

Information and communications technology in automotive industry (ICTA)			
Code number:	46675	Number of ECTS:	6 ECTS
Semester:	Autumn	Language:	English
<b>Lecturer(s) and contact:</b> <ul style="list-style-type: none"> <li>• Dr. Juan Carlos Aguado Manzano (<a href="mailto:jaguado@tel.uva.es">jaguado@tel.uva.es</a>)</li> <li>• Dr. Ignacio de Miguel Jiménez (<a href="mailto:Ignacio.miguel@tel.uva.es">Ignacio.miguel@tel.uva.es</a>)</li> </ul>			
<b>Learning goals:</b> At the end of this sections, the student should be able to: <ul style="list-style-type: none"> <li>• Use software tools for the analysis and design of commercial devices and ICT (Information and Communication Technologies) applications in vehicles.</li> <li>• Analyze and decode traces of basic protocols in vehicles.</li> <li>• Enumerate and describe the most important parameters of the physical layer of the basic protocols in vehicles.</li> <li>• Enumerate and describe ICT applications and basic services in vehicles.</li> <li>• Enumerate and describe basic elements of communications in intra-vehicular, inter-vehicular and vehicle to infrastructure communication networks.</li> <li>• Design and program applications and devices for intra-vehicular communications.</li> <li>• Use the documentation from OEM to develop and analyze ICT devices and applications in vehicles.</li> </ul>			
<b>Contents:</b> <ol style="list-style-type: none"> <li>1. Introduction to Vehicle Telematics.</li> <li>2. Intra-Vehicular communications. CAN Bus.</li> <li>3. Introduction to CANoe.</li> <li>4. Programming in CAPL.</li> <li>5. CANoe advanced options for emulating whole systems</li> <li>6. Intra-vehicular communications. Other standards.</li> <li>7. Design of ECUs.</li> <li>8. ECU diagnosis.</li> <li>9. Dataloggers.</li> </ol> <p>Lab:</p> <ol style="list-style-type: none"> <li>1. Physical layer of the CAN bus.</li> <li>2. CAN analysis: IGN signals, TeleAid Info-Call and Volume Control.</li> <li>3. CAN analysis: Airbag signals.</li> <li>4. CAN analysis: Real car trace.</li> <li>5. Sending CAN messages using CANoe.</li> <li>6. CAPL Program.</li> <li>7. Captur Electronic Architecture: Controlling Infotainment from CANoe</li> <li>8. MOST Optical Bus Analyzer.</li> <li>9. ECU simulation using CANister. Breathalyzer design and development.</li> <li>10. Datalogger. Diagnostics.</li> </ol>			
<b>Prerequisites:</b> This is an intermediate course, intended for learners with a background in computer and electrical engineering. To succeed in this course, you should have the following knowledge prerequisites: <ul style="list-style-type: none"> <li>• Intermediate programming experience, preferable in C.</li> </ul>			



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- Familiarity with protocols, communications networks and telematic services.
- Basic use of laboratory equipment, mainly Oscilloscopes.

**Assessment:**

Online tests (10%), attitude and reports of labs corresponding to topics 1-6 (40%), attitude and reports of labs corresponding to topics 7-9 (35%), final test (15%).