

**Introduction to Mathematical Reasoning**  
**Math 301-1**  
**Fall 2018**

Instructor      Dr. Kimberly Vincent  
Title            Clinical Associate Professor  
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Office Address  Morrill 212  
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Office Hours    Tuesday 2-3 pm  
                      Wednesday 11-12 pm  
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Homepage       <http://www.math.wsu.edu/math/faculty/vincent/welcome.php>

Location        Sloan 163  
Times            Tuesday and Thursday 10:35-11:50  
Start Date      August 20, 2018  
Course Credits  3

Prerequisite: You must have earned a C or better in Math 220

**Required Text**

*Book of Proof* by Richard Hammack. This is an open resource book. To get your free pdf go to the following url. <https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=7>

**Course Objectives**

You will learn how to construct arguments and then write them in proof format. You will learn direct and indirect proof writing techniques. You cannot learn to construct and write proofs by watching. Thus, I expect attendance and active participation. You can participate by doing in class work, journal writing, asking questions, contributing to brainstorm and discussion sessions.

**Learning goals:**

1. Gain facility in reasoning mathematically.
2. Gain facility in communicating mathematically ideas effectively.

The learning goals will be assessed through homework and exams. Journal writing will be used as formative assessment for me to see where students are in their progress toward attaining these goals. Formative assessment is used to make teaching decisions and for students to gain insight of their current knowledge, not to assign grades. Thus, journals will not be graded. I will write comments and questions to help guide your thinking. Any missed journals will lower your participation score, as will off task behaviors.

### Tentative Schedule

Block	Weeks	Topics	Chapters in text
Fundamental Concepts: sets, logic and their connections	1-3	Sets and elements, Venn diagrams, set operations, propositional logic, Boolean Algebra, implications and rules of inference, predicate logic	Chapters 1 & 2
Proving theorems	4-6	Element chasing, direct proof, indirect proof, proof by cases, and counter examples	Chapters 4 & 8 Chapters 5, 6, 7 & 9
Mathematical Induction	7-8	Weak induction, recurrences, strong induction and smallest counter example style arguments	Chapter 10
Relations	9-10	Relations, RFT properties, equivalence relations and classes	Chapter 11
Functions	11-13	Injections, surjections, bijections, cardinality, countability, uncountability	Chapters 12 & 13
Open sets	14	Open intervals, neighborhoods, open and closed sets	Materials will be supplied

### Grading Policy

F Below 60%  
 D- [60-64)  
 D [64-70)  
 C- [70-74)  
 C [74-77)

C+ [77-80)  
B- [80-84)  
B [84-87)  
B+ [87-90)  
A- [90-94)  
A [94-100]

Grades will be determined by the following distribution:

40% Homework  
15% Participation (this includes in class work, discussion and journals)  
30% Two Midterm Exams  
15% Final Exam

Any dispute or errors on grades must be brought to office hours within one week of when the work was returned in class. You lose this one week grace period if you miss class when the work was handed back.

### **Attendance Policy**

Attendance is required. In class we will work on proofs together so that you can learn the thought process necessary for the various style proofs. You will benefit from participating in class and hearing how I make connections so that you may also start to find ways to brainstorm and make connections necessary to craft a coherent proof. Those who skipped class frequently in past semesters did not fare well on exams as they made the common errors of novice proof writers. There are several reasons: they did not hear the discussions about the common errors and why they do not work and they often did not collect graded homework with written comments. Thus they continued to make the same errors on exams.

### **Exam Policy**

No make ups allowed on exams. The first exam will cover the material in weeks 1-6. The second exam will cover the material covered in weeks 7-10 and the final exam will cover the material from weeks 11-15. I will give you minimum of a week notice of exam dates. Your final exam schedule can be accessed on zzzsis. Go to your schedule and there is a pull down menu to the left that will have exam schedule as one of the options. Be sure to not make travel plans to leave before the final exam as you will not be allowed to take it early.

### **Academic Integrity**

Please note that we take extremely seriously the university's policy on the need for academic honesty in all your work. Any form of dishonesty in an assignment will lead to a zero on an assignment and we reserve the right to give a grade of F for the course as well. If needed, Student Conduct will be contacted. Visit the following site for more information regarding

what constitutes academic dishonesty and the WSU procedures for handling cases of academic dishonesty. <http://www.conduct.wsu.edu/default.asp?PageID=343>

### **Disability Policy**

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations **MUST** be approved through the DRC (Admin Annex Bldg, Room 205, Pullman campus). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

### **Miscellaneous**

WSU Safety Measures: Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Please visit <http://safetyplan.wsu.edu> and <http://oem.wsu.edu/emergencies> to access the Campus Safety Plan and emergency information.