

University of Florida
School of Architecture
Spring-2016

SYLLABUS

1. Course: INTRODUCTION TO ARCHITECTURAL STRUCTURES (3 credits): Structural Systems, Statics, Strength of materials, and Structural Analysis.

2. Class Textbooks and Software

- a. **Building Structures.** Nawari O. Nawari & M. Kuenstle, University Readers, Inc. & Cognella Academic Publishing, **ISBN:** 978-1-60927-673-7. **(Required).**
- b. **Analyzing Building Structures: Exercises and Solutions Manual.** Nawari O. Nawari. University Readers, Inc. & Cognella Academic Publishing, **ISBN:** 978-1-60927-581-5. **(Required).**
- c. **Shaping Structures: Statics** Wacław Zalewski and Edward Allen, ISBN: 0-471-16968 **(Recommended).**

3. Materials and Equipment

1. Standard drafting equipment as used in other courses (scale, protractor, etc.).
2. Engineering Paper (green with grid lines or similar) is to be used for numerical homework and quizzes.
3. Three-inch ring binder for homeworks, classworks, and quizzes.
4. Laptop Computer (recommended)
5. Scientific Calculator.

4. Instructor:

N. Nawari, Ph.D, P.E., F.SCE.

Class Hours: Tuesday and Thursday 11:45 AM.-1:40 PM.

Email: nnawari@ufl.edu

Building: FAB 105

Office Hours: T R (3:00 pm – 5:00 pm) or by appointment.

Course website: <http://lss.at.ufl.edu/> and click on the "e-Learning in Canvas" continue button and login using their GatorLink username and password.

5. Prerequisites

Mathematics and Physics

6. General Requirements

- 1- The class is to be handled and conducted in a professional manner. Student attitude and participation are required if the course is to be conceded successfully.
- 2- The student is required to attend all course lectures. The **student is responsible** for knowing the lecture material, homework assignments, and announcements that are made in class. The student should be aware that there is a strong correlation between student performance and class attendance.
- 3- The student is required to read the material in the text, which follows the class lectures. See the table for reading assignments.
- 4- The student is required to complete the homework, quizzes, projects, midterms, and final described below for his/her grade. **Exam attendance is mandatory.** If you have a good reason for missing an exam, you are responsible for notifying me and scheduling a make-up **before the exam is given.** Unexcused absences will be given a zero score.

7. Course Description

This course introduces the fundamentals of architectural structures including statics and strength of building materials. It focus on the correlation of structures and architectural design: exposing, concealing, and celebrating structures, understanding the union of space, form and structures. The course covers building structural analysis for architects. Students will learn how to efficiently organize, coordinate and communicate information in order to convey data necessary for buildings structural analysis and design. Incorporated is an applied project and field sketches related to building design and detailing. Students will understand the essence of buildings structural analysis. The following subject content will be addressed: Loading determination and evaluation, Resolution and equilibrium of force systems, Truss analysis, Centroids, moment of inertia, and shear and bending moment diagrams. Basic beam, column and system design.

8. Course abstract and objectives

This course develops the understanding of the fundamental principles of statics, strength of materials, and analysis of building structures. This includes many structural mechanics concepts such as the force equilibrium, which represent the basic and powerful concept in the field of building structures. At the completion of this course, the student should have a sound understanding of these concepts and be able to utilize them in analyzing and designing building structures. Emphasis is on force analysis involving external load conditions on a structural system. Additional primary objective is to develop a working relationship between applied loads on a non-rigid body and the resulting internal forces and deformations induced in the body. Strength of materials is concerned with the properties of various structural materials (wood, steel, and concrete) in resisting applied forces. Upon completion of this part of the course students should be able also to evaluate the appropriate interplay of stresses, section properties, material strength, and deformation based on an analysis of the load and support conditions present on a structural member. Both graphical and analytical methods are used for structural analysis along with physical and digital modeling techniques. Objectives and goals include:

- a. Identifying the main structural components of a building system and understanding their functions.
- b. Correlation of Architectural structures and architectural design: exposing, concealing, and celebrating structures
- c. Understanding the union of space, form and structures
- d. Understanding forces and their types and nature, moments and their vector representations
- e. Analyze free body diagrams, rigid body equilibrium forces and determine reactions.
- f. Calculate forces generated in elements of a building structure.
- g. Locate critical points in a structure for internal loads and stresses.
- h. Locate and determine center of gravity and moment of inertia of structural members.
- i. Draw shear and moment diagrams for building structures
- j. Calculate strain in structural members.
- k. Analyze and design compression members.
- l. Analyze and design tension members
- m. Understand the relationship between loads, force, stress and strains.
- n. Architectural case studies to examine conceptual development, structural design, building process and the selection of structural material

POLICIES

9. Homework and Assignments

Homework assignments must be worked out on engineering paper, or submitted as produced by the printer. All homework assignments are due at the beginning of the class on the assigned due date. Use one problem per page, i.e. one side of the page only. All solutions sheets must be properly collated and stapled in the upper left hand corner. Do not use crimped edges or paper clips. Homework assignments turned in after the beginning of class will lose 20 % of the total points possible for each day it is late. No credit will be given for an assignment turned in later than 5 days after the date it is due. The students are responsible for materials presented and discussed in class, lab period and in assigned readings. Exams, projects and exercises are written with the assumption that individual students are keeping up with the reading assignments and attending all the lecture and lab sessions. The following table summarizes the instructions for homework and assignments:

Paper	Use workbook sheets or grid “Engineer’s Computation Pad” available in the Bookstore for analytical problems. Computer printout is also accepted. For Drawing assignments use standard A4 or A3 sizes.
Header	Each sheet should have a header with your name or student #, ARCH 3503, Homework #?, date due, Page No.
Margin	The problem number goes in the right hand margin alongside the problem. Do not write in the right hand margin otherwise.
Problem Solution	Each problem should have three headers - Given, Required (or Find), and Solution.
Given	List all the given information. Draw a diagram of the problem. This should be neat and legible, and show all the appropriate dimensions. Use a ruler unless you can freehand neatly.
Required	List the information for which you are required to solve. If the problem is divided into sections (a, b, c, etc.) list each as listed in text.
Solution	Present a legible, organized solution of the problem. Include any information, which is relevant to the solution. Organize the solution as listed in the required section. List all your assumptions. Draw a box around the final answers.
Collaboration	The instructor encourages you to exchange ideas with other students while you are doing your homework. This exchange can help you to understand the concepts and also to practice teamwork. Each student should make a goal of developing problem solving procedures that will be useful for all the problem types offered by the class. Exams and quizzes are for assessing individual problem solving skills. Copying solutions from other students on exams or quizzes is cheating and will not be tolerated.
Other Ways of Cheating	The object of this class is for the students to learn how to solve structural statics problems of building and demonstrate their knowledge to the instructor. Students found to be shortcutting this objective (and shortchanging themselves) will be dealt with in an appropriate manner to be determined by the instructor.
Communication Skills	It is important to be able to communicate your ideas and participate in this class (and other classes too). Your final scores will depend on your ability to communicate solutions to the instructor and participate in class work. Use the homework to practice these skills.
Neatness	Work that is not neat and clearly legible will be marked down and is subject to not being accepted. Neatness implies accuracy.

10. Attendance and Unexcused

Attendance is more than your physical presence during the scheduled class and lab periods. It requires active involvement during the class and laboratory periods by preparing the assigned readings and engaging in laboratory discussions. Our policy on attendance is extremely strict: Students are expected to attend all class meetings (lectures, lab periods, quizzes, exams, field trips and guest lectures, and discussions). A missed attendance should receive prior authorization from the instructor except under extenuating circumstances. It is the student's responsibility to obtain information pertaining to lecture notes, or handouts distributed during any missed session. Students who miss class without prior approval of their instructor will receive a negative grade of zero on the missed in class assignment. Arriving late (after 30 minutes of the start of class) will be counted as a half of an absence.

Note that two or more absences may adversely affect your grade, and THREE absences will result in a failing grade and/or an automatic drop from the course.

11. University Excused

Authorized absences must be approved by your instructor in advance of the absence, unless you have an emergency or illness. Make-up work must be completed outside of normal class hours within ONE WEEK following an excused absence. IT IS YOUR RESPONSIBILITY to see your teacher and make arrangements for make-up work.

12. Class

Tuesday and Thursday 11:45 AM.-1:40 PM. Including lectures, lab exercises, exams, etc, It is required that each student attends and works in all class and lab sessions. Excused absences must have written confirmation.

13. Student with Disabilities

In accordance with University policy, if you have a documented disability and require accommodation to obtain equal access in this course, please contact the instructor at the beginning of the semester or when given an assignment for which an accommodation is required. Students with disabilities must verify their eligibility through the Disability Resource center in the Dean of Student office located in 0001 Building 0020 (Reid Hall), Tel. 352-392-8565, fax. 352-392-8570, e-mail at accessuf@dso.ufl.edu. Upon verification, the DRC staff member will present you with "accommodation letters", to give to your instructors.

14. Building Hours

Students are required to comply with the university established building hours of operation.

15. School Policy

As a reminder, the class rooms, studio, offices and hallways are **non smoking** areas. Smokers using the building entrance areas are expected to dispose of their refuse in an appropriate manner. The use of cell phones etc, is prohibited during scheduled class meeting times. Students are expected **to turn off in-coming cell phone** ringers so that they do not disturb class proceedings. In summary, students are required to maintain the studio, computer lab and class areas in conformance with fire, safety, and health regulations and codes and to maintain a "professional working environment" Miscellaneous damage from activities such as cutting directly on desk tops will not be tolerated. The use of pressurized spray paint or spray fixative is not allowed in the studio / classrooms hall/stair towers.

16. Evaluation

No assignment, interim or final, will be accepted without a valid excuse after the date and time due. Incomplete projects must be submitted on the assigned time and dates. Time due is at the beginning of Class unless otherwise stated. Homework assignments are due prior to the beginning of faculty lectures. No assignments/Submissions will be accepted or graded subsequent to the beginning of daily lectures. Homework assignments will be graded periodically during the semester. Quizzes will be announced and missed quizzes can not be made-up. Quizzes will be counted as a "0" without a valid excused absence. Grades will be the

assessment of a student's performance in the homework problems, lab computer problems, projects, quizzes, and exams given throughout the semester session including skills and participation in all class activities.

Students are expected to be present and prepared for all class sessions, group discussions reviews and field trips. Each instructor will outline the specific criteria to be used in evaluating projects. The School uses the University's standard grading system, a letter grade that is translated into points of course credit as follows:

Grade Values for Conversion May 11, 2009 and After												
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E, I, NG, S-U, WF
Grade Points	4.0	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	.67	0.00

Please note that The University requires that a graduate student maintain a 3.0 (B) average to remain in good academic standing. Every possible effort is made to counsel students in academic difficulty to determine the cause and possible solution so that the student can continue and complete their studies in the University. The graduate design studio and support courses are in required sequences that must be taken in order.

An incomplete ("I") grade for any graduate or undergraduate architecture design studio prerequisite course must be resolved with a grade change form completed before the first day of class of the following semester in order to enroll in the next course of the studio sequence. Faculty that issue incomplete grades must be available to work with their student and complete the grade change form prior to the first day of classes the following semester. Special circumstances can be addressed through an official appeals process with the SoA Director and the approval of the course instructor.

Note

If you need classroom accommodation for a disability, you must first register with the Dean of Students Office. The Dean of Students Office will provide documentation for you to give to the Instructor when requesting accommodation.

17. Grading

Quizzes	10 %
Participation	10 %
Homework	15 %
Projects	35 %
Exam I	10 %
Exam II	10 %
Exam III	10 %
TOTAL	100 %

18. Grading Scale

A	92 and above
A-	87% – 91%
B+	84% - 86%
B	80% - 83%
B-	77% - 79%
C+	74% - 76%
C	70% - 73%
C-	67% - 69%
D +	64% - 66%
D	60% - 63%
D-	59% - 50%
E	49% and below.

20. Spray Painting Policy

Spray painting, or the use of any other sort of aerosol spray, is not allowed in the Architecture Building, Rinker Hall and in Fine Arts C, except within the spray booth found in Room 211 of Fine Arts C. Students found in violation of this policy will be referred to the Dean of Students for disciplinary action.

19. Honor Code

All students are expected to follow the honor code- submit only their original work. Students are expected to work individually on their assignments. Students may discuss the assignment, interpretation of the results, procedure to be used, etc... in groups to enhance understanding and analyze alternative approaches.

***All work is to be legible & presented in a professional manner.**

20. Tentative Schedule

This schedule is subject to change at the instructor's discretion in light of new and unforeseen developments and technologies update.

Week 01 – Aug. 23 rd	Topic: Introduction - Ch.1
Week 02 – Aug. 30 th	Topic: Forces and Force Systems – Ch.2/Ch.3
Week 03 – Sept. 6 th	Topic: Equilibrium of Buildings – Ch.3
Week 04 – Sept. 13 th	Topic: Equilibrium of Buildings – Ch.3
Week 05 – Sept. 20 th	Topic: Load Path: Vertical Forces – Ch.4
Week 06 – Sept. 27 th	Topic: Load Path: Vertical Forces – Ch.4
Week 07 – Oct. 4 th	Topic: Load Path: Lateral Forces and Stability – Ch.5
Week 08 – Oct. 11 th	Topic: Load Path: Lateral Forces and Stability – Ch.5
Week 10 – Oct. 18 th	Topic: Cables – Ch.6
Week 11 – Oct. 25 th	Topic: Cables/Arches – Ch.7
Week 12 – Nov. 1 st	Topic: Arches – Ch.7
Week 13 – Mar. 31 st	Topic: Trusses – Ch.8
Week 14 – Nov. 8 th	Topic: Trusses – Ch.8
Week 15 – Nov. 15 th	Topic: Trusses – Ch.8
Week 16 – Nov. 22nd	Topic: Thanksgiving break
Week 16 – Dec. 6 th d	Topic: Final

Note:

- ❖ Reading assignments are part of the coursework and will be examined each class.
- ❖ Assigned problems are due on or before next week Thursday's class (i.e. you have about a week to finish your homework).
- ❖ Bonus problems are due on or before **1** weeks after the week they are assigned on.