MTH 305.001, Intro to Numerical Methods  
Department of Mathematics and Statistics  
Fall 2019

Professor: Dr. Lynn Greenleaf  
Class Times & Place: 2-3:15 TR, Room 202, Math Building

Office: 340 Mathematics building  
Email: greenleal@sfasu.edu

Office Phone: 936.468.1882  
Office Hours: (or by appointment)

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00-11:50</td>
<td>12:00-12:30</td>
<td>11:00-11:50</td>
<td>12:15-1:50</td>
<td>11:00-11:50</td>
</tr>
</tbody>
</table>

Course description: Basic numerical and computational techniques used in solution of mathematical problems in the real world; approximation of functions, roots and systems of equations, numerical differentiation and integration, interpolation and curve fitting, and machine computation. This course is intended to be a mathematical introduction to the theory and practical use of certain basic numerical methods that often arise in applications. Some theoretical understanding is critical to the proper practice of numerical analysis because no numerical method works 100% of the time. Thus when a method fails, the theory behind the method can often illuminate what went wrong and perhaps give insights into alternative approaches that may work better for the given problem.

Course requisites and co-requisites:  
MTH 234 and CSC 102 or equivalent.

Course Requirements:
- Two in-class exams (If a student must miss an exam due to an excused absence, special arrangements should be made in advance.)
- A comprehensive final exam (lasting 2 hours on Thursday, December 12, 1-3 pm.)
- Homework will be assigned and collected.
- A Project will be assigned and due after Thanksgiving.
- Class attendance and participation: Students are expected to attend all class meetings, arriving on time.

Communication: Check your university email regularly, as you may be sent reminders, assignments, or announcements.

Exam Schedule: Please note that the dates for our in-class exams below are subject to change. If you need to change the date of your exam, you must get it approved through Student Rights & Responsibilities, sfajudicial@sfasu.edu. The final is university scheduled and cannot be taken at a different time without permission of the Dean of the College of Sciences and Mathematics. Please schedule your end-of-semester travel plans accordingly.

Midterm 1 – Thursday, October 3
Midterm 2 – Thursday, November 7
Final Exam – Thursday, December 12, 1-3 pm

Grading Policy: 50% Exams  
15% Homework  
10% Project  
25% Comprehensive Final Exam  
Grading Scale:  
90% - 100%: A  
80% - 90%: B  
70% - 80%: C  
60% - 70%: D  
Below 60%: F
Course outline:

- Taylor Series (5%)
- Representation of Numbers (5%)
- Error Analysis (5%)
- Equations of One Variable (15%)
- Interpolation and Polynomial Approximation (15%)
- Numerical Differentiation and Integration (15%)
- Numerical Methods for Systems of Equations (10%)
- Splines (15%)
- Differential Equations (10%)
- Optimization (5%)

*Per SFA policy 5.4, your schedule should reflect that there is (1) an amount of student work per credit hour that reasonably approximates not less than one hour of class or direct faculty instruction and two hours of out-of-class student work per week for fifteen weeks over a long semester, 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.*

Student Learning Outcomes (SLO): At the end of MTH 305, a student who has studied and learned the material should be able to: 1. Recognize circumstances when numeric methods can and should be used. [PLO: 1, 5] 2. Use several basic numeric methods for solving equations of one variable. [PLO: 2, 4] 3. Find polynomial approximations for functions. [PLO: 2, 4] 4. Numerically approximate derivatives and integrals. [PLO: 2, 4] 5. Use methods for solving linear and nonlinear systems of equations. [PLO: 2, 4] 6. Use “current” computer software available numeric solutions. [PLO: 4]

Program Learning Outcomes (PLO):
Students graduating from SFASU with a B.S. degree and a major in mathematics will:
1. Demonstrate comprehension of core mathematical concepts. [Concepts]
2. Execute mathematical procedures accurately, appropriately, and efficiently. [Skills]
3. Demonstrate competence in using various mathematical tools, including technology, to formulate, represent, and solve problems. [Problem Solving]
4. Demonstrate proficiency in communicating mathematics in a format appropriate to expected audiences. [Communication]

Academic Integrity (Policy 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.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary
measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

**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. Please 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 possible 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](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 [http://www.sfasu.edu/policies/student_conduct_code.asp](http://www.sfasu.edu/policies/student_conduct_code.asp)). 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.