



Learning at Auburn

Modern, up-to-date facilities allow our students to make the most of their experience in the classroom and in the lab. Ross Hall, home to the Department of Mechanical Engineering, was recently renovated as part of a transformational effort to create a flexible learning environment while retaining the classic look that reflects the historic core of the Auburn campus. The Shelby Center for Engineering Technology, whose first phase was completed in early 2008, is home to the Department of Industrial and Systems Engineering. Both provide exceptional undergraduate research project labs, "smart" classrooms and auditoriums as well as reconfigurable instructional laboratories in an environment that provides a sense of community to encourage collaboration among faculty and students.

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www.eng.auburn.edu/automminor



AUBURN UNIVERSITY

SAMUEL GINN
COLLEGE OF ENGINEERING

ENB0806IS1

Auburn University is an equal opportunity educational institution/employer.

Automotive Engineering and Manufacturing Minor



Auburn University

Automotive Engineering and Manufacturing Minor

The automotive industry is growing rapidly in the Southeast and consists of many firms from around the world involved with vehicle manufacture, quality, logistics, design and planning. The automotive engineering and manufacturing minor is a 15 credit-hour set of courses designed for students majoring in industrial and systems engineering or in mechanical engineering. Course work is taken during the junior and senior years.

Students enrolled in other degree majors can also take and complete this minor – if you feel that you would benefit from this sequence of courses, see your academic advisor for more information. Successful completion of one of the available minor tracks results in the awarding of the minor in automotive engineering and manufacturing.

The automotive engineering and manufacturing minor

- Enhances your ability to start a career in the Southeast's growing automotive industry, as well as in the national or international arena
- Increases your ability to find an internship prior to graduation
- Enables you to take part in undergraduate research opportunities in automotive and related industries
- Provides structured curriculum credit for participating in student vehicle teams

Courses

INSY 5330 Data Decision Making Using Six Sigma

This course is designed to provide an overview of Six Sigma, Lean Six Sigma, and Design for Six Sigma as well as provide the tools and training necessary to pass ASQ's Green Belt exam. Students learn project definitions and the roles of team members, process mapping, cause and effect tools, measurement system analysis, capability analysis, graphical techniques, FMEA's, confidence intervals, hypothesis testing as they relate to Six Sigma, correlation and regression, DOE, concept of control, review SPC, and learn the relationship between these tools and Six Sigma process improvement.

INSY 5800 Lean Manufacturing Systems

Lean manufacturing systems design and the methodology for designing lean production systems and manufacturing cells are examined in this course. The strategies explored are based on a new design for the factory called linked-cell manufacturing systems, which provide for a continuous flow or smooth movement of materials through the plant.



INSY 5830 Vehicle Technologies and Trends

Advances in automotive technology and the impact of future technologies on the design and manufacture of the automobile are investigated. In particular, this course covers vehicle design for alternative fuel vehicles, next generation vehicle body and interior design, telematic systems, and technological advancements in drive train systems (including autonomous vehicles). The impact of these advancements on the automotive supply chain is also addressed.

INSY 5840 Control of Manufacturing Floors and Processes

Students work within teams to apply the principles of computer aided manufacturing and the Toyota Production System (TPS) on the modern automated floor. The laboratory component features CNC controls, robots, programmable logic controllers (PLC), Kanban systems, DELMIA Catia and MasterCAM.

INSY 5860 Automotive Manufacturing Systems

This course reviews the history of automotive manufacturing and the automotive manufacturing process for a typical automotive assembly plant. Issues associated with automotive suppliers are presented in relation to these processes, as well as supply chain management, globalization, product and process improvement, quality control and costs.

MECH 4410 Engines

The application of basic thermodynamics and fluid mechanics to the prediction of the operating characteristics of internal combustion engines of various types is studied. Students will be able to understand the effect of internal combustion engine design parameters on performance and emissions.



MECH 4420 Vehicle Dynamics

An introduction to the basic mechanics governing vehicle performance is provided, including longitudinal, ride, and handling dynamics, through analytical and computer simulation tools. The development of mathematical models for the analysis and prediction of vehicle performance through simulation is discussed. Hands-on experience allows students to drive instrumented

test vehicles to gather vehicle data in order to perform analysis. The class culminates with a final project in which students design experiments, analyze data, and validate models by comparing data with simulation results, as well as test design modifications using computer aided simulation tools.

MECH 4430 Vehicle Design

Whole-vehicle design process for identifying and accomplishing objectives in powering, handling, structure, safety, and ergonomics is examined. The course focuses on design process, design project management, system requirement selection, structural design, design assessment, and written and oral presentation.

MECH 4440 Automotive Design Experience I

Practical application of automotive design methodology and automotive engineering analysis to the team-based, full-scale development of a racing vehicle from concept

identification to complete design specification is considered. Emphasis is on completeness, functionality, manufacturability, and cost effectiveness of structural, mechanical, electrical, hydraulic, pneumatic, data, control, and ergonomic systems, as well as integration into the whole vehicle.

MECH 4450 Automotive Design Experience II

Practical application of automotive fabrication, testing, and design development are studied, as well as technologies relevant to a team-based, full-scale creation of a racing vehicle of unique design. Emphasis is on schedule integration and performance, quality assurance and enhancement, data acquisition and interpretation, and on setting and achieving competitive targets. Evaluation is represented in international competitions.

Course by year

Automotive Engineering and Manufacturing Minor/ISE Track

Year	Fall Semester	Spring Semester
Junior	INSY 5800	MECH 4430 and INSY 5840
Senior	INSY 5860	INSY 5330 OR INSY 5830

Automotive Engineering and Manufacturing Minor/ME Track

Year	Fall Semester	Spring Semester
Junior	INSY 5800	MECH 4430 and MECH 4410
Senior	INSY 5860 and MECH 4420	

Automotive Engineering and Manufacturing Minor/SAE Car Teams

Approval of department and car team advisor required

Year	Fall Semester	Spring Semester
Junior	INSY 5800	MECH 4430 and INSY 5840
Senior	INSY 5860 and MECH 4440	MECH 4450

