Universidad Carlos III de Madrid
www.uc3m.es

| COURSE: TECHNIQUES AND TOOLS FOR THE DESIGN OF ELECTRONIC SYSTEMS | | |
|---|---|---|
| **MASTER: ELECTRONIC SYSTEMS ENGINEERING AND APPLICATIONS** | **YEAR: 2016-17** | **TERM: 1st** |

## WEEKLY PLANNING

| WEEK | SESSION | DESCRIPTION | GROUPS (mark X) | | Special room for session (computer classroom, audio-visual classroom…) | WEEKLY PROGRAMMING FOR STUDENT | | |
|---|---|---|---|---|---|---|---|---|
| | | | LECTURES | SEMINARS/ LAB[1] | | DESCRIPTION | CLASS HOURS | HOMEWORK HOURS (Max. 7h week) |
| 1 | 1 | T1. Electronic Systems Overview. Organizational issues | X | | | Goals and Strategy,<br>Application examples<br>Tools<br>Partitioning & Testing<br>Answering questions about background. | 1,5 | 3 |
| 1 | 2 | T2. Design Flow and Development techniques (I) | X | | | HW Prototyping techniques<br>Basic Design Flow. Reference for IC design and embedded systems | 1,5 | |
| 2 | 1 | T2. Design Flow and Development techniques (II) | X | | | Modeling, CAD and EDA tools<br>Design flow<br>Basic Design Flow. Reference for IC design and embedded systems | 1,5 | 4 |
| 2 | 2 | T2. Design Flow and Development techniques (III) | X | | | Modeling, CAD and EDA tools<br>Design flow | 1,5 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Basic Design Flow. Reference for IC design and embedded systems | | |
| 3 | 1 | T3. Signals and Systems review /Non-linear systems | X | | | Digital Signal Processing Review<br>Taxonomy of signals and systems<br>Some useful signals<br>Common Units<br>Introduction to DSP and Applications<br>Z Transform<br>Non linear systems | 1,5 | 5 |
| 3 | 2 | T4. Power spectrum and Frequency Response(I) | X | | | FFT algorithm<br>Power Spectrum Estimation<br>Digital Signal Processing, frequency domain | 1,5 | |
| 4 | 1 | T4. Power spectrum and Frequency Response(II) | X | | X | Practical examples in Matlab | 1,5 | 5 |
| 4 | 2 | T5. Modeling of Sampled systems (I) | X | | | Uniform sampling, decimation, interpolation<br>Multirate systems<br>Irregular sampling<br>Continuous-/Discrete-Time mapping<br>Numerical Solvers | 1,5 | |
| 5 | 1 | T5. Modeling of Sampled systems (II) | X | | X | Matlab examples<br>Practical examples in Matlab | 1,5 | 5 |
| 5 | 2 | T6. Modeling of Noise and Quantization error(I) | X | | | Random Signals and Stochastic Processes.<br>Filtered noise<br>Quantization error<br>Oversampling<br>Dithering | 1,5 | |
| 5 | | **(Dietmar Straüβnigg)**<br>**Seminar on Digital Filters** | X | X | X | 3h seminar including practical exercises | | |
| 6 | 1 | T6. Modeling of Noise and Quantization error (II)<br>Matlab examples | X | | X | Practical examples in Matlab | 1,5 | 5 |
| 6 | 2 | T7. Digital Filters (I) | X | | | IIR filters<br>Exampes | 1,5 | |
| 7 | 1 | | X | | | FIR filters | 1,5 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | T7. Digital Filters (II) | | | | Examples | | 5 |
| 7 | 2 | Test T1-T6 | X | | | | 1,5 | |
| 8 | | Break (assessments of 3ECTS courses) | | | | | | |
| 9 | 1 | T8. System Identification (I) | X | | | Concepts in System identification | 1,5 | 5 |
| 9 | 2 | T8. System Identification (II) | | | X | Examples | 1,5 | |
| 10 | 1 | T9. Modeling and Specifying Digital Functions (I) | X | | | Specification of digital functions | 1,5 | 5 |
| 10 | 2 | T9. Modeling and Specifying Digital Functions (II) | X | | | Examples | 1,5 | |
| 11 | 1 | T10. Test and Functional Validation (I) | X | | | Test Concepts | 1,5 | 5 |
| 11 | 2 | T10. Test and Functional Validation (II) | X | | | Examples | 1,5 | |
| 12 | 1 | Test T7-T10 | X | | | | 1,5 | 6 |
| 12 | 2 | T11. Guided Practical example (I) | | X | X | Complete guided activities | 1,5 | |
| 13 | 1 | T11. Guided Practical example (II) | | X | X | Complete guided activities | 1,5 | 5 |
| 13 | 2 | T11. Guided Practical example (III) | | X | X | Complete guided activities | 1,5 | |
| 14 | 1 | | | X | X | Complete guided activities | 1,5 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | T11. Guided Practical example (IV) | | | | | | 5 |
| 14 | 2 | T11. Guided Practical example (V) | | X | X | Complete guided activities | 1,5 | |
| 15 | 1 | T12. Nonlinear systems modelling | X | | | Concepts an tools | 1,5 | 5 |
| 15 | 2 | T12. Examples of nonlinear systems | X | | | Examples | 1,5 | |
| | | | | | | **Subtotal 1** | **42** | **68** |
| | | | | | | **Total 1** *(Hours of class plus student homework hours between weeks 1-15)* | **110** | |

[1] **A maximum of 1-2 lab sessions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1-7 9-15 | | Tutorials, handing in, etc | | | | | 25 | |
| 16 | | Assessment | | | | | 3 | 12 |
| | | | | | | **Subtotal 2** | **3** | **37** |
| | | | | | | **Total 2** *(Hours of class plus student homework hours at week 8)* | **40** | |

| | |
|---|---|
| **TOTAL** *(Total 1 + Total 2)* | **150** |