



Course guides

230322 - STSN - Statistical Tools for Social Networks and the Www

Last modified: 06/05/2019

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRONIC SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).
BACHELOR'S DEGREE IN ELECTRONIC ENGINEERING AND TELECOMMUNICATION (Syllabus 2018). (Optional subject).

Academic year: 2019 **ECTS Credits:** 2.0 **Languages:** English

LECTURER

Coordinating lecturer: Enric Monte Moreno

Others: Enric Monte Moreno

PRIOR SKILLS

Having passed the semester 2b

REQUIREMENTS

Knowledge of linear algebra and probability

TEACHING METHODOLOGY

blackboard classes and individual work

LEARNING OBJECTIVES OF THE SUBJECT

The aim of this course is to train students in understanding the techniques and tools for describing social networks and www. The course will teach techniques for ranking (ex. google?s pagerank for web pages), recommender systems (ex. amazon?s recommendations of similar products), Auctions of advertisements (i.e. googles adwords), Finding influencers in social networks, finding communities in social networks, finding text similarity between documents by meaning (i.e. similarity between posts in blogs).

STUDY LOAD

Type	Hours	Percentage
Hours large group	20,0	40.00
Self study	30,0	60.00

Total learning time: 50 h

CONTENTS

Ranking Systems.

Description:

Description algorithms for sorting websites by relevance. Algorithms for graphs made of links between pages: Pagerank and HITS.

Specific objectives:

Understanding google's Pagerank and HITS equations from different points of view; flow graph, random walk, probability of visiting a node.

Related activities:

Individual Deliverable

Full-or-part-time: 10 h

Theory classes: 4h

Self study : 6h

Recommender systems

Description:

Description of the recommender systems based on Collaborative and content based. Description of different recommender systems; amazon, netflix, facebook.

Specific objectives:

Be able to adapt the general methods of recommender systems to specific situations.

Related activities:

Individual Deliverable

Full-or-part-time: 10 h

Theory classes: 4h

Self study : 6h

Auctions of web advertisements

Description:

Description of systems for making auctions of online advertisements. Summary of the modified Vickrey auction system used by google's adwords.

Related activities:

Individual Deliverable

Full-or-part-time: 10 h

Theory classes: 4h

Self study : 6h



Social Networks as graphs

Description:

Techniques for finding influencers and communities in graphs. Specific properties of twitter type graphs and facebook type graphs.

Related activities:

Individual Deliverable

Full-or-part-time: 10 h

Theory classes: 4h

Self study : 6h

Finding text similarity between documents by meaning

Description:

Bag of words model for texts, stemming and word-term matrix. Latent semantic analysis

Related activities:

Individual Deliverable

Full-or-part-time: 10 h

Theory classes: 4h

Self study : 6h

GRADING SYSTEM

Individual assessments: 40%

Final examination: 60%

BIBLIOGRAPHY

Basic:

- Langville, A.N.; Meyer, C.D. Google's pagerank and beyond: the science of search engine rankings. Princeton, NJ: Princeton University Press, 2006. ISBN 9780691122021.
- Easley, D.; Kleinberg, J. Networks, crowds, and markets: reasoning about a highly connected world. New York: Cambridge University Press, 2010. ISBN 9780521195331.