Math 281 Fall 2019 (CRN 13774)

- Office Hours: Monday, Wednesday, Friday, (and most Sundays) 1000-10:50 or by appointment.
- Meets MUWF 08:00-08:50 in 106 DEA
- **Text**: MultiVariable Calculus by James Stewart is the textbook. The 5th edition, the 6th edition, the 7th edition, and the 8th edition are all equally acceptable for this course and previous editions can perhaps be obtained more cheaply on the web. However if you are thinking of taking Math 281/282 from an instructor other than Gilkey, then you should perhaps not buy a previous edition since you may not be able to use that edition with different instructor. The syllabus and homework assignments in Gilkey's sections of Math 281/282 will be edition independent.
- **Organization**: Homework is probably the most important activity in the course in terms of helping you internalize the material. Homework will be due each Tuesday on the material of the previous week. The Monday class period will be a discussion section for the homework to be due the subsequent day by 0800 - there will be a quiz the last 25 minutes of class most Monday's.
- **Homework**: The homework will be assigned and graded using Webworks [https://webwork.uoregon.edu/webwork2/Math281-13774/](https://webwork.uoregon.edu/webwork2/Math281-13774/). It is due at 0800 PST Tuesday morning following the week for which it was assigned. the problems will not be specific to the particular edition used -- your account will probably not be active until Monday 30 September 2019. The log in information on this server is as your duckID for username and UO ID number for password.
- If you have a notification letter from the Accessible Education Center, please give me a copy as soon as possible so the relevant accommodations can be finalized.
- **Grades**:
  - 100 points Homework and Quiz Average (The 2 lowest scores from the combined list of HW and QZ scores will be dropped)
  - 100 points Exam #1 Wednesday 23 October 2019
  - 100 points Exam #2 Wednesday 20 November 2019
  - 200 points Final Exam 10:15 Friday 13 December 2019. According to faculty legislation, final exams may not be given early under any circumstances. So please do not plan to leave campus early - this exam is late in the exam period.
  - Your final grade will be assigned on the basis of the total point score of 500 points. Any student getting at least a B on the final will receive at least a C- in the course; to pass the course, you must get at least a "D" on the final exam. You must bring your photo ID to all exams. You may bring a 3x5 inch index card with any formulas on it to any exam or quiz if you wish. Similarly, you may bring with you a hand held graphing calculator to any exam or quiz if you wish.

- **Teaching Associate**: Ekaterina Puffini. Additional information: [Academic calendar](https://academiccalendar.uoregon.edu).

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**Reading Assignments**

- **Week 1** 1 October to 4 October 2019: Read the 3 sections on 3-dim coord systems, Vectors, The Dot Product.
- **Week 2** 7 October to 11 October 2019 Read the 3 sections on The Cross Product, Equations of Lines and Planes, Cylinders and Quadratic Surfaces.
- **Week 3** 14 October to 18 October 2019 Read the 4 sections on Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions, Arc Length and Curvature [but ignore the part on curvature], and Motion in...
Space: Velocity and Acceleration.

- **Week 4** 21 October to 25 October 2019 **Exam #1 23 October 2019.** Start functions of several variables
- **Week 5** 28 October to 1 November 2019 Read the 3 sections on Functions of Several Variables, Limits and Continuity, and Partial Derivatives.
- **Week 6** 4 November to 8 November 2019 Read the 2 sections on Tangent Planes and Linear Approximations, and The Chain Rule.
- **Week 7** 11 November to 15 November 2019 Read the 3 sections on Directional Derivatives and the Gradient Vector, Maximum and Minimum Values, and Taylor and Maclaurin Series [this is in an earlier chapter].
- **Week 8** 18 November to 22 November 2019 **Exam #2 Wednesday 20 November 2019** Start Lagrange multipliers.
- **Week 9** 25 November to 27 November 2019. Read the 1 section on Lagrange Multipliers
- **Week 10** 2 December to 6 December 2019 Review the previous readings.
- **Week 11** **Final exam week 9 December to 13 December 2019** 10:15-12:15 Friday 13 December 2019 Final exam

According to faculty legislation, final exams may not be given early under any circumstances

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### Complete Final Exam Schedule

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<td><strong>2019-2020</strong></td>
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#### Academic Deadlines

- **Deadline**

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<tr>
<th>Deadline</th>
<th>Last day to:</th>
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<tr>
<td>September 29:</td>
<td>Process a complete crop (100% refund, no W recorded)</td>
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<td>October 6:</td>
<td>Drop this course (100% refund, no W recorded; after this date, W's are recorded)</td>
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<td>October 6:</td>
<td>Process a complete drop (90% refund, no W recorded; after this date, W's are recorded)</td>
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<tr>
<td>October 7:</td>
<td>Drop this course (75% refund, no W recorded; after this date, W's are recorded)</td>
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<tr>
<td>October 7:</td>
<td>Process a complete drop (75% refund, no W recorded)</td>
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<td>October 9:</td>
<td>Add this course</td>
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<td>October 9:</td>
<td>Last day to change to or from audit</td>
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<td>October 13:</td>
<td>Withdraw from this course (75% refund, W recorded)</td>
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<td>October 20:</td>
<td>Withdraw from this course (50% refund, W recorded)</td>
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<tr>
<td>October 27:</td>
<td>Withdraw from this course (25% refund, W recorded)</td>
</tr>
<tr>
<td>November 17:</td>
<td>Withdraw from this course (0% refund, W recorded)</td>
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<tr>
<td>November 17:</td>
<td>Change grading option for this course</td>
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- **Course objective**: Understand the geometry of space (cross product, dot product, projection formula, equations of lines and planes), understand the basic quadratic surfaces (paraboloids, hyperboloids of one sheet, hyperboloids of two sheets, ellipsoids, cylinders), be able to compute partial derivatives, obtain the best linear approximation, determine the tangent plane. Students should be able to compute with and apply the chain rule, compute directional derivatives, and understand Taylor and Maclaurin series. Students should understand the geometry of the gradient - the gradient points in the direction of maximal increase and minus the gradient points in the direction of maximal decrease - at a local minima or maxima the gradient vanishes (i.e. the function has a critical point). Students should be able to apply the second derivative test (Hessian) to find label a critical point as a local minima, local maxima, saddle point, etc. Students should be able to solve problems involving the methods of LaGrange multipliers to find local minima and maxima of functions subject to constraints.
Learning outcomes

Note Learning outcomes are brief statements identifying the major skills, abilities, and concepts a student is expected to acquire from your course. The word "outcomes" can be used interchangeably with "goals" or "objectives" as long as the abilities in question are meaningfully evaluated using exams, papers, and other accepted means. The point is to make your expectations more transparent by articulating what may be only implicit in your course description, lesson topics, and assignments. Three to six short sentences or bullet points will suffice. Active verbs (evaluate, analyze, demonstrate, etc.) concretize expectations better than vague ones (appreciate, study, learn, etc.). And, of course, to invent non-verbs like "concretize".

Students should be able to compute the cross product and the dot product of vectors in space, to determine the projection of a vector on a line, to determine the equations of lines and planes, and to be able to recognize, distinguish between, and graph the basic quadratic surfaces (paraboloids, hyperboloids of one sheet, hyperboloids of two sheets, ellipsoids, cylinders). They should be able to compute partial derivatives, obtain the best linear approximation, and to determine the tangent plane. Students should be able to compute with and demonstrate understanding of the chain rule, to compute directional derivatives, and demonstrate understanding of and compute specific examples of Taylor and Maclaurin series. Students should be able to demonstrate understanding of the geometry of the gradient - the gradient points in the direction of maximal increase and minus the gradient points in the direction of maximal decrease - at a local minima or maxima the gradient vanishes (i.e. the function has a critical point). Students should be able to apply the second derivative test (Hessian) to find label a critical point as a local minima, local maxima, saddle point, etc. Students should be able to solve problems involving the methods of LaGrange multipliers to find local minima and maxima of functions subject to constraints.

Mathematics Department Undergraduate Grading Standards November 2011

There are two important issues that this grading policy recognizes.

- (1) Mathematics is hierarchical. A student who is given a grade of C or higher in a course must have mastery of that material that allows the possibility of succeeding in courses for which that course is a prerequisite.
- (2) Some mathematics courses are primarily concerned with techniques and applications. In such courses student success is measured by the student's ability to model, successfully apply the relevant technique, and bring the calculation to a correct conclusion. The department's 100-level courses and most calculus courses are examples in this category although these are not the only examples. Other courses are primarily concerned with theoretical structures and proof. In such courses student success is measured by the student's ability to apply the theorems and definitions in the subject, and to create proofs on his or her own using the models and ideas taught during the course. Many courses are partly hybrids incorporating both techniques and applications, and some element of theory. Some lean more toward applications, others more toward theory.

Rubric for applied courses:

- A: Consistently chooses appropriate models, uses correct techniques, and carries calculations through to a correct answer. Able to estimate error when appropriate, and able to recognize conditions needed to apply models as appropriate.
- B: Usually chooses appropriate models and uses correct techniques, and makes few calculational errors. Able to estimate error when prompted, and able to recognize conditions needed to apply models when prompted.
- C: Makes calculations correctly or substantially correctly, but requires guidance on choosing models and technique. Able to estimate error when prompted and able to recognize conditions needed to apply models when prompted.
- D: Makes calculations correctly or substantially correctly, but unable to do modeling.
- F: Can neither choose appropriate models, or techniques, nor carry through calculations.

Modeling, in mathematical education parlance, means the process of taking a problem which is not expressed mathematically and expressing it mathematically (typically as an equation or a set of equations). This is usually followed by solving the relevant equation or equations and interpreting the answer in terms of the original problem.

Rubric for pure courses:
A: Applies the important theorems from the course. Constructs counterexamples when hypotheses are weakened. Constructs complete and coherent proofs using the definitions, ideas and theorems from the course. Applies ideas from the course to construct proofs that the student has not seen before.

B: Applies the important theorems from the course. Constructs counterexamples when hypotheses are weakened. Constructs complete and coherent proofs using the definitions, ideas and theorems from the course.

C: Applies the important theorems from the course when the application is direct. Constructs simple proofs using the definitions when there are very few steps between the definitions and the conclusions. Explains most important counterexamples.

D: Can do some single step proofs and explain some counterexamples.

F: Unable to do even single step proofs or correctly use definitions.

Many courses combine pure and applied elements and the rubrics for those courses will have some combination of elements from the two rubrics above. Detailed interpretation of the rubrics depends on the content and level of the course and will be at the discretion of instructors. Whether to award grades of A+ is at the discretion of instructors.

Grades in graduate courses

The faculty has reached basic agreement on the meaning of grades for graduate students in the 500- and 600-level courses:

- A+ Truly outstanding work
- A Good Ph.D. or M.S./M.A. level work
- A- Clearly Ph.D. level work, but below average. Good at M.S./M.A. level
- B+ Work which is at the lower margin of acceptable Ph.D. level work, but quite satisfactory at the M.S./M.A. level
- B Substandard at the Ph.D. level but satisfactory at the M.S./M.A. level
- B- Barely passing at the graduate level
- C+ or below. Unsatisfactory at the graduate level

Faculty teaching 600-level courses shall have the option to use different (but functionally equivalent) assessment procedures to grade students who have been admitted to the Ph.D. program compared to students in the Master's/Pre-Ph.D. stage of the program.

Email policy

Unless otherwise prohibited by law, the University of Oregon (University or UO) may send official University communications to employees and students by e-mail to an account provisioned by the University with the full expectation that such e-mails will be read by the recipient in a timely fashion.

Employees and students are expected to review messages received through their UO e-mail account on a frequent and consistent basis. Individuals must ensure that there is sufficient space in their accounts to allow for e-mail to be delivered. Communications may be time-critical. Individuals should use UO e-mail accounts for all University-related e-mail communications.

Individuals who choose to forward e-mail received on a UO e-mail account to a different e-mail address do so at their own risk. The University is not responsible for e-mail, including attachments, forwarded to any e-mail address.

Faculty should use UO e-mail accounts for e-mail communication with students. The University’s course management system requires that faculty and students use their UO e-mail account to gain access to the system.

Academic dishonesty

Academic Misconduct: The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources.
authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at http://researchguides.uoregon.edu/citing-plagiarism see also https://dos.uoregon.edu/academic-misconduct.

Ethical Standards

From the President's Office 2 May 2014: The University of Oregon is a community of scholars dedicated to the highest standards of academic inquiry, learning, and service. We are also committed to the highest standards of ethics as we work to fulfill our mission. We all share responsibility for ensuring that we conduct our transactions in ways that are ethical, honest, and reflect sound fiduciary practices. To accomplish this, it is important that all UO employees review, understand, and consistently practice the standards included in the following laws, rules, and policies including:

- **Child Abuse Under the Oregon Child Abuse Reporting Statutes**, all UO employees have a duty to make a report to the Oregon Department of Human Services or a law enforcement agency when they have reasonable cause to believe any child with whom the employee comes in contact has suffered abuse or that any person with whom the employee comes in contact has abused a child. For instances that relate to UO authorized activities, UO employee are to report to the University of Oregon Police Department. For purposes of this reporting responsibility, a "child" is any "unmarried person who is under 18 years of age" and "abuse" includes, but is not limited to: assault of a child; physical injury to a child caused by other than accidental means; any mental injury to a child caused by cruelty to a child; rape of a child; sexual abuse; sexual exploitation; negligent treatment or maltreatment of a child; threat of harm to a child; buying or selling of a child; allowing a child on the premises where methamphetamine is being manufactured; and unlawful exposure to a controlled substance that subject a child to risk of harm. The duty of employees of public universities to report incidents of child abuse applies at all times, not just to those incidents occurring during working hours or on campus. For this purpose, university employees include all faculty and staff members, student workers, graduate teaching fellows, and temporary employees.

- Under the law, reports must be made to the local office of the Department of Human Services or to a law enforcement agency in the county where the employee making the report is located at the time of the contact. Failure to report when required to do so is a Class A violation. Persons who make reports in good faith are immune from liability for making the report. For instances that relate to UO authorized activities, UO employees are expected to make the report immediately to the UO Police Department at 541-346-2919. Karen Logvin, Director of Work/Life Resources in Human Resources, 541-346-2962, klogvin@uoregon.edu, is the initial point of contact for further questions related to the reporting of child abuse. In addition, you will find additional information and resources regarding mandatory reporting of child abuse and neglect at [http://hr.uoregon.edu/policies-leaves/general-information/mandatory-reporting-child-abuse-and-neglect](http://hr.uoregon.edu/policies-leaves/general-information/mandatory-reporting-child-abuse-and-neglect).

1. ORS Chapter 244, which codifies ethics and conflict of interest policies that you are required to follow as you conduct University of Oregon business. See the guide for public officials here.

2. The Oregon University System (OUS) has a responsibility to prevent and detect fraud, waste, and abuse and to hold accountable those who engage in it. The OUS Fraud, Waste, and Abuse policy sets forth guidelines for reporting known or suspected fraud, waste, or abuse within any OUS institution.

3. If you are aware of fraud, waste, or abuse occurring at the UO or within the OUS, matters can be reported to campus management, OUS Internal Audit Division, or OUS Financial Concerns Hotline. Additional information is also available on the UO Business Affairs and UO vice president for finance and administration webpages.

4. The OUS information security policy and UO information security policy set forth your responsibilities relating to the security of electronic information systems and confidentiality of data. A more comprehensive listing of state laws and rules that guide our operations is available here.

5. The UO will continue a similar focus on these important issues under our new governance structure. We will communicate any changes to reporting protocols after July 1. We are all responsible for understanding and complying with ORS 244, applicable government regulations and policies. We also have a responsibility to raise compliance and ethics concerns through established channels. I appreciate your commitment to integrity and honesty, as it is an essential element in maintaining an ethical and secure UO workplace environment for everyone.

Statement on Final Exams

- 1. In the week preceding final examination during fall, winter, and spring terms: No examination worth more than 20% of the final grade will be given, with the exception of make-up examinations. No final examinations will be given...
under any guise. No work that will be evaluated for grades/credit will be due unless it has been clearly specified on the class syllabus within the first two weeks of the term.

- 2. Take-home examinations will be due no earlier than the day of the formally assigned final examination for the class in question.

This action clarifies and extends earlier faculty legislation (1911 Faculty Assembly archives) prohibiting the giving of final examinations earlier than officially scheduled.

In addition, you should be aware of the Faculty Advisory Council's statement on students with multiple exams:

Examination schedules are listed each term in the Time Schedule. Students who are scheduled to take more than three examinations within one calendar day may take the additional examination(s) as makeup examination(s) later in the examination week. The instructor(s) of record for the course(s) beyond the third examination, counting in the order the examination(s) are scheduled, will arrange for (a) makeup examination(s).

The following procedures were approved by the Undergraduate Council to address rare circumstances of competing exam times. Students with examination conflicts may contact the Office of Academic Advising for assistance.

In the case of two examinations scheduled at the same time, the course with the largest enrollment must provide an alternate examination. For conflicts between regular courses and combined examinations, the combined examination course must provide the alternate examination. For combined examinations with conflicts, the largest combined enrollment course must provide the alternative examination.

Questions and concerns regarding this policy should be directed first to the relevant instructor, then the department head, and finally the dean if necessary. You may also find reference to the policy on the Academic Affairs website. If additional input is needed, please contact srviceprovost@uoregon.edu.

**Title IX**

Under Title IX, I have a duty to report relevant information. The UO is committed to providing an environment free of all forms of prohibited discrimination and sexual harassment, including sexual assault, domestic and dating violence and gender-based stalking. Any UO employee who becomes aware that such behavior is occurring has a duty to report that information to their supervisor or the Office of Affirmative Action and Equal Opportunity. The University Health Center and University Counseling and Testing Center can provide assistance and have a greater ability to work confidentially with students. Note: UO employees also have a duty to report child abuse. For those classes and/or processes in which students have historically reported information regarding child abuse, the language can be expanded to provide that notice as well by adding the following statement: All UO employees are required to report to appropriate authorities when they have reasonable cause to believe that any child with whom they come in contact has suffered abuse or any person with whom they come in contact has abused a child.

- Discrimination and Discriminatory Harassment: Oregon law requires that all university employees with credible evidence that any form of prohibited discrimination by or against students, faculty members, staff members, or visitors to our campus is occurring have a duty to report that information. "Prohibited discrimination" includes: Discrimination on the basis of age, disability, national origin, race, marital status, religion, gender, gender identity, gender expression or sexual orientation; and Discriminatory harassment, including all forms of sexual harassment. Reports are to be made to the employee's supervisor or to the Office of Affirmative Action and Equal Opportunity (OAAEO) at 541-346-3123; or via email to the Office of Affirmative Action and Equal Opportunity. Any UO supervisor who has been notified of credible evidence that prohibited discrimination is occurring has a duty to report that to the OAAEO. Penelope Daugherty, Director of OAAEO and Title IX Coordinator, 541-346-2971, penny@uoregon.edu, is the contact person for questions about the duty to report discrimination and discriminatory harassment.

I am a student directed employee. Students experiencing any form of prohibited discrimination or harassment, including sex or gender based violence, may seek information from the non-confidential Title IX office (541-346-8136), AAEO office (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to
Callisto, a confidential, third-party reporting site that is not a part of the university. Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu or aaeo.uoregon.edu or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at Discrimination & Harassment. Specific details about confidentiality of information and reporting obligations of employees can be found at titleix.uoregon.edu. Mandatory Reporting of Child Abuse UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. This statement is to advise you that your disclosure of information about child abuse to a UO employee may trigger the UO employee's duty to report that information to the designated authorities. Please refer to the following links for detailed information about mandatory reporting: Mandatory Reporting of Child Abuse and Neglect.

The instructor of this class, as a Student Directed Employee, will direct students who disclose sexual harassment or sexual violence to resources that can help and will only report the information shared to the university administration when the student requests that the information be reported (unless someone is in imminent risk of serious harm or a minor). The instructor of this class is required to report all other forms of prohibited discrimination or harassment to the university administration.

Safe Ride is an assault prevention shuttle that works to provide free, inclusive, and accessible alternatives to traveling alone at night for UO students, faculty, and staff. We are a schedule-ahead service and riders can (1) call once we open to schedule a ride with a dispatcher or (2) leave a voicemail on the day of their ride request. We do not call riders ahead of time to confirm due to capacity constraints, but riders are always welcome to call us to double-check that their ride was scheduled. We are a feminist, “for-the-students/by-the-students” organization and operate out of the Women's Center in EMU 12F. Operating hours: Spring term Summer term Fall/Winter term Sunday - Thursday | 7p - midnight Friday + Saturday | 7p - 2a Sunday - Thursday | 9p - midnight Friday + Saturday | 9p - 2a Sunday - Thursday | 6p - midnight Friday + Saturday | 6p - 2a Policy and rules:

- 1. We are a schedule-ahead service, we do not call ahead, and we can only wait for riders for 5 minutes at their pick-up time and location.
- 2. We only give rides to groups of 3 or less to prioritize groups that are at higher risk.
- 3. We are a free service and do not accept tips.

https://respect.uoregon.edu/ is a collection of resources for students, faculty, and other employees who are dealing with harassment or discrimination. Among the topics covered:

- reporting requirements for university employees
- how to report harassment (for students and staff)
- how to report discrimination or hate crimes (for students and staff)
- who can give confidential advice exempt from mandatory reporting requirements.
To rest on the blue of the day, like an eagle rests on the wind, over the cold range, confident on its wings and its breadth.

Web page updated on 24 June 2019 by Peter B. Gilkey, 202 Deady Hall, Department of Mathematics at the University of Oregon, Eugene OR 97403-1222, U.S.A. Phone 1-541-346-4717 Email: peter.gilkey.cc.67@aya.yale.edu of Deady Spider Enterprises