UTTyler ENGINEERING

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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 051
Instructor Name	Tahsin Khajah
Contact Information	Email: tkhajah@uttyler.edu Zoom Meeting ID: 903 566 7245 Phone: 903 566 7245
Class Type / Instruction Mode / Location	Hybrid
Class Time	M 5:00 pm – 7:45 pm
Office Hours	Monday 4:00 pm – 5:30 pm, Wednesday 10:30 am – 12:00 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	Since the mechanical engineering program is designed to prepare students for professional practice, all submitted work (e.g., homework, lab reports, projects, presentations) is expected to meet professional standards. Work that does not reflect professional quality may be subject to grade reductions, even if professionalism is not explicitly listed in the grading rubric. AI tools are allowed to support students' learning and productivity, provided that their use aligns with academic integrity standards. When required, students must disclose their use of AI.
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/academics/academic-calendar-26-27/
Attendance / Makeup policy / other rules	**Attendance Policy:** Regular attendance is expected and essential for success in this course. If you must miss a class, it is your responsibility to obtain class notes from a classmate, stay current with course content and assignments, and be aware of any announcements made during the missed class session. **Homework Assignments:** Homework assignments will be given based on the topics covered in class. These assignments will include both analytical and computational components and are critical for developing a thorough understanding of the course material. Students are expected to submit assignments that are well organized, professional in appearance, and clearly legible. All assignment files, including any required code, must be uploaded to the appropriate assignment submission area in Canvas. Students may collaborate only by discussing problem-solving approaches, methods, and general concepts. They may also compare final answers. However, each student must prepare and submit their own original work. Copying any portion of another student's assignment, or sharing solutions for others to copy, is strictly prohibited. Independent completion of homework is essential for mastering the course material and performing well in the class. Homework assignments are due by **11:59 p.m.** on the specified due date. **Final Project:** A final project will be assigned midway through the semester. Students will work on a challenging engineering application that integrates concepts covered in the course. The project will culminate in a technical report of **8 to 10 pages**, prepared in accordance with the technical writing guidelines provided. In addition, each student (or project team, if applicable) will be required to deliver a class presentation summarizing their work and findings.
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	○ Weak Formulation ○ Basis functions ○ Mesh Generation ○ Boundary value problem and Galerkin Method ○ Heat conduction ○ Wave propagation
University Policies	https://www.uttyler.edu/offices/academic-affairs/faculty-resources/syllabus-information/