

Minor Intelligent Vehicles

Content of the minor



Intelligent Vehicles

In the forthcoming years, modern vehicles will change rapidly. Not only in driveline and powertrain using alternative fuels and innovative concepts like hybrid propulsion, but also because smart and intelligent systems in the vehicle will take further control of the behaviour and performance of driver and vehicle. We already saw the introduction of ADAS systems (Advanced Driver Assistance Systems) like Active Cruise Control, Lane Keeping Assist, Collision Avoidance System, etc. The market penetration and technology of such systems is continuously increasing. For the automotive industry, such application has the objectives to improve vehicle performance regarding handling and stability, safety and environmental impact and to reduce the development costs and time to market of new vehicle concepts and designs.

These intelligent systems will gain a strong impact on driver and vehicle behaviour in relation to traffic circumstances. Communication and cooperation between vehicles and roadside will increase. ITS (Intelligent Transportation Systems) will increasingly dominate the regulation of traffic flows in urban areas and on our motorways. Mechatronic systems as Steer by Wire, Brake by Wire and Drive by Wire will assist drivers to a more controlled and safer vehicle performance.

Minor topics

The minor Intelligent Vehicles aims at educating technical Bachelor students in the field of modern Intelligent Systems in vehicles. The focus will be on driver assistance systems such as (C-)ACC: (Cooperative) Adaptive Cruise Control. Since these system influence vehicle forward and lateral behaviour, a thorough understanding of vehicle dynamics is essential. The main target of the minor is to provide knowledge to the students in order to be able to simulate the vehicle and to develop control algorithms for the intelligent system in the vehicle. Supporting to this, technical information in intelligent vehicle electronics is provided. Subjects such as the intelligent vehicle in perspective of the total traffic system and management aspects of development and introduction of intelligent vehicles are covered as well.

The modules in the minor are:

- Vehicle dynamics & control
- Control Systems Engineering: Control systems and system modeling
- Intelligent Vehicle Electronics: electronic systems development, sensors, communication
- Intelligent Vehicle Highway Systems: A systems view, management aspects
- MATLAB/Simulink introduction
- Minor project: A project in multidisciplinary teams

The minor is divided in the blocks of 10 weeks. The lectures will be concentrated in the first block. In the second block the focus will be on the minor project, which is carried out by multidisciplinary student teams. The modules contain theory lectures enriched with exercises, practices and assignments. In this way the student gains knowledge and competences required for the minor project.

Minor project

Project teams are formed at the start of the minor. The teams will contain an optimal mix of students with varying backgrounds and nationalities. In the project the team may perform a number of tasks:

- Literature survey on systems/components/technology involved
- Vehicle dynamics instrumentation and testing on a test vehicle
- Design and development of control algorithms for intelligent vehicle systems based on simulation environments
- Application and improvement of existing simulation environments for virtual prototyping and Hardware-In-the-Loop testing
- Implementation of control algorithms in a test vehicle with real time vehicle controllers, using automatic code generation techniques
- Co-development of a semi-autonomous vehicle, together with other Bachelor and Master student groups



Target Group and Entry conditions

HAN Automotive is offering the Minor Intelligent Vehicles to all students that have a strong passion for automotive engineering and have successfully reached the level three qualifications (> 150 ECTS achieved) of a Bachelor program in Mechanical-, Automotive-, Electrical-(incl. Embedded) Engineering.

Type of minor: In-depth

Level: Academic level 6 European Classification Framework

Testing: Written exams, practices, assignments reports, presentations. Apart from the written exams, students mostly work in pairs or teams on a task.

Teaching type: Predominantly working in teams of two or three students putting theory into practice.

Language: English

Duration: The minor starts September 1st and finishes January of the following calendar year.

Certificate: At the end of the program a certificate will be issued to the successful student. This certificate is worth 30 ECTS.

Application: Students interested in international courses can apply via the HAN University site: www.hanuniversity.nl. For the minor Intelligent Vehicles please contact: Mr. J. Benders.

Location: Arnhem, The Netherlands

Further information

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