AUTOMOTIVE TECHNOLOGY (SYLLABUS)

I. COURSE DESCRIPTION: This two-year automotive program provides practical hands-on training and experience for high school juniors and seniors, who are seriously considering making a career in the automotive industry. Students will spend approximately 75% of their time performing hands-on, industry-focused tasks. This, combined with classroom, student-participating lectures, reviews and demonstrations, will help the student build a solid background in: brakes; suspension and steering systems; cooling and lubrication systems; engine fundamentals, operation and rebuild; electrical and electronic systems; all servicing aspects; automotive detailing; vehicle safety inspections, tools and equipment, etc. There is also a strong emphasis on shop safety and industry expectations, as well as developing critical employability and leadership skills, and professionalism.

The student will also learn and use a variety of service manuals, lube guides, and on-line automotive service and repair sights. Students should also be in fair to excellent physical shape, as they will be required to stand for extended periods of time, lean over vehicle fenders, bend over to repair or service a vehicle, and squat down many times during the day. They may also be required to lift, unassisted, vehicle parts weighing as much as 30-50lbs.

Developing professionalism and sound employability and leadership skills are absolutely essential. And they are expected in the automotive industry. Further, students must work safely at all times, demonstrate initiative, display integrity, act responsibly, and show pride in workmanship and in one’s personal appearance if they want to be successful. To help students develop and attain these 21st Century Skills they will be trained, evaluated, and graded on them, in addition to the technical subject areas listed above. Having excellent attendance is also critical to achieve maximum benefit and success.

II. STUDENT OUTCOMES

Upon completion of this course, students will be able to:

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<th>Unit</th>
<th>Student Competencies:</th>
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| Reading       | • Understand and apply reading content to practical hands-on applications  
• Apply understanding of text organizational structures  
• Apply understanding of complex information, including functional documents, to perform a task  
• Analyze web-based and other resource materials for relevance in answering research questions |
| Communication | • Applies a variety of listening and observation skills/strategies to recall and interpret information  
• Uses communication skills that demonstrate respect  
• Applies skills and strategies to contribute responsibly in a group setting |
| Writing       | • Produces documents used in a career setting  
• Uses legible handwriting  
• Applies capitalization rules  
• Applies punctuation rules  
• Uses complete sentences in writing  
• Applies paragraph conventions |
| Science       | • Explain Pascal’s Law  
• Explain Newton’s 1st and 2nd Laws of Motion |
|Mathematics| Analyze a problem situation to determine the question to be answered  
|**Leadership**| Demonstrate correct understanding of adding, subtracting, multiplying and dividing fractions, decimals, and whole numbers  
| | Demonstrate understanding and converting of SAE standard and Metric systems in tools and various document/work sheets  
| | Select and apply strategies to solve problems (Cause, Concern, Correct, etc)  
|Employability| Demonstrate oral, written and presentational skills and understand how to apply those skills  
| | Analyze the complex responsibilities of the leader and follower, and demonstrate the ability to both lead and follow  
| | Lead by example, ‘Follow’ with self-discipline, support and loyalty to the leader  
| | Demonstrate integrity (daily)  
| | Demonstrate personal responsibility (daily)  
| | Demonstrate self-discipline (daily)  
| | Demonstrate a willingness to learn and participate  
| | Demonstrate a willingness to fill leadership positions  
| | Demonstrate social responsibility in classroom, shop, family, community, business and industry  
| | Demonstrate understanding of organizational skills necessary to be a successful leader and citizen, and practice those skills in school and in real life  
| | Show respect for all staff and students  
|CA-1 Develop employability skills| Demonstrate the ability to identify, organize, plan and allocate resources  
| | Organize and maintain information  
| | Interpret and communicate information  
| | Demonstrate the ability to work with a variety of technologies: printed and electronic manuals, tools and equipment  
| | Be conscience of equipment needs/repairs and be willing to inspect, troubleshoot and maintain tools and equipment  
| | Demonstrate understanding of intent and proper procedures for set up and operation of all shop equipment  
| | Demonstrate professional abilities to communicate, participate and advocate effectively in pairs, small groups/teams, and large groups in order to reach common goals  
| | Demonstrate working effectively and efficiently on teams, teaching others, serve customers, lead, and work with culturally diverse backgrounds  
| | Contribute to team effort (daily, whether the leader or member)  
| | Demonstrate willingness to properly teach others  
| | Evaluate industry, organizations and careers based on multiple sources of research and information  

- Explain Ohm’s Law  
- Explain Torque  
- Explain Horsepower  
- Explain Kinetic Energy
to secure and keep employment in chosen field

- Demonstrate dedicated interest in career pathway, including career ladders
- Develop a career plan and alternatives
- Create professional cover letters and resumes
- Demonstrate on a daily basis the employability skills needed to get and keep a job/career
- Demonstrate good interviewing skills
- Demonstrate un-waivered ability and willingness to follow directions
- Demonstrate daily ability to be self-disciplined
- Demonstrate daily personal responsibility
- Show respect for all staff, students and employees

**CA-2 Communicate in multiple modes to address needs within the career field**

- Demonstrate reading skills and strategies to work-related documents (manuals, charts, text book, electronic info, etc)
- Locate and apply information from books, journals, magazines, internet, and other sources
- Apply legible and basic writing skills to program and industry-related assignments and documents
- Explain information presented graphically
- Apply active listening skills to obtain and clarify information
- Lead formal and informal group discussions

**CA-3 Solve problems using critical thinking**

- Demonstrate skills used to define and analyze problems
- Explain strategies used to formulate ideas, proposals, and solutions to problem(s) (logical steps from start to finish WO)
- Implement and then evaluate solution(s)
- Select potential solutions based on reasoned criteria (troubleshoot)

**CA-4 Demonstrate Positive Classroom and Shop (Workplace) Behavior**

- Demonstrate time management and task prioritization skills (follow routine, do not procrastinate)
- Explain and demonstrate the importance of following workplace etiquette/protocol
- Demonstrate self-management skills
- Describe and demonstrate the importance of having and maintaining a positive attitude
- Explain and demonstrate the importance of taking pride in workmanship
- Demonstrate initiative, self-discipline and personal responsibility by turning in all assignments on time
- Demonstrate willingness to learn and further develop skills

**CA-5 General Automotive Shop Procedures and Personal Safety**

- Comply at ALL times with required use of safety glasses, hearing protection and all safety required shoes and clothing
- Identify and follow all shop safety rules and procedures
- Identify location and use of eye wash station
- Identify the location of and the posted evacuation routes
- Identify location of and proper use of fire extinguishers
- Maintain professional and industry-proper personal appearance at all times
- Secure hair and remove all jewelry
- Locate and demonstrate knowledge of material safety data sheets (MSDS)
- Demonstrate proper placement of floor jacks and jack/safety stands
| C-6 Tools and Equipment | • Demonstrate safe and proper procedures for using tools and equipment  
• Demonstrate proper ventilation procedures while working in shop and courtyard areas  
• Explain the reasons for and your willingness to follow the “Zero tolerance for horseplay” in the shop, courtyard or classroom. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-7 Looking for Information | • Identify hand tools and specialty tools in automotive applications  
• Identify standard and metric designation  
• Demonstrate safe handling and use of tools and equipment  
• Demonstrate proper care, cleaning, storage and maintaining of tools and equipment |
| C-8 Preparing Vehicle for Service | • Locate and use paper and electronic service and repair information  
• Locate Vehicle Identification Number (VIN), and production date code  
• Apply knowledge of VIN information  
• Demonstrate awareness and knowledge of other vehicle information labels (tire, emissions, etc.) |
| C-9 Preparing Vehicle for Customer | • Identify information needed and service requested on WO  
• Identify purpose and demonstrate proper use of fender covers, mats, etc.  
• Identify and demonstrate use of three C’s (Concern, Cause, Correction)  
• Complete WO to include customer info, vehicle ID info, and three C’s |
| C-10 Basic Vehicle Service | • Ensure vehicle has been washed, dried, vacuumed (floor mats in place)  
• Copy of 40-point inspection given to customer |
| C-11 Automatic Transmissions | • Determine fluid type requirements and locate all fluid check points  
• Check ALL fluids (oil, automatic transmission/transaxle, differential(s), manual transmission, master cylinder, coolant, power steering, windshield washer reservoir  
• Explain which fluids get checked with the engine off and which ones with the engine on  
• Check condition of belts, wiper blades, tires (and pressure), exhaust system, lights and air filter |
| C-12 Manual Drive train and Axles | • Perform visual inspection of transmission, check for leaks, and fluid level and condition  
• Perform transmission service  
• Torque pan bolts  
• Identify and select proper fluid and proper amount and refill  
• Explain final steps needed to complete service |
| | • Inspect manual transmission and differential for damage, fluid loss, etc.  
• Drain and fill transmission/transaxle and final drive  
• Inspect clutch slave and master cylinder, lines, hoses, etc.  
• Inspect CV assemblies |
| C-13 Automotive Engines | • Demonstrate knowledge of the four-stroke engine  
|                       | • Identify all internal and external parts of an engine  
|                       | • Perform pressure test on various cooling systems  
|                       | • Using ALL appropriate work sheets, manuals, tools and equipment perform oil, lube and filter changes to industry standards and times  
|                       | • Inspect engine assembly for various leaks, identify what is leaking, and from where it is leaking  
|                       | • Identify and demonstrate proper use of specialty tools needed for disassembly and assembly of an engine |
| C-14 Steering and Suspension | • Locate and Identify Steering and Suspension components  
|                        | • Explain purpose/function of S&S components  
|                        | • R&R shocks and struts  
|                        | • Dismount & mount tires  
|                        | • Rotate and balance tires  
|                        | • R&R various steering system components  
|                        | • Explain tire sidewall information  
|                        | • Reinstall wheel, find proper torque and torque lug nuts |
| C-15 Brakes | • Identify Brake system components  
|             | • Clean brakes and Perform a M.A.D. brake inspection  
|             | • Inspect drum brake components, determine needed repairs, remove and replace shoes and other hardware  
|             | • Inspect disc brake components, determine needed repairs, remove and replace pads and other hardware  
|             | • Resurface drums on brake lathe, determine if still serviceable  
|             | • Resurface rotors using standard lathe and On-car lathe, determine if still serviceable  
|             | • Bleed brake system |
| C-16 Electrical/Electronic Systems | • Explain Ohm’s Law  
|                              | • Demonstrate proper and safe use of a Multimeter  
|                              | • Determine if a fuse, wire, bulb, or circuit is good and has continuity  
|                              | • Perform battery load test. Determine if still serviceable  
|                              | • Diagnose the cause of a dim or no-light operation, determine necessary action  
|                              | • Explain proper and safe procedure of jump-starting a vehicle  
|                              | • Perform battery charge  
|                              | • Demonstrate knowledge of the causes and effects of shorts, grounds, opens, and resistance problems  
|                              | • Demonstrate proper cleaning and servicing of a battery and related components |
| C-17 Heating and Air Conditioning Systems | • Identify and inspect air conditioning components  
|                                         | • Locate refrigerant label and identify specified refrigerant type  
|                                         | • Conduct performance test of heater and AC ventilation system  
|                                         | • Inspect and replace cabin air filter |
| C-18 Engine Performance | • Perform cylinder cranking compression test  
|                         | • Perform cylinder leakage test  
|                         | • Remove and replace secondary ignition components  
|                         | • Identify engine cooling system components, location and their function  
|                         | • Identify engine lubrication system components, location, and their function  
|                         | • Identify electrical system components and their functions |
III. COLLEGE CREDIT
Students, who earn a 3.0 GPA in this program, may qualify for up to six college credits in Automotive Brakes through Clover Park Community College. (Other colleges may be added to this Tech Prep program in the future). Note: due to state funding, this opportunity is at risk. Check with your teacher.

IV. EQUIVALENCY CREDIT
Students may earn equivalency credit in a general academic subject area while completing this course. The following equivalency credit may be earned in this class: .5 in Math; .5 in Science IF your sending school accepts the equivalency of this program.