Finite Element Analysis and Design
EML 4507 (Sections 13G7(13592) and 3258(13593)), Spring 2021

Basic information

Catalog information: Credits: 3; Stress-strain analysis and design of machine elements; finite element analysis.

Class time and location: MWF 4th period (10:40 – 11:30 AM) online class using Zoom (recorded)

Instructor: Nam Ho Kim, MAE-A 210, Email: nkim@ufl.edu
Ting Dong, MAE-B 215, Email: dting0603@ufl.edu

Teaching Assistant: Chenyou Liang, liangc@ufl.edu
Rendy Khairan, rkhairan@ufl.edu
Andrej Grubisic, andrejgrubisic@ufl.edu
Devyn McElligott, devynski@ufl.edu

Office hours: Instructors: MWF after class (11:30 – 12:30 PM)
Chenyou Liang: TBD
Rendy Khairan: TBD
Andrej Grubisic, TBD
Devyn McElligott: TBD

Textbook: "Introduction to Finite Element Analysis and Design" by Nam-Ho Kim, Bhavani V. Sankar, and Ashok V. Kumar, 2nd Edition, Wiley (Please note that this course will be participating in the UF All Access program. Login at the following website and Opt-In to gain access to your required course materials – https://www.bsd.ufl.edu/G1CO/IPay1f/start.aspx?TASK=INCLUDED – This option will provide you with digital content that is the best value in the marketplace. Materials will be available approximately 1 week before the first day of class.)

Course description: Fundamentals of finite element analysis including, discrete system analysis, steady-state heat transfer analysis, static analysis of structures. Modeling, analysis, and design using FEA software The objective of the course is to teach the fundamentals of the finite element method with emphasis on the underlying theory, assumption, and modeling issues as well as providing hands-on experience using finite element software to model, analyze, and design systems of mechanical and aerospace engineers.

Course content:
1. Uniaxial bar and Truss Finite Element
2. Finite Element Analysis of Beams and Frames
3. Finite elements for plane solids
4. Isoparametric Finite elements
5. Finite Elements for Heat Transfer Problems
6. Finite Element Analysis Procedures and Modeling

Course schedule: Posted on Canvas

Program Objectives and Outcomes: Program objectives supported by this course include educating students to
1. Comprehend quantitative and analytical methods
2. Understand and perform engineering analysis of machine systems
3. Apply mathematics, science, and engineering to design
4. Communicate ideas graphically and in writing
5. Recognize the need for, and engage in lifelong learning

Course Assignments

Homework: There will be about 6 homeworks. Students are required to submit homeworks on Canvas (scanned PDF file). Homework problems may require using commercial finite element software. Late homework will not be accepted under any circumstances.

Projects: There will be 2 term projects, where commercial finite element software is used to solve practical engineering problems. Students are required to submit formal project reports on Canvas along with simulation model/results files.

Exams: There will be 6 exams. The exam schedule is shown in the course schedule. Students are allowed to bring one hand-written 8½ ×11 inch formula sheet written on both sides for exams. All exams equally contribute to the grade and there will be no final exam.

Quiz/Attendance: Attendance in an online class means watching lectures at a scheduled time. Students are expected to watch lecture videos before the next lecture. During the lecture, the instructor will ask a trivial question and students submit the answer in the quiz section as proof of attendance. Since the quiz section will be open until the next class, students can watch the recorded lecture and answer it before the next class.

Grading: Homeworks (10%), Quiz/Attendance (10%), exams (50%), projects (30%)

Other course information

Communication: Any technical questions related to HWs, Projects, and Exams must be asked through the Discussion section on Canvas. **Individual emails won't be answered**. This can help other students who may have the same/similar question. Instructors and TAs will frequently monitor questions in the Discussion section and post answers. Also, those who posted important/interesting/valuable questions, and those who answer them may have extra credits at the end of the semester. The purpose is to help our learning process altogether.

Finite element analysis software: Many homeworks and projects will be carried out using commercial finite element software Abaqus. Students are expected to download and install the software on their personal computers. The software can be downloaded from http://academy.3ds.com/simulia/freese

Grading Scale: The final grade will be calculated by the following table.

Table 1. Grading Table. *%GE = Percent Grade Earned.*

Percentage Range	Grade Point
$93.33 < \%GE < 105.00 \Longrightarrow$ A	4.00
$90.00 < \%GE < 93.33 \Longrightarrow$ A-	3.67
$86.67 < \%GE < 90.00 \Longrightarrow$ B+	3.33
$83.33 < \%GE < 86.67 \Longrightarrow$ B	3.00
$80.00 < \%GE < 83.33 \Longrightarrow$ B-	2.67
$76.67 < \%GE < 80.00 \Longrightarrow$ C+	2.33
$73.33 < \%GE < 76.67 \Longrightarrow$ C	2.00
$70.00 < \%GE < 73.33 \Longrightarrow$ C-	1.67
$66.67 < \%GE < 70.00 \Longrightarrow$ D+	1.33
$63.33 < \%GE < 66.67 \Longrightarrow$ D	1.00
$60.00 < \%GE < 63.33 \Longrightarrow$ D-	0.67
$00.00 < \%GE < 60.00 \Longrightarrow$ E	0.00

Grade Corrections: Corrections of grades should be submitted to the instructor within 5 business days of the grade posting in writing with a concise statement of why you believe there has been an error. Note that

the instructor has the final determination in the grade assigned. If a grade change is determined, it may result in a lower or higher grade.

Academic honesty: All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

Accommodation for Students with Disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Health and Wellness
- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161.
- University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Software Use: All faculty, staff, and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy: There are federal laws protecting your privacy regarding grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html