A. LOGISTICS

Instructor: Dr. Dwayne McDaniel, P.E.
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website: http://web.eng.fiu.edu/mcdaniel
Office Hours: Room: EC 2108; TR, 8:00 AM – 9:00 AM
Class Schedule: MWF 8:00 – 8:50 PM, EC 1115

Textbook (Required): “Applied Numerical Methods with MATLAB for Engineers and Scientists,”


TA: TBD

B. CATALOG COURSE DESCRIPTION

Statistics and probability analysis of materials and fluids experiments, structural and fluid system modeling and analysis using lumped parameters; numerical methods to find solutions.

C. COURSE OBJECTIVES

Use of computational tools for solving problems in mechanical engineering. Use of statistics and statistical tools in mechanical engineering.

D. MECHANICAL ENGINEERING PROGRAM OUTCOMES

1. Analysis of experiments and use of statistical inference in mechanical engineering problems.
2. Development of computational solutions for large problems and problems without exact solutions in mechanical engineering using appropriate numerical methods.

E. TOPICS COVERED

1) Numerical Methods
   - Software for numerical computations (MATLAB)
   - Root finding – solutions of equations in one variable
   - Lagrange interpolation
   - Numerical differentiation and integration
   - Error estimation and adaptive numerical integration
   - Numerical solutions for ODEs
• Solutions of linear algebraic equations
• Matrix inversion
• Determinant of the matrix
• Eigenvalues and eigenvectors of matrices
• Least square approximation

2) **Statistics and Statistical Methods**

• Data Representation
• Probability
• Permutations and Combinations
• Random Variables, Probability Distributions
• Sampling
• Estimation
• Confidence Intervals
• Regression

**F. COURSE GRADING**

*Course-Work Evaluation*

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*Grading Scale:*

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Grades below 60 are considered as an F

*Course Policies:*

**Homework:** Selected problems are assigned in class. It is recommended that student complete these problems by the next lecture period for which they are assigned. The instructor will not collect any of these problems for grading. Answers to selected homework problems are provided in the text, and detailed solutions for some problems related to the topic will be available on the website http://web.eng.fiu.edu/mcdaniel.

**Exams:** Three exams will be held in class. Dates for the exams will be provided in class. Excusable absence from the scheduled exams is accepted only if the student informs the professor before the event such as illness and non-reschedulable prior appointment, or after the event such as last-minute medical or other emergencies, within a reasonable time frame and with a valid documentary proof shown (e.g., medical memo from doctor, letter from employer, etc.). In all cases, academic honesty is expected. Under this condition, a make-up test will be honored.

**Computer Projects:** Each student will be required to obtain access to MATLAB. You may run MATLAB on your computer though EIC by going to www.eic.fiu.edu and selecting the EIC Apps link for information on obtaining access to the software. Throughout the semester assignments will
be made that requires you to run or generate MATLAB code. These assignments will be collected for grading and are due at the beginning of class. Projects turned in after will be considered late and receive a **20% penalty per day**.

**Class Attendance:** It is recommended that every student attend all lectures, however, attendance will not be taken.

**No 4-C Policy:** No Cell-phone, Computer (unless taking notes or test), Chatting, or Cheating is allowed in this class.

**Learning Strategy:** Simply reading the solutions is absolutely the worst strategy for this course. **You need to practice as much as possible.**

**Calculators allowed in test** (by National Council of Examiners for Engineering and Surveying):

- **Casio:** All fx-115 models. Any Casio calculator must contain fx-115 in its model name. Examples of acceptable Casio fx-115 models include (but are not limited to)
  - fx-115 MS
  - fx-115 MS Plus
  - fx-115 MS SR
  - fx-115 ES

- **Hewlett Packard:** The HP 33s and HP 35s models, but no others.

- **Texas Instruments:** All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to)
  - TI-30Xa
  - TI-30Xa SOLAR
  - TI-30Xa SE
  - TI-30XS Multiview
  - TI-30X IIB
  - TI-30X IIS
  - TI-36X II
  - TI-36X SOLAR

**Academic Misconduct:** Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

**Other:** Academic dishonesty is a serious offense and will be treated according to the University policy. The instructor will abide by the University’s policy on religious holidays.