Course Syllabus for Diff. Eq. (MAT 4834)

Dual Credit for BSU MATH374

General:

Instructor: Joshua Ruark Office: Wagoner 150

Day/ Time: MWF 1 PM 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)

Text: *Elementary Differential Equations and Boundary Value Problems* (10th edition; by Boyce and DiPrima.; Wiley; 2012.

Technology: TI-89 or TI-nSpire Calculator; Mathematica Software

Prerequisite: C- or better in AP Calc BC 2 (MATH166) or permission of the department chairperson.

Catalog Description: Introduction to nth order ordinary differential equations, equations of order one, elementary applications, linear equations with constant coefficients, nonhomogeneous equations, undetermined coefficients, variation of parameters, linear systems of equations, and the Laplace transform. Use of standard computer software.

Course Objectives: This course is an introduction to the study of differential equations.

After this course, a student will be able to solve standard ordinary differential equations using techniques learned in integral calculus. Students will also learn how to interpret the behavior of solutions of differential equations. In addition, the student will learn how to utilize a computer algebra package such as Mathematica in problem solving—a crucial skill for today’s applied mathematician.

Course Rationale: One of the most important branches of mathematics is the subject of differential equations. Models that involve rates of change of a function can often be written in terms of differential equations. Areas where differential equations are used include physics, engineering, chemistry, biology, and finance. In order to work with such models, it is important to know how to solve and interpret the behavior of solutions of differential equations.

Content: Topics include but at not limited to:

* First order differential equations (linear and otherwise)
* Second and higher order linear differential equations
* Laplace transform
* Systems of first order linear equations

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

100-93 — A 92-90 — A-

89-87 — B+ 86-83 — B 82-80 — B-

79-77 — C+ 76-73 — C 72-70 — C-

<70 — D\*

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

Homework: 15 %

Quizzes: 15 %

Midterm exams: 45% (15% each)

Final Exam: 25%

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. Generally, it will be collected two class periods after it is assigned. 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.

Furthermore, I will post a lesson plan for each section covered on the BlackBoard page for this course. I highly recommend reviewing and printing off the page before you come to each lecture. Additionally, you will find the homework assignment for each section at the bottom of the posted lesson plan. Warning: these lesson plans are meant as a guide to help you in your note taking, and should not be considered a substitute for coming to class.

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. However, there will be instances where calculators are NOT allowed, but you will be informed in advance when these times occur. In addition, we will utilize Mathematica Software to help model and solve problems throughout the course.

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. Failure to attend class will result in disciplinary action as set forth by Academy policy regarding absences and tardies. You will be considered absent if you arrive more than 10 minutes late. However, I recommend still coming to class, even if you will be marked absent in order to miss as little critical information as possible.

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 am 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.

Diversity Statement:

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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| --- | --- | --- | --- |
|  | Monday | Wednesday | Friday |
| 6-Jan | Syllabus/1.1 | 1.2/1.3 | 2.1-Q |
| 13-Jan | 2.2 | 2.3 | 2.4-Q |
| 20-Jan | MLK Day | 2.5 | 2.6 |
| 27-Jan | 2.6-Q | Review | Exam 1 |
| 3-Feb | Extended | 3.1 | 3.2 |
| 10-Feb | 3.3 | 3.4 | 3.4-Q |
| 17-Feb | 3.5 | 3.6 | 3.6-Q |
| 24-Feb | 3.6 | 3.7 | 3.7-Q |
| 10-Mar | 4.1 | 4.2 | 4.3 |
| 17-Mar | 4.4-Q | Review | Exam 2 |
| 24-Mar | 6.1 | 6.2 | 6.3-Q |
| 31-Mar | 6.4 | 6.5 | 6.5-Q |
| 7-Apr | 7.1 | 7.2 | 7.3-Q |
| 14-Apr | 7.4 | 7.4 | 7.5-Q |
| 21-Apr | Extended | 7.5 | 7.6 |
| 28-Apr | Review | Exam 4 | Review for Final |
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