(c), 11, 15
- 5.5 1(a)-(d), 3, 5, 8