Spring 2021

MECH 320-102: Statics and Mecanics of Materials

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NJIT New Jersey Institute of Technology

MECH 320 - 102 - Statics and Mechanics of Materials - Spring 2021

Text: Hibbeler, R.C, Statics and Mechanics of Materials, 5th Edition,
Pearson 2014, ISBN-10: 0-13-345160-7, ISBN-13: 978-0-13-438259-3 or 10: 0-13-438259-5

Referenced Text: NCEES, Fundamentals of Engineering Supplied-Reference Handbook, latest edition, (or reproduce pages from: http:/www.ncees.org/exams/study_materials/fe_handbook/)

Instructor: Prof. Marwa M. Korayem, Ph. D. Email: mi45@njit.edu

Webex . Wed. 6:00 PM – 8:50 PM

Prerequisites: *Phys 111 and Math 112, For chemical engineering and electrical engineering majors. Statics provides an understanding of the equilibrium of particles and rigid bodies, including simple machines, trusses, and frictional forces. Mechanics of materials covers pressure vessels, thermal stresses, torsion of shafts, stresses and deflection in beams, and column action.*

Basis of Grading

Homework	10%
Class Participation	5%
Quizzes	60% (20% each)
Final	25%
Total	100%

Grade Distribution

A = 88 to 100
B+ = 82 to 87
B = 76 to 81
C+ = 70 to 75
C = 65 to 69
D = 60 to 64
F = 59 or less
W = Voluntary before deadline

Incomplete may be given in rare instances when the student is unable to attend or otherwise do the course due to illness etc. All of the missed work must be made up during the following semester.

Week	Topics	Sections, Pages	Homework Problems
1	General Principles, Concurrent Force Systems	1.1 – 1.5, p.3-14 2.1 – 2.4, p.17-36	2- 3, 10, 19, 23, 30, 35
2	Cartesian Vectors, Position Vectors, Dot Product	2.5 – 2.6, p.40-48 2.7 – 2.9, p.52-69	2- 38, 40, 51 & 52, 2- 62, 65, 75
3	Force System Resultants / Moment Systems	3.1 – 3.7, p.79-130	3- 5, 10, 11, 39, 58, 64, 75
4	Equilibrium of Rigid Bodies	4.1 – 4.4, p.157-182	4- 3, 6, 15, 21, 42, 54
5	Quiz #1 Structural Analysis, Method of Joints	5.1 – 5.3, p.223-238	5- 3, 6, 10
6	Structural Analysis, Method of Sections, Frames and Machines, Handout.	5.4, p.239-247 5.5 p.248-265	5- 20, 26, 30 5- 48, 51
7	Center of Gravity, Moment of Inertia	6.1 – 6.2, p.269-291 6.3 – 6.5, p.292-309	6- 21, 36, 37, 41 6- 61, 69, 86, 90
8	Stress and Strain Allowable Stress Design, Deformation	7.1 – 7.5, p.311-345 7.6 – 7.9, p.346-377	7- 5, 11 7- 31, 34
9	Mechanical Properties of Materials Poisson's Ratio	8.1 – 8.4, p.379-394 8.5 – 8.6, p.398-409	8- 1, 7, 13 8- 21, 23
10	Quiz #2 Axial Loading	9.1 – 9.2, p.411-420	9- 2, 3, 19
11	Torsion Angle of Twist	10.1 - 10.3, p.453-468 10.4 p.474-482	10- 6, 9, 14, 34 10- 37
12	Bending, Shear and Moment Diagrams The Flexure Formula, Handout	11.1 – 11.2, p.499-515 1.4 p.529-536	11- 2, 3, 6 11- 73
13	Quiz #3 Stress Transformation, Mohr's Circle	14.1 – 14.3, p.619-635 14.4 p.643-650	14- 3, 6, 11, 15 14- 44, 50
14	Column Buckling	17.1 – 17.3, p.777-790	17- 7, 9, 36
15	Final Exam Week		

Policies

Attendance: Attendance will be taken at the beginning of the class.

*The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.
*Students will be consulted with by the instructor and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

QUIZZES: All quizzes and finals will be "Closed Book". Only the FE Handbook is permitted as a resource, but NO notes may be added. You should not write in the FE Handbook. The quizzes will be given approximately at the end of the fourth, eighth and twelfth weeks. Information regarding the exact dates and the times will be provided by the instructor.

No make-up quizzes will be given. Instead, the weight for the final examination may be proportionately higher to make up the legitimately missed quiz. (Note from a physician, etc).

Exams Proctoring

LockDown Browser + Webcam Requirement

This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be the type that's built into your computer or one that plugs in with a USB cable.

Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature.

https://www.respondus.com/products/lockdown-browser/student-movie.shtml

Download Instructions

Download and install LockDown Browser from this link:

https://download.respondus.com/lockdown/download.php?id=264548414

Once Installed

- Start LockDown Browser
- Log into to Canvas
- Navigate to the quiz

Note: You won't be able to access a quiz that requires LockDown Browser with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.

Guidelines

When taking an online quiz, follow these guidelines:

- Ensure you're in a location where you won't be interrupted
- Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
- Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it
- Clear your desk or workspace of all external materials not permitted - books, papers, other devices
- Remain at your computer for the duration of the test
- If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam
- To produce a good webcam video, do the following:
    - Avoid wearing baseball caps or hats with brims

    - Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) are likely to move
    - If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete
    - Take the exam in a well-lit room, but avoid backlighting (such as sitting with your back to a window)
- Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

Getting Help
Several resources are available if you encounter problems with LockDown Browser:

- The Windows and Mac versions of LockDown Browser have a "Help Center" button located on the toolbar. Use the "System & Network Check" to troubleshoot issues. If an exam requires you to use a webcam, also run the "Webcam Check" from this area
- [As applicable, insert information about your institution's help desk, including details about how to contact them. Some help desks want students to run the "System & Network Check" and the "Webcam Check" before they are contacted - and even, to forward the results of these checks at the time of opening a ticket.]
- Respondus has a Knowledge Base available from support.respondus.com. Select the "Knowledge Base" link and then select "Respondus LockDown Browser" as the product. If your problem is with a webcam, select "Respondus Monitor" as your product
- If you're still unable to resolve a technical issue with LockDown Browser, go to support.respondus.com and select "Submit a Ticket". Provide detailed information about your problem and what steps you took to resolve it

HOMEWORK: Problems on the course outline sheet are to be solved and submitted at the beginning of the first lecture in the week following the assignment. Homework will be graded and returned to the student during the following week. To obtain full credit, you must submit the work on time and in the proper form. A minimum of 70% of the homework must be submitted to receive a passing grade.

1.	Use 5-square per inch National Computation pad paper ONLY (sold at the NJIT Bookstore). Problems should be done on one side of the 8-1/2 x 11 pad paper.
2.	On the top of each page, in the space provided, Print your instructor's name, section, problem number, student's name (LAST, FIRST) date, and page number.
3.	The problems must be presented in numerical order as assigned, with one problem per page. Letters and numbers must be neat, clear and legible.
4.	Draw neat, clear, free body diagrams as required. Use a straight edge or other drawing instruments as needed.
5.	Box in the final answer accompanied by its units. DO NOT HAND IN CLASS NOTES.
6.	Staple the problems in proper numerical order with a single staple in the upper left-hand corner.

Additional Note*:

Attendance will be taken at the beginning of the class and could affect your final grade.

In case of any student misses a class / quiz, or fail to submit an assignment on time, the ***Office of the Dean of Students*** is the only entity that would determine the legitimacy of the absence or the situation via a written email addressed to the course instructor.

It is the student's responsibility to contact the office mentioned above and make his/her case with proper documentations.

Please note that your final grade will reflect your work and calculated exactly as indicated in the above breakdown, no extra credits will be given.

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