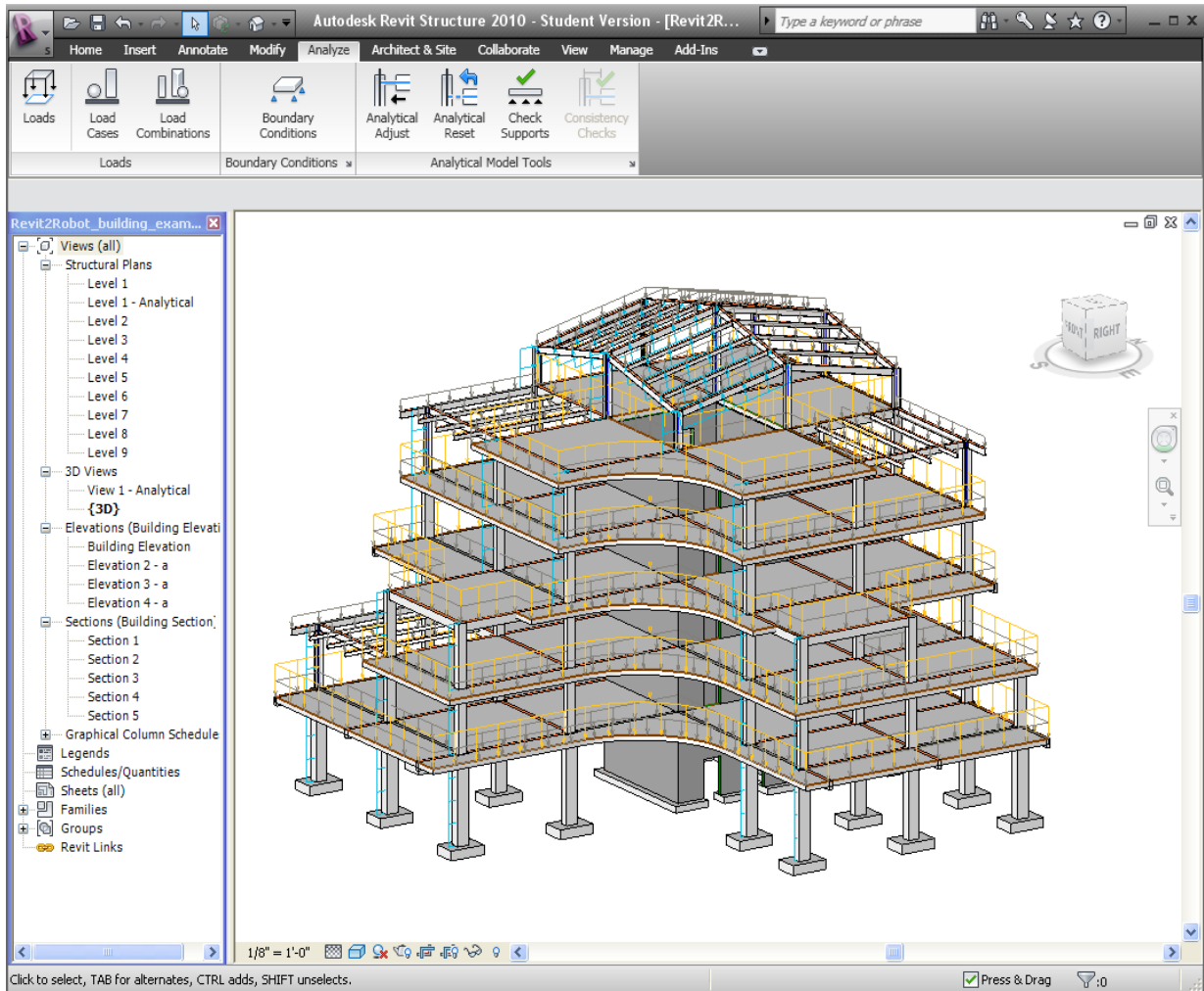


STRUCTURAL MODELING



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**University of Florida
School of Architecture**

University of Florida
School of Architecture
Summer-2021

SYLLABUS

1. Course: STRUCTURAL MODELING (3 credits)

2. Class Textbooks and Software

- i. Building Information Modeling (BIM): A framework for Structural Design, by **Nawari & Kuenstle**, CRC press. **(Highly Recommended)**
- ii. BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors. By Eastman. **(Recommended)**

Required Software:

- i- REVIT 2019 (Free download from Autodesk Student Community website: <http://students6.autodesk.com/>)
- ii- ROBOT STRUCTURAL ANALYSIS PROFESSIONAL 2018 (Free download from Autodesk Student Community website: <http://students6.autodesk.com/>)
- iii- RISA 3D and RISA floor (www.risa.com)

3. Materials and Equipment

1. Laptop Computer.
2. Scientific Calculator.

4. Instructor:

N. Nawari, Ph.D, P.E., F.ASCE
Class Hours: T TH 1:55 pm.- 4:55 pm.
Office Hours: M F
Building:

5. Prerequisites

ARC3503 Introduction to Architectural Structures or its equivalent ((Determined by instructor)

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 STRUCTURAL MODELING. The course also develops the understanding of building information modeling (BIM), digital design, and approximate systems analysis and detailing for architectural structures. Students will learn how to efficiently implement **BIM** to organize, coordinate and communicate information in order to convey data necessary for structural systems. Incorporated are applied projects and field sketches related to building design and detailing.

8. Course abstract and objectives

To provide a fundamental understanding of structural system planning and structural modeling. The coursework and lectures address the fundamental principal of building information modeling and their relation to structural modeling and building design implications. Special emphasis is placed on the practical design process of steel, wood and concrete buildings.

The main topics addressed include:

- A. Introduction to building information modeling (**BIM**) fundamentals
- B. Structural Planning
- C. Structural **BIM** using Revit Structure
- D. Modeling Columns, beams, floor slabs, roof decks, walls, framing, foundations, and rebars.
- E. Examples: Concrete Buildings, Steel Buildings, Wood Framed Buildings, Hybrid Buildings.
- F. Sheets and construction documents
- G. Families creation
- H. Model Sharing: internal and external sharing
- I. Productivity, Interoperability
- J. Visualization and Rendering
- K. Constructability: Project phase and Design Options
- L. Integrated practice
- M. Architectural case studies to examine conceptual development, structural design, integrated building design process and the production of construction documents.

At the completion of this course, the student should have a sound understanding of these concepts and principles along with the skill gained in utilizing REVIT structure and be able to apply them in designing steel, wood, and concrete buildings.

POLICIES

9. Homework and Assignments

All homework assignments are due at the beginning of the class on the assigned due date. 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.

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. Students are expected to attend all class meetings (lectures, lab periods, 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 grade of zero on the missed in class assignment.

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

M W F 8:30 am.-10:25 am. 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 and 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.

Assessment of a student's performance in the homework problems, lab computer problems, and projects, 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

| | |
|--------------|-------|
| Homework/Lab | 35 % |
| Project I | 25 % |
| Project II | 40 % |
| <hr/> | |
| 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%
- F 59% and below.

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

| Class | DATE | TOPICS | ASSIGN. PROBS. | SUPPL. PROBS (***) |
|-------|------|---|----------------|--------------------|
| 1 T | | Organization, Introduction Structural Modeling | | |
| 2 T | | Introduction Revit Architecture / Revit Structure | | |
| 3 T | | Structural Planning | | |
| 4 T | | REVIT Structure: Modeling Structural Members | | |
| 5 T | | Modeling Structural Members | | |
| 6 T | | Modeling Structural Members | | |
| 7 T | | Linking CAD Files/ Material Takeoff and Collision Detection | | |
| 8 T | | Sheet and Construction Documents | | |
| 9 T | | Internal and External Sharing /Families Creation | | |
| 10 T | | Families Creation | | |
| 11 T | | Revit Structural Analysis | | |
| 12 T | | Project Phases and Design Options | | |
| 13 T | | Projects | | |
| 14 T | | Projects | | |
| 15 T | | Projects | | |
| | | Project II Due Date | | |