

Cleveland State University

Washkewicz College of Engineering

Civil and Environmental Engineering Department

Cleveland, Ohio 44115

ESC 211 – Strength of Materials

Fall 2020

COURSE DESCRIPTION:

(Prerequisite: ESC 201 Statics) Basic principles of mechanics governing the behavior of materials are studied. The concepts of stress and strain as well as the relationship between stress and strain are thoroughly examined. Stress-load and load-deformation relationships are developed for a number of simple structural elements, e.g., members that resist axial, torsion and bending moments. The application of the three fundamental tools of mechanics (i.e., equilibrium, load-deformation and geometric compatibility) to the solution of problems involving deformable bodies is emphasized. Buckling of slender compression members is examined. The buckling load is related to material properties. Topics covered include normal, shear, torsional, and thermal stress-strain analysis; generalized Hook's law; bending moment and shear force diagrams; transformation of stress-strain and principle stresses; Mohr's circle for plane stress; state of stress in three-dimension; stress due to combined loading; deflection of beams; plane stress in thin-walled members; analysis of columns; and design principles based on mechanics of solids.

TEXTBOOK:

"Mechanics of Materials," F.P. Beer, E.R. Johnston Jr., J.T. DeWolf, and D.F. Mazurek. McGraw Hill, Eight Edition. ISBN: 978-1-260-11327-3

INSTRUCTOR:

Reza Harirforoush, PhD – Instructor of Civil and Environmental Engineering

e-mail address: r.harirforoush@csuohio.edu

Class time: Tuesday and Thursday 4:30 pm - 5:45 pm

Teaching Assistant: TBA

Teaching Assistant online office hour: TBA

METHOD OF EVALUATION:

Grades will be determined by your performance on three exams, homework, attendance and class participation based on the following distribution:

Midterm-1	20 %
Midterm-2	20 %
Final exam	40 %
Homework	15 %
Attendance and class participation	05 %

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Exams: I use Respondus LOCKDOWN BROWSER AND MONITOR platform which is a custom browser that locks down the testing environment within Blackboard. In the link below, please find the information of the LOCKDOWN BROWSER AND MONITOR:

<https://www.csuohio.edu/center-for-elearning/lockdown-browser-and-monitor>

All three exams are closed book. Course textbook, lecture notes, student notebook, and cellphones are not allowed. Exams are not graded on a curve. Any student absent from a scheduled exam automatically receives a score of zero for that exam unless arrangements have been made prior to the exam. Note that you should have access to your own computer and a webcam to record assessment sessions.

Homeworks: Homeworks will be issued with specific instructions and due dates. For each day late, 20% will be deducted and no three day late will be accepted. You should scan your submission with a readable resolution and upload it to BlackBoard.

Attendance in online classes is mandatory. Students absent for more than three classes will require permission to continue the course.

CLASS POLICY:

Please contact me using the r.harirforoush@csuohio.edu. I will respond to e-mail message within 12 hours. If I need to be away for longer, I will notify through BlackBoard.

I use Zoom for remote course delivery. The sessions will be recorded and posted to BlackBoard. If you do not have access to a computer/tablet or you do not have access to the internet, please call Campus 411 (216-687-5411). The staff there have information to help students get resources.

To find the system requirements for using Zoom, please check the following website:

<https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux>

POLICY ON ACADEMIC MISCONDUCT:

“The Cleveland state university academic community values honesty and integrity and holds its members to high standards of ethical conduct. Academic dishonesty is, therefore, unacceptable, and students shall prepare to accept the appropriate sanctions for any dishonest academic behavior as outlined in the policy on academic misconduct”. “*Cheating*” – “Fraudulent acquisition and/or submission of another’s intellectual property. This includes, but is not limited to, the unauthorized giving or receiving of a copy of examination questions, the use of unauthorized or fabricated sources in carrying out assignments and copying the examination answers of others”. “*Plagiarism*” – “Stealing and/or using the ideas or writings of another in a paper or report and claiming them as your own. This includes but is not limited to the use, by paraphrase or direct quotation, of the work of another person without full and clear acknowledgment”.

Reference: <https://www.csuohio.edu/sites/default/files/3344-21-02.pdf>

ACCESSIBILITY STATEMENT:

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need. Accommodations will not be made retroactively.

Reference: <https://www.csuohio.edu/disability/disability>

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COURSE CORRESPONDENCE:

All communication in this course will be made via your CSU email account. Include your name, and course name, in the Subject Line of the email. Check your e-mail regularly throughout the semester. Official announcements and communication regarding your course will be made by e-mail and via Blackboard announcements. If you check another email account regularly, you should configure your CSU email to forward all messages to your other account. If you do not hear from me within 24 hours, try resending the message. Usually I try to reply (including weekends and holidays) within a few hours. I try to reply when I am near a computer.

STRENGTH OF MATERIALS - COURSE OUTLINE

Date Month- Date	Topic	Reading	Homework Posting dates
08/25	Chapter 1: Statics-Review	1.1	
08/27	Concept of Stress	1.2-1.5	HW 1
09/01	Chapter 2: Stress and Strain – Axial Loading	2.1A-2.1E	
09/03		2.1F-2.1G	
09/08		2.2-2.4	
09/10		2.5-2.8	HW 2
09/15		2.10-2.12	
09/17			Review Chapters 1 & 2
09/22	Chapter 3: Torsion	3.1	
09/24		3.2-3.3	HW 3
09/29		3.3-3.5	
10/01			Review Chapter 3
10/06		Midterm-1 Module Test	
10/08	Chapter 4: Pure Bending	4.1-4.3	HW 4
10/13		Columbus Day	
10/15		4.4-4.7	
10/20		4.8-4.9	
10/22	Chapter 5: Analysis and Design of Beams for Bending	5.1-5.2	HW 5
10/27		5.2-5.3	
10/29			Review Chapters 4 & 5
11/03	Chapter 6: Shearing Stresses in Beams and Thin-Walled Members	6.1-6.4	
11/05			Midterm-2 Module Test
11/10	Chapter 7: Transformations of Stress and Strain	7.1	
11/12		7.2-7.6	
11/17	Chapter 8: Principal Stresses Under a Given Loading	Chapter 8	HW 7
11/19	Chapter 9: Deflection of Beams	9.1-9.2	
11/24		9.2-9.4	
11/26		Thanksgiving recess	HW 8
12/01	Chapter 10: Columns	10.1-10.3	
12/03		10.3-10.4	
12/7- 12/12	Final Exam Week		

- This schedule is tentative and subject to change at the discretion of the faculty member. All changes will be announced at BlackBoard.
- Last day to drop: 09/04/2020
- Last day to withdraw: 10/30/2020