

# Math 686, Numerical Solution of Differential Equations

Spring 2018: T 7:20pm – 10:00pm, Exploratory Hall, Room 4106

**Instructor:** Dr. Daniel Anderson

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**Office Hours:** Tuesday/Thursday 3:00PM-4:00PM, and by appointment.

**Text:** *A first course in the numerical analysis of differential equations* (Second Edition), by Arieh Iserles.

**Prerequisites:** Math 214 and Math 446 or 685 including sufficient recall of undergraduate linear algebra, differential equations and computer literacy including familiarity with Matlab.

**Course Description:** This course will cover the fundamental concepts of numerical methods for differential equations. Students will learn how computational methods are constructed, and how they are used to solve problems arising from the sciences and engineering.

## Topics:

Chapter 1	Euler's Method
Chapter 2	Multistep Methods
Chapter 3	Runge-Kutta Methods
Chapter 4	Stiff Equations
Chapter 6	Error Control
Chapter 7	Nonlinear Algebraic Systems
Chapter 8	Finite Difference Methods (Poisson Eq.)
Chapter 9	Finite Element Methods (Poisson Eq.)
Chapter 10	Spectral Methods
Chapter 16	Diffusion Equation
Chapter 17	Advection Equation

**Grading Policy:** A student's course grade will be based on homework (50%), a midterm exam (20%) and the final exam (30%).

**Final Exam:** The final exam date is Tuesday, May 15, 7:30-10:15pm.

**Online class information** will be posted periodically on my webpage  
[http://math.gmu.edu/~dmanders/WEBDAN/math686\\_spring18.html](http://math.gmu.edu/~dmanders/WEBDAN/math686_spring18.html)

**Honor Code:** It is expected that each student in this class will conduct himself or herself within the guidelines of the Honor Code. All academic work should be done with the level of honesty and integrity that this University demands.

**Academic Integrity** Mason is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

**Mason Email Accounts** Students must use their MasonLIVE email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

**Office of Disability Services** If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. <http://ods.gmu.edu>

**Writing Center:** A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

**University Libraries** Ask a Librarian <http://library.gmu.edu/mudge/IM/IMRef.html>

**Counseling and Psychological Services (CAPS):** (703) 993-2380; <http://caps.gmu.edu>

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