

Master of Science in Mechanical Engineering

Automotive and Motorsport Engineering

FA1



Contacts



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Track description

The automotive sector has always stood out as one of the most dynamic and innovative in the current industrial landscape, evolving to meet safety, economic and environmental sustainability needs.

Motorsport represents the opportunity to create new technologies for extreme performance that can then be applied to mass-produced vehicles.

By attending the Automotive and Motorsport Engineering track students will learn how to conceive, design, manufacture and test both the vehicle as a whole as well as vehicle components.

Faculty and industry partners focus on providing students with hands-on experience during the entire academic program.

Three specialistic paths are offered: Science and Technology, Aerodynamics, Noise Vibration Harshness.



Skills

Students will learn how to:

- model and design road and off-road vehicles
- model and design motorsport vehicles
- conceive and control hybrid and electric vehicles
- set-up the control stack for autonomous and unmanned vehicles
- analyse (eventually through a driving simulator) vehicle-driver interaction for innovative HMIs
- optimize vehicle components for lightweight and durability
- use numerical methods (such as multi-body, FEM and CFD) for complex vehicle analysis
- perform testing and validation of vehicle systems and components



FA1: Core Courses

Course Title	YEAR	SEM	ECTS	ECTS GROUP
Energy Conversion Technologies	1	1	5	5
Data Analysis for Future Transportation Systems	1	1	5	5
Control of Mechanical Systems	1	1	5	5
Advanced Dynamics of Mechanical Systems	1	1	10	10
Advanced Machine Design	1	2	10	10
Advanced Manufacturing Processes B	1	1	5	5

FA1: Track Specific Courses

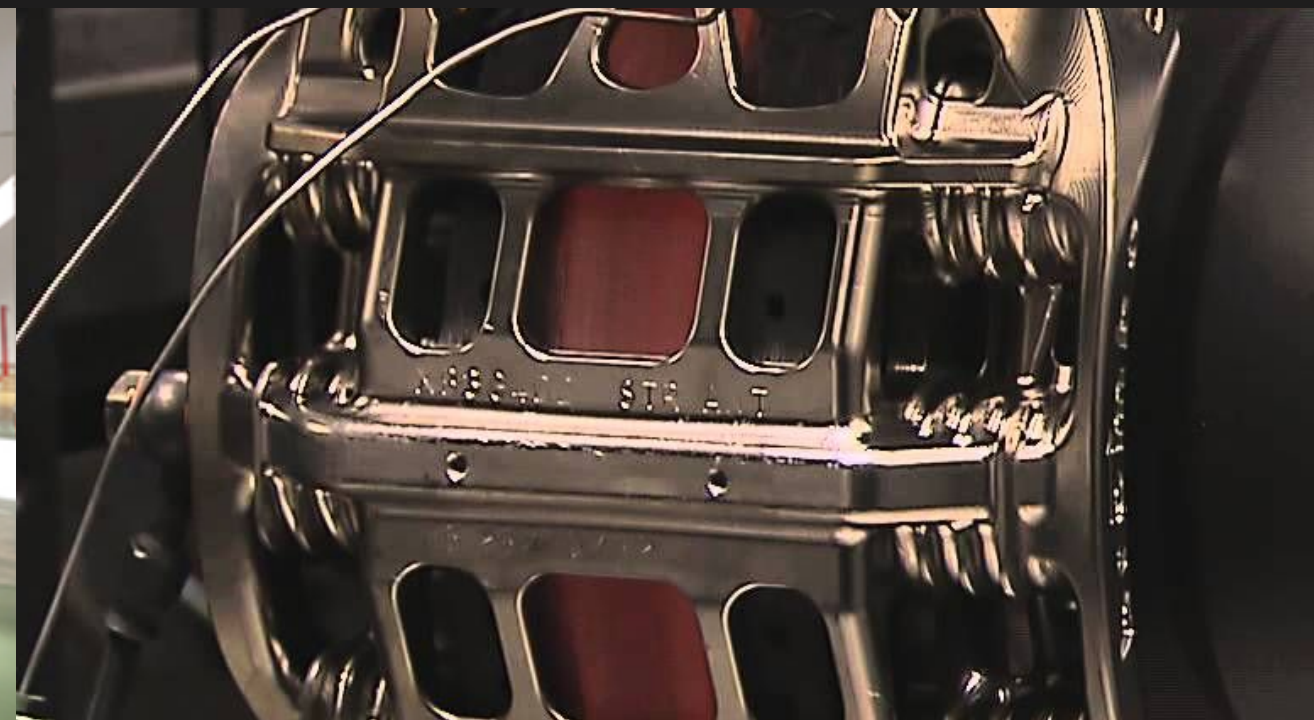
Course Title	YEAR	SEM	ECTS	ECTS GROUP
Vehicle Dynamics and Control A	1	2	10	10
Road and Off-road Vehicles	2	1	10	10
Internal Combustion Engines for Automotive Applications	2	2	5	10
Aerodynamics of Transport Vehicles	2	1	5	
Connected and Autonomous Vehicles	2	1	5	
Hybrid And Electric Vehicles	2	1	5	
Advanced Motorsport Engineering	2	2	5	
Vehicle Design (Optimal Design)	2	1	5	
Design and Construction of Automotive Electric Motors	2	1	5	10
Elective courses (Lightweight Design of Mechanical Structures, Advanced Tire Modeling and Testing, Motorcycle Dynamics, Vehicle Acoustics, Fuel Cells and Batteries, ...)	2	1-2	5	
Lab course (Destructive and Non-Destructive Testing of Composite Materials and Structures, Human-in-the-loop Dynamic Driving Simulator, Formula Student,Motostudent, Shell Eco Marathon, Virtual And Physical Prototyping, ...)	2	1-2	5	5

FA1: Master's Thesis

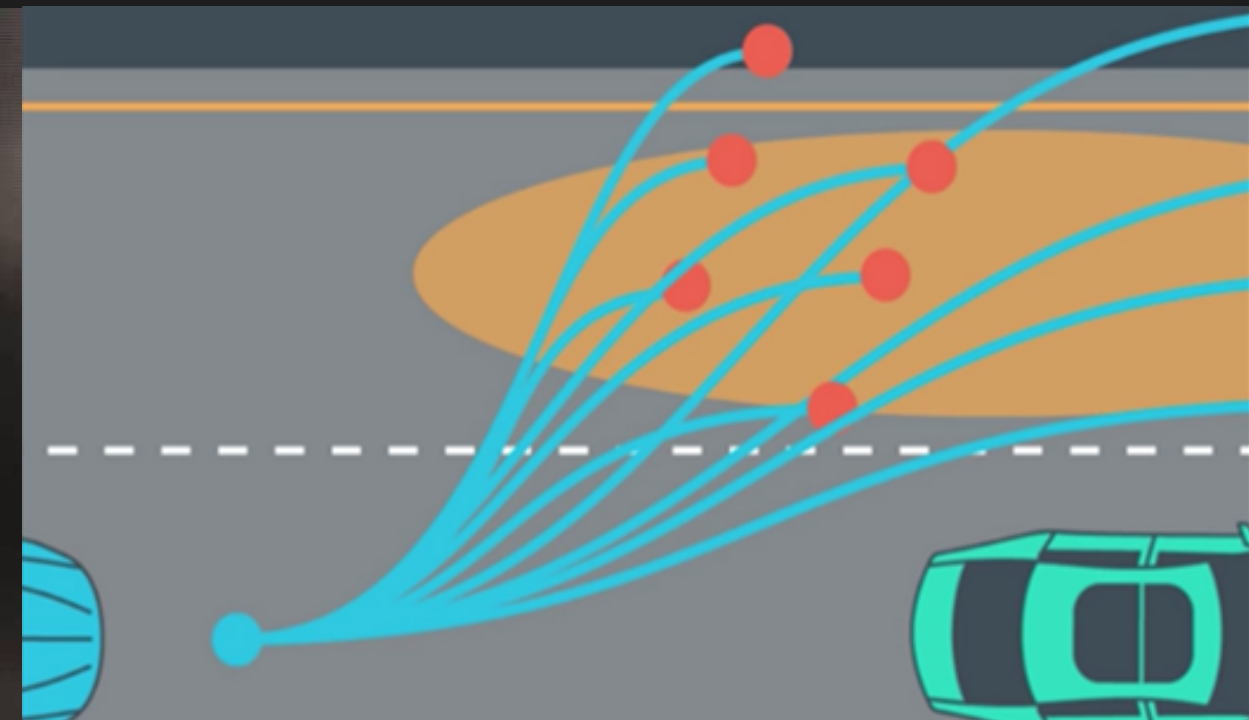
**Indoor testing of
vehicles**



**Design and
testing of F1
brakes**



**Optimal
trajectory for
autonomous
driving**



FA1: Master's Thesis

**Control of
vehicle
dynamics**

**Aerodynamic
study of road
vehicles**

**Tyre noise
assessment**

