Universidad Zaragoza

Academic Year/course: 2022/23

60565 - Water resources and hydraulic facilities

Syllabus Information

Academic Year: 2022/23
Subject: 60565 - Water resources and hydraulic facilities
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 546 - Master in Agricultural Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Compulsory
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is focused on applied technology and it favors the acquisition of skills needed in professional practice.

The theoretical contents are taught with the support of ppt, animations, interactive examples, and encouraging the active participation of students and the incorporation of their own experience. Practical contents of the course consist on practical examples using computer tools provided in the course.

4.2. Learning tasks

The course includes the following learning tasks:

- Lectures (30 hours).
- Exercises and case studies (20 hours).
- Computer laboratory practice sessions (10 hours).
- Optional homework projects: numerical integration of flow equations, sustainability of irrigation demands, proposed exercises (24 hours)
- Study (60 hours).
- Assessment (6 hours).

Regarding the Agenda 2030, in lectures, exercises, práctical cases, and laboratory and computer activities, contents aligned with the SDG 6. Additionally, students will develop and be evaluated of skills associated with the goals 6.3 and 6.4 in voluntary work.

4.3. Syllabus

The course will address the following topics:

Theory

- C1 Fundamentals of Hydrodynamic Transport
- C2 Free surface flows
- C3 Channel regulation
- C4. Free surface Irrigation
- C5 Transients in networks
- C6 Hydrological Cycle
- C7 Surface hydrology. Precipitation
- C8 Flood hydrographs
- C9 Underground hydrology. Wells characterization

Practice

- P1 Surface Flow steady
- P2 Surface Flow Transient I
- P3 Surface Flow Transient II
- P4 Surface irrigation
- P5 Water hammer

Theoretical classes consist of expository and demonstrative sessions of theoretical content and are supported by printed material that students will have in advance on which to make annotations and keep as technical documentation.

The practical classes of exercises are developed through examples of solving typical problems for each case, accessible with ordinary calculation tools.

The laboratory and computer sessions are based on the learning of professional tools for solving real cases. These practical sessions take place from the seventh week.

4.4. Course planning and calendar

The following table shows the weekly organization proposed for this course, which is divided into topics (identified as contents C1, C2, ...). For each of them, it is specified the hours of theory, exercises, practice (all in sessions of 2h), assessment (6h), and homework hours for study and exercices.

Week	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
T1 Theory	C1	C1	C2	C2	C2	C3	C3	C4	C4	C5	C6	C7	C8	C9	C9
T2 Exercises	C1	C1	C2	C2	C2	C3						C7	C8	C9	C9
T3 Comp Lab							P1	P2	P3	P4	P5				
T6 Homework				2h	2h	2h	2h	2h	2h	2h	2h	2h	2h	2h	2h
T7 Study	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h	4h
T8 Assessment															

4.5. Bibliography and recommended resources

BB Chow, Ven Te. Hidrología aplicada / Ven Te Chow, David R. Maidment, Larry W. Mays ; traducción Juan G. Saldarriaga ; revisión técnica Germán R. Santos G. Santafé de Bogotá ; Madrid : McGraw-Hill, imp. 1999

BB French, Richard H. Hidraúlica de canales abiertos / Richard H. French ; traducción M.I. Ariel Fredman ; revisión técnica Jorge Esteban Athala Molano. México McGraw-Hill cop. 1988

BB Gurovich R., Luis A. Riego superficial tecnificado / Luis A. Gurovich R. 2ª ed. México : Alfaomega, cop. 1999

BB Muñoz Carpena, Rafael. Hidrología agroforestal / Rafael Muñoz Carpena, Axel Ritter Rodríguez. Madrid : Mundi-Prensa ; Las Palmas de Gran Canaria : Gobierno de Canarias, Dirección General de Universidades e Investigación, 2005

BB Transitorios y oscilaciones en sistemas hidráulicos a presión / editores José M. Abreu, Rafael Guarga, Joaquín Izquierdo. Valencia : Universidad Politécnica, Unidad Docente Mecánica de Fluidos, D.L. 1995

BC Abbott, Michael Barry. Computational hydraulics / Michael B. Abbott, Anthony W. Minns. [2nd ed.] Aldershot : Ashgate, 1998

BC Discharge characteristics / edited by D.S. Miller. Rotterdam [etc.] : A.A. Balkema, 1994

BC Energy dissipators / edited by D.L. Vischer and W.H. Hager. Rotterdam, [etc.] : A.A. Balkema, 1995

BC Fried, Erwin. Flow resistance : a design guide for engineers / Erwin Fried, I.E. Idelchik. New York [etc.] : Hemisphere Publishing Corporation, cop. 1989

BC Miller, D.S. Internal flow systems / D.S. Miller. 2nd ed. Bedford, UK : BHR, 1996

BC Naudascher, Eduard. Hydrodynamic forces / Eduard Naudascher. Rotterdam, [etc.] : A.A. Balkema, 1991

BC Wylie, E. Benjamin. Fluid transients in systems / by E. Benjamin Wylie and Victor L. Streeter ; with Lisheng Suo. Englewood Cliffs, NJ : Prentice Hall, cop. 1993

The updated recommended bibliography can be consulted in:http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=60565