E C E 533, Image Processing

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

3. **Textbook and Materials :** Digital Image Processing; Gonzalez & Wood; 3rd; 2008

   a. **Other Supplemental Materials :** None

   • **Specific Course Information :**

   a. **Brief description of the content of the course (Course Catalog Description) :** Mathematical representation of continuous and digital images; models of image degradation; picture enhancement, restoration, segmentation, and coding; pattern recognition, tomography.

   b. **Pre-requisites or Co-requisites :** ECE 330 or cons inst; Math 320 or 340 or equiv

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

   • **Specific Goals for the Course :**

   a. **Course Outcomes :**

      1. Students will be able to Input a photograph, ultrasound, or other image into Matlab or Mathematica and to process that image in order to achieve a desired engineering goal such as denoising, deblurring, edge detection, corner locating, etc.

      2. Students learn how the various algorithms work and how they can be combined.

   • **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.
(e) Ability to identify, formulate and solve engineering problems.
(g) Ability to communicate effectively.
(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:**

  1. 2-D signals, systems, sampling and filtering
  2. Fundamentals of image formation, human visual systems
  3. Digital image enhancement, spatial domain, frequency domain
  4. Digital image restoration, inverse, least squares, Wiener filters, constrained least square filters
  5. Nonlinear 2D filtering: morphological operations
  6. Registration techniques, keypoints and features, super-resolution