

Course guide 210740 - AA - Acoustics in Architecture

Last modified: 05/07/2024

Academic year: 2024	ECTS Credits: 5.0 Languages: Spanish	
Degree:	MASTER'S DEGREE IN ADVANCED STUDIES IN ARCHITECTURE-BARCELONA (Syllabus 2015). (Optional subject).	
Teaching unit:	753 - TA - Department of Architectural Technology.	
Unit in charge:	Barcelona School of Architecture	

LECTURER

Coordinating lecturer:	CARLOS ALONSO MONTOLÍO	
Others:	Primer quadrimestre: CARLOS ALONSO MONTOLÍO - AEMA1	

TEACHING METHODOLOGY

Go to Spanish or Catalan version

LEARNING OBJECTIVES OF THE SUBJECT

Go to Spanish or Catalan version

STUDY LOAD

Туре	Hours	Percentage
Self study	87,5	70.00
Hours large group	37,5	30.00

Total learning time: 125 h



CONTENTS

title english

Description:

Basic principles. Physics of sound. Characterization. Physical units. Physiology of sound: Weber-Fechner physiological perceptive system. Ear audiogram. Practical units: dB, dBA, dB SPL, dB PWL , NC.

Psychology of sound: sound's concept. Psychological comfort. Sound evaluation: Typical levels of audible pressure. Sound masking and critic bands. Spatial behaviour. Distribution: reflection, transmission, propagation, absorption, resonance, etc. Diffusion: poly cylindrical diffusers, QRD, MLS. Edge behaviour: acoustic barrier diffraction. Isolation of aerial or impact sound (mass law, R, D, coincidence effect). Sound protection systems. Open enclosures: Outdoor spaces: squares, streets and patios. Indoor enclosures: Rooms, shape and geometry of sound. Acoustic phenomena in the enclosures. Modelling: geometrical acoustics, statistical acoustics, undulatory acoustics. General systems of indoor acoustic conditioning. Natural means: Systems of controlled reflection. Geometrical systems and volume changes. Room response control. Artificial means: electro acoustic systems. Amplifiers and players. Room acoustic design. Computer programs: simulation and correcting means.

Specific objectives:

In this course, relations between architecture and sound will be covered, considering the later as an element of the design of interior and exterior spaces in buildings, both from an energetic understanding and from the point of view of the requirements of the sonorous space. The objective is to establish the acoustic characteristics of architecture in relation to the design of buildings, urban and natural landscapes using the necessary acoustic tools.

Full-or-part-time: 125h Theory classes: 15h Laboratory classes: 30h Self study : 80h

GRADING SYSTEM

Continuous evaluation (%) Final evaluation (%) SE04 Testing and reporting of experimental work 30 SE09 Individual practical exercises 70

Continuous evaluation throughout the entire course by means of successive evaluation acts: Field work, in a team (30%) Individual work proposition (constructive solutions), tutored and assisted (70%)

BIBLIOGRAPHY

Basic:

- Beranek, Leo L. Music, Acoustics and Architecture. London: Wiley & Sons, 1962.
- Cingolani, Sergio. Acustica musicale e architettonica. Torino: UTED Libreria, 2005. ISBN 8877509414.
- Carrión Isbert, Antoni. Diseño acústico de espacios arquitectónicos [on line]. Barcelona: Edicions UPC, 1998 [Consultation: 05/05/2020]. Available on: <u>http://hdl.handle.net/2099.3/36341</u>. ISBN 8483012529.
- Egan, David M. Architectural acoustics. New York: McGraw Hill, 1988. ISBN 0070191115.
- Beckers, Benoit. Acústica Técnica [on line]. 2002. Available on: www.heliodon.net.
- Isalgué Buxeda, Antoni. Física de la Llum i el So. Barcelona: Edicions UPC, 1995. ISBN 8476535449.
- Llinares Galiana, Jaime; Llopis Regna, Ana. Acústica Arquitectónica. Valencia: Universidad Politecnica de Valencia Escuela Tecnica Superior de Arquitectura, 1987. ISBN 8477210330.
- Sabine, Paul E. Acoustics and Architecture. New York: McGraw-Hill, 1932. ISBN 991003620179706711.

Complementary:

- Spagnolo, Renato. Manuale di acustica applicata. Torino: UTED Libreria, 2004. ISBN 8877507101.

- Cavanaugh, William; Wilkes, Joseph A.. Architectural acoustics: principle and practice. New York: Wiley & Sons, 1998. ISBN 0471306827.



- Colina Tejada, Carlos.; Moreno Arranz, Antonio. Acústica de la edificación. 5ª ed.. Madrid: Fundación Escuela de la Edificación, 2005. ISBN 8486957982.

- Querol, J.M. Manual de mesurament i avaluació del soroll. Barcelona: Generalitat de Catalunya. Departament de Medi ambient, 1994. ISBN 8439332351.

- Bianchi, Francesco; Carratú, Robreto. L'Acustica e architettura. Novara: De Agostini Scuola, 2007. ISBN 9788825172997.

- Lord, Peter; Templeton, Duncan. The Architecture of Sound. Designing Places of Assembly. London: Architectural Press, 1986. ISBN 0851397263.

- Pierce, John R.. Los Sonidos de la Música. Barcelona: Prensa Científica, 1985. ISBN 8475930093.