| Teaching Guide | | | | |
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| Identifying Data | | | | 2018/19 |
| Subject (*) | Experimental hydraulics I | | Code | 632844204 |
| Study programme | Mestrado Universitario en Enxeñaría da Auga (plan 2012) | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 1st four-month period | First | Optional | 6 |
| Language | English | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | ComputaciónEnxeñaría Civil | | | |
| Coordinador | Rabuñal Dopico, Juan Ramon | E-mail | juan.rabunal@udc.es | |
| Lecturers | Rabuñal Dopico, Juan Ramon<br>Vázquez González, Ana María | E-mail | juan.rabunal@udc.es<br>ana.maria.vazquez@udc.es | |
| Web | http://caminos.udc.es/info/asignaturas/201/masterindex.html | | | |
| General description | Introduction to experimental hydraulics. Scale models. Hydrometry. Continuous of control crosssections. Experimental field techniques. Instrumentation and control of water treatment processes. Tests to obtain design parameters. Know and understand the design and construction of scale models of hydraulic structures. Understand the different techniques of measurements of physical parameters (pressure, temperature, speed, etc..). Knowledge and practices with computer systems, electronic devices and hydraulic data acquisition systems (monitoring and control of a river basin, hydraulic experiments...). | | | |

| Study programme competences | |
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| Code | Study programme competences |
| A13 | Knowledge of the experimental technics applied to the water engineering. Capacity to design experiments. Capacity to develop reduced models in the laboratory. Capacity to use different types of experimental instrumentation, including flowmeter, depth probes, three-dimensional speedometer, limnimeter, windlass.. |
| A14 | Knowledge and understanding for design and construction of scale-models of hydraulic structures. Understanding of different technics that exist in the measurement of physical conditions (pressure, temperature, speed?) in the field of hydraulic knowledge of computing systems and electronic control and the acquisition of hydraulic data (monitoring and control of the river basin, hydraulic circuit, etc) |
| A20 | Use and management of measuring equipment in the field and in the laboratory. Knowledge of the methodology of control process and the determination of design parameters for water treatment processes |
| B1 | To resolve problems effectively |
| B2 | To apply critical thinking, logic and creativity |
| B3 | To work individually with initiative |
| B4 | To communicate effectively in work surroundings |
| B5 | Continuous recycling of knowledge in a general perspective in a global situation of water engineering |
| B6 | Understanding of the need to analyse history to understand the present |
| B7 | Facility to integrate in multidiscipline teams |
| B8 | Capacity to organize and plan |
| B9 | Capacity for analysis, synthesis and structure of information and ideas |
| C1 | To understand the importance of the enterprising culture and to know the means at the reach of the enterprising people |
| C2 | To value knowledge critically, technology and available information to resolve problems that they will face |
| C3 | To assume as a professional and citizen the importance of learning throughout life |
| C4 | To value the importance of the investigation, innovation and technology development in the social ?economic advance and cultural in society |
| C5 | To posses and understand knowledge that gives a base or oportunity to be original in the development and for applications of ideas, often in the context of investigation |
| C6 | The students must be able to apply the acquired knowledge and their capacity to resolve problems in new surrandings or not well known within wider contexts (or multidiscipline) related with the study area |

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| C7 | The students must be able to integrate knowledge and to affront the complexity to formulate judgements from information that, been incomplete or limited, include reflexions about social responsabilities and ethics related to the application of the knowledge and judments |
| C8 | The students must be able to comunicate their conclusions, knowledge and the last reasons that support them, to spezialated publics and not spezialated in a clear and unambiguous way. |
| C9 | The student must possess the learning ability with permits them to continues to study in a manner wich will be in a great measure self directed and individual |

| Learning outcomes | | | |
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| Learning outcomes | Study programme competences | | |
| Be able to perform tests and experimentation in the field of hydraulics and water quality | AC13<br>AC14<br>AC20 | BC1<br>BC2<br>BC3<br>BC4<br>BC5<br>BC6<br>BC7<br>BC8<br>BC9 | CC1<br>CC2<br>CC3<br>CC4<br>CC5<br>CC6<br>CC7<br>CC8<br>CC9 |

| Contents | |
|---|---|
| Topic | Sub-topic |
| 1. Introduction | 1.1 Introduction to testing and experimentation in hydraulics |
| 2. Continuous of control crosssections | 2.1 Experimental field techniques. |
| 3. Hydrometry. Techniques for measuring and recording water parameters (level, flow, speed, etc..). | 3.1 Instrumentation Systems (sensors, actuators)<br>3.2 Control Modules (PLCs, data acquisition)<br>3.3 Data Transmission Systems |

| Planning | | | | |
|---|---|---|---|---|
| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
| Guest lecture / keynote speech | A14 B1 B2 B4 B5 B6 B8 B9 C1 C2 C3 C4 C5 C6 C7 C8 C9 | 20 | 20 | 40 |
| Laboratory practice | A13 A14 A20 B1 B2 B3 B4 B7 B8 B9 C2 | 20 | 20 | 40 |
| Objective test | A13 A14 B1 B2 B5 B6 B9 | 2 | 8 | 10 |
| Seminar | A13 A14 A20 B1 B2 B3 B5 | 15 | 15 | 30 |
| Personalized attention | | 30 | 0 | 30 |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | | |

| Methodologies | |
|---|---|
| Methodologies | Description |
| Guest lecture / keynote speech | Regular lectures where the main theoretical contents of the subjects are regarded |
| Laboratory practice | Practical experiments related to the theoretical aspects regarded at the magistral lectures |
| Objective test | Final Exam |
| Seminar | Personalized attention to be provided for the semminars |

| Personalized attention | |
|---|---|
| **Methodologies** | **Description** |
| Guest lecture / keynote speech<br>Objective test<br>Seminar<br>Laboratory practice | Personalized attention to be provided for the semminars |

| Assessment | | | |
|---|---|---|---|
| **Methodologies** | **Competencies** | **Description** | **Qualification** |
| Guest lecture / keynote speech | A14 B1 B2 B4 B5 B6 B8 B9 C1 C2 C3 C4 C5 C6 C7 C8 C9 | Attendance | 10 |
| Objective test | A13 A14 B1 B2 B5 B6 B9 | The knowledge of the concepts developed at the magistral lectures will be assesed and considered for the final mark | 30 |
| Seminar | A13 A14 A20 B1 B2 B3 B5 | Optional | 10 |
| Laboratory practice | A13 A14 A20 B1 B2 B3 B4 B7 B8 B9 C2 | The attendance to the seminars and the work developed will be considered for the final mark | 50 |

| Assessment comments |
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| Sources of information | |
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| **Basic** | - Reginald W Herschy (1999). Hydrometry : principles and practices.. John Wiley &Sons<br>- Jacob Millman, Arvin Grabel (1998). Microelectronics: Digital and Analog Circuits and Systems. McGraw Hill Higher Education<br>- Puertas Agudo, Jerónimo, Sánchez Juny, Martí (2006). Hidráulica. Universidade da Coruña<br>- Pallás, R. (1998). Sensores y acondicionadores de señal. Barcelona. Marcombo |
| **Complementary** | |

| Recommendations |
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| **Subjects that it is recommended to have taken before** |
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| **Subjects that are recommended to be taken simultaneously** |
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| **Subjects that continue the syllabus** |
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| **Other comments** |
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**(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.**