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MENG 5328 – Finite Element Analysis
Course Syllabus

Semester / Year	Fall 2024
Catalog Description	The mathematical principles of the finite element method applied to the solution of field problems in mechanical engineering. Solutions implemented using current commercial computer application codes. Three hours of lecture per week with integrated computer lab exercises.
Prerequisites	Familiarity with Matlab or Python
Section Number	001 and 040
Instructor Name	Tahsin Khajah
Contact Information	Office: RBN 3010, Phone: (903) 566-7245, tkhajah@uttyler.edu
Class Type / Instruction Mode / Location	RBN 2011 and HEC C203
Class Time	M 5:00 pm – 7:45 pm
Office Hours	M 9:00 am – 10:30 am and W 3:00 pm – 4:30 pm or by appointment using the Zoom ID: 903 566 7245.
No. of Credits	3 credits
Required Textbook	None
Optional References	*The Finite Element Method: Linear Static and Dynamic Finite Element Analysis*, Hughes, Wiley, Dover, 2000. *Isogeometric Analysis: Toward Integration of CAD and FEA*, Cottrell, Hughes, and Bazilevs, Wiley, 2009.
Additional Rules and Requirements	You can use AI programs (ChatGPT, Copilot, etc.) in the course. These programs can be powerful tools for learning and other productive pursuits, including completing assignments in less time, helping generating new ideas, or serving as personalized learning tool. However, your ethical responsibilities as a student remains the same. You must follow UT Tyler's Honor Code and upholds the highest standards of academic honesty. This applies to all uncited or improperly cited content, whether created by a human or in collaboration on with an AI tool. If you use an AI tool to develop content for an assignment, you must cite the tool's contribution to your work.
Evaluation Method	Final course grades will be based on: Assignments 50% Final project 40% Attendance 10% Total 100%

Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60
Important Events / Dates	https://www.uttyler.edu/schedule/files/2024-2025/academic-calendar-2024-2025-main-20240222.pdf
Attendance / Makeup policy / other rules	Regular attendance is required. In case you must miss a class, it is your responsibility to get a copy of the class notes, keep up with the class work and be informed of all announcements made during the class. **Homework Assignments:** homework will be assigned according with the topics covered in lectures. These assignments will cover both analytical and computational components and considered very important for the understanding of the course material. It is expected from graduate students to turn in assignments that are organized, professional looking, and legible. Utilization of LaTeX is highly recommended. All assignments and the accompanying codes should be uploaded to the corresponding assignment section in Canvas. Student collaboration in completing their homework should be limited to discussing the means and methods for solving problems and even comparing answers. Students are not allowed to copy someone's assignment even partially. A student is caught copying or sharing his/her assignment solution to another will receive an "F" and will be reported for further punitive action. Completing your homework independently is an absolute necessity to do well in this course. Homework is due at 11:59 pm on the due date. Late assignments will not be accepted after five-minute grade period. **Final Project:** A final project will be assigned toward the middle of the semester. Students will work on a challenging engineering application. The final report will consist of 8-10 pages following the provided guidelines for technical writing. A class presentation will be required.
Course Learning Objectives	By the end of this course, students will be able to: ○ Understand the mathematical foundation of FEM ○ Develop the weak form ○ Impose common boundary conditions ○ Understand the effect of basis function selection ○ Write special-purpose finite element programs ○ Utilize FEM/IGA to solve heat, elasticity, and wave propagation problems
Tentative Topics / Course Plans	○ Bernstein Polynomials and Bezier Curves ○ Non-Uniform Rational B-Splines ○ Mesh Generation ○ Isoperimetric Analysis ○ Boundary value problem and Galerkin Method ○ Heat conduction ○ Linear Elastostatics

University Policies	https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf