I SY E 525, Linear Programming Methods

1. **Credits**: 3  
   **Contact Hours**: 2.5

2. **Textbook and Materials**: Linear Programming in MATLAB; Ferris, Mangasarian, Wright; 1st edition; No Year Given

3. **Other Supplemental Materials**: N/A

   - **Specific Course Information**:

     a. **Brief description of the content of the course (Course Catalog Description)**: Real linear algebra over polyhedral cones; theorems of the alternative for matrices. Formulation of linear programs. Duality theory and solvability. The simplex method and related methods for efficient computer solution. Perturbation and sensitivity analysis. Applications and extensions, such as game theory, linear economic models, and quadratic programming.

     b. **Pre-requisites or Co-requisites**: Math 443 or 320 or 340 or cons inst

     c. **This is a Elective course.**

   - **Specific Goals for the Course**:

     a. **Course Outcomes**:

     b. **ABET Student Learning Outcomes**:

        (a) Ability to apply mathematics, science and engineering principles.

        (b) Ability to design and conduct experiments, analyze and interpret data.

        (c) Ability to design a system, component, or process to meet desired needs.

        (d) Ability to function on multidisciplinary teams.

        (e) Ability to identify, formulate and solve engineering problems.

        (f) Understanding of professional and ethical responsibility.
(g) Ability to communicate effectively.
(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
(j) Knowledge of contemporary issues.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

**Brief List of Topics to be Covered:**

Linear Algebra: A Constructive Approach, The Simplex Method, Duality, Convexity and Polyhedral Sets, Large Scale Consumption, Sensitivity Analysis, Approximation, Quadratic Programming and Complementarity Problems