

MATH 266-20078: DIFFERENTIAL EQUATIONS

COURSE SYLLABUS

COURSE DESCRIPTION

Pre-requisite: MATH 265

Solution of elementary equations by elementary techniques, Laplace transforms, systems of equations, matrix methods, numerical techniques, and applications.

INSTRUCTOR

Mrs. Amanda K. F. Davis

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Office: SC 200

Office Phone: 701-774-4504

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Math Lab Hours/Office Hours:

M 10a-11⁵⁰a & 2p-6p

T 10a-11⁵⁰a & 2p-4p

W 10a-11⁵⁰a & 2p-5p

R 10a-11⁵⁰a & 2p-4p & 5³⁰p-7p

F 10a-12p

S 9a-12p

TEXTBOOKS & MATERIALS

A First Course in Differential Equations, 10 edition, Dennis G. Zill

978-1-111-82705-2

STUDENT LEARNING OUTCOMES

INSTITUTIONAL OUTCOMES

- I. Institutional Outcome: #2. Students will use reasoning skills to analyze and solve problems.

PROGRAM OUTCOMES

1. Mathematics – including numerical literacy and knowledge and use of logical and statistical processes.
2. Analogical thinking – using former knowledge and experience to help comprehend and explain new situations.
3. Problem solving – the ability to analyze situations and synthesize solutions

COURSE OUTCOMES

1. Analyze applications and write differential equations to model the behavior.
2. Distinguish between different types of differential equations.
3. Solve differential equations and communicate the results.

See the following webpage for further discussion:

<http://www.willistonstate.edu/Documents/Instruction/Student%20Learning%20Outcomes/MATH%20266COG.pdf> .

ASSESSMENT TASKS (FOR COURSE OUTCOMES)

ASSESSMENT METHODS

The general education outcomes and course objectives will be assessed by using: Bookwork, Homework Assignments, Test Reviews, Tests, and a Final.

Bookwork will be assigned over every section covered in lecture and should be attempted prior to the next class meeting; however these problems are just practice problems for the actual Homework Assignments and will be used as bonus points on the individual tests. The students may ask for clarification of any bookwork problems, or review problems during MATH LAB HOURS. We will have 6 HOMEWORK ASSIGNMENTS, 3 TEST REVIEWS, 3 TESTS and a FINAL. Test problems will be similar to those assigned for Bookwork & Homework, and review problems, therefore, it will be difficult to achieve a passing grade without completing the Bookwork, Homework and Test Reviews. In grading, I am as interested in your work as in your answers, so show as much work as reasonable, and do not just give the answers.

SPECIAL MATERIALS

Keep a notebook for differential equations only; use it for notes, bookwork and questions you wish to ask. Write with PENCIL ONLY and use an eraser when needed.

IF YOU USE INK I WILL NOT GRADE YOUR WORK. Erasable ink is okay.

Homework will be assigned every few weeks and will be submitted for a grade. The problems assigned from the textbook (Bookwork) are for practice and can be submitted at test time for an additional 5 points on your exam. There will be 3-4 tests given during the semester; tentative dates can be found under Course Calendar. Each class period the student is expected to READ THE SECTION PRIOR TO CLASS, bring note taking material, a textbook, and be prepared to participate in class.

It is recommended that you also have a graphing calculator. The following calculators are suggested: a TI-83, or TI-83 PLUS, or TI-84 PLUS.

PARTICIPATION POLICY & CLASSROOM POLICY

This class will be conducted under the regulations defined in the Williston State College Student Handbook.

1. The students are expected to ATTEND ALL CLASSES. If you miss a class, it is your responsibility to find out what work you missed and you are responsible for that material. You may get help from me during MATH LAB HOURS, by phone, by text, by email, or by appointment.
2. CELL PHONES MUST BE OFF or on SILENT MODE. You must NEVER answer your phone in class.
3. CLASS STARTS AT 8 AM SHARP! and will end at 9:15 AM in SCIENCE CENTER 102 on Tuesdays and Thursdays.
4. Any constant and persistent talking while the instructor or another student is lecturing and/or speaking will result in (1) a warning and then (2) your dismissal from the classroom.
5. CHEATING IS WRONG! We will strive for academic honesty in our work and turn in homework we have completed on our own. You may discuss problems and procedures; however, any assignment

handed in for grading should contain only those problems you have completed and have a thorough understanding.

PROCESS SKILLS

- Classify differential equations
- Model a differential equation with a direction field
- Distinguish between methods of solving a differential equation
- Solve First Order Differential Equations
- Solve homogeneous equations
- Solve non-homogeneous equations
- Apply to mechanical electrical, and forced vibrations
- Define Laplace Transform
- Solve Step Functions
- Apply to discontinuous forcing functions
- Review matrices
- Solve linear algebraic equations with Eigenvalues and Eigenvectors

CONCEPTS & ISSUES

- Mathematical Models & Direction Fields
- Classification of Differential Equations
- Linear Equations with Variable Coefficients
- Separable Equations
- Autonomous Equations
- Exact Equations
- Homogeneous Equations with Constant Coefficients
- Solutions of Linear Homogeneous Equations & the Wronskian
- Fundamental Solutions
- Complex Roots of the Characteristic Equations
- Repeated Roots
- Nonhomogeneous Equations
- Variation of Parameters
- Mechanical Vibrations
- Definition of Laplace Transform
- Discontinuous Forcing Functions
- Systems of Linear Equations

GRADING POLICY

SIX HOMEWORKS (25 POINTS EACH) = 150 POINTS

CLASS PARTICIPATION (20 POINTS) =

* Daily participation in the Class Activity is earned at a rate of 0.5 POINTS PER DAY for 32 days AND 4 POINTS earned the day of the final

THREE TEST REVIEWS (10 POINTS EACH) = 30 POINTS

THREE TESTS (100 POINTS EACH) = 300 POINTS

FINAL EXAM COUNTED TWICE = 200 POINTS

Total possible points are **Seven-Hundred (700)**.

	89.5-100 A
Grade	79.5-89.5 B
Scale	69.5-79.5 C
	59.5-69.5 D
	0-59.5 F

STUDENT ACADEMIC INTEGRITY

Students will be held responsible for any breaches of academic integrity. Academic integrity is outlined in both the *WSC Catalog* and *WSC Code of Student Conduct*. Violations may result in failure of the class.

DISABILITY STATEMENT

Williston State College is committed to providing equal access to students. If you have a disability which may impact your performance, attendance, or grades in this course that requires accommodations, you must first register with Disability Support Services (Stevens Hall Room 104A). Please note that classroom accommodations cannot be provided until your instructors receive an Accommodations Form, signed by you and the Disability Support Services Coordinator.

SCOPE AND SEQUENCE OF THE COURSE (SUBJECT TO CHANGE)

THERE WILL BE 3 MAJOR EXAMS AND A FINAL

IMPORTANT DATES

Course Calendar	
Day/Week	Important Dates & Instruction
1/14/2014	Syllabus, Sec 1.1 Pg. 10 # 1,2,5,7,9,10,11,13,15,16,22,23,27,31
1/16/2014	Sec 1.2 Pg. 17 # 2,3,9,13,18,21,24,25,26 Sec 1.3 Pg. 28 # 5,9,10,13,14,26,27
1/21/2014	Sec 2.1 Pg. 43 # 1,5,7,15a,21,25 Sec 2.2 Pg. 51 # 3,6,12,15,18,27,29,32,39
1/23/2014	Sec 2.3 Pg. 61 # 3,4,7,10,13,16,21,25,28,38 Sec 2.4 Pg. 69 # 2,5,8,9,12,22,27,33,37
1/28/2014	Sec 2.5 Pg. 74 # 3,6,9,12,15,18,21,24,30
1/30/2014	Sec 2.6 Pg. 79 # 1,3,5,7,11
2/4/2014	Test One Review
2/6/2014	Chapter 3 & 4 Overview
2/11/2014	Test One (9 sections)
2/13/2014	Sec 3.1 Pg. 90 # 3,4,5,6,10,13,14,21,22,23,25,29,43 Sec 3.2 Pg. 100 # 2,3,5,15,24,33
2/18/2014	Sec 3.3 Pg. 110 # 1,2,4,5,6,7
2/20/2014	Sec 4.1 Pg. 127 # 1,3,4,5,10,13,15,18,21,24,27,30,31,34 Sec 4.2 Pg. 131 # 1,4,10,16

2/25/2014	Sec 4.3 Pg. 137 # 2,4,5,8,10,11,12,16,18,21,24,28,30,35,37,41 Sec 4.4 Pg. 147 # 3,6,9,12,15,18,24,30,38,44
2/27/2014	Sec 4.5 Pg. 155 # 1,11,15,35 Sec 4.6 Pg. 161 # 3,5,9,11,16,20
3/4/2014	Test Two Review
3/6/2014	Sec 4.7 Pg. 168 # 3,6,9,12,19,26,31,37 Sec 4.8 Pg. 179 # 1,7,13,18,19,35
3/11/2014	Test Two (9 sections)
3/13/2014	Sec 4.9 Pg. 184 # 3,6,9,20 Sec 4.10 Pg. 189 # 2,3,6,7,13,16
3/18/2014	No Class: Spring Break
3/20/2014	No Class: Spring Break
3/25/2014	Sec 5.1 Pg. 205 # 3,6,7,12,17,18,19,20,23,30,33,34
3/27/2014	Sec 6.1 Pg. 237 # 2,3,5,9,12,13,15,19,23,25,27,31,35,38
4/1/2014	Sec 6.2 Pg. 246 # 9,12,17,18,19 Sec 7.1 Pg. 280 # 3,6,9,12,15,21,24,27,30,33,36
4/3/2014	Sec 7.2 Pg. 288 # 3,6,9,12,15,16,19,22,24,28,29
4/8/2014	Sec 7.3 Pg. 297 # 3,8,13,16,19,21,25,38,41,45,48-55
4/10/2014	Sec 7.4 Pg. 309 # 1,6,10,19,20,25,28,33,37
4/15/2014	Test Three Review
4/17/2014	Sec 8.1 Pg. 332 # 1,7,11,13,17,23
4/22/2014	Test Three (11 sections)
4/24/2014	Sec 8.2 Pg. 346 # 1,5,10,13,19,33 Sec 8.3 Pg. 354 # 1,3,6,16,25
4/29/2014	Sec 8.4 Pg. 359 # 1,4,9,19,21 Sec 9.1 Pg. 367 # 1,5,9
5/1/2014	Sec 9.2 Pg. 371 # 3,5,7,9
5/6/2014	Sec 9.3 Pg. 375 # 3,4,5
5/8/2014	Final Exam Review
5/13/2013	Final Exam 7:30 am-9:30am

ACADEMIC RESOURCES

Take advantage of academic resources available to you at Williston State College:

- **Academic Success Center:** Tutoring is provided to assist students who are either having difficulty or desiring extra help with specific subjects. This service is provided by qualified instructors or peer tutors proficient in specific subjects. The general subject areas for tutoring are accounting, math, computer application, English composition, and reading. Students wanting to utilize this service should contact their instructor. Fees are not charged for tutorial services. For more information, please contact Laurel Kaae (701-774-4221).
- **Learning Commons:** It's not just the Library anymore. In addition to the normal library functions (book checkout, research assistance, etc.), the Learning Commons serves a number of other functions. Get help with Moodle and other Distance Ed questions. The "technology counter" provides an opportunity to play with some of the latest technology. Computers and printers available. If you have questions, visit (Stevens Hall Rm 200) or call (701-774-4226). If it's after business hours, check out our LibGuides through the Learning Commons website.
- **Smarthinking:** Web based program that offers live tutoring services in a variety of subject areas at no cost to the student. With Smarthinking you can access live tutors, ask a question and come back the next day for a response, and/or submit writing pieces to be reviewed. If you have further questions or need assistance in using this great tool, please stop in the Academic Success Center in Stevens Hall Room 104 or contact Katie Peterson at 701-774-4594.