UNIT OPERATIONS IN FOOD INDUSTRY

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<td>Basics of Food Technology</td>
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**LECTURER(S)**

Antonio Raúl Pérez Gálvez (Lectures)
Nor Elena Rahmani Manglano (Laboratory)

Dr. Raúl Pérez Gálvez, Department of Chemical Engineering, Faculty of Sciences, +34 958243360, rperezga@ugr.es
MSc Nor Rahmani Manglano, Department of Chemical Engineering, Faculty of Sciences, +34 958241329, norelemarm@ugr.es

**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 subject: Basics of Food Engineering

**BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE ???)**


**GENERAL AND PARTICULAR ABILITIES**

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

- Identify types of fluids from a rheological point of view and the rheological measures necessary.
- Resolve fluid flow systems employing conservation equations in different flow regimes.
- Calculate heat transfer systems, including heat exchangers, considering the mechanisms involved.
- Design, from mass transfer mechanisms, distillation and solid-liquid extraction operations.
## DETAILED SUBJECT SYLLABUS

### THEORETICAL TOPICS:

1. **Rheology**
   Rheological classification of fluids: newtonian fluids, non-newtonian fluids. Variables which influence on the rheological parameters. Rheological measures: rotational viscometers, tube viscometers.

2. **Fluids flow**

3. **Heat transfer**

4. **Mass transfer**
   Mass transfer mechanisms: diffusion, convection. Distillation: liquid-vapor equilibrium, simple distillation, rectification. Solid-liquid extraction: extraction equilibrium, single-stage extraction, multistage extraction.

### LABORATORY PRACTICES:

1. Tube and shell heat exchangers.
2. Friction losses through pipes and fittings.
3. Pump characteristic curve.
4. Viscosity measurement using Cannon-Fenske viscosimeter.

### READING


### RECOMMENDED INTERNET LINKS

- **Conversion units**: [http://www.thermexcel.com/english/tables/unit_con.htm](http://www.thermexcel.com/english/tables/unit_con.htm)
- **Tools for pump selection and performance**
  - [http://impeller.net/spaix.asp?LGG=en](http://impeller.net/spaix.asp?LGG=en)