COURSE OUTLINE: ELR211 - FLUIDS & COMBUSTION

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Course Code: Title	ELR211: FLUIDS & COMBUSTION
Program Number: Name	
Department:	ELECT./INSTRUMENTATION PS
Semesters/Terms:	21F
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:	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. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2021-2022 academic year.

A+ 90 - 100% 4.00
A 80 - 89%
B 70 - 79% 3.00
C 60 - 69% 2.00
D 50 - 59% 1.00
F (Fail)49% and below 0.00

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 - 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
Assingments and quizes	10%
Labs	20%
Written Tests	70%

Date: July 30, 2021

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.