AE 722 Finite Element Analysis of Structures I, Fall 2015

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Preferred Method of Contact:	Email
Office Hours:	TR 1:00—2:00 pm
Classroom; Days/Time:	TBD
Prerequisites:	AE 333, 625, equivalent, or instructor's consent

How to use this syllabus

This syllabus provides you with information specific to this course, and it also provides information about important university policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves. If any changes will be made, the updated syllabus will be distributed in the first class of each semester this course is offered.

Academic Honesty

Students are responsible for knowing and following the Student Code of Conduct http://webs.wichita.edu/inaudit/ch8_05.htm and the Student Academic Honesty policy http://webs.wichita.edu/inaudit/ch2_17.htm.

Course Description

Advanced treatment of the theoretical concepts and principles necessary for the application of the finite element method in the solution of differential equations in engineering.

Definition of a Credit Hour

Success in this course is based on the expectation that you will attend 45 hours of in-class instruction and engage in an additional 90 hours of out-of-class preparation/studying or course related activities for a total of 135 hours.

Measurable Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- Apply integral formulations and variational methods.
- Apply basic steps of finite element formulation.
- Analyze one-dimensional beam problems using finite element method.
- Analyze two-dimensional frame problems using finite element method.
- Analyze eigenvalue and time-dependent problems using finite element method.
- Analyze two-dimensional solid elasticity problems using finite element method.

Required Texts/Readings Textbook

Required textbook: J. N. Reddy, *An Introduction to the Finite Element Method*, 3rd ed., McGraw-Hill, 2006. (ISBN 0-07-246685-5)

Other Equipment/Materials

Students are encouraged to use computer tools such as Maple or Matlabfor practice problems and also

homework assignments.

Class Protocol
Independent work on assignments is expected. Copying from Solutions Manual or online resources is strictly prohibited.

Grading Scale
WSU uses a +/- grading scale for final grades and to calculate grade point averages. In this class, grades are assigned according to the following chart. (Other classes might assign grades differently: Be sure to understand the different grading scales in all of your classes.)

Points/percentages, as instructor chooses	Letter grade	Grade Points	Interpretation
90%	A	4.00	*The A range denotes excellent performance.*
87%	A-	3.70	
83%	B+	3.30	
80%	B	3.00	*The B range denotes good performance.*
77%	B-	2.70	
73%	C+	2.30	
70%	C	2.00	*The C range denotes satisfactory performance.*
67%	C-	1.70	
63%	D+	1.30	
60%	D	1.00	*The D range denotes unsatisfactory performance.*
57%	D-	0.70	
Below 57%	F	0.00	*F denotes failing performance.*

Assignments
There are a total of five homework assignments to be collected and graded. The assignment counts 20% of the overall grade of the course. Due date of each assignment will be announced during the semester via lecture, on BlackBoard, and also email.

Undergraduate vs. Graduate Credit
Undergraduate students enrolled in 700 level courses will receive undergraduate credit (not graduate credit) unless they have a previously approved senior rule application or dual/accelerated enrollment form on file in the Graduate School. Undergraduate credit earned in 700 level courses cannot later be counted toward a graduate degree.

Late Assignments
No late assignments will be accepted unless for any legitimate reasons such as documented illness, emergencies, etc.

Missed Assignments and Exams
If assignments or exams are missed due to legitimate reasons, make up exams or late homework assignments will be acceptable with official evidence such as doctor's documentation, etc.

Important Academic Dates
For Fall semester 2015, classes begin on Monday, February 17, 2015, and end Thursday, December 3, 2015. The last date to drop a class and receive a W (withdrawn) instead of F (failed) is October 27, 2015. The final exam is on Friday, December 11, 2015.

Disabilities
If you have a physical, psychiatric/emotional, or learning disability that may impact on your ability to carry out assigned course work, I encourage you to contact the Office of Disability Services (DS). The office is located in Grace Wilkie Annex, room 150, (316) 978-3309 (voice/tty) (316-854-3032 videophone). DS will review your concerns and determine, with you, what academic accommodations are necessary and appropriate for you. All information and documentation of your disability is confidential and will not be released by DS without your written permission.

Counseling & Testing
The WSU Counseling & Testing Center provides professional counseling services to students, faculty and staff; administers tests and offers test preparation workshops; and presents programs on topics promoting personal and professional growth. Services are low cost and confidential. They are located in room 320 of Grace Wilkie Hall, and their phone number is (316) 978-3440. The Counseling & Testing Center is open on all days that the University is officially open. If you have a mental health emergency during the times that the Counseling & Testing Center is not open, please call COMCARE Crisis Services at (316) 660-7500.

Diversity and Inclusive
Wichita State University is committed to being an inclusive campus that reflects the evolving diversity of society. To further this goal, WSU does not discriminate in its programs and activities on the basis of race, religion, color, national origin, gender, age, sexual orientation, gender identity, gender expression, marital status, political affiliation, status as a veteran, genetic information or disability. The following person has been designated to handle inquiries regarding nondiscrimination policies: Executive Director, Office of Equal Employment Opportunity, Wichita State University, 1845 Fairmount, Wichita KS 67260-0138; telephone (316) 978-3186.

Intellectual Property
Wichita State University students are subject to Board of Regents and University policies (see http://webs.wichita.edu/inaudit/ch9_10.htm) regarding intellectual property rights. Any questions regarding these rights and any disputes that arise under these policies will be resolved by the President of the University, or the President's designee, and such decision will constitute the final decision.

Shocker Alert System
Get the emergency information you need instantly and effortlessly! With the Shocker Alert System, we will contact you by email the moment there is an emergency or weather alert that affects the campus. Sign up at www.wichita.edu/alert.

Student Health Services (Suggested)
WSU's Student Health clinic is located in 209 Ahlberg Hall. Hours are 8:00am to 7:00pm (8:00 am to 5:00 pm on Fridays), though the clinic may be closed occasionally on Wednesdays from noon to 1:30pm. The telephone number is (316) 978-3620. In addition to outpatient and preventive care (including immunizations, a prescription service, and testing/counseling for sexually transmitted infections), Student Health can handle minor injuries. All services are confidential. For more information see www.wichita.edu/studenthealth.

The Heskett Center and Campus Recreation
Whether you are wanting to be active on campus, relieve the stress from classes or take care of your body, Wichita State Campus Recreation is the place for you. Campus Recreation, located inside the Heskett Center, contributes to the health, education, and development of Wichita State University students, faculty, staff, alumni, and community members by offering quality programs and services. With

many programs and facilities which are free to all students and members, Campus Recreation offers its members limitless opportunities. For more information about our services see www.wichita.edu/heskett.

Video and Audio Recording

Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. Unless explicit permission is obtained from the instructor, recordings of lectures may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

Tentative Schedule for 15 week class

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/19—8/23	Integral formulations and variational method
2		Weighted-integral method, define boundary, initial, and eigenvalue problems, calaulus of variation
3		Homework #1 due. Variational calculus, the Euler equation, "weak" form formulation, weighted integral form
4		The method of weighted residuals, Petrov-Galerkin method, Galerkin method, least-square method, collocation method
5		One dimensional problems, weak form of boundary value problems
6		Homework #2 due. Linear and quadratic elements, connectivity of elements
7		Post processing, applications of second-order differential equation in one-dimensional problems
8		Exam #1. 1D truss element
9		Homework #3 due. 2D truss element, use of symmetry,
10		Euler beam element, interpolation functions, element equation formulation
11		Element assembly, Timoshenko beam theory
12		Homework #4 due. Development of Timoshenko beam element, the first consistent interpolation element
13		Timoshenko frame element, nodal hinge
14		Exam #2. Eigenvalue problems, axial rod free vibration, beam free vibration, Euler-Bernoulli buckling
15		Homework #5 due. Time-dependent problems, spatial and temporal
16		Time approximation, review for final exam
Final		Final exam is comprehensive