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Scope: Highway bridges are getting older but they are asked to support increased traffic and loads. At the same time economic resources for their maintenance, rehabilitation and reconstruction are getting harder to get. The objective of this course is to provide to the students information and tools for making the best decisions regarding the bridge network. A comprehensive systems approach to management of highway bridges is followed. Needs assessment, in-service monitoring and evaluation. Condition forecasting models and failure analysis. Life-cycle cost and benefit analysis, prioritization and optimization.

Evaluation: The grade of the course will be determined from various assignments and a final exam. The assignments will consist of short reports, traditional problems, and short presentations.

Format: The format of the course will be short presentations and a lot of discussions. Students will be expected to regularly present short reports.

Texts: No specific text is required. Notes and references will be provided as needed. The following can be considered as recommended. Many of them can be found online.


**Topics**

I. Introduction. Bridge management systems.

II. Bridge reliability methods. Introduction to optimization techniques, simulation and probabilistic methods for bridge management.

III. Analysis techniques for forecasting future condition of bridge elements. Markovian models for bridge maintenance and management.

IV. Inspection and condition rating.

V. Bridge assessment and evaluation.

VI. Bridge monitoring. Data collection methods.


VIII. Bridge maintenance strategies.

IX. Bridge deterioration processes including corrosion, degradation, fatigue, etc.

X. Information technology and integration with asset management. Database principles.

XI. PONTIS bridge management software. Virtis/Opis software for bridge design and rating.

XII. Special topics as needed.

The above list of topics is tentative and may be altered depending with the needs of the course.