



**AUTOMOTIVE TECHNOLOGY AS A CAREER**  
**Program Advisor/Instructor, Denis Samson: (360) 538-4131 or 538-4011**



<http://www.ghc.edu/voc/automotive.pdf>

# AUTOMOTIVE TECHNOLOGY

## As a Career

This program is designed to train individuals to engage in the servicing and maintenance of a variety of vehicles and manufacture. Instruction includes analysis of vehicle systems such as Fuel systems, Ignition systems, Automatic and Manual drive-trains, Suspension systems, Brake systems, Electronic controlled systems and Climate control systems.

The Automotive occupation employs more than 17,800 persons in the State of Washington. There is currently a shortage of journey-level technicians. Recent studies show that employers are reluctant to hire entry-level workers without completion of vocational training or substantial on-the-job training. The complexity of modern vehicles is requiring that students entering the job market need good skills in electrical and electronic analysis and repair.

### **Students who successfully complete this program will be able to:**

- Apply fundamentals of Automotive service training, including the basics of automotive analysis and repair, Pre-delivery inspection and Warranty repair procedures.
- Identify, inspect, disassemble and assemble basic components of automotive systems.
- Apply knowledge of the function, construction, operation, analysis and servicing of automotive systems and sub-systems.
- Use current state of the art analysis tools such as scan tools, electronic analysis equipment, electrical diagnostic tools and computer-generated information.
- Apply knowledge and understanding of electrical principles, semi conductors, microprocessors and wiring diagrams to diagnose and repair malfunctions in modern day vehicle systems.
- Test, service and repair heating and air conditioning/climate control systems.

### **Job titles that may be obtained through training:**

- Automotive Technician
- Alignment Technician
- Transmission Rebuilder
- Power-train Specialist
- Under-car Specialist
- Pit Crew chief
- Service Manager
- Shop owner

### ***Job Opportunities and Salary Expectations***

For job opportunities and salary expectations, please see: <http://www.workforceexplorer.com/>

### ***Funding Opportunity***

Students who are interested in completing the Automotive program may qualify for an additional funding option. Please see: <http://ghc.edu/Opportunity> for details.

### ***What Do I Need To Do First?***

- **Apply for Admission** (<https://admissions.ctc.edu/applicant/welcome.cfm>)
- **Request Official Transcripts** from high school, previous colleges or GED certificate. Have them sent directly to GHC.
- **Take the College Placement Test (CPT)**. Make an appointment at GHC Counseling Center (360-538-4099 or toll-free 1-800-562-4830). The CPT is not required if 100 level English and math were completed at another college.
- **Meet with an entry advisor.**



## **AUTOMOTIVE TECHNOLOGY**

### **Associate in Technology Degree**

#### **Recommended Preparation for AUTO programs.**

*Prerequisite requirements must be fulfilled prior to enrollment in most required program courses. Prerequisite requirements are listed together with course titles and descriptions of required program courses in this catalog.*

#### **Prerequisite Requirements**

*Placement in ENGL 060, MATH 060, READ 080 and instructor permission is required prior to enrollment in core courses in this program.*

#### **Core Courses (96 credits)**

		<b><u>Credits</u></b>
AUTO 111	Brakes/Suspension/Steering	16
AUTO 112	Electrical/Electronics/ABS	16
AUTO 113	Engines/Electrical/Tune-up/Ignition	16
AUTO 211	Power Train/Transmissions (Manual and Automatic)	16
AUTO 212	Fuel Systems/Electronic/Computer Controls	16
AUTO 213	Advanced Engine Performance/Air Conditioning/Heating	16

#### **Support Courses (6 credits)**

WELD 101	Related Welding I	6
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#### **General Education Courses (13-15 credits)**

ENGL& 101	English Composition I	5 <b><u>or</u></b>
ENGL 150	Vocational/Technical/Business Writing	
MATH 100	Vocational/Technical Math (or higher)	5
PSYC& 100	General Psychology	5 <b><u>or</u></b>
PSYCH 106	Applied Psychology	3 <b><u>or</u></b>
SOC& 101	Introduction to Sociology	5

#### **Elective Courses (1-5 credits)**

AUTO 224	Work Experience	1-5
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*Elective courses must be approved by the student's academic advisor at Grays Harbor College.*

***Minimum Credits Required***

***116+***  
***3 PE credits***

***NOTE: When students return to the automotive degree program after a break in enrollment, they may be required to retake previously completed courses. The faculty will make this determination and will take the length of absence and related work experience into consideration when making this decision.***

Grays Harbor College complies with all Federal and State rules and regulations and does not discriminate on the basis of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled or Vietnam era veteran.



## **AUTOMOTIVE TECHNOLOGY**

### **Certificate of Completion**

**Recommended Preparation for AUTO programs.**

*Prerequisite requirements must be fulfilled prior to enrollment in most required program courses. Prerequisite requirements are listed together with course titles and descriptions of required program courses in this catalog.*

**Prerequisite Requirements**

*Placement in ENGL 060, MATH 060, READ 080 and instructor permission is required prior to enrollment in core courses in this program. Students select any three (3) of the six (6) core courses listed.*

**Core Courses (48 credits)**

		<b><u>Credits</u></b>
AUTO 111	Brakes/Suspension/Steering	16
AUTO 112	Electrical/Electronics/ABS	16
AUTO 113	Engines/Electrical/Tune-up/Ignition	16
AUTO 211	Power Train/Transmissions (Manual and Automatic)	16
AUTO 212	Fuel Systems/Electronic/Computer Controls	16
AUTO 213	Advanced Engine Performance/Air Conditioning/Heating	16

**General Education Courses (13-15 credits)**

ENGL& 101	English Composition I	5 <b>or</b>
ENGL 150	Vocational/Technical/Business Writing	5
MATH 100	Vocational/Technical Math (or higher)	5
PSYC& 100	General Psychology	5
<b>or</b>		
PSYCH 106	Applied Psychology	3 <b>or</b>
SOC& 101	Introduction to Sociology	5

**Elective Courses (1-5 credits)**

AUTO 224	Work Experience	1-5
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*Elective courses must be approved by the student's academic advisor at Grays Harbor College.*

***Minimum Credits Required***                      **62**

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***Students may earn a Certificate of Achievement in each level of Automotive Technology***

*Prerequisites: Placement in ENGL 060, MATH 060, READ 080 and instructor permission is required prior to enrollment in core courses in this program.*

**AUTOMOTIVE TECHNOLOGY LEVEL 1**

***Certificate of Achievement***

AUTO 111 Brakes/Suspension/Steering 16 credits

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**AUTOMOTIVE TECHNOLOGY LEVEL 2**

***Certificate of Achievement***

AUTO 112 Electrical/Electronics/ABS 16 credits

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**AUTOMOTIVE TECHNOLOGY LEVEL 3**

***Certificate of Achievement***

AUTO 113 Engines/Electrical/Tune-up/Ignition 16 credits

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**AUTOMOTIVE TECHNOLOGY LEVEL 4**

***Certificate of Achievement***

AUTO 211 Power Train/Transmissions (Manual and Automatic) 16 credits

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**AUTOMOTIVE TECHNOLOGY LEVEL 5**

***Certificate of Achievement***

AUTO 212 Fuel Systems/Electronic/ Computer Controls 16 credits

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**AUTOMOTIVE TECHNOLOGY LEVEL 6**

***Certificate of Achievement***

AUTO 213 Advanced Engine Performance/Air Conditioning/Heating 16 credits

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# AUTOMOTIVE TECHNOLOGY PROGRAM COURSE DESCRIPTIONS

## **AUTO 111**

### **Brakes/Suspension/Steering**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

The foundation of Automotive Technology provided in this course includes a study of safety rules and procedures, use of shop tools, equipment, steering, suspension, and alignment procedures currently in use by the automotive industry. This course provides theory and application of conventional and strut-type suspension systems and modern braking systems. The student is introduced to conventional and rack and pinion types of steering systems, applies two-wheel and four-wheel alignment procedures, applies tire and wheel balance procedures. The second part of this course is a study of brakes and brake control systems, including brake system hydraulics and hardware. The student will practice brake service procedures, brake performance, diagnostic, and troubleshooting methods. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

## **AUTO 112**

### **Electrical/Electronics/ABS**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

An introduction to the fundamental laws of electricity and the principles of magnetism and induction. The course will include a study of Ohm's Law and Kirchoff's Laws of Electricity as well as electrical circuit schematic reading, wire repair and use of electrical test equipment. Also included will be a study of the automotive batteries, starting systems and charging systems and ignition systems in current use. The second portion of this course includes the principles of Anti-Lock brake systems. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

## **AUTO 113**

### **Engines/Electrical/Tune-up/Ignition**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

The student will be introduced to engine construction, valve and camshaft arrangements, cooling systems, and lubrication systems. The student will use applications of engine teardown/reassembly methods, measurement techniques, and part wear/failure analysis to make diagnosis of engine systems. Tune-up and troubleshooting with electrical and electronic test equipment will be emphasized. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

## **AUTO 211**

### **Power Train/Transmissions/Manual and Automatic**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

This course is a study of the vehicle power train and methods of delivering power from the engine to the drive wheels. Topics of study will include details of power flow in a manual transmission/transaxle and automatic transmission/transaxle, gear ratios, driveline components and construction, differential components, clutch systems, transfer cases, and drive axles. Much emphasis will be given to diagnosis and troubleshooting techniques. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

## **AUTO 212**

### **Fuel Systems/Electronic/Computer Controls**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

This course is an advanced study of the fuel management systems presently used in current emission, fuel economy and performance requirements of the modern automobile. The course includes an in-depth study of fuel injection systems used on domestic and foreign vehicles. Included in the class will be identification of components, on car diagnosis, replacement of components. Utilization of modern test equipment such as scanners and analyzers will be stressed. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

## **AUTO 213**

### **Advanced Engine Performance/Air Conditioning/Heating**

**16 Credits**

*Prerequisites: Placement in MATH 060 and ENGL 060; or instructor permission.*

This course is an advanced study of the equipment that is used in diagnosing the modern automobile. This course will include the use of diagnostic equipment such as, current industry engine analyzers, lab scopes, scanners, multi-gas analyzers and various meters and sensor testers. A study of the principles of refrigeration, and the heating and air conditioning systems currently used by the automotive industry including manual, semiautomatic, and automatic systems. The course will include details of the electrical control circuits for the compressor, blower, and coolant fan(s). The description, purpose and function of air conditioning system components are explained in this course, and service and repair procedures will be presented and practiced by the student. Safety procedures for handling R-12 and 134-A are discussed. 8 lecture hours; 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

# AUTOMOTIVE TECHNOLOGY PROGRAM COURSE DESCRIPTIONS

## **AUTO 224**

**1-5 Credits**

### Cooperative Work Experience

*Prerequisite: Instructor permission.*

Students participate in on-the-job training as volunteers or for pay. Students achieve specific learning objectives based on job-related conferences, faculty work-site visitations, and other appropriate assignments. 5-25 hours per week. Vocational program course. May be used as a general elective in the AA degree.

## **ENGL& 101**

**5 Credits**

### English Composition I

*Prerequisite: Appropriate English placement test score or a grade of "C-" or better in ENGL 095.*

ENGL 101 emphasizes the basic rhetorical principles and development of expository and argumentative prose. Included is an introduction to the research methods necessary for evidence-backed writing. Skills gained in this course should help students improve their performance of such tasks as writing for a variety of purposes and audiences, as well as writing informative and persuasive essays and research-backed reports, projects and papers. 5 lecture hours. Satisfies writing skills requirement for the AA degree.

## **ENGL 150**

**5 Credits**

### Vocational/Technical and Business Writing

*Recommended Preparation: Competence in basic computer operation or concurrent enrollment in CIS 100.*

*Prerequisite: Appropriate English placement score or a grade of "C-" or better in ENGL 095.*

This course is designed for both vocational/technical and business students. It emphasizes written and oral communication required in the world of work. Major topics include business letters and memorandums, formal and informal reports, computer graphics, basic principles of technical writing, and oral presentations. 5 lecture hours. Vocational program course. May be used as a general elective in the AA degree.

## **MATH 100**

**5 Credits**

### Vocational Technical Mathematics

*Prerequisites: A grade of "C-" or better in MATH 059 or MATH 060 or appropriate placement score.*

This course is designed to meet the needs of the vocational-technical student. Topics will include powers and roots, signed numbers, formulae manipulation, plane and solid geometry, trigonometry and specialized formulae. 5 lecture hours. Vocational program course. May be used as a general elective in the AA degree.

## **PSYC& 100**

**5 Credits**

### General Psychology

*Recommended Preparation: Placement in ENGL& 101.*

An introduction to psychology utilizing lectures and group exercises. Deals with the psychology of behavior, development, learning, cognition, motivation and emotion, perception, memory, and both normal and abnormal personalities. Provides an overview of modern psychology in terms of biological, social and intrapsychic factors. 5 lecture hours. Satisfies social science distribution area D requirement or specified elective for the AA degree.

## **PSYCH 106**

**3 Credits**

### Applied Psychology

Applications of theory and current research in psychology with major topics of personality, decision making, communications, motivation, learning and the workplace. Focuses on individual and group thought and behavior in the world of work. Emphasis is placed on change, personal and professional growth. 3 lecture hours. May be used as a general elective in the AA degree.

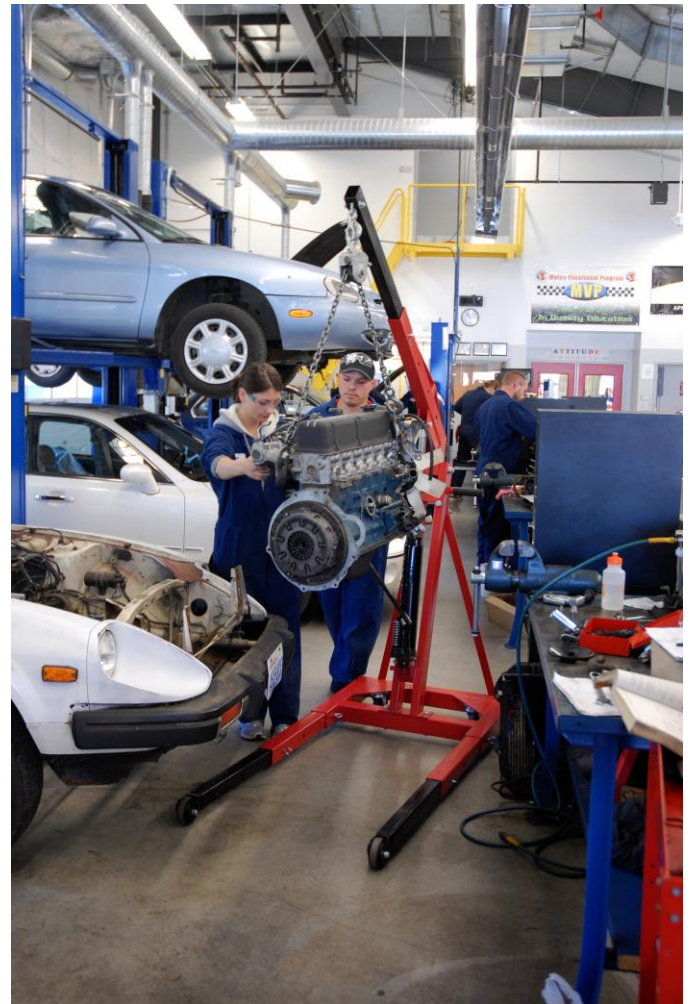
## **SOC& 101 (formerly SOC 110)**

**5 Credits**

### Introduction to Sociology

*Recommended Preparation: ENGL 095 or placement in ENGL& 101.*

An introduction to the principles, concepts, theories and methods of the sociological perspective. Emphasis is placed upon relating sociological ideas to national, community, and individual levels. 5 lecture hours. Satisfies social science distribution area C requirement or specified elective for the AA degree.



# GRAYS HARBOR COLLEGE - Typical Student Schedule

*AUTOMOTIVE TECHNOLOGY – ASSOCIATE IN TECHNOLOGY DEGREE*

*AUTOMOTIVE TECHNOLOGY – CERTIFICATE OF COMPLETION*

(students completing a Certificate of Completion select any three (3) of the six (6) core courses)

## 1<sup>st</sup> Quarter

Course #	Course Title	Credits
AUTO 111	Brakes/Suspension/Steering	16
ENGL 150	Vocational/Technical/Business Writing	5
<b>TOTAL QUARTER CREDITS</b>		<b>21</b>

## 2<sup>nd</sup> Quarter

Course #	Course Title	Credits
AUTO 112	Electrical/Electronics/ABS	16
WELD 101	Related Welding I	6
<b>TOTAL QUARTER CREDITS</b>		<b>22</b>

## 3<sup>rd</sup> Quarter

Course #	Course Title	Credits
AUTO 113	Engines/Electrical/Tune-up/Ignition	16
MATH 100	Vocational/Technical Math (or higher)	5
<b>TOTAL QUARTER CREDITS</b>		<b>21</b>

## 4<sup>th</sup> Quarter

Course #	Course Title	Credits
AUTO 211	Power Train/Transmissions (Manual and Automatic)	16
PSYCH 106	Applied Psychology	3
<b>TOTAL QUARTER CREDITS</b>		<b>19</b>

## 5<sup>th</sup> Quarter

Course #	Course Title	Credits
AUTO 212	Fuel Systems/Electronic/Computer Controls	16
AUTO 224	Work Experience	1
<b>TOTAL QUARTER CREDITS</b>		<b>17</b>

## 6<sup>th</sup> Quarter

Course #	Course Title	Credits
AUTO 213	Advanced Engine Performance/Air Conditioning/Heating	16
<b>TOTAL QUARTER CREDITS</b>		<b>16</b>

*PLEASE NOTE: Students may substitute ENGL& 101 for ENGL 150; PSYC& 100 or SOC& 101 for PSYCH 106, and WELD 102 for WELD 101.*

# AUTOMOTIVE TECHNOLOGY TOOL LIST

Each participant in automotive technology programs is required to purchase the tools listed below. Items in parenthesis ( ) are recommendations for type and size.

## SOCKET SETS

### 1/4" Drive Set

- 1 1/4" Drive ratchet (4" to 5½" in length)
- 1 1/4" Drive standard socket set (3116" to 3/8" deep and shallow 6 point)
- 1 1/4" Drive metric socket set (5mm to 12mm deep and shallow 6 point)
- 1 Extension (6")
- 1 Drive handle
- 1 Adapter 1/4" to 3/8"

### 3/8" Drive Set

- 1 3/8" Drive ratchet (approximately 8" in length)
- 3 3/8" Drive extensions (1", 3", 12")
- 1 3/8" Drive standard socket set (3/8" to 7/8" deep and shallow 6 point)
- 1 3/8" Drive metric socket set (19mm to 19mm deep and shallow 6 point)
- 2 3/8" Drive spark plug sockets (5/8" and 13/16" (flex recommended))
- 1 3/8" universal joint
- 1 Set Torx drive bits (T27 to T50 (tamper sets preferred))
- 1 Adapter 3/8" to 1/4"
- 1 Adapter 3/8" to 1/2"

### 1/2" Drive Set

- 1 1/2" Drive ratchet (approximately 10" in length)
- 1 1/2" Drive breaker bar (approximately 18" in length)
- 1 1/2" Drive standard socket set (7/16" to 1")
- 1 1/2" Drive metric socket set (13mm to 24mm)
- 2 1/2" Drive extensions (3", 10")
- 1 1/2" Drive wheel lug impact socket 3/4" & 13/16"
- 1 1/2" Drive wheel lug impact socket 19mm & 21mm
- 1 Impact air wrench
- 1 Adapter 1/2" to 3/8"

## WRENCHES

- 1 Set standard combination box/open end wrenches (1/4" to 1")
- 1 Set metric combination box/open end wrenches (9 to 19mm)
- 1 Set standard Allen wrenches
- 1 Set metric Allen wrenches
- 1 Set standard flare wrenches (3/8" to 3/4")
- 1 Set metric flare wrenches (10mm to 19mm)
- 1 Crescent wrench (10")
- 1 Pair standard slip joint
- 1 Pair diagonal cutting
- 1 Pair needle nose
- 1 Pair channel lock (12")
- 1 Pair vise grip (10")

### **SCREWDRIVERS**

- 5 Straight blade — one each: Stub, very small, small, medium, large
- 4 Phillips — one each: #2 Stub, #1, #2, #3
- 1 Set Torx drive screwdrivers

### **MISCELLANEOUS TOOLS**

- 1 Tool Chest, lockable with drawers (Industrial size and quality, not hobby)
- 1 Center punch
- 1 Punch set (1/8", 3/16", 5/16")
- 1 Chisel set (7/16", 5/8")
- 1 Brass drift
- 1 Plastic tip hammer
- 1 Set ball peen hammers (4oz, 16oz)
- 1 Rubber mallet
- 1 Pair safety goggles/glasses (instructor approved only)
- 1 Tire pressure gauge
- 1 Valve core remover
- 1 Flat hand file with handle (10")
- 1 Gasket scraper
- 1 Knife
- 1 Pry, pinch or crowbar
- 1 Flashlight, with batteries or fluorescent drop light
- 1 Set feeler gauges — (flat, with metric and standard graduations)
- 1 Set oil filter wrenches
- 1 Set brake tools (return, hold down)
- 1 Measuring tape
- 1 Inspection mirror
- 1 Pick-up magnet
- 1 6" steel rule graduated in 1/64" (0mm to 130mm also useful)
- 1 Spark plug gap adjusting tool (round wire type 024" to .080")
- 1 Tire depth gauge
- 1 Pair fender covers
- 1 Hacksaw (10 — 12", 18 teeth per inch blades)
- 1 Set standard thread gauges
- 1 Set metric thread gauges

### **ELECTRICAL TEST EQUIPMENT**

- 1 12 Volt Test Light (or logic probe, or power probe)
- 1 Digital Volt/Ohm Meter (DVOM) (Fluke 87 or 88 or equivalent [10 meg ohm impedance])



**AUTOMOTIVE TECHNOLOGY CAREER PATHWAY**

