Course Syllabus for Multi-Variable Calculus MAT4833 (MATH 267—BSU Dual Credit)-Live Class

General:

Instructor: Joshua Ruark Office: Wagoner 150

Day/ Time: M-W,F 8AM Office Hours: MWF 11:30-12:30PM, MW 3-4:30 PM

T 11AM-1PM, R 10-Noon

Phone Number: 765-285-7410 Email: [jjruark@bsu.edu](mailto:jjruark@bsu.edu)

Required materials:

1. *Calculus: Early Transcendentals,* 9th edition, by James Stewart. Brooks/Cole, 2012. ISBN 978-1-3376-2418-3.
2. Texas Instruments TI-89 or TI-nSpire graphing calculator; Mathematica Software

Pre-requisite: C- or better in MAT4134 (BSU--MATH 166) or permission of the department chairperson.

Course Objectives and Content:

This course extends the concepts and methods of calculus to a higher-dimensional setting. The content includes vectors, higher-dimensional analytic geometry, vector-valued functions, space curves, motion in space, functions of two or three independent variables, rates of change, optimization, multiple integrals, surface integrals, and potentials. The objectives include continued growth in expressing mathematical ideas in written and spoken form.

Outline of content:

1. Three-dimensional analytic geometry
2. Vectors
3. Lines, planes, cylinders, and quadric surfaces
4. Vector-valued functions
5. Curves
6. Motion
7. Proofs of Kepler’s Laws
8. Functions of two independent variables
9. Directional derivatives and gradients
10. Optimization
11. Multiple integrals
12. Multiple integrals in rectangular, polar, cylindrical, and spherical coordinates
13. Applications
14. Change of variables in multiple integrals
15. Vector Analysis
16. Vector fields
17. Line integrals
18. Potentials and the fundamental theorem of line integrals
19. Surface areas and surface integrals
20. Green’s theorem
21. Divergence theorem and Stokes’s theorem

Grading:

Grades for the course and assignments are assigned by the following percentages:

100-93 — A 92-90 — A-

89-88 — B+ 87-83 — B 82-80 — B-

79-78 — C+ 77-73 — C 72-70 — C-

<70 — D\*

The final grade in the course will be determined by the following factors:

Homework: 10%

Quizzes: 10%

Midterm exams: 60%

Final Exam: 20%

Assignments:

For nearly every section, there will be a homework assignment. Homework will be collected on a regular basis and checked for both completeness and accuracy. Expect quizzes on a near weekly basis that will cover material discussed the previous two weeks in class. Depending on the number of quizzes, I will drop up to the lowest three scores from consideration for the overall quiz grade. At the end of each chapter or couple of chapters, there will be a midterm exam covering that material. Finally, at the end of the course, you will have a final exam that will encompass all the material presented during the semester. As the final exam is cumulative, its score will replace any lower midterm exam scores throughout the semester.

Academic Integrity:

As a firm believer that grades should reflect learning, academic integrity is paramount to the academic experience. Please review the Academy's Academic Integrity policy as it will be strictly adhered to in my class.

Examples of behavior subject to review under the Academic Integrity policy include, but are not limited to:

1, Copying someone's work and turning it in as one's own

2, Use of aids and/or other materials on quizzes and exams without expressed permission.

3, Use of calculators when explicitly forbidden to do so.

4, Copying another person's work or answers on a quiz or exam.

I encourage you to work in groups when doing the homework assignments as much can be learned from your peers that you may not always pick up in class. However, each individual is required to turn in work in their own handwriting accompanied by the requisite work shown to receive full credit.

Technology:

The use of technology is limited to that which will enhance the learning process. Use of laptops is permitted as long as it is not distracting from what is transpiring in the classroom. Calculators, though not required, are welcome to be used for the majority of homework, quiz, and exam assignments. It is strongly recommended that you familiarize yourself with the model’s of calculator listed above. We will also be using Mathematica Software (see Canvas for access information) solve problems and model concepts discussed in class. This includes 3-D graphing and multiple integrals.

IA Wireless Device Policy:

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodation, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being. The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

Attendance:

Attendance will be taken at the beginning of the hour. You are responsible to be on time for each class period. Arrival within the first 10 minutes of class will constitute a tardy, otherwise you will be marked absent. Failure to attend class will result in disciplinary action as set forth by Academy policy regarding absences and tardies.

Unexcused Absence

It is the policy of the Indiana Academy that any absence from class is unexcused, except for illness, death in the family, college or school-related activities, and extenuating circumstances. When a student is absent from a class, the instructor reports the student absence to the Faculty Attendance Coordinator in the Office of Academic Affairs. Unless the absence is excused by a school official, it is considered unexcused. The decision as to whether an absence is excused is not determined by the instructor.

Any unsubmitted assignment that is due on the day of an unexcused absence is subject to receiving a grade of “0” with no possibility of changing the grade. The only exception is an exam, which will still be recorded as a “0” but may be replaced with a higher percentage attained on the final exam minus ten percent.

Late Work/ Make-up policy:

It is my policy not to accept late work/ allow make-up work unless there is an excused absence the day an assignment was due. If you can't be in class the day an assignment is due, please bring it by my office or put it in my mailbox. If you miss a quiz or exam due to an excused absence, it is up to you to schedule a time with me (office hours or other) during which you can take the exam or quiz before I would normally return the quiz or exam. If it can’t be made up in that time frame, the next exam will cover the missing quiz grade, and the final exam will cover the exam grade.

Personal Responsibility:

Learning, by definition, is an individual experience. No one can learn for you, just as no one can eat, sleep, or breathe for you. If you are having difficulties in this course (or any course for that matter), it is your responsibility to seek help. Your first avenue should be to come to office hours, then seek outside tutoring. When seeking assistance, it is not recommended that you say, “I don’t understand this.” This conveys a lack of effort to learn the material and an attitude of giving up. Saying, “Can you help me understand this?” conveys a willingness to learn and put forth the requisite amount of effort to master the material. I am more than willing to help anyone who is willing to put in the time and energy required to learn to the best of their ability.

Office Hours:

My office hours are posted at the top of the syllabus, but if my door is open, feel free to stop by, even if you don't have any specific questions. However, there may be times I have work that must get done, so please don't be offended if I ask you to leave if it is not an official office hour time.

Institutional Diversity:

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge and through university resources found at <http://cms.bsu.edu/campuslife/multiculturalcenter>.

Disability Services:

If you need course adaptations or accommodations because of a disability, please contact me as soon as possible. The BSU [Office of Disability Services](https://www.bsu.edu/about/administrativeoffices/disability-services) coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or [dsd@bsu.edu](mailto:dsd@bsu.edu).

Schedule:

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| --- | --- | --- | --- | --- |
| Week of | M | T | W | F |
| 6-Jan | Syllabus/Sec 12.1 | Sec. 12.2 | Sec. 12.3 | Sec. 12.4-Q |
| 13-Jan | Sec. 12.5 | Sec. 12.6 | Sec. 13.1 | Sec. 13.2-Q |
| 20-Jan | MLK Day | Sec. 13.2 | Sec. 13.3 | Sec. 13.3\_Q |
| 27-Jan | Sec. 13.4 | Sec. 13.4 | Review | Exam 1 |
| 3-Feb | Extended | Sec. 14.1 | Sec. 14.2 | Sec. 14.3-Q |
| 10-Feb | Sec. 14.3 | Sec. 14.4 | Sec. 14.5 | Sec. 14.5-Q |
| 17-Feb | Sec. 14.6 | Sec. 14.6 | Sec. 14.7 | Sec. 14.7 |
| 24-Feb | Sec. 14.8 | Sec. 14.8-Q | Review | Exam 2 |
| 10-Mar | Sec. 15.1 | Sec. 15.2 | Sec. 15.3 | Sec. 15.4-Q |
| 17-Mar | Sec. 15.5 | Sec. 15.6 | Sec. 15.7 | Sec. 15.7-Q |
| 24-Mar | Sec. 15.8 | Sec. 15.8-Q | Exam Review | Exam 3 |
| 31-Mar | Sec. 16.1 | Sec. 16.2 | Sec. 16.3 | Sec. 16.3-Q |
| 7-Apr | Sec. 16.4 | Sec. 16.4 | Sec. 16.5 | Sec. 16.5-Q |
| 14-Apr | Sec. 16.6 | Sec. 16.6 | Sec. 16.7 | Sec. 16.7-Q |
| 21-Apr | Extended | Sec. 16.8 | Sec. 16.8 | Sec. 16.9 |
| 28-Apr | Exam Review | Exam 4 | Final Review | Final Review |
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