

## **CE 489/589: Pavement Preservation and Rehabilitation**

### **Course Description:**

Overview of pavement preservation and pavement rehabilitation techniques. Overview and selection of materials used in pavement preservation and rehabilitation strategies. Evaluating suitability of pavement preservation and pavement rehabilitation strategies based on existing structure, pavement distresses and non-condition factors. Use of recycled pavement materials in pavement reconstruction techniques.

### **Course objectives (course designed to provide students with):**

1. A working knowledge of pavement preservation, rehabilitation and maintenance strategies.
2. Understanding of the effects of design, construction, maintenance and rehabilitation practices on subsequent pavement performance.
3. Understanding of the types of pavement preservation techniques and rehabilitation strategies.
4. Engineering judgement to determine the best course of action for preservation and rehabilitation strategies for pavements under a variety of circumstances (e.g. traffic, underlying pavement structure, materials).
5. Methodology for developing trigger values for preservation and rehabilitation techniques considering cost and other important factors.

### **Course Outcomes (students should be able to):**

1. Evaluate a pavement and determine its overall performance based on pavement condition data.
2. Apply knowledge of pavement condition to recommend various maintenance, preservation and rehabilitation strategies.
3. Evaluate the effects of construction variability and quality control on pavement performance.
4. Communicate the importance of preventative maintenance, pavement preservation techniques and rehabilitation strategies.
5. Use engineering design methods and engineering judgement in selection of pavement preservation, and rehabilitation techniques.

### **Course Topics**

- Introduction to Causes and Types of Pavement Distresses
- Introduction to Pavement Management, Preservation and Rehabilitation
- Pavement Evaluation Strategies
- Pavement Materials: Subgrade, Base Materials and Drainage

## Course Topics, continued

- Pavement Materials: Aggregates, Asphalt, Portland Cement Concrete (PCC)
- Pavement Materials: Emulsions, types, uses and modifications
- Pavement Preservation and Rehab Design Considerations: Traffic, Environmental, Windows of Opportunity, Traffic Control
- Pavement Management Strategies
- Pavement Management: Life cycle cost analysis- Methods & Examples
- Pavement Surface Characteristics
- Maintenance:
  - Roadway Pavement and Surface Preparation
  - Asphalt in Pavement Maintenance
  - Equipment used in Asphalt in Pavement Maintenance
- Preservation
  - Fog Seals
  - Slurry Seals
  - Chip Seal
  - Microsurfacing
  - Concrete Patching – Full and Partial Depth
- Maintenance of Rigid Pavements
  - Diamond Grinding of Rigid Pavement
  - Dowel-Bar Retrofit
- Pavement Assessment for Rehabilitation
- Rehabilitation
  - Rubbilization
  - Mill and Overlay
  - Heater Scarification
  - Thin HMA Overlays
  - Concrete Overlays
  - Hot In-place Recycling
  - Cold In-place Recycling
  - Full Depth Reclamation
  - Specialty Mixes and Surface Treatments
- Noise reducing surface treatments
- Selection of Preservation and Rehabilitation Strategies
- Best Practices
  - Timing, Planning and Construction
  - Evaluating Alternatives
- Specifications and Contracts