1. *Course number and name*

**ENGR 323: Structural Analysis**

1. *Credits and contact hours*

3 credit hours; one 1-hr-40-minute lecture and one 2-hr-45-minute lab/week

1. *Instructor’s or course coordinator’s name*

Instructor: Cheng Chen, Professor of Civil Engineering

Course coordinator: Cheng Chen, Professor of Civil Engineering

1. *Text book, title, author, and year*

Hibbeler, R.C., Structural Analysis, 10th Edition, Person Prentice Hall, NJ, (2017)

ISBN: 0134610679, 978-0134610672

https://www.pearson.com/en-us/subject-catalog/p/structural-analysis/P200000003322/9780137561773

1. *Specific course information*
2. *brief description of the content of the course (catalog description)*

Structural engineering, including standards and codes. Determination of loads, discussion of load path. Analysis of statically determinate structures. Forces within statically indeterminate structures. Structural analysis software.

1. *prerequisites or co-requisites*

ENGR 309: Mechanics of Solids.

1. *indicate whether a required, elective, or selected elective course in the program*

Required for Civil Engineering.

1. *Specific goals for the course*
2. *Specific outcomes of instruction.*

* Student is aware of the major phases of the structural engineering project.
* Student is aware of ASCE Standard 7 and the UBC/IBC.
* Student can obtain loads on structures using ASCE Standard 7.
* Student can determine the load path through common structures.
* Student recognizes when a structure is unstable and how to make it stable.
* Student recognizes when a structure is indeterminate and the number of degrees.
* Student is able to compute internal forces in beams and readily construct shear and moment diagrams.
* Student is able to compute bar forces in trusses.
* Student can use classical methods for computing deflections, such as, moment-area method and virtual work.
* Student can apply the method of consistent deformations for solving statically

indeterminate trusses, beam and frames.

* Student can make qualitatively correct sketches of deflections and moment diagrams

for statically determinate beams and frames.

* Student can make qualitatively correct sketches of deflections and moment.
* Student is able to use a computer program (selected by instructor) to model and to

solve problems similar to problems done “by hand.”

* Students are able to work effectively in teams.

1. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

ABET Student Outcome(s): 1, 2, 4, 5, 6, 7

1. *Brief list of topics to be covered*

* Introduction to structures and loads.
* Static determinacy and indeterminacy.
* Stable and unstable planar structures.
* Reactions for planar structures.
* Forces in statically determinate trusses.
* Forces in statically determinate beams and frames.
* Deflections in statically determinate trusses.
* Deflections in statically determinate beams and frames.
* Forces in statically indeterminate trusses.
* Forces in statically indeterminate beams and frames.
* Deflections in statically indeterminate trusses.
* Deflections in statically indeterminate beams and frames.
* Forces and deflections using computer software SAP2000.