

Cleveland State University

Washkewicz College of Engineering

Civil and Environmental Engineering Department

Cleveland, Ohio 44115

ESC 211 – Strength of Materials

Spring 2021

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: Monday, Wednesday and Friday 2:35 pm - 3:25 pm

Teaching Assistant: Seyedkiarash Sharifillierdy (s.sharifillierdy@vikes.csuohio.edu)

Teaching Assistant online office hour: TBA

METHOD OF EVALUATION:

Grades will be determined by your performance on midterm exams, final exam, Homeworks, 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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Your final grade will be converted to CSU grading system (i.e., A, B, C, D, F):

92.5%-100%: A, 90%-92.5%: -A, 87.5%-90%: +B, 82.5%-87.5%: B, 80%-82.5%: -B, 77.5%-80%: C+, 70%-77.5%: C, 60%-70%: D, below 60%: Fail.

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, you should find the information of the LOCKDOWN BROWSER AND MONITOR:

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

For online exams, you should have access to your own computer and a webcam to record assessment sessions. 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.

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: 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.

This course is based on synchronous teaching which allows you to interact with instructor in real time. 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>

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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>

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.

HEALTH AND SAFETY SYLLABUS STATEMENT

Approved by Faculty Senate on 07/15/2020

The COVID-19 pandemic is still present and serious. Before entering class, you should have completed your daily health assessment. While you are in class on campus, you are required to: sit in your designated seat, maintain physical distance, wear your facial covering (e.g., masks or face shields), always cough or sneeze into your elbow or tissue, use the materials provided to clean your desk and chair before and after use, and adhere to other public safety protocols and directives for your specific classroom/lab/studio.

Students who do not follow these health and safety requirements will be instructed to leave class immediately. Students who violate this protocol will need to leave the classroom and MAY be marked absent. Repeated violations of these health-saving protocols may lead to sanctions under the Student Code of Conduct (3344-83-04 [E] and [Z]) up to and including suspension or expulsion. The CSU community thanks you for your cooperation!

STRENGTH OF MATERIALS - COURSE OUTLINE

Date Month- Date	Topic	Reading	Homework Posting dates	
01/11		Spring Recess		
01/13				
01/15				
01/18				
		Martin Luther King Day (University Holiday)		
01/20	Chapter 1: Concept of Stress	Statics-Review		
01/22		1.2		
01/25		1.3-1.5	HW 1	
01/27	Chapter 2: Stress and Strain – Axial Loading	21.A-2.1C		
01/29		2.1D-2.1G		
02/01		2.1G-2.2		
02/03		2.2-2.3		
02/05		2.4-2.5		
02/08		2.7-2.8		
02/10		2.10-2.12	HW 2	
02/12			Review Chapters 1 & 2	
02/15			President's Day (University Holiday)	
02/17	Chapter 3: Torsion	3.1		
02/19		3.2		
02/22		3.3		
02/24		3.4-3.5	HW 3	
02/26			Review Chapter 3	
03/01		Midterm1-Module Test		
03/03	Chapter 4: Pure Bending	4.1		
03/05		4.2-4.3		
03/08		4.4-4.5		
03/10		4.7-4.8		
03/12		4.9	HW 4	
03/15	Chapter 5: Analysis and Design of Beams for Bending	5.1		
03/17		5.2		
03/19		5.3	HW 5	
03/22		Review Chapters 4 & 5		
03/24	Chapter 6: Shearing Stresses in Beams and Thin-Walled Members	6.1		
03/26		6.3-6.4	HW 6	
03/29		Midterm2-Module Test		
03/31	Chapter 7: Transformations of Stress and Strain	7.1		
04/02		7.2-7.4		
04/05		7.6		
04/07	Chapter 8: Principal Stresses Under a Given Loading	8	HW 7	
04/09		8/Review Chapters 7 & 8		
04/12	Chapter 9: Deflection of Beams	9.1		
04/14		9.2		
04/16		9.4		

04/19		9.5	HW 8
04/21		Review Chapter 9	
04/23	Chapter 10: Columns	10.1	
04/26		10.3	
04/28		10.4	
04/30		Review Chapter 10	
May 1-7	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 with full fund: 01/22/2021
- Last day to drop: 01/29/2021
- Last day to withdraw: 03/26/2021