Universidad Carlos III de Madrid
www.uc3m.es

COURSE: Onboard Systems Design		
DEGREE: Aerospace Engineering	YEAR: 4th	TERM: 1st

<table>
<tr><td colspan="9" align="center">WEEKLY PLANNING</td></tr>
<tr>
<td rowspan="3">WEEK</td>
<td rowspan="3">SESSION</td>
<td rowspan="3">DESCRIPTION</td>
<td colspan="2">GROUPS (mark X)</td>
<td rowspan="2">SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)</td>
<td rowspan="2">Indicate YES/NO If the session needs 2 teachers</td>
<td colspan="3">WEEKLY PROGRAMMING FOR STUDENT</td>
</tr>
<tr>
<td rowspan="2">LECTURES</td>
<td rowspan="2">SEMINARS</td>
<td rowspan="2">DESCRIPTION</td>
<td rowspan="2">CLASS HOURS</td>
<td rowspan="2">HOMEWORK HOURS (Max. 7h week)</td>
</tr>
<tr></tr>
<tr>
<td>1</td>
<td>1</td>
<td>• Onboard Systems Design Introduction.
• Avionic Systems Technology Introduction.</td>
<td>X</td>
<td></td>
<td></td>
<td>Yes</td>
<td>- Reading the reference material:
  o Subject Slides.
  o Aircraft Systems; chapter 12.
  o The Avionics Handbook, sections I and V.
- Looking for additional information or performing trade-offs.
- Study and personal work.</td>
<td>1,67</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>• Avionics Systems Architectures.
• Integrated Modular Avionics.
• IMA Application Exercise.</td>
<td>X</td>
<td>X</td>
<td></td>
<td>No</td>
<td>- Reading the reference material:
  o Subject Slides.
  o Aircraft Systems, chapter 12.
  o The Avionics Handbook, sections I and V.</td>
<td>1,67</td>
<td>2</td>
</tr>
</table>

						- Looking for additional information or performing trade-offs. - Study and personal work.		
3	3	• Systems Engineering Overview: - Systems Engineering Definition. - Systems Engineering Frameworks. - INCOSE Systems Engineering Introduction. • Systems Design Process I: - Systems Engineering Technical Processes, Part I. - Application Exercise.	X	X		No	- Reading the reference material: o Subject Slides. o INCOSE Handbook. - Looking for additional information or performing trade-offs. - Study and personal work.	1,67	2
4	4	• Systems Design Process II: - Systems Engineering Technical Processes, Part II.	X	X		No	- Reading the reference material: o Subject Slides. o INCOSE Handbook. - Looking for additional information or performing trade-offs. - Study and personal work.	1,67	2
5	5	• Avionic Systems Technology. - Discrete and Analogue Interfaces. - Digital Data Buses: o Digital Data Buses introduction. o ARINC 429 introduction. o ARINC 429 Application Exercise	X	X		No	- Reading the reference material: o Subject Slides. o Aircraft Systems, chapter 12 and chapter 12.3 for the examples. o The Avionic Handbook, section I. - Looking for additional information or performing trade-offs. - Study and personal work.	1,67	2
6	6	• Avionic Systems Technology. Digital Data Buses: - MIL-STD-1553B Introduction. - MIL-STD-1553B Application Exercise.	X	X		No	- Reading the reference material: o Subject Slides. o Aircraft Systems, chapter 12 and chapter 12.3 for the examples. o The Avionic Handbook, section I. - Looking for additional information or performing trade-offs. - Study and personal work.	1,67	2

7	7	• Partial Exam.
		• Certification Considerations for Onboard System Design:
		- SAE ARP4754/A Introduction.
		- SAE ARP4761 Introduction.
		- Application Exercise.
			X	X		No	- Reading the reference material:
							  o Subject slides.
							  o The Avionics Handbook, chapter 23.
							  o ARP4754/A
							- Looking for additional information or performing trade-offs.
							- Study and personal work.
								1,67	2

8	8	• Arduino-based Practice I. Introduction to Arduino platform and programming concepts.		X	Avionics Lab	Yes	- Reading the reference material:
							  o Practice Description.
							  o Subject Slides.
							- Study and personal work.
								1,67	4

9	9	• Arduino-based Practice II. IMU and Barometer acquisition and PFD representation.		X	Avionics Lab	Yes	- Reading the reference material:
							  o Practice Description.
							  o Subject Slides.
							- Study and personal work.
								1,67	4

10	10	• Arduino-based Practice III. IMU and Barometer acquisition and PFD representation.		X	Avionics Lab	Yes	- Reading the reference material:
							  o Practice Description.
							  o Subject Slides.
							- Study and personal work.
								1,67	4

11	11	- Arduino-based Practice IV. A429 Implementation.		X	Avionics Lab	Yes	- Reading the reference material:
							  o Practice Description.
							  o Subject Slides.
							- Study and personal work.
								1,67	4

12	12	• Development Assurance for Onboard Systems Design:
		- SAE ARP4754A.
		- RTCA DO-178B/C Introduction.
		- RTCA DO.254 Introduction.
			X	X		No	- Reading the reference material:
							  o Subject Slides.
							  o ARP4754/A.
							  o The Avionics Handbook; chapter 23.
							  o DO-178B/C.
							- Looking for additional information or performing trade-offs.
							- Study and personal work.
								1,67	2

13	13	• Partial Exam
		• Aircraft Systems Verification and Validation:
		- Verification vs Validation.
		- Integration Testing.
		- RIG Testing.
		- Ground Tests.
		- Flight Tests.
			X	X		No	- Reading the reference material:
							  o Subject Slides.
							  o INCOSE Handbook.
							- Looking for additional information or performing trade-offs.
							- Study and personal work.
								1,67	2

14	14	• Test Bench Practice:
		  - Open System Mission Computer (OSMC) Test Bench Description.
		  - Practice of Onboard System Verification on OSMC Test Bench.
				X	Avionics Lab	Yes	- Reading the reference material:
							  ○ Practice Description.
							  ○ Subject Slides.
							- Study and personal work.
								1,67	4

							Subtotal 1	**23,38**	**38**

Total 1 *(Hours of class plus student homework hours between weeks 1-7)*	61,38

8		Tutorials, handing in, etc						
9		Assessment Ordinary – Extraordinary					3	21
10								
11								
							Subtotal 2	**3**	**21**

Total 2 *(Hours of class plus student homework hours between weeks 8-11)*	24

TOTAL *(Total 1 + Total 2. Maximum 90 horas)*	**85,38**

(*) In EPS are given an additional 6 hours of completary teaching along two sessions.