STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
CONS472 – Advanced Highway Design

Created by: Robert Blickwedehl

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Canino School of Engineering Technology

Department: Construction and Civil Technologies

Semester/Year: Spring/2019

A. **TITLE**: Advanced Highway Design

B. **COURSE NUMBER:** CONS472

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 3 **per week**
 # Lab Hours: **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE 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.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

CONS 322 (Hydraulics), CONS 385 (Hydrology and Hydrogeology), CONS 216 (Soils in Construction), CONS 470 (Highways and Transportation)

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
a.Design a rigid pavement			2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	PS Subsets Subsets Subsets
b. Design a flexible pavement			2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	PS Subsets Subsets Subsets
c. Design the drainage system for a section of highway			2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	PS Subsets Subsets Subsets
d. Design a roundabout intersection			2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	PS Subsets Subsets Subsets
e. Determine maintenance and repair program priorities for limited resources			2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	PS Subsets Subsets Subsets
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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator

J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Text used in CONS 372 (Highways and Transportation)
Huang, Y.H. (2004) Pavement Analysis and Design, 2/E. Pearson.
Marek, M.M. (2009) Hydraulic Design Manual, Texas Department of Transportation. March 1, 2009. March 22, 2009 <http://onlinemanuals.txdot.gov/txdotmanuals/hyd/manual_notice.htm>

L. REFERENCES:

-- (2004) A Policy on Geometric Design of Highways and Streets, 5th Edition. American Association of State Highway and Transportation Officials

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A - F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams
HW
Design Projects

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. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐