CONS 336 – STRUCTURAL ANALYSIS

A. **TITLE:** Structural Analysis

B. **COURSE NUMBER:** CONS 336

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** no

E. **COURSE LENGTH:** 15 Weeks

F. **SEMESTER(S) OFFERED:** Fall

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   2 – one hour lectures and 1 – 2 hour recitation per week

H. **CATALOG DESCRIPTION:**
The course analyzes statically determinate and indeterminate structures. Additional topics of influence lines, moving loads, member forces and stresses, deflections, flexibility and stiffness analyses are explored using computer applications.

I. **PRE-REQUISITES/CO-COURSES:**
a. Pre-requisites: C or better in CONS 272 (Strength of Materials for Technicians) or ENGS 203 (Engineering Strength of Materials; and MATH 162 (Calculus II)

J. **GOALS (STUDENT LEARNING OUTCOMES):**
Upon successful completion of this course, the student should be able to:

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<tr>
<th>Course Objective</th>
<th>Institutional ISO</th>
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<tr>
<td>a. Determine the dead and live loads to be considered for structural analysis.</td>
<td>3. Professional Competence</td>
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<td>b. Determine whether a structure is statically determinate or indeterminate.</td>
<td>3. Professional Competence</td>
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<td>c. Determine shear and moment functions and diagrams for beams and frames.</td>
<td>3. Professional Competence</td>
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<td>d. Determine the effect of moving loads on structures using influence lines.</td>
<td>3. Professional Competence</td>
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<td>e. Determine the forces and deflections of structural members and frameworks using various analytical techniques.</td>
<td>3. Professional Competence</td>
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<td>f. Employ computer programs for structural analyses.</td>
<td>3. Professional Competence</td>
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K. **TEXTS:**

L. **REFERENCES:**

M. **EQUIPMENT:** Technology enhanced classroom, Computer Laboratory

N. **GRADING METHOD:** A-F
O. **MEASUREMENT CRITERIA/METHODS:**
   - Exams
   - Projects
   - Homework

P. **DETAILED COURSE OUTLINE:**
   a. Types of Structures and Loads
   b. Statically Determinate Structures
      i. Determinacy and Stability
      ii. Truss Analysis
      iii. Shear and Moment Functions
      iv. Shear and Moment Diagrams for a Beam
      v. Shear and Moment Diagrams for a Frame
      vi. Influence Lines
      vii. Moving Loads
   c. Deflections
      i. Beam Theory
      ii. Geometric Methods
      iii. Energy Methods (optional)
   d. Statically Indeterminate Structures
      i. Approximate Analysis (optional)
      ii. Force Method
      iii. Displacement Method
      iv. Influence Lines (optional)
   e. Stiffness Method (optional)

Q. **LABORATORY OUTLINE:**