

COURSE SYLLABUS

1. General Information:

Alpha-numeric codification: INGE 4016 (GEEG 4016).
Course Title: Fluid Mechanics Laboratory
Number of credits: 1 (25% of GEEG 4010)
Contact Period: Three contact hours of laboratory per week

2. Course Description:

English: Laboratory work supplementing classroom instruction in mechanics of fluid phenomena, measuring devices and techniques, and the testing of fluid machinery.

Spanish: El trabajo de laboratorio suplementa la instrucción en clase sobre mecánica de los fenómenos de los fluidos, aparatos de mediciones y técnicas, y el ensayo de las máquinas para fluidos.

3. Pre/Co-requisites and other requirements:

INGE 4015

4. Course Objectives:

The Fluid Mechanics Laboratory aims at the following educational objectives:

- Experimentation, observation, simulation and analysis of fluid phenomena.
- Training students in measurements of the physical properties of fluids.
- Provide experience in collection, analysis, interpretation, and presentation of experimental data, precision analysis and equipment limitations.

After completing the course, the student should be able to explain the operation of flow and pressure measurement devices, use basic instrumentation for fluids applications and organize and present experimental reports.

5. Instructional Strategies:

- | | | | |
|---|--|--|--|
| <input checked="" type="checkbox"/> Conference | <input checked="" type="checkbox"/> Discussion | <input type="checkbox"/> Computation | <input checked="" type="checkbox"/> Laboratory |
| <input type="checkbox"/> Seminar with formal presentation | | <input type="checkbox"/> Seminar without formal presentation | |
| <input type="checkbox"/> Workshop | <input type="checkbox"/> Art workshop | <input type="checkbox"/> Practice | <input type="checkbox"/> Trip |
| <input type="checkbox"/> Thesis | <input type="checkbox"/> Special problems | <input type="checkbox"/> Tutoring | <input type="checkbox"/> Research |
| <input type="checkbox"/> Other, please specify: | | | |

6. Minimum or Required Resources Available:

Fluid Mechanics laboratory equipped with appropriate equipment for demonstrations or experiments of physical phenomena in Fluid Mechanics. For online lectures a laptop with camera and access to High Speed Internet are needed.

7. Course time frame and thematic outline:

Outline	Contact Hours
• Introduction: Safety in the Laboratory. The Scientific Method	3
• Error analysis and uncertainty in experimental measurements	3
• Viscosity	3
• Obstruction and Variable Area Flowmeters: Venturi, Orifice and Rotameters	3
• Jet Impact	3
• Friction in Closed Conduits	3
• Boundary Layer Flow	3
• Drag Forces	3
• Turbines	3
• Sharp crested weirs and Hydraulic Jump/ Compressible flow	3
• Pumps	3
• Computational Fluid Dynamics	9
• Q&A and review	3
Laboratory Total hours: (equivalent to contact period)	45

8. Grading System:

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies:

	Quantity	Percent
<input type="checkbox"/> Exams		
<input type="checkbox"/> Final Exam	Variable	0 to 20
<input type="checkbox"/> Short Quizzes	6 - 10	30 - 45
<input type="checkbox"/> Oral Reports	Variable	0 to 10
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects (Laboratory reports)	6 to 11	45 - 60
X Other, specify: Attendance and Participation		5 - 10
TOTAL:		100%

10. Bibliography:

Laboratory Manual:

- Manual de Laboratorio Mecánica de los Fluidos: Teoría y Procedimientos, Silva, W.F., First Ed., John Wiley & Sons, 2005.

Additional References:

- Fluid Mechanics, White, F.M., McGraw Hill, 8th ed., 2015.
- Fundamentals of Fluid Mechanics, Munson B.R., Rothmayer A.P., Okiishi T.H., and Huesbsch, 7th Ed, John Wiley & Sons, 2012.
- Introduction to Fluid Mechanics, Fox R. W., Pritchard, P. J. and McDonald, A. T. 8th Ed, John Wiley & Sons Inc, 2011.

11. Reasonable Accommodation (Law 51):

The University of Puerto Rico at Mayagüez (RUM) recognizes that each student has an inherited right to request reasonable accommodation according to Law 51: Law for Integral Educational Services for People with Disabilities. Every student has the right to receive reasonable accommodation if he/she presents the necessary evidence to be evaluated by the Office of Services to Students with Disabilities (OSEI-RUM), and the related information can be found at the following link: <https://www.uprm.edu/cms/index.php/page/85>. If your case is approved by OSEI-RUM, you will receive reasonable accommodation in your courses and evaluation, and you must contact each professor for course registered. For additional information contact OSEI-RUM at Sánchez Hidalgo 410 or via telephone 787-832-4040 extension 3107.

12. Academic Integrity:

The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.—.

13. Policy Against Discrimination Based on Sex, Sexual Orientation, and Gender Identity:

The University of Puerto Rico prohibits discrimination based on sex, sexual orientation, and gender identity in any of its forms, including that of sexual harassment. According to the Institutional Policy Against Sexual Harassment at the University of Puerto Rico, Certification Num. 130, 2014-2015 from the Board of Governors, any student subjected to acts constituting sexual harassment, may turn to the Office of the Student Ombudsperson, the Office of the Dean of Students, and/or the Coordinator of the Office of Compliance with Title IX for an orientation and/or formal complaint.

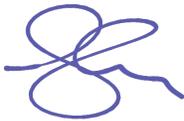
14. Sexual Harassment: Certification 130-2014-2015 states:

Sexual harassment in the workplace and in the study environment is an illegal and discriminatory act and is against the best interests of the University of Puerto Rico. All persons who understand they have been subject to acts of sexual harassment at the University of Puerto Rico may file a complaint and request that the institution investigate, where necessary, and assume the corresponding action by the university authorities. If the complainant is a student, he or she must refer his or her complaint to the Office of the Student Ombudsperson or that of the Dean of Students.

15. Certification 06-43 of the Academic Senate states, "The academic guidelines for offering online courses," defines:

Traditional face-to-face courses are those that have less than 25% of the course's regular contact hours via the Internet. Therefore, a three-credit course will be considered "face to face" if, of the 45 hours of regular contact, 11 or less are taught via the Internet. According to certification 16-43 of the Academic Senate, a course may include up to 25% of its total contact hours via the Internet. The objective of this is so that all professors have this alternative in the case of any unscheduled eventuality.

Revised by:



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Approved by:



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