COURSE OUTLINE
CONS 472- ADVANCED HIGHWAY DESIGN

Prepared By: Robert R. Blickwedehl
CONS 472- ADVANCED HIGHWAY DESIGN

A. **TITLE:** Advanced Highway Design

B. **COURSE NUMBER:** CONS 472

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 Weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   3 lecture hours per week

H. **CATALOG DESCRIPTION:**
   This course focuses on the design of pavements in consideration of subgrade conditions and anticipated traffic load and on drainage of roads to meet design storm conditions. Topics include thickness design of pavements, techniques for subgrade improvement, geotextiles, and design of culverts for design storm conditions.

I. **PRE-REQUISITES:**
   CONS 322 (Hydraulics), CONS 385 (Hydrology and Hydrogeology), CONS 216 (Soils in Construction), CONS 470 (Highways and Transportation)

J. **GOALS (STUDENT LEARNING OUTCOMES):**
   By the end of this course, the student will be able to:

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<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>a. Design a rigid pavement</td>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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<td>b. Design a flexible pavement</td>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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<td>c. Design the drainage system for a section of highway</td>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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<td>d. Design a roundabout intersection</td>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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<td>e. Determine maintenance and repair program priorities for limited resources</td>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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K. **TEXTS:**
   Text used in CONS 372 (Highways and Transportation)
L. REFERENCES:

M. EQUIPMENT: Technology enhanced classroom

N. GRADING METHOD: A-F

O. MEASUREMENT CRITERIA/METHODS:
• Exams
• Quizzes
• Research papers
• Homework

P. DETAILED COURSE OUTLINE:

I. Review of Highways and Transportations
   A. Geometric design of highways
   B. Pavement design

II. Pavement design
   A. Factors to consider in pavement design
   B. Stresses and strains in flexible pavements
   C. Methods of improve subgrades
   D. Rigid pavements
      1. Stresses and strains
      2. Dowel bars and expansion joints
   E. AASHTO Method of flexible pavement design
   F. PCA method of rigid pavement design
   G. Life cycle cost analysis of pavements

III. Highway drainage
   A. Sheet flow over pavements
   B. Design of gutters and swales
   C. Design of drainage inlets and storm sewers
   D. Design of culverts
   E. Design of subsurface drains

IV. Traffic
   A. Traffic growth forecasting
   B. Advanced signal timing
   C. Design of roundabouts

V. Highway planning
   A. Needs studies
   B. Sufficiency ratings
   C. Inspections
   D. Establishment of programming priorities

Q. LABORATORY OUTLINE:
   NA