

1. **CE 47400: Structural Analysis II**, School of Civil Engineering, Purdue University

2. **Credits & Contact Hours:** 3 credits

Lecture that meets 3 time(s) per week for 50 minutes per meeting for 15 weeks

Lectures: MWF: 8:30am - 9:20am, Room: HAMP-1144, Hampton Hall Civil Eng.

3. Instructor:	Arun Prakash	TA:	Joselito Wong Yau
E-mail:	aprakas@purdue.edu	E-mail:	jwongyau@purdue.edu
Office	4119, Hampton Hall Civil Eng.	Office	4129 Hampton Hall Civil Eng.
Hours*	Mon & Wed: 9:30am-11:30am	Hours*	Tue & Thu: 2:30pm-4:30pm
	Or email for an appointment.		Or email for an appointment.

*See Class Webpage for updated information: **Blackboard:**

<http://www.itap.purdue.edu/learning/tools/blackboard/>

4. **Textbook(s): Recommended**

- *Structural Analysis*, R. C. Hibbeler, 6th, 7th, 8th ed., Pearson, 2005, 2008, 2011.
- *Structural Analysis: A Unified Classical and Matrix Approach*, A. Ghali and A.M. Neville. 2nd ed., Chapman and Hill, 1978.
- *Matrix Structural Analysis*, W. McGuire, R.H. Gallagher, R.D. Ziemian. 2nd ed., J. Wiley and Sons, 2000.

5. **Specific course information**

- **Catalog description:** Determination of deflections by the method of virtual work; analysis of trusses, continuous beams, and frames by direct stiffness method; approximate methods of analysis.
- **Prerequisites:**
 - CE 37100 - Structural Analysis I
Stress resultants (reactions, axial forces, shear forces, and bending moments) for beams and framed structures.
Deflections of beams and frames (moment-area theorems; conjugate beam).
Analysis of indeterminate beams and frames: slope deflection; moment distribution.
Influence functions and their applications.
 - CE 27000 - Introductory Structural Mechanics
Loads; Structural forms;
Analysis of axially loaded members, flexural members (beams and frames), torsional members; Combined loading conditions; Buckling.
Basic behavioral characteristics of structural elements: laboratory experiments.
 - CE 23100 - Engineering Materials I
Nature and performance of materials under load (concepts of stress and strain).
Elastic, inelastic, and time-dependent behavior.
 - CE 29700 - Basic Mechanics I (Statics)
Free Body Diagrams (FBDs), Equilibrium of Particles; Rigid bodies; Equivalent systems of forces; Centroids and centers of gravity; Trusses, Frames, and Machines; Friction;
Area moments of inertia.
 - PHYS 17200 - Modern Mechanics
 - MA 26100 - Multivariate Calculus
- **Course status:** Technical Elective in Civil Engineering curriculum.
(highly recommended for students with Structures emphasis area)

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- Review of Basic Concepts in Structural Analysis (CE-297, CE-230, CE-270, CE-371)
- Review of Deflections of Determinate structures using Governing equations (Ch 8)
- Deflections of Determinate structures using Work-Energy Methods (Ch 9)
- Review of Force method for statically indeterminate structures (Ch 10)
- Approximate Methods in Structural Analysis (Ch 7)
- Review of displacement methods: Slope-deflection and Moment distribution (Ch 11-12)
- Displacement (Stiffness) Method of Analysis: Trusses Beams & Frames (Ch 14-15-16)
- Introduction to the Finite Element Method (if time permits)

7. Specific goals for the course

- Student learning outcomes: On completing this course the student shall be able to:
 - i. Apply the principle of virtual work to analyze trusses, beams & frames
 - ii. Conduct approximate analysis of indeterminate structures
 - iii. Conduct systematic analysis of determinate and indeterminate structures using the displacement-stiffness method (matrix method)

8. Grading Basis:

- Homeworks 20%
- Midterm Exams 40% (Tentatively) Tuesday, Feb. 25, 2014, 6:30pm-7:30pm
(Tentatively) Tuesday, Apr. 8, 2014, 6:30pm-7:30pm
- Final Exam 40% To be announced.
- **Total 100%**
- Bonus 5% In class activity; Blackboard forum participation

Note: Students must notify the instructor about conflicts with the scheduled exams allowing sufficient time to verify the conflict and arrange an alternate time. Make-up quizzes / exams for absences will **not** be given except under extremely unavoidable situations.

9. Homework Guidelines:

- There will be 1 homework assigned every week.
- Each homework will consist of 4 problems. The problems and due dates will be posted **online** on the course webpage on "Blackboard".
- You must **scan and submit all homework online** on Blackboard as a **single pdf-file**.
- **Do NOT email** your homework to the instructor or the TA.
- Make sure that your **scan is good quality** and your pdf-file is **clearly readable**.
Cell-phone / camera pictures of your homework will **not** be accepted / graded.
Illegible or light scans will **not** be graded.
Use black & white scans (avoid color scans - for smaller pdf-file sizes).
- **Late** homework submissions will be accepted with a 25% penalty on the 1st late day and a 50% penalty for the 2nd late day. After that, submission will not be accepted.
- **Do NOT email** your late homework to the instructor or the TA.
- **Solutions** will be posted on the Blackboard web page.

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Academic Integrity

- All work (assignments and exams) that you submit must be strictly **your own work**.
- Obtaining solutions from an external source or from another student's homework and/or sharing your homework with another student is **absolutely not allowed**. Giving and receiving help on **concepts** is allowed and encouraged.

Classroom conduct

- Attendance is expected in **all** lectures.
- **Cell phones** must be **switched off**. Talking, texting or any other use is **not permitted**.
- **Avoid** arriving late, leaving early, leaving & reentering the class in the middle of a lecture.
- Ask questions:
 - **How** does this work?
 - **Why** is this so?
 - Could you please explain again ...
- Sit up front and pay attention!

Emergency Procedures: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Information regarding these changes will be posted on the Blackboard course webpage and you will be intimated using the class email list.

Prepared by: Arun Prakash

Date: December 17, 2013