

**Code: 1663 Food Structure and Biopolymers****Degree:** 2<sup>nd</sup> cycle – Food Science and Engineering**Stream:** Food Processing**Curricular Year:** 1<sup>st</sup>**Semester Course:** 2<sup>nd</sup>**Credits:** 6 ECTS**Optional****Language:** Portuguese/English**Responsible:** Isabel Maria Nunes de Sousa**Other lecturer(s):** -**Web Site:** <http://www.isa.utl.pt/home/node/3859>**1. Contact hours:****Lecture/Practicals 70 Others 14 Total 84****2. Objectives:**

Learning the biodiversity and functions of biopolymers in Nature. To know the chemical characteristics, extraction methods and functionality of the most important biopolymers for industrial purposes. Learn the current techniques for molecular and structural characterization to forecast functionality. Be aware of the applications, economics, environmental impact and biodegradability of the main biopolymers.

**3. Programme:**

Definition of oil and fat, physical, chemical and functional properties of fats; degradation reactions of oils and fats and their technological consequences. The importance of the fats in human nutrition. Olive oil: definition, commercial types, extraction methodologies and equipment used. The low and high content oil-bearing seeds: extraction techniques and equipment. Animal oils and fats: extraction techniques and equipment. Refining of crude oils and fats: alkaline and physical refining, unit operations and equipment used. Modification techniques of fats: fractionation, hydrogenation and interesterification. Margarines: definition and commercial types; production techniques. Frying of fats. New trends in the technology of oils and fats: production of structured lipids by chemical and lipase-catalysed reactions; biodiesel production.

**4. Bibliography:****Main Bibliography**

Dickinson, E. and Vliet T. van. Food Colloids, Biopolymers and Materials. Springer Verlag 2003

Hill, S.E., Ledward, D.A. and Mitchell, J.R. Functional Properties of Food Macromolecules. Chapman &amp; Hall 1998

Marchessault, R.H., Ravenelle, F. and Zhu, X.X. Polysaccharides for Drug Delivery and Pharmaceutical Applications. Amer Chemical Society 2006

Nemeth, T. S. Biopolymer Research Trends. Nova Science Publishers 2008

Nishinari, K. Physical Chemistry and Industrial Application of Gellan Gum. Springer-Verlag 1999

Steinbuechel, A. Biopolymers: Biology, Chemistry, Biotechnology, Applications. 10 tomos. Wiley-VCH publisher 2001-2003

Steinbuechel, A. and Marchessault, R.H. Biopolymers for Medical and Pharmaceutical Applications Wiley-VCH 2005

Williams, P. A. and Phillips, G. O. Gums and Stabilizers for the Food Industry 1-14. Woodhead Publishing 1982-2007

Wool, R. and Sun, X. S. Bio-Based Polymers and Composites. Academic Press 2005

**5. Assessment:**

A - Final exam (60% of the final mark)

B - Report of a group work within the scope of the UC (20% of the final mark)

C - Presentation and discussion of the referred work (20% of the final mark).

**6. Estimated Workload:**

168

Hours

**7. Last Update:**

19/7/2010