

Applied Multivariable Mathematics, Fall 2018
MST-205/605

Dr. John Gemmer: gemmerj@wfu.edu

Office: 360 Manchester Hall **Phone:** (336) 758-5386

Course Website: <http://users.wfu.edu/gemmerj/math205-605.html>

Office Hours: Tuesday 3-5, Wednesday 1-2, Thursday 2-4

Class Meeting Times: MTWF 9:00-9:50

Class Location: Manchester Hall 245

Textbook: Kreyszig, *Advanced Engineering Mathematics, 10th edition.*

Prerequisites: Calculus at the MST-112 level. Students should be comfortable with fundamental concepts from calculus: differentiation and integration.

Course Description: This is an accelerated course covering topics in matrix algebra, differential equations, and vector calculus. The course will be equal parts mathematical techniques and applications. Specific topics covered will include: vector algebra, solving linear systems of equations, rank, determinants, eigenvalues, complex numbers, first order ODEs, second order linear ODEs, power series solutions, vector fields, vector differential calculus, vector integral calculus.

Course Delivery: The course material will be delivered through a combination of lectures and classworks. Evaluation of the students understanding of the material will be assessed through written homework assignments, in-class exams, in-class quizzes, participation in classworks and a final exam.

Course Policies:

◆ **Grading:** Your grade will be based on:

- Weekly written homework: 25%
- Quizzes: 10%
- Group work: 5%
- Two in-class exams: 60% (30% each)

You are guaranteed the following grades if your final percentage lies within the following ranges:

90-92.9: A-	93-100: A	
80-82.9: B-	83-86.9: B	87-89.9: B+
70-72.9: C-	73-76.9: C	77-79.9: C+
60-62.9: D-	63-66.9: D	67-69.9: D+

◆ **Written homework:** Written homework will be assigned most weeks on Thursday and will be due Friday at the beginning of class the following week. The assigned homework problems will be posted on the course website. Late homework will not be accepted under any

circumstances. However, I will drop the lowest homework score from your grade. Written homework must consist of solutions that show all steps, be your own work and be written clearly using complete sentences as appropriate (see homework policy).

- ◆ **Quizzes:** On most Fridays there will be a short 5-10 minute in-class quiz. These quizzes will consist of a very short problem that will test your knowledge of the prior lectures. These quizzes are to help both the students *and* the instructor understand concepts that students may be struggling with. All quizzes will be announced in class. *There will be no “pop” quizzes.* There are no retakes for missed quizzes, however I will drop the lowest quiz score from your final grade.
- ◆ **Group work:** Throughout the course there will be several unannounced “class works”. These consist of structured group assignments that will be completed during class time. These assignments will generally be exploratory allowing students to learn a new concept through a “hands on” approach.
- ◆ **In-Class Exams:** There will be two in-class exams. The second in class exam will be during our final exam period. The dates of these exams are October 16 and December 11. You must contact me by **August 31** if you have any university-approved conflicts with these dates. Otherwise you may miss the exam only in the case of serious illness or emergency.

Tentative Course Calendar:

1. Week 1 (8/27–8/31): Vector Algebra: 7.1, 9.1-9.3
2. Week 2: (9/3–9/7): Matrix multiplication, linear systems: 7.2-7.4
3. Week 3: (9/10–9/14): Existence and uniqueness, determinants: 7.5-7.7
4. Week 4: (9/17–9/21): Inverses and vector spaces: 7.8-7.9
5. Week 5: (9/24-9/28): Eigenvalue problems: 8.1-8.3

6. Week 6: (10/1-10/5): Complex Numbers: 13.1-13.4
7. Week 7: (10/8-10/10): First order Differential equations: 1.3-1.5
8. Week 8: (10/15-10/19): Review, **Exam #1**, Second order differential equations: 2.1-2.2
9. Week 9: (10/22-10/26): Power series solutions, vector fields: 5.1, 5.4, 9.4

10. Week 10: (10/29-11/2): Calculus of curves, functions of multiple variables: 9.5–9.6
11. Week 11: (11/5-11/9): Gradient, divergence, curl: 9.7-9.9
12. Week 12: (11/12-11/16): Line integrals, double integrals: 10.1-10.3
13. Week 13: (11/19-11/20): Green’s theorem: 10.4
14. Week 14: (11/26-11/30): Surface integrals, triple integrals: 10.5-10.7
15. Week 15: (12/3-12/7): Divergence and Stoke’s Theorem: 10.8-10.9

16. 17. Final Exam: (12/11)

Important Dates:

1. October 16: Exam 1.
3. December 11: Exam 2.

The Honor Code: At Wake Forest, we expect you to behave as honorable citizens of the class, the university, and the world as a whole. When you complete an assignment with your name on it, you are representing that everything you are turning in is your own work. That means that you do not copy from other students, textbooks, or websites. If at any time I become aware of cheating or plagiarism in this course, I will submit the information to the honor council.