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| Program | 09TT- Engineering in Telecommunication Technologies and Services |
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| Course number and name | |
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| Number | 95000070 |
| Name | Speech and Audio Signal Processing Tratamiento Digital de Voz y Audio |
| Semester | Y4 – S7 |

| Credits and contact hours | |
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| ECTS Credits | 6 |
| Contact hours | 60 |

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| Coordinator's name | Luis A. Hernández Gómez |
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| Specific course information | | |
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| Description of course content | | |
| This course provides fundamental concepts of signal processing techniques applied to speech and audio signals. Based on the analysis of the specific characteristics of speech and audio, the study of signal processing techniques is applied over four main areas: synthesis, coding, recognition and human-machine interaction. A major emphasis is put on speech and audio coding technologies. | | |
| List of topics to be covered | | |
| 1. Speech and audio signals characterization. Production, perception and synthesis. 2. Signal processing for speech and audio. 3. Speech and audio coding. 4. Recognition and human-machine interaction. | | |
| Prerequisites or co-requisites | | |
| Basic knowledge of signal and systems, digital signal processing and statistics. | | |
| Course category in the program | | |
| <input type="checkbox"/> R (required) | <input type="checkbox"/> E (elective) | <input checked="" type="checkbox"/> SE (selective elective) |

| Specific goals for the course |
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| Specific outcomes of instruction |
| RA1: Speech and audio signal processing for telecommunication services and applications: coding, synthesis, recognition and interactive systems. |
| RA2: Speech and audio signals characterization based on production and perception mechanisms. Tools for speech and audio recording and reproduction. Basic synthesis procedures. |
| RA3: Short-time analysis in time and frequency, and its use for synthesis, coding and recognition. |
| RA4: Principles of source and perceptual coding. Main schemes and standards for |

speech and audio coding and their use in telecommunication networks and services. Standards for objective quality assessment.

RA5: Basic speech and audio recognition technologies (mainly speech and speaker recognition). Design of interactive systems and usability evaluation.

Student outcomes addressed by the course

CE-SI2, CE_SI3, CE-SI5
 CG1-13

Bibliography and supplemental materials

“Speech and Audio Signal Processing”, B. Gold, N. Morgan, and D. Ellis, 2nd edition, Wiley Press 2011.

“Spoken Language Processing”, X. Huang, A. Acero, and H. Won , Prentice Hall, 2001

“Introduction to Data Compression”, Khalid Sayood, Fourth Edition, The Morgan Kaufmann Series in Multimedia Information and Systems, 2012

Web: <http://moodle.upm.es/titulaciones/oficiales>

Teaching methodology

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| <input checked="" type="checkbox"/> lectures | <input checked="" type="checkbox"/> problem solving sessions | <input checked="" type="checkbox"/> collaborative actions | <input checked="" type="checkbox"/> laboratory sessions |
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Other: