

CE 476**Design of Pressurized Hydraulic System****3 Units**

USC | SONNY ASTANI DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

ABET Course Syllabus

Course Information, Textbook and Supplementary Materials

Design Kernel

Course Description: Application of hydraulic principles to the engineering design of hydraulic structure with pressurized flow, piping network, water hammer, surge suppression, pumps and turbines, manifold hydraulic design.

Design Kernel for: BSCE, BSCE-ENE, and BSENE

Prerequisites: CE 309 Fluid Mechanics ENE410 Fluid Mechanics

Co-Requisite: none

Required Textbook: Roberson, John A., John J. Cassidy and M. Hanif Chaudhry.
Hydraulic Engineering. 2nd ed. Wiley, 1998.

Reference: none

Topics Covered	Learning Outcomes
Analyzing and designing piping systems for steady flows	Students will have learned to: <ol style="list-style-type: none"> 1. Use hydraulic principles to design piping systems and networks 2. Design pipe transitions and anchor blocks 3. Design manifold hydraulic systems and outfall diffusers 4. Design flow measurement systems, orifices, Venturi meters
Analyzing and designing hydraulic systems for unsteady flows	<ol style="list-style-type: none"> 5. Perform water hammer analysis 6. Design surge protection system, surge tank air chambers
Analyzing and designing hydraulic machinery systems	<ol style="list-style-type: none"> 7. Use dimensionless numbers for turbomachine selection 8. Design pumps and turbines 9. Design pump operation in parallel or in series
Analyzing and choosing the most economic design	<ol style="list-style-type: none"> 10. Use net present worth, equivalent annual return, B/C ratio, and internal rate of return in economic analysis 11. Choose the most economical design of a hydraulic system

Lecture and Lab Schedule			
Lecture		Lab	
Sessions per Week	Duration per Session	Sessions per Week	Duration per Session
1	3 hours	n/a	

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**Relation of Course
Objectives to Program Outcomes**

The Civil Engineering program is designed to teach beyond the technical content of the curriculum and prepare the students to utilize what they learn in a professional setting.

This course does not contribute to the program outcomes.

Course Contribution to Program Outcomes (a-k)	✓ Key
N/A	

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Date: Fall 2014