

Course Policies and Procedures
BCN 2405C Construction Mechanics
Fall 2018

Prerequisites

MAC 3233, PHY 2004, and PHY 2004L

Description

Structural behavior of loads resisting members in buildings. Properties of structural materials. Primarily for Building Construction majors.

Objectives

To study forces, materials and their strengths particular to construction, to include analysis for structural systems: beams, columns, frames, trusses. Students will also learn axial stress, strain, properties of materials, beam analysis, shear and moment diagrams, bending and shearing stress, deflection and design of typical building beams.

Course Learning Outcomes

Upon completion of the course students will demonstrate their ability to:

1. Understand various types of measurement systems for force, area, length etc., and scalar and vector quantities for construction materials. ACCE SLO 19
2. Understand various force systems, e.g., concurrent, non-concurrent and parallel force systems and equilibrium to explain forces in structures and behavior of construction materials. ACCE SLO 19
3. Apply the concepts of structural mechanics to understand beam reactions, bending, shear, deflection, compression and tension, as applicable, in beams, columns, trusses, walls and footings. ACCE SLO 19
4. Quantify and analyze the internal and external forces acting within and upon a structural component under various anticipated loading conditions. ACCE SLO 19
5. Understand effects of moments of inertia, sectional modulus, radius of gyration and modulus of elasticity on axial stress, strain, shear, moment, bending and shearing stresses, and deflection of various structural systems. ACCE SLO 19
6. Understand basic principles of equilibrium and structural behavior of beams, frames, footings, trusses and columns. ACCE SLO 19
7. Understand basic material properties of concrete, steel and timber for design and selection of beams, frames, trusses and columns. ACCE SLO 8.

Required Texts

Applied Statics and Strength of Materials, Sixth Edition, Limbrunner and Allaird, Pearson Prentice Hall, 2016.

Class Teaching Assistant

Mr.

Office

Phone

E-mail

Office hours

Mengda will be teaching some lab. classes on Fridays or Mondays and may be giving some quizzes. He will maintain the Canvas website, grade homework assignments and help students with the assigned HW. Canvas website will be used for homework and quiz grades, attendance grades, homework solutions, quiz solutions and important announcements. Please contact him for discussing homework and quiz grades as well.

Structures Teaching Assistant

Rinker School also appoints another TA for help for structures courses (if funds are available). If additional TA is available, his name contact information and office hours will be announced in class.

Instructor

Dr. Ajay Shanker, PE, RNK 331 Rinker Hall, 273-1162, shanker@ufl.edu.

Grading	Points
Pop Quizzes	500
Homework	150
Total	650

Fourteen to sixteen unannounced pop quizzes, will be given during the semester. Quiz topics and syllabus will be announced one week in advance. Students should be ready to take a quiz on any lecture or lab. day and should carry calculator and text book to all classes. Students are advised to adhere to highest norms of honesty as spelled out in the student honor code during quizzes. Students should also avoid any action that may even lead to perception of cheating or dishonesty in quizzes. Therefore, talking, exchanging books or notes, sitting close to another student in quizzes, wearing sunglasses or caps is strictly prohibited during quizzes. Instructor may assign seating to a specific student before or during a quiz.

All quizzes are open books, open notes and have equal weight. Three or four lowest quiz grades will be dropped while calculating final grade because of low performance or absences due to medical reasons, school-related activities, family issues, emergencies, work-related issues and other unforeseen circumstances. **No make-up quiz will be given.** If a student expecting to miss more than four quizzes for valid school related or medical reasons should e-mail doctors note or other documents for failing to take a quiz to class TA within a week of quiz. To complete the course syllabus in time, quiz solutions will be posted on the Internet. All matters about change of quiz grade should be settled within a week after it is given. Depending on raw scores instructor may choose to curve any or all quizzes.

Grading Scale

0-389 E ;	390-411 D- ;	412-431 D ;	432-454 D+ ;	455-475 C- ;	476-496 C ;
497-519 C+ ;	520-540 B- ;	541-561 B ;	562-584 B+ ;	585-606 A- ;	607-650 A .

Office Hours

Many office-hour issues can be dealt by e-mail in a very efficient manner. Increasingly, I am spending more and more time answering students' e-mails. So please e-mail if you have any questions. Always write **BCN 2405C, Section Number, and your Name** in the subject line.

For help with lectures and homework please come during office hours after making an appointment day or two before by an e-mail. Please keep your appointment time to 15 minutes, (e.g., 12:45PM - 1:00PM). Also suggest one or two alternate times for scheduling other student requests. I will send you an e-mail about the appointed time. The office hours are given below:

Mondays and Wednesdays 11:30AM to 1:30PM
Thursdays 10:30AM to 12:30PM

ASSESSMENT METHODS

Assessment	SLO 08	SLO 19
Quiz 1-3		X
Quiz 4-6		X
Quiz 7-9		X
Quiz 10-12	X	X
Quiz 13-15	X	X

Assessment	Target
All Quizzes	At least 80% receive a C- or better
Homework	At least 70% receive C- or better

Scanner

Documents can be scanned in all on-campus computer labs. Alternately, students may find it advisable to buy an 8.5 in. x 11in. sheet scanner or a flat-bed scanner. The prices have dropped significantly and many scanners for scanning 8.5in. X 11in. sheets are available between \$65 -\$80.

Homework

- **Assigned homework should be uploaded to the Canvas website by 5PM every Wednesday as one pdf file.**
- In case the server is not working an e-mail with attachment (in pdf file format) to **jmd930@gmail.com** can be sent.
- If TA's e-mail is not working then you may send the HW to **shanker@ufl.edu**
- If you submit HW by e-mail, the subject line should be 'BCN 2405C, HW No. ____, and Your Name_____'

We will try to post the HW solutions before 9:00AM on Thursday. Students are required to check their HW and make any corrections themselves. The TA will assign HW grade to all submissions within a week. Because of this arrangement, late homework will not be accepted under any circumstances. Problems should be worked on the engineering paper with 0.5-mm pencil before scanning the HW as a pdf file. Please use not more than 300 dpi resolution to make small files. All sketches should be neatly drawn using a ruler. All answers should be underlined.

The teaching assistant appointed by the school for this course would be in-charge of the homework grade part of this course. As many students are enrolled in this class, students should realize the potential of errors or omissions on part of teaching assistant and resolve it directly with her by e-mail. Homework grade may be assigned based on overall attempt or detailed checking, therefore, full points on any homework does not imply that solution is correct. Students are responsible for reviewing correct homework solutions, quizzes and homework grades that are posted on the Internet.

Class Discipline

Students are not allowed to use laptops, iPods or other electronic devices at all. All cell phones must be turned off during classes. Students who are more than five minutes late will not be allowed to attend class.

Student Responsibilities

Attend all classes and send-in homework when due. Be aware of all the announcements or changes in the course policies or coverage made by the instructor. Read the text assignment before the class and come prepared with questions. Work extra problems to understand each topic. Instructor will ask a student to leave the classroom if he is talking or engaging in other disruptive behavior in class. Food or drinks are not allowed in classes. Honor Code will be strictly enforced. Seek timely help if not making satisfactory progress. Students needing accommodations for learning differences and other physical conditions need authorization from appropriate UF offices and should submit the paperwork to instructor otherwise no accommodation will be provided. Tell instructor if you withdraw from this course or end your activity in this course. Be aware of the Honor System of University of Florida. All students in this course are subject to the requirements of the University of Florida's Honor Code. *We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

BCN 2405C Course Outline

Week	Topics and Coverage	Reading Assignments
1	Introduction of Course; Introduction to Statics Force, Units, Types	1-1 thru 1-6 2-1 thru 2-4
2	Scalar and Vector Quantities Principle of Transmissibility, Force Systems Resultants & Components of Forces	2-5 2-6 thru 2-8
3	Resultant of Two Concurrent Forces Resultant of Three or More Forces Moment of Force & Varignon's Theorem Parallel Force Systems Couples & Non-concurrent Force Systems	3-1 3-2 3-3 thru 3-4 3-5 3-6 thru 3-7
4	Equilibrium of Concurrent Force Systems Equilibrium of Parallel & Non-concurrent Forces	4-1 thru 4-4 4-5 thru 4-6
5	Trusses, Types, Behavior and the Method of Joints The Method of Sections	5-1 thru 5-4 5-5
6	Analysis of Frames Center of Gravity Centroids and Centroidal Axes	5-6 7-1, 7-2 7-3
7	Centroids & Centroidal Axes of Composite Areas Moment of Inertia & Transfer Formula Moment of Inertia of Composite Areas	7-4 8-1 thru 8-3 8-4 thru 8-6
8	Tensile, Compressive, Shear Stresses & Deformations Hooke's Law, Tension Test & Factor of Safety	9-1 thru 9-4 9-6, 10-1 thru 10-7
9	Beams Types, Loads, Reactions	13-1 thru 13-3
10	Introduction of Shear Force & Bending Moment Shear Force & Bending Moment Diagrams	13-4 thru 13-5 13-6
11	Sections of Max Moment Stresses due to Bending, Flexure Stresses due to Bending & General Shear Formulas	13-7, 13-7 14-1, 14-2 14-3 thru 14-7
12	Beam Analysis & Deflections Beam Deflections	14-7, 15-4 15-4
13	Tentative Chapter 16	