COURSE NAME

Name: **HYDRAULIC ENGINEERING**
Code: 101136
Curriculum: **DEGREE IN CIVIL ENGINEERING** Year: 1
Name of the module to which it belongs: COMMON MODULE FOR THE CIVIL BRANCH
Subject: HYDRAULIC ENGINEERING
Nature: COMPULSORY Duration: SECOND SEMESTER
ECTS Credits: 6 Classroom hours: 60
Face-to-face classroom percentage: 40% Non-contact hours: 90
Online platform: http://moodle.uco.es/m1516/course/view.php?id=2345

FACULTY DETAILS

Name: GARCIA MORILLO, JORGE (Coordinator)
Centre: EPSB
Department: AGRONOMY area: HYDRAULIC ENGINEERING
Location of the office: EPSB
E-mail: g62gamoj@uco.es Phone number: 957212243 / 957213041

SKILLS

CB1	Have and understand specific knowledge of the study area of the Degree that gives skills for the exercise of the profession of Technical Civil Engineering.
CB2	Have and understand updated and cutting-edge knowledge related to the field of study of the degree of Technical Civil Engineering.
CB3	Be able to apply the knowledge acquired to their work or vocation in a professional manner. Prepare and defend arguments in the relevant knowledge area.
CB7	Have the necessary learning skills to undertake studies with a high level of autonomy.
CEC7	Knowledge of the technical aspects and concepts related to duct systems, both under pressure and in free nappe.
CEC8	Knowledge of basic concepts of surface and underground hydrology.

OBJECTIVES

Students should be able to:

1. Know and understand the fundamental principles and laws, basic concepts and working methods of Fluid Mechanics.

2. Know and understand the movement of water through pressure ducts (pipes), and in open pipes (movement under free regime or open channels).

CONTENTS:

1. Theoretical contents

BLOCK 1. INTRODUCTION TO HYDRAULICS.

Unit 1. Introduction.

1.1. Water resources: the hydrologic system.
1.2. Hydraulics and Hydrology: concept and evolution.
1.3. Course context. Applications

Unit 2. Water: units of measurement and properties.

2.1. Variables and units of measurement.
2.2. Water. Properties of fluids.

Unit 3. Main equation of fluid statics.
- 3.1. Previous concepts.
- 3.2. Main equation of hydrostatics.
- 3.3. Static balance of heavy fluids.
- 3.4. Pascal's theorem.
- 3.5. Measurement of pressure.
- 3.6. Problem solving.

Unit 4. Thrust on underwater surfaces.
- 4.1. Thrust on plane surfaces.
- 4.2. Thrust on warped surfaces.
- 4.3. Archimedes' principle.
- 4.4. Stability of fully underwater bodies.
- 4.5. .

Unit 5. Fundamentals of Kinematics. Equation of continuity.
- 5.1. Previous concepts.
- 5.2. Representation of movement of fluids.
- 5.3. Lines and surfaces of currents. Limits.
- 5.4. Acceleration. Modalities of movement.
- 5.5. Discharge.
- 5.6. Conservation of matter.

Unit 6. Fundamentals of fluid dynamics.
- 6.1. Previous concepts.
- 6.2. Forms of energy equations.
- 6.3. Monodimensional method for analysis of liquid currents.
- 6.4. Extension of the Bernoulli's theorem.
- 6.5. Problem solving.

Unit 7. Dynamics of real liquids.
- 7.1. Introduction.
- 7.2. Laminar and turbulent flow of a current.
- 7.3. Sheet uniform flows in pipes FREE FLOWS.

Unit 8. Charging flows.
- 8.1. Introduction.
- 8.2. Uniform flows in pipes
- 8.3. Charging conduction systems.
- 8.4. Problem solving.

Unit 9. Free flows.
- 9.1. Introduction.
- 9.2. Uniform movement.
- 9.3. Calculation of sections.
- 9.4. Capacity curves.

Unit 10. Hydrometry.
- 10.1. Introduction.
- 10.2. Measurement of the speed of a liquid current.
- 10.3. Expense relations in gauging devices

2. Practical contents.

1. Problem solving.

2. Deliverable exercises.