1. **General Information**

   **Professor:** Thanh Thieu, Ph.D.
   **Office Location:** Room 230
   Mathematics, Statistics, and Computer Science Building
   **Office Phone:** 405-744-2450
   **Email:** tthieu@okstate.edu
   (preferred medium of communication)

   **Teaching Assistant:** Troni (Thanh) Duong
   **Email:** thanh.t.duong@okstate.edu

   **Office Hours:**
   - Tue/Thu 4:30pm – 5:00pm
   - Mon/Wed 11:00am – 12:00pm
   Use the same Zoom meeting as the class lectures

   **Course Site:** https://canvas.okstate.edu/courses/77407

2. **Course Description**

   CS 3513: Numerical Methods for Digital Computers. Prerequisites: MATH 2153 (Calculus II);
   MATH 3013 (Linear Algebra) or concurrent enrollment; or MATH 3263 (Linear Algebra and
   Differential Equations) and knowledge of programming. Errors, floating point numbers and
   operations, interpolation and approximation, solution of nonlinear equations and linear systems,
   condition and stability, acceleration methods, numerical differentiation and integration.

3. **Textbook:**

   - Steven C. Chapra. *Applied Numerical Methods with MATLAB for Engineers and

4. **Course Topics:**

   1. MATLAB fundamentals and programming (2 weeks)
   2. Error Analysis (1 week)
   3. Roots of equations. Bracketing methods (1 week)
   4. Roots of equations. Open methods (1 week)
   5. Linear algebraic equations and matrices. Gauss elimination (1 weeks)
   6. LU decomposition (1 week)
   7. Matrix inverse and system condition. Iterative methods for systems of equations (1 week)
   8. Curve fitting. Linear regression. Nonlinear regression (1 week)
10. Numerical integration (1 week)
11. Fast Fourier Transform (1 week)
12. Eigenvalues (1 week)
13. Principal Component Analysis

5. **Homework and Examinations**

There will be homework/programming assignments, 1 mid-term, and 1 final examination.

6. **Course Grade**

The course grade is based on the homework (40%), mid-term (30%), and final examination (30%). The passing letter-grade is determined by the following partition of the course grades:

D : [50, 60); C : [60, 70); B : [70, 85); and A : [85, 100]

7. **Miscellaneous**

- **Attendance**: Attending lectures are not mandatory, but historically, students with active attendance have done significantly better on examinations than their less frequently attending classmates.

- **Homework**: Problem sets form an important part of the learning in the course, and thus, you are required to do them in order to pass.

- **Collaboration**: You are encouraged to collaborate in study groups on the solution of the homework. If you do collaborate you must write up solutions on your own and acknowledge your collaboration in the write-up for each problem. If you obtain a solution with help (e.g., through library work, another student, etc.), acknowledge your source, and write up the solution on your own.

8. **Student Disability Services**

Student Disability Services and other Student Services are committed to providing support services to students with physical and learning disabilities. Please advise the instructor of desired academic accommodations, and notify Student Disability Services.

9. **Academic Dishonesty or Misconduct**

Refer to the section in “University Academic Regulations” in current “University Catalog” http://registrar.okstate.edu/

10. **Adding/Dropping/Withdrawing, Important Dates, and Syllabus Attachment**
- **Examination:**
  Final examination: 2:00-3:50pm on Tuesday, December 8, 2020
  Location: Online proctored.
  Refer to block “TR 3:00pm” in “Fall 2020 Final Exams” at:
  http://registrar.okstate.edu/Exams
- **Adding/Dropping/Withdrawing and Important Dates:** Refer to the section in
  “Academic Calendar”:
  http://registrar.okstate.edu/
- **Syllabus Attachment:** Refer to:
  http://academicaffairs.okstate.edu/content/resources-students
## Class Schedule (Tentative)

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Aug 18</td>
<td>MATLAB fundamentals and programming</td>
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<tr>
<td>Aug 25</td>
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<tr>
<td>Sep 1</td>
<td>Error Analysis</td>
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<tr>
<td>Sep 8</td>
<td>Roots of equations. Bracketing methods</td>
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<td>Sep 15</td>
<td>Roots of equations. Open methods</td>
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<td>Sep 22</td>
<td>Linear algebraic equations and matrices</td>
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<td>Oct 29</td>
<td>LU decomposition</td>
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<tr>
<td>Oct 6</td>
<td>Review</td>
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<td>Oct 8</td>
<td>Mid-Term Exam</td>
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<tr>
<td>Oct 13</td>
<td>Matrix inverse and system condition. Iterative methods for systems of equations</td>
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<tr>
<td>Oct 20</td>
<td>Curve fitting. Linear regression. Nonlinear regression</td>
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<tr>
<td>Oct 27</td>
<td>Curve fitting. Polynomial interpolation. Splines</td>
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<td>Nov 3</td>
<td>Numerical integration</td>
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<td>Nov 10</td>
<td>Fast Fourier Transform</td>
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<td>Nov 17</td>
<td>Eigenvalues</td>
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<td>Nov 24</td>
<td>Fall Break</td>
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<td>Nov 26</td>
<td>Thanksgiving</td>
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<td>Dec 1</td>
<td>Principal Component Analysis</td>
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<td>Dec 3</td>
<td>Review</td>
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<tr>
<td>Dec 8</td>
<td>Final Examination, 2:00-3:50pm</td>
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