MME 532 Differential Equations (2 CR) 202

Goals:

1. illustrate the concepts, applications and skills involved with Differential Equations
2. establish the foundations needed in order to successfully work in Differential Equations. Elementary Calculus, especially.
3. provide careful mathematical foundation for other MME courses such as 528 (Modeling – heat and sound)
4. develop a more precise sense of the secondary backgrounds some of your students will need when they take similar courses (algebra, trig, calculus)

textbook: *Differential Equations and Their Applications* - - Stanley Farlow - - Dover

please also have a standard Calculus textbook available for reference. If this is not possible, let me know.

calendar: no class the week of February 15, April 18 (14 total)

Syllabus

1. **Review of Calculus**
   Separation of Variables
   Newton's Law of Cooling
   Linear 1st order
   equations reduceable to linear

2. **Numerical Solutions – Cauchy Euler Method**

3. **Second Order Linear**
   homogeneous
   applications: mass/spring

4. **Second Order Linear, Forced**
   Undetermined Coefficients
5. **Resonance & Beats**
6. **Partial Derivatives**
7. **Wave Equation**
   standing waves

superposition

8. **Fourier Series and Orthogonality**
9. **Heat Equation**

Grade:

2 quizzes - - 50 %

homework - - 50%

help: am always happy to answer questions! Send email; scan in your work. Or we can meet by Zoom or phone or at WPI.