

230808 - STAT - Statistics

Coordinating unit:	230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit:	749 - MAT - Department of Mathematics
Academic year:	2016
Degree:	BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN ELECTRONIC SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)
ECTS credits:	6
Teaching languages:	English

Teaching staff

Coordinator:	JOSEP M. AROCA FARRERONS
Others:	JOSEP M. AROCA FARRERONS

Prior skills

Probability, random variables.

Requirements

PPEE.

Teaching methodology

- Lectures.
- Application classes.
- Laboratory classes.
- Exercises.
- Short answer test (Control).
- Short answer test (Test).
- Extended answer test (Final Exam).

Learning objectives of the subject

Basic concepts and methods of statistics. Data analysis, hypothesis testing, estimation.



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Study load

Total learning time: 150h	Hours large group:	26h	17.33%
	Hours small group:	26h	17.33%
	Self study:	98h	65.33%

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Content

1. Random variables	Learning time: 19h Theory classes: 3h Practical classes: 2h Self study : 14h
Description: Basic concepts of random variables. Parameters. Important variables in statistics: Gaussian, chi-squared, Student's t, Fisher's F.	
2. Descriptive statistics. Theory of sampling	Learning time: 21h Theory classes: 3h Practical classes: 2h Laboratory classes: 2h Self study : 14h
Description: Populations and samples. Distribution of sample statistics. Sample mean value and variance. Distribution of proportions, differences and sums, ratio of variances.	
3. Estimation Theory. Confidence Intervals	Learning time: 21h Theory classes: 3h Practical classes: 2h Laboratory classes: 2h Self study : 14h
Description: Unbiased estimators. Point and interval estimation. Confidence intervals for the mean value and variance. Confidence intervals for proportions. Confidence intervals for differences and sums. Maximum likelihood estimators.	
4. Statistical hypothesis testing	Learning time: 22h Theory classes: 3h Practical classes: 3h Laboratory classes: 2h Self study : 14h
Description: Statistical hypotheses. Errors of type I and type II. Tests with one and two tails. Significance level. Tests of significance for small and large samples. Power of a test. Adjusting theoretical distributions to sample frequency distributions. Chi-squared test.	

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<p>5. Regression</p>	<p>Learning time: 22h Theory classes: 3h Practical classes: 3h Laboratory classes: 2h Self study : 14h</p>
<p>Description: Adjustment curves. Linear regression. The method of the least squares. Multiple regression. Correlation coefficients.</p>	
<p>6. Analysis of variance</p>	<p>Learning time: 22h Theory classes: 3h Practical classes: 3h Laboratory classes: 2h Self study : 14h</p>
<p>Description: Techniques of analysis of variance (ANOVA). One factor experiments. Fisher test. Block treatment. Two factor experiments.</p>	
<p>7. Non-parametric tests</p>	<p>Learning time: 23h Theory classes: 4h Practical classes: 2h Laboratory classes: 3h Self study : 14h</p>
<p>Description: Signed rank test. Kruskal-Wallis test. Runs test. Rank correlation.</p>	

Qualification system

The final grade is obtained from the works proposed by the professor (each one 10% to 35% of the total grade)

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Bibliography

Basic:

Walpole, R.E. [et al.]. Probabilidad y estadística para ingeniería y ciencias. 9a ed. México: Pearson Educación, 2012. ISBN 9786073214179.

Ríos, S. Métodos estadísticos. 6a ed. Madrid: Ediciones del Castillo, 1967. ISBN 8421901982.

Spiegel, M.R. [et al.]. Probabilidad y estadística. 3a ed. México: McGraw-Hill, 2010. ISBN 968-451-102-7.

Complementary:

Mendenhall, W.; Sincich, T. Statistics for engineering and the sciences. 6th. Upper Saddle River, NJ: Pearson Prentice-Hall, 2017. ISBN 9781498731829.

Devore, J.L. Probability and statistics for engineering and science. 8th int. ed. Cengage Learning, 2011. ISBN 9780840068279.

Feller, W. An Introduction to probability theory and its applications (vol 1). 3rd ed. New York: John Wiley, 1968. ISBN 978-0471257080.

Feller, W. An Introduction to probability theory and its applications (vol 2). New York: John Wiley, 1968. ISBN 0471257117.

Others resources: