ESCUELA TÉCNICA SUPERIOR DE INGENIEROS AGRÓNOMOS
UNIVERSIDAD POLITÉCNICA DE VALENCIA

FICHA MEMORIA DOCENTE

Curso Académico 2006/2007

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CODE	3092	COURSE NAME/TITLE	INDUSTRIAL FOOD PROCESSES						
DEGREE	- AGRICULTURAL ENGINEERING				TYPE				
ORIENTATION	ALL								
ESTUDIES PROGRAM		CYCLE		COURSE		SEMESTER		FOUR-MONTH PERIOD	

DEPARTMENT [1]	**- FOOD TECHNOLOGY -**
AREA [1]	**- FOOD TECHNOLOGY -**
COURSE COORDINATOR [1]	**JOSE J. BENEDITO**
TEACHING STAFF	**ANTONIO MULET**

[1] En el caso de haber **más de un departamento ó área** que imparta docencia en la asignatura, rellenar **una ficha para cada uno de ellos y una conjuntamente firmada por los responsables y directores de todos ellos**.

TOTAL CREDITS:	**6**			
TOTAL THEORY	**3**	TOTAL PRACTICE	**3**	
T. AULA (TA) CLASSROOM	**3**	P. AULA (PA) CLASSROOM	**0.5**	
T. SEMINARIO(TS) SEMINAR		P. INFORMATICA [3] (PI) LABORATORY	COLLEGE	DEPT.
T. TUTORIZADA[2] (TT) TUTORIALS		P.LABORATORIO LABORATORY PRACTICE	**2**	
		P. CAMPO FIELD WORK	**0.5**	
		P. TUTORIZADA [2] (PT) TUTORIALS		

[2] Únicamente en el caso de asignaturas con actividades programa de innovación educativa y convergencia europea (PAEEES)
[3] Especificar si los créditos se imparte en aulas de la Escuela o del Departamento

Valencia, a 29 de marzo de 2006

Fdo.	Fdo.	Fdo.
Fdo.	Fdo.	Fdo.

Firmas del profesor/es responsable y del Director/es del Departamento

«ASI» «NOMASI» «DEP»/ «v_dptos» «v_areas»

COURSE TITLE:

OBJECTIVES

The theory includes not only the general aspects of the agro food industries but also the involved processes to condition and transform the raw materials.
The student will learn about the application of the main four systems of food preservation: thermal treatments, water activity reduction, emerging technologies and the use of additives. Furthermore, final operations such as food packaging will also be covered. The processes of the main food industries will be explained in more detail.

EVALUATION

The evaluation of the course will be based on:

- Attendance to the practical sessions and preparation of the corresponding reports is required. The evaluation of the practical work will be based on the written reports. 20 %.
- Exam on theoretical aspects. 60 %.
- A monographic work related to a particular food industry. 20 %.

COURSE TITLE:

CONTENTS: THEORY (1/2)

PART I. GENERAL ASPECTS

Theme 1. The food industry. Classification and characteristics. Economical environmental and food safety aspects.

Theme 2. Introduction to the industrial agro-food processes. Effects of the industrial processing on the nutritive and organoleptic characteristics of fresh foods.

Theme 3. Raw materials. Types. Food degradation. Causes of alteration of raw materials and food products. Kinetics of food degradation.

Theme 4. General plant utilities. Compressed air. Steam. Ventilation.

PART II. CONDITIONING AND PROCESSING OF RAW MATERIALS.

Theme 5. Preliminary and ancillary operations: cleaning, washing, classification and transport of solid materials.

Theme 6. Mechanical operations: size reduction, grinding, mixing, molding and homogenization.

Theme 7. Extraction and centrifugation.

PART III. FOOD PRESERVATION.

Theme 8. Processes for food preservation I. Thermal treatment.

8.1. Preservation through heating:
- Blanching, pasteurization, sterilization.
- Extrusion, frying, oven and toasting.

8.2. Cooling preservation: refrigeration and freezing.

Theme 9. Processes for food preservation II. Reduction of water activity.

9.1. Membrane evaporation and concentration.

COURSE TITLE:

CONTENTS: THEORY (2/2)

9.2. Drying, freeze drying and crioconcentration.

Theme 10. Processes for food preservation III. Emerging technologies: High pressure. High intensity electric pulses. Application of magnetic fields. Ultrasounds. Food irradiation.

Theme 11. Processes for food preservation IV. Use of additives. Types of additives: antioxidants, depressors of water activity. Softeners. Smoking.

Theme 12. Combined preservation methods. The theory of hurdles. Slightly processed foods.

Theme 13. Final operations for food preservation: packaging, filling and closing. Use of modified atmospheres.

PART IV. PROCESSES OF THE MAIN AGRO-FOOD INDUSTRIES.

Theme 14. Fruit post-harvest.
Industry characteristics. Processes involved. General layout.
Theme 15. Fat and oil industries.
Industry characteristics. Processes involved. General layout.
Theme 16. Cereals and grains.
Industry characteristics. Processes involved. General layout.
Theme 17. Wine and beverages.
Industry characteristics. Processes involved. General layout.
Theme 18. Meat industries.
Industry characteristics. Processes involved. General layout.
Theme 19. Dairy industry. Industrial treatment of milk and manufacturing of dairy products.
Industry characteristics. Processes involved. General layout.
Theme 20. Other agro food industries. Juice manufacturing. Eggs and derived products. Fried and toasted products.
Industry characteristics. Processes involved. General layout.

COURSE TITLE:

CONTENTS: PRACTICE

Pilot Plant practical sessions.

1. Analysis and control of can seams.
2. Vegetable blanching. Preserves and low temperature blanching.
3. Vegetable preserves manufacturing (operations: raw material selection, washing, cutting up, chemical peeling, syrup preparation, sterilization and canning.
4. Quality control of preserves. Study of the preserves from the previous practical sessions and commercial preserves.
5. Jam manufacturing (operations: selection, washing, cutting up, boiling, use of additives, sterilization and canning).
6. Manufacturing of a meat based product, pâté (operations: cutting up, grinding, addition of food additives, cooking, packaging and refrigeration).

-Practical sessions in the computer laboratory.

1. Basic concepts of spreadsheets.
2. Optimization of thermal treatments.
3. Calculation of pressure vessels.

- Practical work about a food industry

The students should develop a subject within this list and afterwards make an oral presentation. The work should include aspects related to products, processes, flowcharts, economical and environmental aspects.

1. Fruits and vegetables.
2. **Juices. Preserves. Post-harvest. Frozen products.**
3. Industries of meat products.
4. Cereals and related products.
5. Other industries I: Fermentative. Wine, vinegar, beer, cider, pickles.
   II: No fermentative.
6. **Fats and oils.**

- Several visits to companies of the agro-food sector will be carried out.

COURSE TITLE:

RECOMMENDED BIBLIOGRAPHY

GENERAL LITERATURE

- Aleixandre, J.L. and García-Esparza, M.J. (2001). *Industrias Agroalimentarias.* Ed. SPUPV. I.S.B.N.: 84-7721-735-1.
- Aleixandre, J.L. (1997). *Conservación de Alimentos.* Ed.:SPUPV. I.S.B.N.: 84-7721-470-0.
- Casp, A. and Abril, J. (1999) *Procesos de conservación de alimentos.* Ed. Mundi-Prensa. I.S.B.N.: 84-7114-810-2.
- Fellows, P. (1994). *Tecnología del procesado de los alimentos. Principios y prácticas.* Ed. Acribia, Zaragoza. I.S.B.N.: 84-200-0748-X.

SPECIFIC LITERATURE

- Aleixandre, J.L. and García-Esparza, M.J. (1996). *Prácticas de procesos de elaboración y conservación de alimentos.* Ed. SPUPV. I.S.B.N.: 84-7721-385-2.
- Aleixandre, J.L.(2002). *Vinos y bebidas alcohólicas.* Ed. SPUPV. I.S.B.N.: 84-7721-817-X.
- Barbosa-Cánovas, G.V. et col. (1998). *Conservación no térmica de alimentos.* Ed. Acribia. I.S.B.N.: 84-200-0888-5.
- Mulet,A. Methods of Food Conservation. Lecture notes.
- Kill, R.C., Ranken, M.D.. 1997. Food Industries Manual. Blackie Academic and professional.
- Madrid-Vicente, A. and Madrid-Cenzano, J. (2001). *Nuevo manual de industrias alimentarias.* Ed. Mundi-Prensa. I.S.B.N.: 84-7114-980-X.
- Madrid-Vicente, A. (1990). *Manual de industrias lácteas.* Ed. Mundi-Prensa. I.S.B.N.: 84-7114-340-2.
- Marks, H.F. 1995. Food: Its Production, marketing and consumption. The Institute of Agricultural Management.
- Mulet,A. Ordorica,C. Benedito, J. (eds.) 1997. Herramientas de calculo en Ingenieria de Alimentos. Vol III. SPUPV-97.1180.
- Mulet,A. Ordorica,C. Bon J. (eds.) 1998. Herramientas de calculo en Ingenieria de Alimentos. Vol IV. SPUPV-98.1180.
- Mulet,A. Ordorica,C. Bon J., Ortega, E. (eds.) 1996. Herramientas de calculo en Ingenieria de Alimentos. Vol II. SPUPV-96.3002.
- Mulet,A., Fito, P., Escoin, C. Arranz,A. 1990..Methods of Food Conservation: Chemical and microbial systems. Dir. 79/112/EEC.
- Ziller, S. et col. (1994). *Grasas y aceites alimentarios.* Ed. Acribia. I.S.B.N.: 84-200-0799-4.