FUNDAMENTALS OF FOOD ENGINEERING

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LECTURER(S)

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TUTORING SCHEDULE

http://sl.ugr.es/bailonm

DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT

Degree in Food Science and Technology

PREREQUISITES and/or RECOMMENDATIONS (if necessary)

Students should have passed the following basic subjects: Physics, Chemistry and Mathematics

BRIEF ACCOUNT OF THE SUBJECT PROGRAMME


GENERAL AND PARTICULAR ABILITIES

CE2, CE4, CE5, CE6, CE15

OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

At the end of the subject the student should know / understand:

- Know the basic concepts related to food engineering.
- Solve balances of matter in single units and systems, without chemical reaction and with chemical reaction, in steady and non-steady states.
- Solve balances of energy in single units and systems, without chemical reaction and with chemical reaction in steady, and non-steady states.
- Jointly solve balances of matter and energy.
- Know the laws that govern the transport phenomena of momentum, heat and matter.
- Know the different types of chemical reactors and their modes of operation and calculate the dimensions a single reactor.

**DETAILED SUBJECT SYLLABUS**

**THEORETICAL TOPICS:**

- **Theme 1. Introduction to Chemical Engineering and Food.** Concept of Chemical Engineering and Food Engineering. Development of processes and products in the food industry. Access to information techno-scientific and evaluation. Extensive and intensive variables. Technical System of Units. Types of operation and contact. Block and flow diagrams. Classification and brief description of the main basic operations of the food industry.
- **Theme 2. Balances of matter without chemical reaction in steady state.** Principles of conservation of matter and energy. Balances of matter for single units. Balances of matter in systems of units in series, with shunt currents and recycle streams without purge and purge.
- **Theme 3. Balances of matter with chemical reaction in steady state.** Balances of matter in systems of units in series, with shunt currents and recycle streams without purge and purge.
- **Theme 5. Balances of matter and energy in unsteady state.** Nonstationary operations in the food industry. Simultaneous matter and energy balances.
- **Theme 6. Fluid mechanics.** Internal flow of incompressible fluids: Equation of continuity, Bernoulli's equation, energy losses due to friction, Fanning equation and Moody chart, impulsion power. External flow: Movement of particles within a fluid. Terminal speed.

**PRACTICAL SYLLABUS:**

Practices class / computer

Practice 1. Triangular diagrams.
Practice 2. Graphical solution of a balance of matter.
Practice 3. Solving nonlinear equations by numerical methods.
Practice 4. Numerical integration
Practice 5. Derivation of empirical models from experimental data.

**READING**

**FUNDAMENTAL BIBLIOGRAPHY:**

• Guillermo Calleja Pardo. Introducción a la Ingeniería Química. Editorial Síntesis (1999)
• V. Bravo Rodríguez, G. Blázquez García y A. Gálvez Borrego. Fundamentos de la Ingeniería Química. V. Bravo (1997)

SUPPLEMENTARY BIBLIOGRAPHY:
• Antonio Huerta Cerezo y Antonio Rodríguez-Ferrán. Métodos numéricos: introducción, aplicaciones y programación. Ediciones UPC (2009).

RECOMMENDED INTERNET LINKS
• Oficina Española de Patentes y Marcas. http://www.oepm.es
• Scopus. http://www.scopus.com/