1. **Course number and name**  
   ENGR 432 Finite Element Methods in Structural and Continuum Mechanics

2. **Credits and contact hours**  
   3 credit hours; Two 1:15 minute lecture sessions/week.

3. **Instructor’s or course coordinator’s name**  
   Instructor: Dipendra K. Sinha, Professor

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

   **Other supplemental materials**  
   On Wildfire, ANSYS and Abaqus FEM packages.

5. **Specific course information**  
   a. **brief description of the content of the course (catalog description)**

   The fundamental concepts of the finite element method are presented and developed for one- and two-dimensional elements. Applications in the areas of structural analysis, plane stress and plane strain, and two-dimensional groundwater flow. Computer implementations of finite element techniques are emphasized.

   b. **prerequisites or co-requisites**
   
   Engr 309 Mechanics of Solids

   c. **indicate whether a required, elective, or selected elective course in the program**
   
   Elective for Civil and Mechanical Engineering students

6. **Specific goals for the course**  
   a. **specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**

   - To understand the concept of discretization of continuum
   - General steps in finite element method
   - Familiarity with FE formulations
   - Application of finite element method to stress analysis of truss, frame, grid, plate and shell. Fluid flow applications
   - Comparison of results. Effect of grid size. Comparison of FE solutions to Theoretical solutions

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

   Course addresses ABET Student Outcome(s): b,c,e,k

7. **Brief list of topics to be covered**  
   - Introduction. Chapter 1. Sections 1-1 to 1-6
Course Syllabus Engr 432 FEM in Structural and Continuum Mechanics

- Development of Truss Equations. Chapter 3.
- Symmetry, Bandwidth and their utilization in FEM solutions.
- Development of Beam equations. Chapter 4.
- Plane Frame and Grid Equations. Chapter 5
- Practical Considerations in Modeling. Chapter 7.
- Linear-Strain Triangle Equations. Chapter 8
- Isoparametric Formulations. Chapter 10.
- Industrial webinars on FEM analysis
- Use of Wildfire, ANSYS and Abaqus FEM packages.