



COURSE OUTLINE: ELR211 - FLUIDS & COMBUSTION

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	ELR211: FLUIDS & COMBUSTION
Program Number: Name	4104: INST CONTROL ENG TN
Department:	ELECT./INSTRUMENTATION PS
Semesters/Terms:	18F
Course Description:	This course includes the study of viscosity, pressure, temperature, gas laws, pressure at a depth, manometry, continuity equation, Bernoulli's equation, pitot tubes, orifice and venturi meters, laminar and turbulent flow, combustion and properties of steam.
Total Credits:	5
Hours/Week:	3
Total Hours:	45
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Essential Employability Skills (EES) addressed in this course:	<p>EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 3 Execute mathematical operations accurately.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	<p>Grade Definition Grade Point Equivalent</p> <p>A+ 90 - 100% 4.00</p> <p>A 80 - 89%</p> <p>B 70 - 79% 3.00</p> <p>C 60 - 69% 2.00</p> <p>D 50 - 59% 1.00</p> <p>F (Fail) 49% and below 0.00</p>



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CR (Credit) Credit for diploma requirements has been awarded.
 S Satisfactory achievement in field /clinical placement or non-graded subject area.
 U Unsatisfactory achievement in field/clinical placement or non-graded subject area.
 X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
 NR Grade not reported to Registrar's office.
 W Student has withdrawn from the course without academic penalty.

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
Define, express and relate the properties of fluids	Define the terms fluids and fluid mechanics - Derive units of force, energy and pressure in SI and English - Perform unit conversions - Select the appropriate significant figures - Define the tem density, weight density and specific gravity - Derive the relationship between mass density and weight density - Express pressure as equivalent liquid column - Differentiate between gauge pressure and absolute pressure - Explain the role of viscosity in fluid flow
Course Outcome 2	Learning Objectives for Course Outcome 2
Describe the behavior of fluids at rest	Discuss the different forms of fluid energy - Express the fluid energy as head - Derive the relationships between pressure and elevation - Measure fluid pressure using manometers and gauges - Calculate the forces acting on retaining walls and buoyant forces on bodies immersed in fluids
Course Outcome 3	Learning Objectives for Course Outcome 3
Apply the principles of mass conservation and energy conservation to fluids in motion	Derive and apply continuity equation to size the pipes - Apply the concept of energy conversation to write Bernoulli's equation - Recognize the limitations of Bernoulli's equation - Define Toricelli's theorem - Describe the working principles of variable head meters
Course Outcome 4	Learning Objectives for Course Outcome 4
Apply the principles of fluid mechanics to flow measurement	Identify hydraulic mechanics like pumps and turbines - Expand Bernoulli's equation to include the terms head added and head lost apply energy equation to solve practical problems - Calculate the power required to drive pumps - Derive general flow equation for variable head meter - Study a venturi meter in the laboratory - Calculate the velocity of flow using Pitot-static tube - Characterize laminar flow and turbulent flow - Compute frictional head loss - Calculate total losses and use this in the general energy equation
Course Outcome 5	Learning Objectives for Course Outcome 5
Describe the Products of Combustion	Define Combustion and its properties - Fuels



		<ul style="list-style-type: none"> - Molecular structure of fuels - Write balanced Combustion equations - Describe Stoichiometric Ratio - Describe heating Value of Fuels 	
	Course Outcome 6	Learning Objectives for Course Outcome 6	
	Describe Flue gases and Flue gases Analyses	Describe the products of Combustion - Boiler efficiency and Excess Air	
Evaluation Process and Grading System:	Evaluation Type	Evaluation Weight	Course Outcome Assessed
	Assingments and quizzes	10%	
	Labs	20%	
	Written Tests	70%	
Date:	August 20, 2018		
	Please refer to the course outline addendum on the Learning Management System for further information.		