Department of Engineering Technology & Surveying Engineering
ET 332 Course Outline

Title and Course Number: Applied Design of Structures I, ET 332

Credits/Contact hours: 4/5.5

Instructor: Sonya Cooper, ECIII Room 386, 646-3848, socooper@nmsu.edu

Textbooks:

1. George F. Limbrunner and Abi O. Aghayere, *Reinforced Concrete Design*, 6th Ed., Prentice Hall, 2007, ISBN: 0-13-118767-8.
2. Jack C. McCormac, Structural Steel Design, 4th Ed, ISBN 13: 978-0-13-221816-0; ISBN 10: 0-13-221816-X.

Course Description: Applications of the principles of statics and strength of materials to the design and analysis of basic structural elements such as tension members, beams, columns, slabs, and footings. This will be accomplished by use of classical and modern analysis and design techniques, discussions of the properties of materials used in these applications, and the use of codes for respective materials.

Prerequisites: ET 254, ET 310
Corequisite: MATH 236

Goals/Objectives: To introduce the student to basic methods of structural analysis and design of structural components. The primary objective is to expose students to intense code usage so that they will be able to read and interpret various codes required by industry. This course is weighted heavily in written communication requirements and design components to fulfill ABET requirements.

This required Technical Specialty course will help contribute to the goals of the overall program outcomes by giving a *preliminary* measure of:

- an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines
- an ability to design a system, component, or process to meet desired needs
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively

The following are formally assessed:

Ability to select and evaluate appropriate engineering materials and practices (ABET 9e); (measured by lab 3 (ability to select appropriate tension members); lab 5 (ability to select appropriate steel beams); lab 9 (ability to evaluate concrete and rebar contribution to retaining wall and footing strength)
Ability to apply basic technical concepts to the solution of civil problems involving structures and material behavior (ABET 9f) (Measured by Homework ("Bringing down the loads"), Homework (shear/moment diagrams), Homework (Euler), Homework (nominal moment)
Ability to performe standard analysis and design in structures (ABET 9g) (Measured by lab 2 (tension member analysis); lab 3 (tension member design); lab 5 (steel joist and beam design); lab 8 (reinforced concrete beam design); Test #2 problem (design of steel and concrete bay)

Specifics:

COURSE REQUIREMENTS AND POLICY:

A. *Homework & Notebooks* - Homework will be assigned every Monday and Wednesday and due the following class. Late homework will not be accepted. Full credit for homework will not be given unless the homework is prepared on engineering-type paper or computer generated, and the homework is neat and legible. Include a sketch of the problem, and a logical format required for the solution of engineering problems. Give the answer in the units presented in the problem. Late homework should still be attempted and placed in your notebook for partial credit, at the end of the course. An organized notebook must be maintained throughout the course.

B. *Tests* - There will be two tests and a final examination. The two tests will be given during lab times and will be 'open notes/open book'. The final examination will cover the last topics of the semester, i.e. it will not be comprehensive. No make-up exams will be given unless there is an authorized excused absence before the test date. The Health Center or appropriate department head must authorize excused absences.

C. *Attendance and Participation* – You are expected to attend **every** class. More than three absences will result in an administrative drop. Class time will be used for examples, questions and answers, prep for lab assignments, and discussion of situations relevant to topics discussed.

D. *Labs* – Lab time will be spent learning codes and computer software. The lab assignment will be given at the beginning of class and you will work on the assignment during lab time. Labs are due at the beginning of the following lab period. Labs will consist of a memo outlining the procedures for designing particular components, attached to your design calculations. Please double space memos. Refer to Attachment #1.

COURSE GRADE:

The final course letter grade will be based on performance in the following areas with approximate weights as indicated:

Participation	= 15%
Two Tests	= 25%
Homework	= 12.5%
Labs 7@5%	= 35%
Final Exam	= 12.5%

Course topics and tentative lecture hours (and lab if applicable) devoted to each topic:

1. Design Loads (3+L)

STEEL

2. Effective net area (3+L)
3. Rods and bars (1)
4. Tension design (2+L)
5. Introduction to Members in Compression-Columns (1)
6. Column analysis and design (3)
7. Introduction to Members in Bending -Simple Beams (1)
8. Beam Analysis and Design (4 +L)
9. Beam Analysis and Design-Composite (1+L)

CONCRETE

10. Beam moment (4+L)
11. Beam shear (2)
12. Beam deflection (1)
13. Walls (4+L)
14. Footings (3+L)
15. Prestressed concrete (2)
16. Formwork (2)