Prerequisite: MAT 266 or MAT 271 (Calculus II) or its equivalent with a grade C or better.

When you contact your instructor, put “MAT 272” and class time into the subject line. Due to FERPA, your instructor cannot answer grade related questions or discuss grades by email. You MUST send all email from your official ASU email account. Emails that are not sent from that account will be ignored.

Tentative Lecture and Test Schedule

<table>
<thead>
<tr>
<th>Week Of</th>
<th>Section</th>
<th>Concepts/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/7 – 1/11</td>
<td>12.1-12.3</td>
<td>3-D Coordinate Systems; Vectors; Dot Product</td>
</tr>
<tr>
<td>1/14 – 1/18</td>
<td>12.4-12.6</td>
<td>Cross Product; Lines and Planes; Cylinders and Quadratic Functions;</td>
</tr>
<tr>
<td>1/21 – 1/25</td>
<td>13.1-13.2</td>
<td>1/21-MLK Holiday, Vector Functions and Space Curves; Derivatives and Integrals of V.F.</td>
</tr>
<tr>
<td>1/28 – 2/1</td>
<td>13.3-13.4</td>
<td>Arc Length &amp; Curvature; Motion in Space</td>
</tr>
<tr>
<td>2/04 – 2/8</td>
<td>14.1-14.2</td>
<td>Functions of Several Variables; Test 1 Wednesday 2/06; Limits and Continuity</td>
</tr>
<tr>
<td>2/11 – 2/15</td>
<td>14.3-14.5</td>
<td>Partial Derivatives; Tangent Planes and Linear Approximations; The Chain Rule</td>
</tr>
<tr>
<td>2/18 – 2/22</td>
<td>14.6-14.7</td>
<td>Directional Derivatives and the Gradient; Maximum &amp; Minimum values</td>
</tr>
<tr>
<td>2/25 – 3/1</td>
<td>14.8, 15.1-2</td>
<td>Lagrange Multipliers; Double Integrals over Rectangles- General Regions</td>
</tr>
<tr>
<td>3/04 – 3/08</td>
<td>Spring Break</td>
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</tr>
<tr>
<td>3/18 – 3/22</td>
<td>15.3-15.6</td>
<td>Double Integrals in Polar Coordinates; Applications; Surface Area; Triple Integrals</td>
</tr>
<tr>
<td>3/25 – 3/29</td>
<td>15.7-9,16.1</td>
<td>Triple Integrals in Cylindrical/Spherical Coordinates; Change of Variable; Vector Fields</td>
</tr>
<tr>
<td>4/1 – 4/5</td>
<td>16.2-16.3</td>
<td>Line Integrals; The Fundamental Theorem for Line Integrals</td>
</tr>
<tr>
<td>4/8 – 4/12</td>
<td>16.4-16.5</td>
<td>Green’s Theorem; Test 3 Wednesday 4/10; Curl &amp; Divergence;</td>
</tr>
<tr>
<td>4/15 – 4/19</td>
<td>16.6-16.7</td>
<td>Parametric Surfaces and Their Area; Surface Integrals</td>
</tr>
<tr>
<td>4/22 – 4/26</td>
<td>16.8-16.9</td>
<td>Stokes’Theorem; The Divergence Theorem</td>
</tr>
<tr>
<td>4/29 – 5/3</td>
<td>Final Exam: Tuesday, April 30th from 7:10-9:00pm (room t.b.a.)</td>
<td></td>
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</tbody>
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Video Resources
Videos for the content may be viewed at vidman.asu.edu website and https://math.la.asu.edu/~surgent/video.
Important Dates and Points Allocations

<table>
<thead>
<tr>
<th>Testing Schedule</th>
<th>Grade Allocations</th>
<th>Min. % for Grades</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>12.1-12.6, 13.1-13.4</td>
<td>Date</td>
</tr>
<tr>
<td>2</td>
<td>14.1-14.8, 15.1-15.2</td>
<td>3/15</td>
</tr>
<tr>
<td>3</td>
<td>15.3-15.9, 16.1-16.3</td>
<td>4/10</td>
</tr>
<tr>
<td>Final</td>
<td>Comprehensive, including 16.4-16.9</td>
<td>4/30</td>
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<td></td>
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</tbody>
</table>

Your final grade will be assigned based on the course credit you have earned during the period from the first day of class to the final exam, with weights assigned to grade components as given in the table above. Your opportunity to earn course credit ends with the final exam. You will not receive extra credit assignments before or after the final exam to raise your grade to a more desirable one.

Important dates:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Withdrawal Deadline</td>
<td>March 31, 2019</td>
</tr>
<tr>
<td>Complete Withdrawal Deadline</td>
<td>April 26, 2019</td>
</tr>
</tbody>
</table>

Textbook: *Calculus, Early Transcendentals, 8th Edition*, by James Stewart (Cengage). The used version of the textbook is fine. The new version of the textbook at the bookstore comes bundled with WebAssign at no added cost. You must read each section of the textbook before it is covered in class.

Catalog Description: Vector-valued functions of several variables, partial derivatives, multiple integration.

Course Overview: We will discuss vectors and analytical geometry in three dimensions; vector-valued functions and curvature; components of acceleration; functions of several variables; limits and continuity in three-space; partial and directional derivatives; gradients, tangent planes, and extrema of functions of two variables; multiple integrals in rectangular, polar, spherical, and cylindrical coordinates; line integrals; applications of multiple integrals to area, volume, moments, centroids, and surface area.

Learning Outcomes: At the completion of this course, students will be able to, among other things:

- Describe the structure of a 3-D coordinate system.
- Perform vector operations including dot product and cross product.
- Find parametric equations of a line and scalar equation of a plane.
- Identify cylinders and quadric surfaces.
- Find domain, limit, derivative and integral of a vector function, and the tangent line to a space curve.
- Evaluate the arc length of a vector function.
- Solve applied problems involving velocity and acceleration.
- Determine the domain and range of two and three variable functions, and interpret contour plots and level surfaces.
- Identify where a two variable function may be discontinuous.
- Find partial derivatives and explain their geometrical meaning.
- Find the tangent plane to a surface at a given point.
- Find linear approximations and differentials.
• Write out and apply the chain rule.
• Evaluate gradients and directional derivatives
• Determine maximum and minimum values of a two variable function.
• Determine maximum and minimum values of a two variable function with constraints using Lagrange Multipliers.
• Evaluate double integrals over general regions.
• Convert double integrals from cartesian to polar coordinates and vice versa
• Evaluate triple integrals in Cartesian, cylindrical and spherical coordinates.
• Sketch vector fields
• Evaluate line integrals of scalar functions and line integrals of vector fields.
• Find a potential function for a conservative vector field.
• State and apply the Fundamental theorem for Line Integrals
• State and apply Green's Theorem
• Find curl and divergence of a vector field.
• Find an equation of the tangent plane to a parametric surface at a given point.
• Evaluate the surface area of a parametric surface on a given domain.
• Evaluate surface integrals of scalar functions and surface integrals of vector fields.
• State and apply Stokes’ Theorem
• State and apply the Divergence Theorem

Class Content, Teacher Expectations, Studying for the Class and Examinations

Attendance is expected. Your instructor may take regular attendance and incorporate attendance into your grade.

Quizzes (ASU clickers-TurningPoint): Quizzes will be given almost every class and will frequently reflect material that has recently been addressed. We will be using the student response system, TurningPoint 8. Therefore, a clicker will need to be purchased, and a student account set up. To learn more, visit https://uto.asu.edu/services/tools/clickers/students.

Homework will be submitted online through WeBWorK. (Click on your instructor’s name at https://webwork.asu.edu.) Students are also responsible for reading each section before it is taught in class. For best results on the tests (especially the final exam), do not use the work of others (including Wolfram Alpha) to answer the problems.

Recitations Recitations help students to improve conceptual understanding in a collaborative work environment. You will be graded on participation, homework and quizzes. Group work may be assigned as well. Your recitation grade is worth one test grade!

Piazza: The class will use Piazza (https://piazza.com) for class discussions. Piazza is the appropriate place to ask a question about the material or homework. The advantage of using Piazza is that if you ask a question and someone answers it, everyone else can benefit as well. Piazza is a collaborative site in which students are encouraged to post questions and other students are encouraged to offer assistance. The instructor monitors Piazza regularly, offering feedback whenever necessary.

Student Rules of Engagement (Piazza):
• All questions related to classwork should be posted to Piazza. Any homework or classwork questions emailed directly to the instructor will not be answered.
• Please include the section number and question number in the header (e.g. Section 11.2, #7).
• Please include a couple lines of your work. You may also photograph your written work and insert the image within the post. Please trim the image size if possible.
• Please be courteous at all times. No vulgar, demeaning, or aggressive language will be tolerated.
• Do not use Piazza to air grievances or to campaign.
• Do not use Piazza for personal messages. Those should be sent by email to the instructor directly.
• Stay on topic. Do not use Piazza for discussions not related to this class.
• Keep a civil and friendly atmosphere so that there are a lot of students willing to engage the forum.
• Please do not expect immediate replies. Instructors usually check the forum daily. In the meantime, other students are encouraged to add feedback and commentary. Instructors may also deliberately stay in the background so as to promote student-led discussions.

Failure to adhere to these requirements may result in your posting privileges being revoked.

Exams: There will be three midterm exams given during the semester. Non CAS graphing calculators are allowed on the exams, but graphing calculators that do symbolic algebra are not allowed on the exams (see above). Your calculator may be viewed during exams and it will be taken away if it is a CAS calculator or have its memory cleared if anything suspicious is written therein. The Instructor has the right to regard any suspicious material in your calculator memory as cheating.

All internet-capable devices such as computers, phones and smart-watches, etc., are to be turned off and made inaccessible for the duration of an exam. Accessing one for any reason will result in an automatic score of 0 for the exam.

Makeup exams are given at the discretion of the instructor and only in the case of verified medical or other emergency, which must be documented. The instructor must be notified before the test is given. There are no test retakes or “corrections”, and no lowest test will be dropped, nor will you receive extra credit assignments to erase the consequences of a bad test.

Any (parts of) exams, assignments, reports, or solutions to these, from current or previous semesters, posted to any website not affiliated with ASU will result in academic integrity disciplinary actions against the students posting them and the students using them.

Graphing Calculator: A graphing calculator is required for this course. If you already have a graphing calculator, you may use it. Examples of highly recommended models are the TI-nspire & TI 83/84 or Casio 9850GB Plus. Calculators that do symbolic algebra, such as the Casio FX2, Casio 9970Gs,TI-89, TI-92, or TI- nspire CAS cannot be used in class or during an exam.

Picture ID requirement for testing: for each exam you have to bring picture ID. On the exams, show your ID when you turn in your test. If you cannot show picture ID, instructors or proctors may take your picture with your test. If you do not consent to that, they do not have to accept your test.

Reviews: Reviews and old exams are posted on the school’s website at https://math.asu.edu/resources/math-courses/mmat272

It would also be a good idea to study a diverse sample of homework problems given in the textbook for additional review.

Tutoring:
• The Math Tutor Center (free of charge) in WXLR 116 will be open the following hours:
  o 8:00 a.m. - 8:00 p.m. Monday through Thursday
  o 8:00 a.m. - 3:00 p.m. Friday
  o 1:00 p.m. - 6:00 p.m. Sunday
• The Mathematics Community Center (MC²) in WXLR 303
  o Monday – Friday from 10:30 AM – 7:00 PM (no tutors after 4:00pm)
• The Engineering Tutor Center (free of charge) in ECF 100 will be open approximately the same hours Mon – Fri. as the Math Tutor Center.

• Many residence halls and the Memorial Union also offer evening or weekend free tutoring to all ASU students enrolled in math courses as part of the Student Success Centers. See also https://math.asu.edu/resources/math-tutoring-center

Come in for help before it is too late, and several days before an exam day to strengthen your preparation.

In order to be admitted to the Tutor Center each student must present their valid ASU Sun Card.

COURSE POLICIES

• Students are responsible for assigned material. Students are responsible for material covered in class whether or not it is in the text.

• Working regularly on assigned problems and attending class is essential to success.

• You are expected to read the text, preferably before the material is covered in class.

Final Exam Make-up Policy: The final exam schedule listed in the Schedule of Classes will be strictly followed. Except to resolve those situations described below, no changes may be made in this schedule without prior approval of the Dean of the College of Liberal Arts and Sciences. Under this schedule, if a conflict occurs, or a student has more than three exams on one day, the instructors may be consulted about an individual schedule adjustment. If necessary, the matter may be pursued further with the appropriate dean(s). This procedure applies to conflicts among any combination of Downtown Phoenix campus, Tempe campus, Polytechnic campus, West campus, and/or off campus class. Make-up exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

Classroom behavior, etiquette and academic integrity policies

• Students with Disabilities  Disability Accommodations: Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me at the beginning of the semester either during office hours or by appointment. Note: Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required. Disability information is confidential.

• Establishing Eligibility for Disability Accommodations  Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. Their office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: 480-965-1234 (V), 480-965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc. Their hours are 8:00 AM to 5:00 PM, Monday through Friday.

• Policy on Threatening Behavior  All incidents and allegations of violent or threatening conduct by an ASU student (whether on-or off campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. If either office determines that the behavior poses or has posed a serious threat to personal safety or to the welfare of the campus, the student will not be permitted to return to campus or reside in any ASU residence hall until an appropriate threat assessment has been completed and, if necessary, conditions for return are imposed. ASU PD, the Office of the Dean of Students, and other appropriate offices will coordinate the assessment in light of the relevant circumstances.

• Classroom behavior: Make sure you arrive on time for class  Excessive tardiness will be subject to sanctions. Under no circumstances should you allow your cell phone to ring during class. Any disruptive behavior, which includes ringing cell phones, listening to your mp3/iPod player, text messaging, constant talking, eating food noisily, reading a newspaper will not be tolerated. The use of laptops (unless for lecture note taking), cell phones, MP3, IPOD, etc are strictly prohibited during class. Students who
engage in disruptive classroom behavior may be subject to various sanctions. The procedures for initiating a disruptive behavior withdrawal can be found at https://clas.asu.edu/resources/disruptive-behavior.

- **Absences related to religious observances/practices:** If you will be absent from class due to a religious observance or practice, it is your responsibility to inform the instructor as soon as possible. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

- **Absences related to university sanctioned events and activities:** If you will be absent from class due to participation in a university sanctioned event/activity, it is your responsibility to inform the instructor as soon as possible. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

- **Academic Integrity:** Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity. Students are expected to maintain the highest ethical standards at all times and in all dealings and interactions with fellow students, faculty, teaching assistants and staff.

**Withdrawal:** A student may withdraw from a course with a grade of W during the withdrawal period. The instructor's signature is not required. A complete withdrawal must be done in person and that it involves withdrawing from all ASU classes, not just Math 267. Students will not be withdrawn if they merely stop coming to class. It is a student's responsibility to verify whether they have in fact withdrawn from a class.

**The grade of Incomplete:** A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who is doing acceptable work from completing a small percentage of the course requirements. The incomplete is not a “get out of jail free” card and cannot be used as an alternative to withdrawal, or as a way to re-take the class for free. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed.

*Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.*

*As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling, is available if you wish discuss any concerns confidentially and privately.*

*Note:* This syllabus is tentative and should not be considered definitive. The instructor reserves the right to modify it (including the dates of the tests) to meet the needs of the class. It is the student responsibility to attend all class meetings and to make note of any changes. The instructor also reserves the right to create class policies in regards to homework due date, late assignments, etc.