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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MECH 241 – FLUID MECHANICS

Created by: Dr. Lucas Craig

Updated by:

Canino School of Engineering Technology !

Department: MET

Semester/Year: Spring 2019

A. **TITLE**: Fluid Mechanics

B. **COURSE NUMBER:** MECH 241

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 develops a basic knowledge of fluids under static and dynamic applications. Properties of fluids, pressure, fluid statics, Bernoulli's and the energy equation are explored in respect to applications in the mechanical industry. Flow rate, pipe sizing, and minor losses in piping systems are addressed.

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

MATH 123
PHYS 121
PHYS 125

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***	
Define and analyze hydrostatic forces.	6		2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
Define and analyze the ideal gas law.	6		2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
Determine horsepower and efficiency for pumps and fans.	6		2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
Size pipes, pumps, motors, cylinders, fans, ducts and accumulators.	6,7		2-Crit Think 1-Comm Skills ISLO	PS W Subsets Subsets
Determine Reynolds number and differentiate between laminar and turbulent flow. Use Darcy's equation to calculate the friction losses of pipes and fittings.	6		2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
Manipulate Pascal and Bernoulli's laws to solve basic fluid mechanic problems.	6		2-Crit Think ISLO 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	☐ Civic Engagement
☐ Internship	☐ Creative Works/Senior Project
☐ Clinical Placement	☐ Research
☐ Practicum	☐ Entrepreneurship (program, class, project)
☐ Service Learning	
☐ Community Service	

K. TEXTS:

Cengel, Yunus A. and Cimbala, John M., Fluid Mechanics 3e , McGraw-Hill 2014., ISBN: 9780073380322.

Or

Mott, R. Applied Fluid Mechanics (7th Edition). New York: Prentice Hall, 2014.

L. REFERENCES:

N/A

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Homework	**25%**
Exams (3)	**60%**
Final Exam / Project	**15%**

P. DETAILED COURSE OUTLINE:

I. Intro to Fluid Mechanics
- **A. Fluid as a liquid or gas**
- **B. Power vs. Transportation systems**
- **C. Pascal's, Bernoulli's law (introduced)**

II. Properties of Fluids
- **A. Weight, Density, and Specific Gravity**
- **B. Force, Pressure, and Head**
- **C. Pascal's Law**
- **D. Bulk Modulus**
- **E. Viscosity**

III. Energy and Forces
- **A. Review Mechanics**

B. Pressures in liquids at rest
C. Atmospheric Pressure
D. Manometers
E. Forces on plane surfaces
F. Forces on inclined surfaces
G. Buoyancy
H. Bernoulli's Equations applications

IV. Sizing pipes and ducts

A. Flow Rate
B. Laminar flow and Turbulent flow
C. Losses due to valves and fittings
D. Compressible and Incompressible Flow

V. Pump Sizing

A. Pumps
B. Motors
C. Horsepower and Efficiency
D. Sizing Hydraulic Cylinders

VI. Air Handling Systems

A. Sizing Fans
B. Velocity and Pressure Measurement

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