Drive Into Knowledge With Automotive Tech Curriculum

Looking for resources to implement or enhance an automotive technology course? Macomb's Center for Advanced Automotive Technology (CAAT) has you covered! Through grants and partnerships, CAAT provides a wide range of free materials for educators at all levels.

Browse the catalog below for a list of available courses and their descriptions. To request specific curriculum materials, please complete the **Curriculum Request Form.** CAAT will review your request and provide the materials within 1–5 business days.

	Course Title	Brief Description
1	Automated, Connected and Intelligent Vehicles	This is an advanced automotive technology course designed for the final semester of an associate degree or advanced certificate program, focusing on the implementation and evolution of advanced driver assistance systems, including automation, connectivity, and autonomous decision-making to enhance vehicle safety
2	Automotive Cybersecurity for Automotive Technicians	This is an advanced course for the final semester of an associate degree or advanced certificate program, focusing on cybersecurity threats, attack vectors, protection methods, and standards related to connected and automated vehicles.
3	Experimental Testing of Vehicles	This is a community college course that enhances automotive engineering curriculum by developing hands-on skills in vehicle experimental testing, including sensor setup, data acquisition, experiment conduction, and analysis, supplemented by lectures and practical projects using tools like LabVIEW, myRIO, and MATLAB/Simulink.
4	Introduction to Hybrid and Electric Vehicle Engineering	This course provides an in-depth exploration of hybrid and electric vehicle engineering, focusing on mechatronic system design, power flow management, vehicle dynamics, and hands-on testing and simulation.

Questions? Contact us at: CAAT@macomb.edu

Center for Advanced Automotive Technology
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5	Modified ASE Certification Courses Including Hybrid/EV Impacts	Focusing on ASE Certification material, these thirteen short courses help prepare for certification in a variety of automotive technology topics, such as advanced engine performance, diagnostics, repair, electrical systems and more.
6	Battery Manufacturing Job Training	This 30+ hour safety program for Advanced Energy Storage Manufacturing operators covers OSHA standards and safety protocols, leading to an OSHA General Industry 30-hour Safety certification.
7	Hybrid and EV Overview Modules for Technician Workforce and General Public	This half-day course provides an overview of hybrid and electric vehicle safety, service procedures, and hands-on lab exercises for technicians and the general public.
8	Remanufacturing, Repurposing and Recycling Batteries	This course provides a comprehensive overview of battery technology, including hands-on labs for building, disassembling, assessing, charging, diagnosing and repurposing battery packs, with a focus on lithium-ion batteries used in electric and hybrid vehicles.
9	Project-Based High School STEM Curriculum: Designing and Building Electrathon Electric Vehicles	This project-based STEM curriculum guides students through designing, building and testing an electric vehicle for the Electrathon America race, integrating classroom and lab experiences with a focus on physics, energy and electricity for grades 9–12.
10	Exploratory Design and Engineering II	This is a project-based course for students, grades 7–9, that focuses on electric vehicle engineering, covering electronics, energy sources, mechanical design, and culminating in the design, build and testing of an electric vehicle.
11	Motor Control Systems for Advanced Automotive Propulsion Systems	This course prepares technicians and engineers for the electric and hybrid vehicle industry by teaching motor control systems, including DC motor performance, Matlab/Simulink programming, PID controller design and fault identification.
12	Energy Efficiency of Hybrid and Electric Vehicles Labs	This college course aims to equip students with analytical and practical skills to identify and test power losses in the powertrain systems of electric and hybrid-electric vehicles through lectures, laboratory experiments, and computer workshops.
13	IT 311 – Sensors Used in Connected and Automated Vehicles	IT 311 introduces students to the principles and applications of sensors such as GPS, MEMS, LIDAR, and Radar, covering kinematic models, maneuverability, and mobile robot positioning.
14	IT 312 – Navigation Techniques Used in Connected and Automated Vehicles	IT 312 introduces students to principles of autonomous navigation, GPS, inertial sensors, Kalman filtering, and integrated navigation systems, with a focus on mobile robot positioning and vehicle communication.
15	Design with Composite Materials	Design with Composite Materials is a 7 week course for community college students with CAD experience, covering properties, manufacturing processes and design guidelines of fiber-reinforced composite materials.
16	Short-Term Lightweight Metals Welding Courses	Four specialized courses each with a distinct welding focus: MECH 2700 Robotic Welding, NDTE 1010 Introduction to Non-Destructive Testing QA/QC, WELD 1410 Metallurgy and Material Testing, and WELD 2010 Aluminum Welding.
17	Designing with Aluminum for Automotive Technologies	This course equips students with foundational knowledge in engineering design, properties, manufacturing processes, and design guidelines of aluminum alloy materials, utilizing blended learning and flipped classroom approaches to explore real-life applications in automotive and other industries.
18	Joining Aluminum to Aluminum and Dissimilar Materials	This course focuses on providing essential knowledge and hands-on experience in aluminum joining techniques, tailored for community college students, technicians, and those in associate degree programs, with applications in automotive and various industries.
19	Embedded C Programming for Automotive Systems	This 4 credit introductory college course equips students with essential skills in programming automotive microcontrollers using C, covering embedded systems, software development processes, MISRA coding standards and practical applications in automotive technology.

Courses have been funded by the National Science Foundation and developed in collaboration with academic partners across the country.
For additional information on courses, such as content or NSF grant codes, please reach out to us directly at CAAT@macomb.edu.