CE 271 ADVANCED STRUCTURAL ANALYSIS
Fall Semester - 2017

Time: TR 4:25 – 5:40 PM       Class Room: PERKIN 101

Course Website: Blackboard
Instructor: Dr. Priyantha Wijesinghe
Office: VOTEY 113
Phone: (802) 656-3305
E-mail: pwijesin@uvm.edu
Office Hours: M & F 11 AM - noon, T & R 8:30 – 9:30 AM, W 4:30 - 6 PM or by appointment

COURSE CATALOG DESCRIPTION:
CE 271 – Advanced Structural Analysis. Virtual work, energy theorems, analysis of structures by the
placement method and the finite element method, non-linear structural analysis.
Prerequisites: CE 170

OBJECTIVES:
This course is mainly focused on the matrix method of structural analysis. Students will apply the mat
method to analyze statically indeterminate linear 3D frames and trusses. Students will also gain an in depth
understanding of the structural analysis software developed from matrix theory. Additionally, the advanced
topics such as plastic analysis and finite element method will be introduced.

REFERENCES:
  Spon Press, London & NY

GRADING:
In-class questions and “favorite structure” presentation  10%
Quizzes 10% (both in-class and take-home)
Homework 20%
Group Project(s) 20%
Midterm Exams 40% (two in-class exams, each counts 20%)
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Total 100%

The minimum passing grade is 60%. Other grades will be assigned as shown below.

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<tr>
<th>Letter Grade</th>
<th>Numerical Grade</th>
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<tr>
<td>A+</td>
<td>97-100</td>
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<tr>
<td>A</td>
<td>94-97</td>
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<tr>
<td>A-</td>
<td>90-93</td>
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<tr>
<td>B+</td>
<td>87-89</td>
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<td>B</td>
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<td>B-</td>
<td>80-82</td>
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<tr>
<td>C+</td>
<td>77-79</td>
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A statistical scale may be used at instructor’s judgment in addition to the above scale.

EXAM AND HOMEWORK POLICIES:

Midterm Exams are scheduled as follows:

**Midterm Exam 1: Thursday, October 12, 2017 (in class)**
**Midterm Exam 2: Thursday, November 16, 2017 (in class)**

Make-up exams will be given at the discretion of the instructor. An appropriate, valid documentation of absence will be required for consideration of a make-up exam. It is strongly encouraged to obtain prior permission from the instructor. Examples of valid reasons are; injury or illness that is too severe or contagious for the student to attend, participation in a university authorized activity, death or major illness in a student’s immediate family, time conflicts with other courses, or important travel plans (made before the first day of class – August 29, 2017).

Homework assignments will be assigned weekly in class and will be posted in Bb. They should strictly follow the homework format which is posted in Blackboard under “HW” tab and will be collected at the beginning of class. Those who come late to the class must submit their assignments before taking a seat, or else will be considered as late. **Only one late homework assignment per student** will be accepted but, no make-up quizzes will be given without a valid reason (listed above).

CLASSROOM BEHAVIOR

The lectures should be treated in a professional manner. All cellular phones, pagers and laptop computers must be turned off during regular quizzes and exams. Students should refrain from all actions that disrupt the learning environment (e.g., making noise, talking incessantly while delivering a lecture, ostentatiously not paying attention, and leaving and reentering the classroom inappropriately etc.). Students who fail to follow the above instructions will receive a warning the first time and a reduction of one letter of their final grade the second time. Further such behavior will result in disciplinary action at the department and/or college level.

COURSE OUTLINE

Unit 1. Review of fundamental concepts from CE 170 Structural Analysis: analysis of statically determinate (SD) structures and internal loadings developed in structural members
Unit 2. Statically indeterminate (SI) structures and approximate analysis of SI structures
Unit 3. Energy methods (virtual work and Castegliano’s theorem): review and more complex problems
Unit 4. Force method: review and more complex problems
Unit 5. Basic matrix concepts and linear algebra
Unit 6. Truss analysis using the stiffness method
Unit 7. Beam analysis using the stiffness method
Unit 8. Plane frame analysis using the stiffness method
Unit 9. Structural modeling and computer analysis
Unit 10. Plastic analysis and Finite element analysis (if time permits) and computer simulations
**Computer Usage**
MATLAB, SAP2000 and ANSYS

**Disabilities**
In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Student Accessibility Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated in an accommodation letter to faculty. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. Contact SAS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; or www.uvm.edu/access.

**Academic Integrity**
Offences against the Code of Academic Integrity are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the code are taken very seriously and will be forwarded to the Center for Student Ethics & Standards for further intervention. To read the Code of Academic Integrity and learn more about the Center for Student Ethics & Standards, visit their website at: https://www.uvm.edu/policies/student/acadintegrity.pdf

**Health and Wellbeing**
The Center for Health & Wellbeing (CHWB) offers a wide range of services to support your mind, body, and soul while you're at UVM. The Student Health Services staff of board certified physicians, physician assistants, nurse practitioners, nurses, and dietitians work with patients and collaborate with other CHWB providers to ensure personalized and timely care to UVM students. Counseling & Psychiatry Services (CAPS) offers short-term individual counseling, urgent needs counseling, group counseling, outreach and education, psychiatry, referrals, and consultation services. Please visit their website at: http://www.uvm.edu/~chwb/ to find out more.

At Living Well they believe that mental and physical health go hand in hand. They have a variety of programs that offer you the space to create a wellness practice that will support your goals and positive intentions. I highly recommend you to visit their LivingWell website at http://www.uvm.edu/~chwb/livingwell/ and checkout the meditation and yoga videos.

Extensive research has shown the benefits of meditation towards the learning process. http://www.huffingtonpost.com/2013/04/08/mindfulness-meditation-benefits-health_n_3016045.html