MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 443: Turbomachinery (4) Elective

Course Description: (2019-20 Catalog)	Performance characteristics of various types for liquids and for gases. Criteria for proper selection of type and main dimensions. Cavitation criteria. Gas turbine cycles and performance. Two-dimensional cascades. Axial flow turbines and compressors. Centrifugal compressors and radial-inflow turbines. 4 lectures.
Prerequisite Courses:	ME 303, ME 350, ME 347, MATH 344
Prerequisites by Topic:	. Thermodynamic cycles . Isentropic processes of ideal gases . Compressible flow functions . Boundary layer development . Conservation theories for energy, momentum, moment of momentum . Vibration in rotating machinery
Textbook: **(and/or other required material)**	Fluid Mechanics with Engineering Applications, 10th Edition, E. J. Finnemore and J.B. Franzini, McGraw Hill, New York, New York, 2002
References:	The Design of High-Efficiency Turbomachinery and Gas Turbines, by D. G. Wilson. MIT Press 1984. Turbomachinery, Basic Theory and Applications, by Earl Logan, Marcel Dekker Inc., New York, 1993 Turbomachines, A Guide to Design, Selection and Theory, by O. E. Balje, John Wiley & Sons, 1981
Course Coordinator/Instructor:	Christopher C. Pascual, Professor of ME
Course Objectives:	The student will be able to: 1. Select the right type of pump, compressor or turbine for given operating conditions. 2. Comprehend the basic theories underlying the design of turbomachines. 3. Comprehend and compare mathematically reaction and vortex theories. 4. Interpret the language and some of the current efforts of turbomachinery manufacturers. 5. Design, build, and test an operational water turbine

Relationship of Course to Mechanical Engineering Student Outcomes:	SO 1: Mastered (M) SO 2: Mastered (M) SO 3: SO 4: SO 5: SO 6: Mastered (M) SO 7:
Topics Covered:	1. Non-dimensional Parameters 2. Basic Thermodynamics and Fluid Mechanics, Efficiencies 3. Pumps, Cavitation 4. Centrifugal Machines 5. Two-Dimensional Cascades 6. Axial-Flow Compressors, Fans 7. Radial-Inflow Turbines calculated result or function
Laboratory Projects:	Design, build, and test a water turbine
Class/Lab Schedule:	Four 50-minute lectures each week.

Contribution of Course to Meeting the Professional Component:	(a)College-level mathematics and basic sciences:	0 credits
	(b) Engineering Topics (Science and/or Design):	4 credits
	(c)General Education:	0 credits
	(d) Other:	0 credits

Prepared by: Chris Pascual **Date:** 07/02/20