CoSM Class Syllabus/Policy  
MTH 337: Differential Equations, Summer II 2019

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Office: Math 306  
Office Hours: MTWR 7:30–8, MTW 2:30–3:30  
Department: Mathematics and Statistics  
Class meeting time/place: MTWR 8–9:55, Math 212

Credit hours: MTH 337–3  
The following is an excerpt from SFA Policy 5.4:

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Description: Solving of differential equations of physics, chemistry, and engineering, and a study of the characteristics of the solutions.

Text and Materials: The Ordinary Differential Equations Project by Thomas W. Judson, available online; see D2L for details.

Program Learning Outcomes (PLO): Students graduating from SFASU with a B.S. Degree and a major in mathematics will demonstrate:

1. Lower Order Cognition. Examples: remembering definitions, understanding how to factor, applying the chain rule.

3. Proficiency in communicating mathematics in a format appropriate to expected audiences (written, visual, oral).

**Student Learning Outcomes (SLO):** At the end of MTH 337, a student who has studied and learned the material should be able to:

1. Solve forced and unforced linear ODEs and linear systems of ODEs either explicitly or numerically. [PLO: 1, 2]

2. Explain the qualitative long term behavior of a the solutions to an ODE or system of ODEs. [PLO: 2, 3]

3. Explain the role that eigenvalues and eigenvectors play in the solutions to linear ODEs and linear systems. [PLO: 2, 3]

4. Solve a nonlinear system qualitatively by equilibrium point analysis and the phase plane. [PLO: 2, 3]

5. Demonstrate understanding of the relationship between continuous differential equations and discrete difference equations. [PLO: 1, 2]

6. Demonstrate understanding of the relationship between periodic solutions and chaos. [PLO: 1, 2, 3]

**Course Requirements:** Students will be expected to come to class prepared—most notably, to have read the section(s) under discussion and attempted any assigned homework. Assessments will likely consist of homework and exams, though other types of assessments may be added at the instructor’s discretion. Homework will be turned in approximately every day; exams about every seventh day. The final exam will be comprehensive and is scheduled for Fr, 16 August, 8–9:55.

**Course calendar/outline:** (Topics may be presented in a different order than given here)

- **First-order Differential Equations**
  - Separation of variables, linear equations
  - Qualitative techniques: Slope Fields
  - Existence and Uniqueness
  - Euler’s Method
  - Equilibria and the phase line
  - Bifurcations

- **First Order systems**
  - Qualitative Methods
  - Analytic Methods for Special Cases
  - Euler’s Method

- **Linear systems**
  - Properties and the Linearity Principle
  - Eigenvalues, Eigenvectors, Straight Line Solutions
  - Phase Plane
  - Complex Eigenvalues
  - Second and Higher Order DEs

Approximate time spent:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>First-order Differential Equations</td>
<td>15%</td>
</tr>
<tr>
<td>First Order systems</td>
<td>15%</td>
</tr>
<tr>
<td>Linear systems</td>
<td>20%</td>
</tr>
</tbody>
</table>
• **Forcing and Resonance**  
  - Forcing  
  - Sinusoidal Forcing  
  - Amplitude and Phase of Steady State  
• **Nonlinear Systems**  
  - Equilibrium Point Analysis and Linearization  

**Grading Policy:** Grades will be based on the total points accumulated on assessments. If you miss a regularly scheduled exam, the next exam will count double. *There will be no extra credit (other than, perhaps, bonus questions on exams).*

**Attendance Policy:** Attendance is expected and roll will be checked every day. Students who miss no more than two class days may receive special consideration in determining their grade.

**Academic Integrity (A-9.1):** Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one’s own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one’s paper without giving the author due credit.

Read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades (Semester Grades Policy A-54):** Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

**Students with Disabilities:** To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as pos-
sible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations.

For additional information, go to http://www.sfasu.edu/disabilityservices/

**Acceptable Student Behavior:** Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Please be respectful of your fellow students and your instructor. Cell phone use and texting are not allowed in class. Remember to turn your cell phone off or place it in quiet mode before entering the classroom.