Proyecto/Guía docente de la asignatura

Se debe indicar de forma fiel cómo va a ser desarrollada la docencia. Esta guía debe ser elaborada teniendo en cuenta a todos los profesores de la asignatura. Conocidos los espacios y profesorado disponible, se debe buscar la máxima presencialidad posible del estudiante siempre respetando las capacidades de los espacios asignados por el centro y justificando cualquier adaptación que se realice respecto a la memoria de verificación. Si la docencia de alguna asignatura fuese en parte online, deben respetarse los horarios tanto de clase como de tutorías). La planificación académica podrá sufrir modificaciones de acuerdo con la actualización de las condiciones sanitarias.

Asignatura	Strategy in Chemical Engineering Processes / Estrategia en Ingeniería de Procesos Químicos		
Materia	Advanced Process Design / Diseño Avanzado de Procesos		
Módulo	Intensification / Intensificación		
Titulación	Master in Chemical Engineering/ Máster en Ingeniería Química		
Plan	542	**Código**	53754
Periodo de impartición	1st Semester / 1er CUATRIMESTRE	**Tipo/Carácter**	OP
Nivel/Ciclo	MASTER	**Curso**	2
Créditos ECTS	6.0 ECTS		
Lengua en que se imparte	ENGLISH / INGLÉS		
Profesor/es responsable/s	RAFAEL MATO CHAÍN FIDEL MATO CHAÍN ALBERTO MORO LOBO		
Datos de contacto (E-mail, teléfono…)	rbmato@iq.uva.es, 983 423 177 fidel@iq.uva.es, 983 423 169		
Departamento	Ingeniería Química y Tecnología del Medio Ambiente [Edificio Residencia Alfonso VIII]		

1. Situación / Sentido de la Asignatura

1.1 Contextualization

This elective course is a deeper insight into modern strategy techniques for process design, analysis and revamping.

1.2 Relationship with other subjects

Basic knowledge of process simulation with HYSYS is required for course development.

1.3 Prerequisites

2. Learning outcomes

2.1 Basic

CG01. Ability to apply the scientific method and principles of engineering and economics to formulate and solve complex problems in processes, equipment, facilities and services, where matter changes its composition, state or energy content, characteristic of the Chemical industry and other related sectors, including pharmaceuticals, biotechnology, materials, energy, food and the environment.

CG02. Devise, project, calculate, and design processes, equipment, industrial facilities and services in the field of chemical engineering and related industrial sectors in terms of quality, safety, economy, rational and efficient use of natural resources, and environment preservation.

CG04. Perform appropriate research, design and lead the development of engineering solutions, in new or uncertain environments, relating creativity, originality, innovation and technology transfer.

CG05. To know how to establish mathematical models and develop them by means of appropriate informatics, as scientific and technological basis for the design of new products, processes, systems and services, and for the optimization of others already developed.

CG06. To be able to analyse and synthesize the continuous progress of products, processes, systems and services using criteria of safety, economic viability, quality and environmental management.

CG07. Integrate knowledge and face the complexity of making judgments and decision making, based on incomplete or limited information, including reflections on the social and ethical responsibilities of professional practice.

CG09. Communicate and discuss proposals and conclusions in multilingual, specialized and non-specialized forums, in a clear and unambiguous way.

CG10. Adapt to changes, being able to apply new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit.

CG11. To possess the abilities of the autonomous learning to maintain and to improve the own competences of the chemical engineering that allow the continuous development of the profession.

2.2 Specific

CEP18. To identify the fundamental aspects of the processes that determine its viability.

CEP19. To know the techniques for developing an integrated process from restricted information.

3. Aims

- Identify, asses and evaluate possibilities for chemical process revamping.
- Design and optimize Heat Exchanger Networks.

4. Thematic blocks

Block 1: Process revamping

Workload in ECTS credits: 3.0

a. Contextualization and justification

(see section 1.1)

b. Learning objectives

(see section 3)

c. Syllabus

01. An Introduction to Chemical Process Retrofitting and Revamping
02. Project Engineering and Management for Process Retrofitting and Revamping
03. Process Intensification in Process Retrofitting and Revamping
04. Retrofit of Side Stream Columns to Dividing Wall Columns, with Case Studies of Industrial Applications

d. Teaching methods

(see section 5)

e. Workplan

Week 1: Start of Process revamping section

Week 7: Assignment 1

f. Assessment

(see section 7)

g Training material

g.1 Basic Bibliography

- Chemical Process Retrofitting and Revamping: Techniques and Applications, Gade Pandu Rangaiah (Editor), Wiley, 2016
- User´s Guide HYSYS (AspenTech).

- User´s Guide Aspen Properties (AspenTech)

g.2 Additional Bibliography

g.3 Other telematic resources (knowledge pills, blogs, videos, digital magazines, mass courses (MOOC), ...)

The course Web page on Campus Virtual includes links to the videos with the theoretical contents of the subject.

h. Necessary resources

- Course material will be available in the virtual classroom: class notes, wordings and solutions of exams/exercises, videos …
- Computer classroom with commercial software
- As this software is licensed by UVa, students are committed to using it exclusively for the course activities, not being allowed its use for other purposes. If you plan to use it in any research activity, you must inform the teacher in charge in advance, indicating whether there is a company or third party involved.

i. Timing

(see section 4.e)

Block 2: HEN design

Workload in ECTS credits: 3.0

a. Contextualization and justification

(see section 1.1)

b. Learning objectives

(see section 3)

c. Syllabus

To develop procedures for quick, simple, humble design of operable HENs (Exchanger Networks). Also, procedures to relax/simplify/optimize existing HENs. Based on these procedures, if possible, automated software tool(s) for the job..

d. Teaching methods

(see section 5)

e. Workplan

Week 8: Start of HEN design section

Week 15: Assignment 2

f. Assessment

(see section 7)

g Training material

g.1 Basic Bibliography

g.2 Additional Bibliography

g.3 Other telematic resources (knowledge pills, blogs, videos, digital magazines, mass courses (MOOC), ...)

The course Web page on Campus Virtual includes links to the videos with the theoretical contents of the subject.

h. Necessary resources

i. Timing

(see section 4.e)

5. Teaching methods

Classes are developed in the computer room in a practical way. The professor guides the class by explanations followed by the development of practical cases. Examples are provided to students to build on the knowledge acquired in the classroom.

6. Table of student dedication to the subject

ON-SITE AND PRESENTIAL ON-LINE ACTIVITIES (1)	HOURS	OFF-SITE ACTIVITIES	HOURS
Lectures	25	Self-study and individual work	60
Practical classes	5	Study and autonomous group work	30
Workshops	2		
Computing room classes	25		
Tutoring	2		
Assesment	1		
Total presencial	**60**	Total no presencial	**90**
		TOTAL presencial + no presencial	**150**

(1) Presential on-line activity is when a group follows a videoconference synchronously to the class given by the teacher for another group present in the classroom.

7. Assessment methods – Summary table

ACTIVITY	WEIGHT ON FINAL MARK	COMMENTS
Written exam	20%	
Assignments	70%	2 Assignments
Class activity	10%	

ASSESSMENT CRITERIA

• **Ordinary exam:**
  ○ A minimum mark of 4.0 is required in the written exam to pass.
• **Extraordinary exam:**
  ○ A minimum mark of 4.0 is required in the written exam to pass.
  ○ The exam will be carried out in a similar way to the ordinary call. Only the final weight of each contribution to the final mark will be modified:
  Oral exam: 25%
  Assignments: 75%

8. Closing remarks