CIVE.5120 Structural Stability (3-0-3)

Syllabus

Spring 2017

Instructor:

Tzuyang Yu (Falmouth 107-C, ext.4-2288, Tzuyang_Yu@UML.EDU)

Tuesday 11:00 a.m.∼ 12:00 p.m. (or by appointment)

Teaching Assistant:

N/A

Time and Venue:

Tuesday 6:30 p.m.∼9:20 p.m., Olsen Hall 114

Prerequisite: MATH.2360 *Engineering Differential Equations*; CIVE.3500 *Structural Analysis I*

Course Description

This course provides a concise introduction to the principles and applications of structural stability for their practical use in the design of steel frame structures. Concepts of elastic and plastic theories are introduced. Stability problems of structural members including columns, beam-columns, rigid frames, and beams are studied. Approaches in evaluating stability problems, including energy and numerical methods, are also addressed.

Grading Policy

There will be three homework problem sets (10% for each) and two exams (35% for mid-term and 35% for final). All homework must be turned in on time. The late policy is stated as follows: (1) 25% reduction for "less than one day" late; (2) 50% reduction for "one to two days" late; and (3) 100% reduction for "more than two days" late.

Textbook and References

Textbook:

W.F. Chen and E.M. Liu (1987), *Structural Stability*, Pearson.

References:

S.P. Timoshenko and J.M. Gere (1961), *Theory of Elastic Stability*, McGraw-Hill.

T.V. Galambos and A.E. Surovek (2008), *Structural Stability of Steel: Concepts and Applications for Structural Engineers* , Wiley.

Schedule

Week	Date	Topics
1	01/17	Introduction; Stability in SDOF systems; Bifurcation approach vs. energy approach
2	01/24	Imperfection; Stability in MDOF systems; Buckling of columns – I
3	01/31	Buckling of columns – II
4	02/07	Buckling of beam-columns – I
5	02/14	Buckling of beam-columns – II
6	02/21	*Monday schedule*
7	02/28	Buckling of rigid frames – I
8	03/07	Buckling of rigid frames – II
9	03/14	*Spring break*
10	03/21	**Mid-term examination**
11	03/28	Buckling of beams – I
12	04/04	Buckling of beams – II
13	04/11	Buckling of rings, curved bars, and arches
14	04/18	Buckling of thin plates
15	04/25	Buckling of shells; Advanced topics
16	05/02	**Final examination**