MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
CIVL 317 – FLUID MECHANICS LAB

Created by: Joseph Reilly
Updated by: Adrienne C. Rygel

Canino School of Engineering Technology
Department: Civil and Construction Technologies
Semester/Year: Fall 2021
A. **TITLE**: Fluid Mechanics Lab

B. **COURSE NUMBER**: CIVL 317

C. **CREDIT HOURS**: 1 credit hour(s) per week for 15 weeks

- [ ] One hour (50 minutes) of lecture per week
- [x] Two to three hours of lab or clinical per week 2 hr lab
- [ ] Two hours of recitation per week
- [ ] 40 hours of internship

D. **WRITING INTENSIVE COURSE**: Yes [ ] No [x]

E. **GER CATEGORY**: None: [x] Yes: GER

*If course satisfies more than one: GER*

F. **SEMESTER(S) OFFERED**: Fall [x] Spring [ ] Fall & Spring [ ]

G. **COURSE DESCRIPTION**:  
This laboratory course will provide experiential supplements to the Fluid Mechanics I lecture ENG 315; and experiential and computational activities which will demonstrate and investigate practical applications of fluid mechanics theories in the Civil Engineering realm.

H. **PRE-REQUISITES**: None [ ] Yes [x] If yes, list below:

ENGS 315 Fluid Mechanics I

**CO-REQUISITES**: None [ ] Yes [x] If yes, list below:

ENGS 315 Fluid Mechanics I
I. **STUDENT LEARNING OUTCOMES**: *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
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</thead>
<tbody>
<tr>
<td>Solve for resultant force and center of pressure on a submerged surface</td>
<td>2488 - SO 1, SO4 517 - SO 1, SO4</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<tr>
<td>Employ Bernoulli Energy Equation to solve for head, pressure or velocity for various fluid systems</td>
<td>2488 - SO 1, SO4 517 - SO 1, SO4</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>Determine the head loss due to friction in a piping system</td>
<td>2488 - SO 1, SO4 517 - SO 1 SO4</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<tr>
<td>Compute the velocity and discharge in piping system systems</td>
<td>2488 - SO 1 517 - SO 1</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>Compute the coefficient of discharge for flow devices such as venturi, weir and orifice.</td>
<td>2488 - SO1, SO4 517 - SO1, SO4</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>Calculate discharge in open channels.</td>
<td>2488 - SO1, SO4 517 - SO1, SO4</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>Task</td>
<td>Course Code</td>
<td>Competencies</td>
<td>Subsets</td>
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<td>Design small sanitary or storm sewer system.</td>
<td>2488 - SO2</td>
<td>2-Crit Think</td>
<td>PS</td>
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<td>517 - SO2</td>
<td>ISLO</td>
<td>Subsets</td>
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<tr>
<td>Prepare a standard report.</td>
<td>2488 - SO3</td>
<td>1-Comm Skills</td>
<td>W</td>
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<td>517 - SO3</td>
<td>ISLO</td>
<td>Subsets</td>
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<tr>
<td>Function effectively as a team member.</td>
<td>2488 - SO5</td>
<td>4-Soc Respons</td>
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<td>517 - SO5</td>
<td>ISLO</td>
<td>Subsets</td>
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<td>Subsets</td>
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<tr>
<td>KEY</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<tr>
<td>ISLO #</td>
<td>ISLO &amp; Subsets</td>
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</tbody>
</table>
| 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
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service

☐ Civic Engagement
☐ Creative Works/Senior Project
☐ Research
☐ Entrepreneurship

(program, class, project)
K. **TEXTS:**

CIVL 317 Laboratory Manual, SUNY Canton

L. **REFERENCES:**

The text used in ENGS 315 will serve as reference.


M. **EQUIPMENT:** None ☐ Needed: flow meters, weir, venturi meter, Bernoulli's Theorem apparatus, orifice and mouthpiece apparatus, reolnds apparatus, and other flow related equipment, computer lab with hydraulic related software (e.g. civil 3D hydraflow hydrograph, ArcGIS Hydrogeology toolset)

N. **GRADING METHOD:** A - F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Computational Assignments, Lab Reports, Quizzes.

P. **DETAILED COURSE OUTLINE:**

N/A Lab course

Q. **LABORATORY OUTLINE:** None ☐ Yes ☑

Lab Topic (Order may vary)
1 Specific weight and density of water
2 Buoyancy
3 Piezometers and manometers
4 Resultant force from pressure on a vertical surface
5 Resultant force from pressure on an inclined surface
6 Friction/head loss in a pipe
7 Calibration of a venturi meter
8 Calibration of sharp crested weirs
9 Pump Selection
10 Toricelli’s Theorem
11 Pipe system design
12 Computer Assisted Hydraulic Design (StormCad or Civil 3D)
13 Flow measurement in a natural stream
14 Operation of Hydraulic Devices