

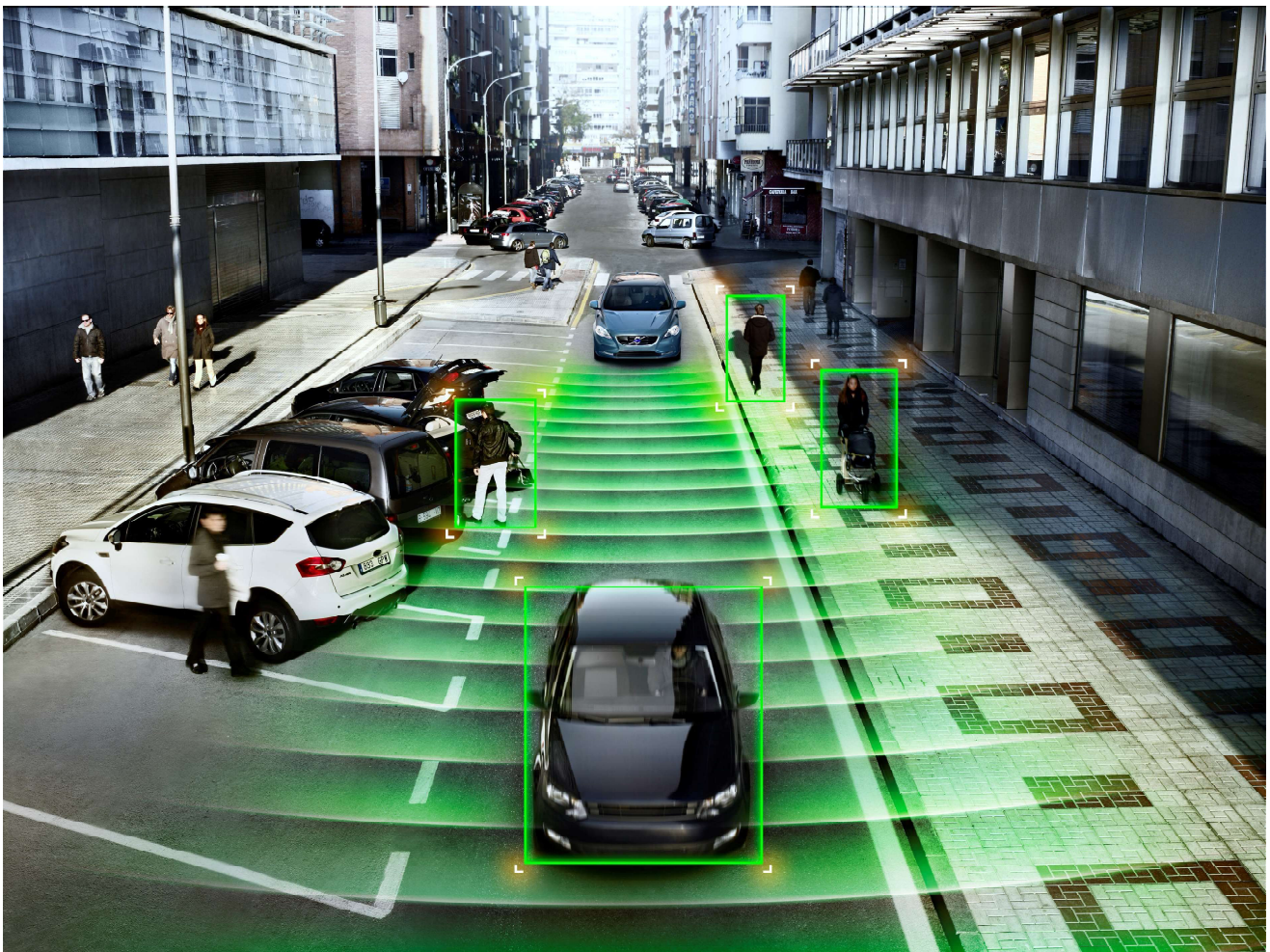
MASTER'S PROGRAMME

AUTOMOTIVE ENGINEERING



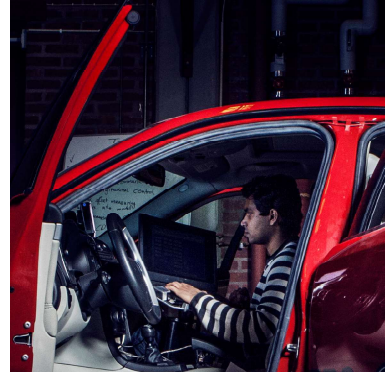
CHALMERS
UNIVERSITY OF TECHNOLOGY

The Master's Programme Automotive Engineering will provide you with an excellent education and preparation for a position within the engineering process in the automotive industry. The programme offers a wide range of courses particularly into the areas of powertrain, vehicle dynamics and vehicle safety. The courses are developed to reflect the need for reduced impact on the environment and human health. The program is well suited for emerging technologies such as electrification and automated driving. By integrating industrial collaboration into the courses and projects, the students are well prepared for engineering work in the automotive industry, and to contribute to a sustainable transportation.



Courtesy of Volvo Cars

WHY AUTOMOTIVE ENGINEERING?



Pooja Umeshkumar, CAE Engineer

PROGRAMME IDEA

COMPULSORY AND ELECTIVE COURSES:

The compulsory part of the programme covers a wide range of skills necessary for work in the automotive industry. In order to adapt to future trends and other related areas of expertise, a number of elective courses have been identified for the programme.

INTERNATIONAL TEAM WORK:

Since all industrial automotive product development is carried out in a team-based project environment, the programme emphasizes the importance of project work. Students are working in multi-cultural teams comprising many different skillsets and are developing interpersonal skills.

INDUSTRY CONNECTIONS:

The interconnection and collaboration with automotive industry is significant and includes guest lectures, student visits, laboratory exercises as well as input to project courses. The Master thesis projects at MPAUT are often carried out in industry.

CUTTING EDGE TEACHING:

The MPAUT courses combine teaching of traditional automotive engineering subjects and are using state-of-the-art applications and development tools. This prepares the students well for working in the industry.

* LEARNING BY DOING:

The students collect their own data for analysis in different courses, which brings a deeper understanding of the system and enhances the learning experience through practical involvement in these activities. The MPAUT programme has access to e.g. engines, vehicle simulators, active safety systems and field data to be used in courses.

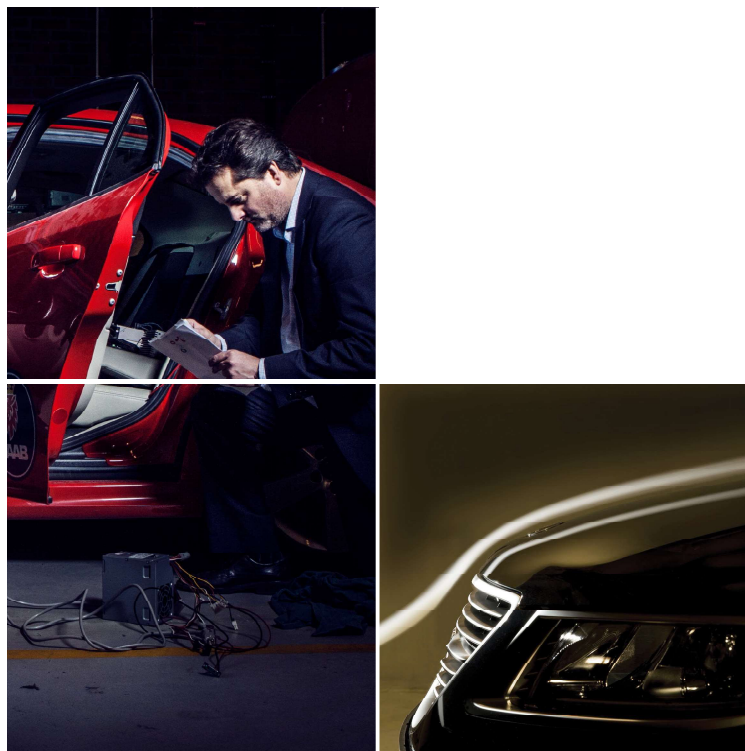
"The MPAUT programme let me select courses from a large selection of courses, including courses from other departments. Examinations require that you think logically and have an in-depth knowledge. The best thing with the MPAUT programme is that it gives many opportunities to connect directly with the automotive industries, e.g. guest lectures from the industry, projects with the industry. We also have opportunities to carry out our Master Thesis projects in the industries. Overall, I would say it has been a great experience and very good preparation for my work in the industry."

- Pooja Umeshkumar, CAE Engineer at CEVT.

MORE THAN USUAL COURSES

There are ample opportunities to deepen your knowledge in student organizations and projects. At Caster (Chalmers Automotive Simulator Technology Research) the students develop models and code (Simulink) to take the front seat while having fun! In the Chalmers EcoMarathon Projects the students work in their free time to further boost their competence in automotive engineering.





CAREER OPPORTUNITIES

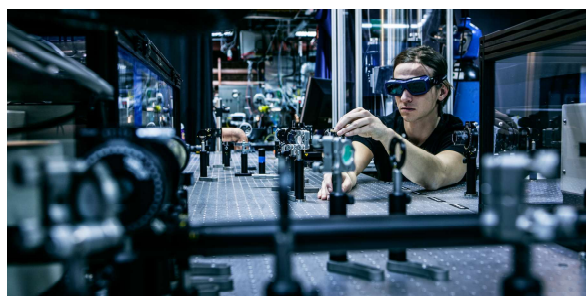
The programme will lead to professional roles within research and development, design, and testing of processes, systems and parts of automotive vehicles or other mechanical systems. Some of the career opportunities include development and evaluation of suspensions, engine processes, active and passive safety systems, hybrid (electrified) powertrains, stability of heavy vehicles, aerodynamics, thermal management and new opportunities in the area of autonomous driving. The holistic approach provided in the programme will give you a general knowledge that is especially well suited for early phases concept engineering and general management in the automotive industry

LINK TO INDUSTRY

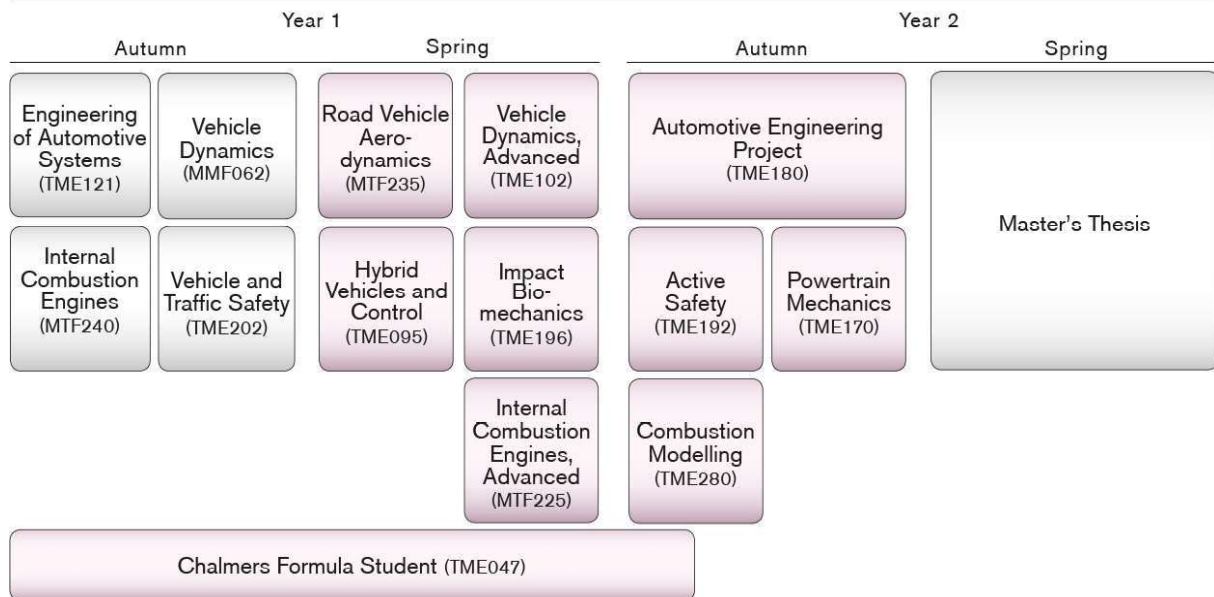
Today there are continuous challenges for the automotive industry in terms of new consumer demands, intelligent technologies, autonomous driving, electrification and legislation for safety and environmental issues, as well as financial pressure to manufacture vehicles at the lowest possible cost. To meet these demands, new advanced technologies are constantly introduced. In order for Swedish industry to remain competitive at an international automotive level, well-educated engineers and designers possessing general industry expertise, as well as specialized skills in key areas of automotive engineering are needed. The MPAUT responds to these challenges and constitute a vital contribution to the know-how of the regional, national and international automotive industry. The relevant employers of MPAUT graduates is not limited to vehicle manufacturers but also includes consultancy companies and suppliers of software, parts and systems.

LINK TO RESEARCH

Research in automotive engineering is one of the prioritised areas at Chalmers University of Technology. The Department of Mechanics and Maritime Sciences hosts or participates in several research centra including Vehicle and Traffic Safety Centre at Chalmers (SAFER), Combustion Engine Research Centre (CERC) and Swedish Hybrid Vehicle Centre (SHC). Chalmers is a partner in AstaZero, the world's first full-scale test environment for future road safety. In addition, the Research Vehicle Resource lab (ReVeRe) enable research and education to use real vehicle testing through supplying test vehicles and test preparation. In conjunction to these centra, high quality research is ongoing in fundamental as well as applied fluid and solid mechanics applied to vehicles, or with a more general focus. The research at the department of Mechanics and Maritime sciences support the MPAUT and the graduate schools at the department constitute a natural continuation of all three focus areas of the programme. Many of the courses in the MPAUT curriculum are also incorporated into the Ph.D. programmes.



AUTOMOTIVE ENGINEERING - COURSE PLAN



MANDATORY BLOCK OF COURSES (30cu)

These four courses (marked in grey) makes the basis of the automotive programme. It gives a system view on automotive engineering and a thorough insight into the three different focus areas.

SEMI MANDATORY COURSES (30cu)

At least 30 cu is needed (from the courses marked in pink) and enables the student to develop their knowledge into the preferred focus area.

ELECTIVE COURSES (30 cu)

These courses can be chosen from the semi-mandatory courses or from other masters programs at Chalmers. Recommended courses depend on the chosen focus area.

- Powertrain specialisation: CFD for Engineers (KKR070), Design and analysis of experiments (KBT120), Electric drives-1 (ENM051), Li-Ion battery systems for vehicles and energy storage applications (EEN015)
- Vehicle dynamics specialisation: Modelling and Simulation (ESS101), Rigid Body Dynamics (MMA092)
- Active safety specialisation: Autonomous Robots (TME290), Autonomous and Cooperation Vehicular Systems (DAT295), Applied Signal Processing (SSY130), Applied Mechatronic Design (SSY281)
- Impact biomechanics (passive safety) specialisation: Finite element method – structures (TME245), Mechanics of Solids (TME235), Rigid Body Dynamics (MMA092)



CHALMERS AUTOMOTIVE PROJECTS

In Automotive Engineering, teamwork and communication skills are much appreciated. At Chalmers, there is a good opportunity to practice these skills within our projects. In Chalmers Formula Student, a business concept of a light competitive vehicle is presented and a prototype is designed, built and tested. The powertrain is electric since 2014.

In the **Automotive Engineering Project**, industrially oriented projects are offered in cooperation with automotive industry. In **Chalmers EcoMarathon**, the aim is to further develop the Chalmers Eco vehicles to travel as far as possible for a given amount of energy.



CHALMERS
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Programme page: [https://www.chalmers.se/en/education/](https://www.chalmers.se/en/education/programmes/masters-info/Pages/Automotive-Engineering.aspx)

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