SUBJECT GUIDE

Statistics

Academic year 2017-2018

MODULE	**CONTENT**	**YEAR**	**TERM**	**CREDITS**	**TYPE**
Basic	Statistics	1	2º	6	Basic

LECTURER(S)	**Postal address, telephone nº, e-mail address**
• Dr. Francisco A. Ocaña Lara	Dept. Statistics and Operations Research, 1st floor, Faculty of Pharmacy URL: http://www.ugr.es/local/focana/ E-mail: focana@ugr.es
DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT	
Degree in Food Science and Technology	

PREREQUISITES and/or RECOMMENDATIONS (if necessary)

Some basic subjects of Mathematics: elemental function, derivatives and integrals of real-valued functions, elemental functions.

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

- Descriptive Statistics.
- Description of statistical variable.
- Statistical regression models.
- Contingency tables.
- Probability and Inference.
- Sampling.
- Statistical Quality Control.

GENERAL AND PARTICULAR ABILITIES

General abilities:

- CG1: Express oneself correctly in the Spanish language in their disciplinary field.
- CG2: Problem resolution.
- CG3: Teamwork.
- CG4: Apply theoretical knowledge to practice.
- CG6: Ethical commitment.
- CG8: Critical reasoning.

- CG10: Organizational skills and planning.
- CG11: Information management.

Specific ability:
CE1: Recognize and apply the physical, chemical, biochemical, biological, physiological, mathematical and statistical fundamentals necessary for understanding and development of Food Science and Technology.

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

- Know statistical descriptive methods, statistical measures and regression techniques.
- Know the fundaments of probability, random variables and notable probability distributions.
- Know the most frequent sampling procedures.
- Know the principles of statistical inference and its application to problems related to Food Science and Technology.
- Interpret control charts and their application in production processes.

DETAILED SUBJECT SYLLABUS

TEMARIO TEÓRICO

1. Descriptive analysis of statistical data.
1.1. Description of a statistical process.
1.2. Statistical variable: types, tables, plots.
1.3. Statistical measures.
1.4. Bidimensional statistical variables: tables, covariance, linear correlation coefficient.
Exercises and applications.

2. Statistical regression models.
2.1. Concept of statistical regression.
2.2. Least squares regression.
2.3. Linear regression: linear equation, residual variance.
2.4. Non-linear regression: polynomials, exponential, etc.
Exercises and applications.

3. Probability. Random variable. Notable random distributions.
3.1. Algebra of events.
3.2. Space of probability. Consequences of probability axioms.
3.3. Conditional probability. Independence. Total probability and Bayes Theorems.
3.4. Random variable: types. Characteristics of a random variables.
3.5. Probability distributions of discrete random variables.
3.6. Probability distributions of continuous random variables.
Exercises and applications.

4. Statistical Inference.
4.1. Estimation and hypothesis testing.
4.2. Estimation procedures.
4.3. Confidence intervals for the Normal distributions.
4.4. Confidence intervals for the Poisson distribution.
4.5. Confidence intervals for proportions.
4.6. Hypothesis testing.

4.7. Hypothesis tests for the Normal model.
4.8. Independence text of qualitative variables.
Exercises and applications.

5. Statistical sampling.
5.1. Sample selection.
5.2. Basic concepts for sampling.
5.3. Types of sampling.
5.4. Random sampling with and without reemplacement.
5.5. Stratified sampling. Optimal allocation of sample size.
5.6. Conglomerate and systematic samplings.
5.7. Sample size.
Exercises and applications.

6. Statistical quality control.
6.1. Targets of the quality control. The quality control production processes.
6.2. Variability.
6.3. Control of Online production processes: tolerance intervals and control charts.
6.4. Reception control.
6.5. Sampling planes. Acceptance-rejection plans.

READING

FUNDAMENTAL BIBLIOGRAPHY:

- Alonso, F.J., García, P.A., and Ollero, J.E. (1996) *Estadística para Ingenieros*. Madrid: Colegio de Ingenieros de Caminos, Canales y Puertos.
- Montgomery, D.C. (2003) *Control estadístico de la calidad.* C.México: Limusa.
- Kenett, R., and Shelemyahu, Z. (1998) *Estadística industrial moderna : diseño y control de la calidad y la confiabilidad.* México: Thomson Editores.

COMPLEMENTARY BIBLIOGRAPHY:

- Ardanuy, R., and Martín, Q. (1993) *Estadística para Ingenieros*. Salamanca: Hespérides.
- Hubbard, M.R. (2003) *Statistical Quality Control for the Food Industry*. Nueva York: Kluwer Academic.
- Kenett, R.S., and Zacks, S. (2000) *Estadística Industrial Moderna*. México: Thomson.
- Lara, A. M. (2002) *Estadística para ciencias biológicas y ciencias ambientales*. Granada: Proyecto Sur.
- Martín, A., and Luna, J.D. (1995) *50 ± 10 horas de Bioestadística*. Madrid: Norma.
- Rueda, M.M., and Arcos, A. (1998) *Problemas de Muestreo en Poblaciones Finitas. Granada*: Grupo Editorial Universitario.
- Sánchez, M., Frutos, G., and Cuesta, P.L. (1996) *Estadística y Matemáticas Aplicadas*. Madrid: Síntesis.
- Shewhart, W. (1986) *Statistical Methods from the view point of Quality Control*. Nueva York: Dover.
- Valderrama, M.J. (2010) *Biometría*. Granada: Sider S.C.

RECOMMENDED INTERNET LINKS

- Department of Statistics and Operations Research: http://www.ugr.es/~estadis
- Campus de Cartuja's Unit: http://www.ugr.es/~udocente/
- SWAD: http://swad.ugr.es
- Prof. Francisco A. Ocaña's home page: http://www.ugr.es/local/focana