COURSE GUIDE: 2013-14

COURSE DETAILS

Name :	Fluid Mechanics Engineering		
Code :	44102201	Plan :	Degree in Industrial Chemical Engineering Degree in Mechanical Engineering Degree in Industrial Electronics Engineering
Academic year :	2013-14	Level :	Bachelor Degree
Course :	2	Type :	Compulsory
Semester :	2		

TIME DISTRIBUTION IN ACCORDANCE WITH REGULATION

ECTS :	6	In-class hours:	45
		Not in-class hours:	105
		Total time (in hours):	150
USE OF VIRTUAL PLATFORM:			B-Learning

LECTURER DETAILS

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ACTIVITIES ORGANIZATION

Planned activities for learning and workload distribution per activity (in hours)

I. STUDENT'S ACTIVITIES (In-class / Online)	• Seminars [Example]	4,0
	• Teaching group [Example]	22,0
	• Work group / small group [Example]	19,0
	Total In-class/Online time :	45,0
II. STUDENT'S AUTONOMOUS ACTIVITIES (not in-class)	•	105
	Total not in-class time :	105
TOTAL WORKING HOURS		150,0

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ELEMENTS OF INTEREST FOR COURSE LEARNING

Justification of contents

The general objective of the course is to learn the basic principles of the fluid mechanics and its application to the problem solving in the field of the engineering practice: design of pipeline, channels and fluid transport systems.

The contents of the subject are organized in the following units:

I. Fluid Mechanics Fundamentals.

1. Definition and properties of the fluids.
2. Static of fluids.
3. Dimensional analysis and similitude.
4. Fluid kinematics
5. Fluid dynamics.

II. Fluids Transport Systems.

6. Steady flow in closed conduits.
7. Fluid distribution networks.
8. Steady flow in open conduits.
9. Flow measurement
10. Pumping systems

Other courses related

- Physics fundamentals of the engineering
- Mathematics fundamentals of the engineering
- Mechanical technology.
- Industrial installations
- Industrial Pneumatics
- Machinery maintenance and safety

Minimum knowledge required to deal with the Course

None

COMPETENCIES

General competencies

General objectives of the University of Almería

- Interpersonal skills in teamwork
- Capacity of self-criticism
- Use of computers, internet nd TICs.
- Problem solving capacity
- Proffesional basic knowledge
- Autonomous working and learning.
- Oral / written communication in a second language.

Other general objectives

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- Ability to learn and adquire knowledge
- Application of the theoretical knowledge
- Ability to make judgments
- Communication with experts in other fields of knowledge and work in an interdisciplinary team and social attitude.
- Self-learning skills

Specific competencies developed

- Ability to analyze, solve and make judgments and reports related to the fluid mechanics installations and machinery.
- Knowledge of the Basic principles of the fluid mechanics and its application to the problem solving in the field of the engineering practice.
- Ability to calculate and design fluid transport systems: pipe and channel Systems.

LEARNING OJECTIVES/OUTCOMES

The main objective of this course is to provide the students with the basic knowledge of the laws governing the behavior of fluids, so they can understand and address real engineering problems in their fields. The aim is to initiate the future Engineers in the Fluid Mechanics, conceived as part of Mechanics extended to all fluids. The analysis of their behavior, core of the subject, is essential for the design of hydraulic works and fluid installations (pipelines, canals, dams, etc.).

CONTENTS

Module I	FLUID MECHANICS FUNDAMENTALS
Content	Unit I. Properties of the fluids

Learning system and methodology

System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Big group [example]	Seminar		2,0
Teaching group [example]	Lectures		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Search and enhancement of the information provided in class

Content	Unit II. Static of fluids

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Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		4,0
Work group [example]	Problems		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lessons
- Review and study the teaching materials and recommended bibliography
- Solve and submit the homework problems proposed in class.
- Search and complete the information provided in class.

Content	Unit III. Dimensional analysis and similitude

Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Search and enhancement of the information provided in class

Content	Unit IV. Fluid kinematics

Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Search and enhancement of the information provided in class

Content	Unit V. Fluid dynamics

Learning system and methodology			
System	*Learning procedures and*	*Observations*	*Hours*

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	activities		*In-class/ Online*
Teaching group [example]	Lectures		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.
- Search and enhancement of the information provided in class.

Module	FLUID TRANSPORT SYSTEMS
Content	Unit VI. Steady flow in closed conduits

Learning system and methodology

System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Big group [example]	Seminar		2,0
Teaching group [example]	Lectures		2,0
Work group	Lab practical		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.
- Search and enhancement of the information provided in class.
- Preparation and submission of the lab practical report

Content	Unit VII. Fluid distribution networks

Learning system and methodology

System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		2,0
Work group	Problems		2,0

Description of autonomous workload

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.

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- Search and enhancement of the information provided in class..

Content	Unit VIII. Steady flow in open channels		
Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		4,0
Work group	Problems		2,0
Description of autonomous workload			

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.
- Search and enhancement of the information provided in class.

Content	Unit IX. Flow measurement		
Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Teaching group [example]	Lectures		4,0
Work group	Lab practicals		4,0
Description of autonomous workload			

The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.
- Search and enhancement the information provided in class.
- Preparation and submission of the lab practical report

Content	Unit X. Pumping systems		
Learning system and methodology			
System	*Learning procedures and activities*	*Observations*	*Hours In-class/ Online*
Big group	Seminar		2,0
Teaching group [example]	Lectures		2,0
Work group	Evaluation	Theoretical test	1,0
Work group	Problems		2,0
Work group	Lab practicals		2,0
Description of autonomous workload			

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The autonomous workload will consist of:

- Attendance to the in-class lectures
- Revision and study of the teaching materials and the recommended bibliography
- Solving and submission of the homework problems proposed in class.
- Search and enhancement the information provided in class.
- Preparation and submission of the lab practical report

EVALUATION SYSTEM

Assessment criteria

The evaluation will be carried out taking into account the following criteria:

a) A continuous evaluation of the progress of the student will be made taking into account the following issues:

1. Attendance to classrooms lessons and participation in the classroom activities (10%)
2. Preparation and submission of the lab practical reports (20%)
3. Realization of an online theoretical test (70%)

b) Final exam: The student will have to solve a practical problem.

The final marking will be the weighted average of the markings obtained in the continuous evaluation (40%) and in the final exam (60%).

Marking system

	Activity	*(Number of hours)*	*Percentage*
I. STUDENT 'S ACTIVITIES (In-class/Online)	• Seminars [example]	(4)	0 %
	• Teaching group [example]	(22)	32 %
	• Work group/ small group [example]	(19)	60 %
II. STUDENT'S AUTONOMOUS ACTIVITIES (Autonomous work)	• Individual work [example]	(105)	8 %

Assessment instruments

- Progress report.
- Test, exercises and problems.
- Observations of the process.
- Final evaluation of the reports, works, projects, etc.
- Final Tests (Oral or written).
- Final Tests (multiple options).

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Monitoring mechanisms
▪ Attendance to the tutoring sessions. ▪ Attendance and participation in seminars. ▪ Logging in the virtual course. ▪ Use of the virtual communications tools: forums, emails, etc. ▪ Preparation and submission of virtual activities.

BIBLIOGRAPHY
Recommended bibliography
▪ Mecánica de fluidos incompresibles y turbomáquinas hidráulicas / José Agüera Soriano. *(José Agüera Soriano)* - – Basic Bibliography ▪ Mecánica de fluidos y máquinas hidraúlicas *(Mataix, Claudio)* - – Basic Bibliography ▪ Mechanic of fluids and hydraulics *(Giles, Ranald V.)* – Basic Bibliography ▪ El Riego : fundamentos hidráulicos *(Alberto Losada Villasante)* Complementary Bibliography ▪ Ingeniería hidráulica : aplicada a los sistemas de distribución de agua *(Editores: Cabrera, E. ...[et al])* - Complementary Bibliography ▪ Fluid mechanics *(Streeter, Victor L.)* - Complementary Bibliography ▪ Fluid mechanics *(Robert L. Mott)* – Complementary Bibliography
Bibliography existing in the library of the University of Almeria
http://almirez.ual.es/search/x?SEARCH=70534211

WEB ADRESSES
• http://es.libros.redsauce.net/index.php?folderID=10 *Curso de Mecánica de Fluidos - Pedro Fernández Díez* • http://es.libros.redsauce.net/index.php?folderID=9 *Curso de Turbinas - Pedro Fernández Díez* • http://es.libros.redsauce.net/index.php?folderID=7 *Curso de Bombas - Pedro Fernández Díez* • http://fluing.upv.es *Página del Grupo FluIng (UPV)* • http://www.epa.gov/nrmrl/wswrd/dw/epanet.html *EPANET site* • http://www.ehu.es/inwmooqb/fluidos.htm *Curso de Ingeniería Fluidomecánica - Universidad del País Vasco* ▪ http://www.ehu.es/inwmooqb/maqhidraulicas.htm *Curso de Máquinas Hidráulicas - Universidad del País Vasco*

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