

# MISSOURI S&T

## Syllabus

### Spring/2024

#### Instructor and Teaching Assistant Information

Instructor	Pengfei Ma
Teaching Assistant	Sadeq Annooz ( <a href="mailto:sadm5@mst.edu">sadm5@mst.edu</a> ) Office: Pine Building, Room 205
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#### Course Information

Course Name	Structural Analysis I
Course ID & Section	Course ID: CIV/ARCH ENG 3201 Sections: 1A-LEC Regular and 301-LAB Regular
Credit Hours	3 units
Semester/Year	Spring/2024 (Dates: Jan 16/2024 – May 3/2024)
Location	Lecture: Mo 3:00 PM - 3:50 PM, Room: Butler-Carlton Hall 00315 TuTh 9:30 AM - 10:20 AM, Room: Butler-Carlton Hall 00318 Re&Ex: Mo 1:00 PM - 3:50 PM, Room: Butler-Carlton Hall 00315
Course Structure	Lecture: Classroom-based Lab: Blend Class Instruction

#### Course Description

Members and fixations. Loads on Structures. Basic Structures. Analysis of statically determinate beams, frames, and trusses. Influence lines and moving loads. Computation of deflections. Analysis of statically indeterminate structures. Force method. Development and use of theorems of displacement methods including slope-deflection. Moment distribution. Computer solutions.

Prerequisites: Civ Eng 2200, 2210 each with a grade of "C" or better. (Co-listed with Arch Eng 3201)

## Course Goals

At the end of this course, students will be able to:

1. Analyze a structure to ensure that it has its required strength and rigidity.
2. Know approximations and idealizations (such as supports, connections and members) made for structural analysis.
3. Calculate the forces in the structural members and their displacements using the theory of structural analysis.

These objectives are designed to enhance the student's understanding of how structures behave under various loading conditions. Problem assignments are designed to illustrate the concepts discussed in class and to enhance analytical skills.

## Course Materials

- Structural Analysis, 10<sup>th</sup> Edition, R. C. Hibbeler <https://www.amazon.com/Structural-Analysis-10th-Russell-Hibbeler/dp/0134610679>

## Course Policies

Lectures: The lectures will introduce the principles of structural analysis in conjunction with meeting the course objectives.

Attendance: Class attendance is strongly encouraged and will be monitored by the instructor. If an emergency arises in which you cannot attend class, please notify the instructor ahead of time, by email or phone, such that arrangements can be made for any missed handouts or homework assignments. In normal situations, students may be asked to drop from class after four absences. Attendance will be absolutely checked at some highlighted lectures.

Assignments: Homework will be assigned on a regular basis and collected as designated by the instructor. Homework must be neat and organized. Presentation of the homework will include a statement of the problem at the top of a new page with one-inch spacing between problems. Use of a straight edge in preparation for homework assignments is required. (The grader will deduct points from homework assignments that are not neat and organized.) An engineering computation paper is recommended for the homework. Homework assignments will be due at the beginning of the following lecture unless noted otherwise. Late homework will be accepted with a 20% penalty unless the instructor permits. Please contact the grader and copy the instructor if any questions in your homework grades.

Examinations: There will be two regular exams during the semester and a final exam during the scheduled final exam period of this course. Missed exams will count as zero. Exams cannot be made up except under very unusual circumstances approved prior to the scheduled exam date by the instructor. Please contact the instructor if any questions in your exam grades.

Lab meeting: The lab meeting time frame will be used for lectures, exams, and a limited number of software/lab-related demonstrations. In addition, on a limited number of designed days, the instructor will have an optional problem-solving session for the class where additional problems will be solved.

Expected Performance: Attend class regularly, participate in discussions and ask questions in class, solve homework problems on a regular basis, submit assignments on time, and not miss an exam.

Canvas: All course information, including lecture notes, assignments, and files will be available on Canvas. Students will submit their assignments using Canvas or at the beginning of class.

Grades: All grades will be posted on Canvas. The final grades will be treated on an absolute basis, that is, A for 90% and above, B for 80-89%, C for 70-79%, D for 60-69%, and F for 59% and below. The instructor reserves minor discretion over grades for critical cases.

Feedback: The instructor can provide feedback about your performance in this course and specifically what you need to do to improve it only per your request. He also would appreciate your feedback about how the course material and presentation could be further improved. Please see him confidentially for any suggestions/concerns you may have related to the course.

Other Important Information: Posted separately; please see the supplementary info on Canvas.

## Course Schedule

*Students appreciate a schedule of when assignments are due and when topics will be taught.*

Date		Day	Topic		
Jan	16	Tu	Introduction, Structural Element & System		
	18	Th	Dead Load, Live Load		
	22	Mo	Live Load, Idealized Struct., Superposition		
	23	Tu	Equil. Eqs., Determinacy & Stability of Beams		
	25	Th	Types, Determinacy and Stability of Trusses	HW1	
	29	Mo	Methods of Joints		
	30	Tu	Methods of Sections		
Feb	1	Th	Internal Loadings, Shear & Moment Functions		
	5	Mo	Shear & Moment Diagrams-Beams	HW2	
	6	Tu	Shear & Moment Diagrams-Frames		
	8	Th	Moment Diagrams by Superposition		

	12	Mo	Influenced Lines- Beam	HW3	
	13	Tu	Qualitative Influence Lines		
	15	Th	Influenced Lines- Trusses		
	19	Mo	Review for Exam I		
	20	Tu			Career Fair
	22	Th	Maximum Influence at a point	HW4	
	26	Mo	Exam I		
	27	Tu	Absolute Maximum Shear&Moment		
	29	Th	Elas. Beam Theory& Double Integration Method		
Mar	4	Mo	Deflections-Conjugate Beam	HW5	
	5	Tu	External Work & Strain Energy		
	7	Th	Principle of Virtual Work - Trusses		
	11	Mo	Principle of Virtual Work – Beams		
	12	Tu	Principle of Virtual Work - Frames	HW6	
	14	Th			Recess
	18	Mo			
	19	Tu	Indeterminate Structures, Redundant, Beams		
	21	Th	Force Method of Analysis - Beams		
	25	Mo			Break
	26	Tu			Break
	28	Th			Break
Apr	1	Mo	Exam II		
	2	Tu	Force Method of Analysis - Frame		
	4	Th	Qualitative Influence Lines of Ind. Struct.		
	8	Mo	Displacement Methods	HW7	
	9	Tu	Slope- Deflection Equations, Beams		
	11	Th	Slope- Deflection Equations, Frames		
	15	Mo	Moment Distribution - Concept, Beams		
	16	Tu	Moment Distribution - Frames: No Sidesway		
	18	Th	Moment Distribution - Frames: Sidesway	HW8	
	22	Mo	Computer Software Introduction		
	23	Tu	Final Exam Review		
	25	Th	Final Exam Review		
	29	Mo	Study Session		
	30	Tu	Study Session		
May	1	Th	Study Session		
	6	Mo	Final Exam (1:00pm-3:00pm)		

## Grading Policies

Gradings will be based on the performance of the exam, homework, and lab assignments as follows:

- Lecture Attendance 5%
- Homework/Lab Assignments 30%
- Two Mid-Term Exams 40% (20% each)
- Final Exam 25%

Partial credit will be given on exams and homework as determined by the instructor/grader and is not open to discussion. Any errors in adding points, marking something wrong that is actually correct, etc. should be brought to the attention of the instructor/grader. You are expected to keep all of your homework and lab exercises in a single notebook should the instructor decide to review your notebook during the final exam period.

It is encouraged for students to interact and even work together on homework and/or lab assignments. However, the work on homework and/or lab assignments should **never** be solely the work of one individual within a study group.

## Grading Scale Information (graded assignments and/or weighted grades)

Letter Grade	Points
A	90 – 100 points
B	80 – 89 points
C	70 – 79 points
D	60 – 69 points
F	59 and below

### Updates for Course Syllabi: Spring 2024

This document includes information for faculty to share with students:

- Recommendations for using campus systems and resources.
- **Updated boilerplate** to copy and paste into Canvas.

If you have questions about this information, please contact Undergraduate Education at 573-341-7276 or [undergrad@mst.edu](mailto:undergrad@mst.edu).

## COVID Update on Classroom Instruction

- For the Spring 2024 semester, in-person courses and assessments are scheduled without distancing between students.
- Staying home when you are sick and seeking testing when you have symptoms of COVID-19 are measures to help reduce the spread of the virus.
- Advise students who are ill to contact Student Health Services (mstshs@mst.edu), 573-341-4284.
- If a student is isolating, the student will receive an absence note from Student Health. The student will be responsible of forwarding the absence note to their instructors.
- To protect against serious illness from COVID-19, everyone aged 5 years and older is recommended to get one dose of an updated COVID-19 vaccination.
- Explain how the course will continue in the event of instructor emergency.

## Recommended Syllabus/Policies Checklist

- Course title, number, section, and description (as [published](#) in schedule and catalog).
- Course goals, student learning outcomes.
- Advice for students about how to engage with the course and succeed.
- Policies regarding attendance and participation (aligned to [Course Instruction Modes](#)). **Instruction must align with the mode listed on your section in the course schedule.**
- Policies about late work, make-up tests, and extra credit
- List of assignments with anticipated due dates and grade weights
- Required materials including software, hardware, textbooks, equipment)

## Campus Instructional Support Systems and Resources

**One Canvas.** (<https://umsystem.instructure.com/>) Use Canvas to post syllabi, policies, schedule(s), and grades.

**Training Webinars for Faculty** are available at <https://elearningevents.umsystem.edu/>.

**S&T Connect.** “Starfish” icon on Canvas toolbar.

S&T Connect enables students to request appointments with their instructors and advisors via the S&T Connect calendar, which syncs with the Outlook Exchange calendar. S&T Connect tracks each student’s performance across all courses. S&T Connect Early Alert enables students to be provided with services as needs arise.

**Reporting Academic Dishonesty.** Explain to students the practices they should follow for demonstrating academic integrity. For example, set expectations about processes and behaviors for examinations, appropriate use of AI systems, group

projects, writing, and citing sources. Incidents involving behaviors such as cheating, plagiarism, sabotage, or unauthorized use of artificially generated content in an academic context must be reported to the instructor's department chair and the Vice Provost of Undergraduate Education as violations of [the Student Academic Regulations](#). Such reporting is in addition to, and separate from, grade penalties for these violations as described in the instructor's syllabus. An online form facilitates reports of academic dishonesty, accessed from the [Faculty Resources for Academic Integrity](#).

### ***Artificial Intelligence***

Unauthorized use of artificially generated content violates University Student Academic Standards without consent of the instructor. With the introduction of ChatGPT and other AI systems, it's **strongly encouraged** for instructors to develop a policy within their syllabi to provide students guidance on appropriate use within the course and what is not approved. For example, providing clear instructions on when it's appropriate to utilize the tool such as creation of outlines, how to document it, and what is not acceptable use. For more resources visit <https://teaching.missouri.edu/blog/teaching-time-ai>

**Reporting Non-Academic Misconduct.** It will also be helpful to be aware of and explain that students must uphold all non-academic misconduct standards in addition to the academic standards as outlined in the [University of Missouri Collected Rules and Regulations Section 200.010](#). Instances of non-academic misconduct, which may include but are not limited to disruption, obstruction, failure to comply, and/or forgery shall be reported to [Student Support and Community Standards](#) using the [online reporting form](#).

[Student Support and Community Standards](#) has a dedicated team and numerous resources such as [UCARE](#) and the [student emergency fund](#) to help students navigate the S&T experience and support their success. This includes support to address barriers related to academic, personal, emotional, medical, financial, or any other needs. All students can learn and grow from challenges or setbacks, they are stepping stones to success and we are here to help.

### **UCARE**

UCARE is the central point of contact to connect a student who may be experiencing a personal, academic, financial, wellbeing, and/or other concern to support and resources. Sharing your concern with UCARE helps connect a student with solution-focused assistance to support their holistic well-being, success, and academic progress. A referral can be submitted at <https://go.mst.edu/ucare-refer> or by

emailing [ucare@mst.edu](mailto:ucare@mst.edu). For urgent matters, check out the [after-hour and urgent resources](#)

### **Boilerplate: Missouri S&T Campus and UM System Policies**

(Feel free to copy and paste, omitting "Classroom Egress" for online-only sections)

#### **Statement about Copyright, FERPA, and Use of Video**

It is vitally important that our classroom environment promotes the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions, whether in class or online. Please obtain the instructor's permission before recording any class activity. It is a violation of the University of Missouri policy to distribute such recordings without authorization and the permission of all who are recorded. More information is provided [online](#).

#### **Accessibility and Accommodations**

It is the university's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on a disability, please contact Student Accessibility and Testing at (573) 341-6655, email [dss@mst.edu](mailto:dss@mst.edu), or visit <https://saat.mst.edu/> for information.

#### **Student Honor Code and Academic Integrity**

- All students are expected to follow the [Honor Code](#).
- [Student Academic Regulations](#) describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010 and offers descriptions of academic dishonesty including cheating, plagiarism, and sabotage, any of which will be reported to the Vice Provost for Undergraduate Education.
- Other resources for students regarding academic integrity can be found [online](#).

#### **Student Well-Being**

Student Well-Being provides counseling services, health promotion initiatives, and prevention programs to empower the S&T community to thrive and enhance personal, academic, and professional success. Department office hours are Monday-Friday, 8 a.m. – 5:00 p.m. On the website, you can find information related to individual and group counseling, wellness consultations and training, resources for many health and wellness topics, and help for mental health crises.

#### **Health and Well-Being Canvas Course**

The Health and Well-Being Canvas Course features training, presentations, and other health and well-being resources for students. The course is free for all students, is non-credit, and students can enroll at any point in the semester.

#### **Miner Well-Being Certification Program**

The Miner Well-Being Certification Program is a semester-long certification where students can engage with campus-wide services and initiatives that help develop



skills that contribute to personal well-being and success. Housed in MinerLink, students can start the certification at any time in the spring or fall semesters, but it must be completed before the end of the semester in which they started it. Participants who finish the program will receive a certification of completion signed by the director of the Student Well-Being department, a letter of recommendation, and a badge in MinerLink.