### Curriculum Standard for Mobile Equipment Maintenance and Repair

**Career Cluster:** Transportation, Distribution and Logistics **

**Cluster Description:** The planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

**Pathway:** Mobile Equipment Maintenance and Repair

**Effective Term:** Spring 2017 (2017*01)

#### Program Majors Under Pathway

<table>
<thead>
<tr>
<th>Program Major / Classification of Instruction Programs (CIP) Code</th>
<th>Credential Level(s) Offered</th>
<th>Program Major Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Systems Technology</td>
<td>CIP Code 01.0205</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Alternative Transportation Technology</td>
<td>CIP Code: 47.0614</td>
<td>Diploma/Certificate</td>
</tr>
<tr>
<td>Automotive Customizing Technology</td>
<td>CIP Code 47.0603</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Automotive Light-Duty Diesel Technology</td>
<td>CIP Code 47.0605</td>
<td>Diploma/Certificate</td>
</tr>
<tr>
<td>Automotive Restoration Technology</td>
<td>CIP Code 47.0603</td>
<td>Diploma/Certificate</td>
</tr>
<tr>
<td>Automotive Systems Technology</td>
<td>CIP Code 47.0604</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Collision Repair and Refinishing Technology</td>
<td>CIP Code 47.0603</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Construction Equipment Systems Technology</td>
<td>CIP Code 47.0302</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Diesel and Heavy Equipment Technology</td>
<td>CIP Code 47.0613</td>
<td>AAS/Diploma/Certificate</td>
</tr>
<tr>
<td>Motorcycle Mechanics</td>
<td>CIP Code 47.0611</td>
<td>AAS/Diploma/Certificate</td>
</tr>
</tbody>
</table>

**Pathway Description:**

Curriculums in the Mobile Equipment Maintenance and Repair pathway prepare individuals for employment as entry-level transportation service technicians. The program provides an introduction to transportation industry careers and increases student awareness of the diverse technologies associated with this dynamic and challenging field.

Course work may include transportation systems theory, braking systems, climate control, design parameters, drive trains, electrical/electronic systems, engine repair, engine performance, environmental regulations, materials, product finish, safety, steering/suspension, transmission/transaxles, and sustainable transportation, depending on the program major area chosen.

Graduates of this pathway should be prepared to take professional licensure exams, which correspond to certain programs of study, and to enter careers as entry-level technicians in the transportation industry.

**Program Description:** Choose one of the following 4th paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Agricultural Systems Technology:** A program that prepares individuals to maintain and repair specialized farm, ranch, and agribusiness power equipment and vehicles. Includes instruction in the principles of diesel, combustion, electrical, steam, hydraulic, and mechanical systems and their application to the maintenance of terrestrial and airborne crop-spraying equipment; tractors and hauling equipment; planting and harvesting equipment; cutting equipment; power sources and systems for silos; irrigation and pumping equipment; dairy, feeding, and shearing operations; and processing systems.

**Alternative Transportation Technology:** A program that prepares individuals to apply technical knowledge and skills to the maintenance of alternative fuel vehicles (AFV), hybrid electric vehicles and the conversion of standard vehicles to AFV status. Includes instruction in electrical vehicles, hybrid electric vehicles, liquefied petroleum gas (LPG)

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*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.*

Approved by the State Board of Community Colleges on August 16, 2012; Editorial Revision 09/05/12; Editorial Revision 12/14/12; Editorial Revision 08/21/13; Editorial Revision 03/11/14; Revised SBCC 04/17/15; SBCC Revised (D60310) 10/21/16; Editorial Revision 11/08/16; Editorial Revision 11/30/16; SBCC Revised 03/17/17; Revised 02/16/18; CCRC Revised–Electronic Only (RISE & Consent Agenda) 10/24/19.

**Automotive Customizing Technology:** A program that prepares individuals to modify existing automotive vehicle components, fabrication techniques to create custom vehicle components, non-structural damage repair, custom painting and refinishing techniques, custom upholstery and glass removal/replacement/custom modifications, and other automotive technology related systems.

**Automotive Light-Duty Diesel Technology:** A program that prepares individuals to apply technical knowledge and skills to diagnose, adjust, repair, or overhaul light duty diesel vehicles under one ton classification. Includes instruction in electrical systems, diesel-electric drive, engine performance, engine repair, emission systems, and all types of diesel engines related to the light duty diesel vehicle. Includes technicians working primarily with automobile diesel engines.

**Automotive Restoration Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct, finish and restore automobile bodies, fenders, and external features of a wide range of classic vehicles typically from year models 1900 - 1970. Includes instruction in internal combustion engines, transmissions, brakes, restoring original sheet metal, upholstery, and wood components, rebuilding starters, generators, and painting and refinishing techniques.

**Automotive Systems Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain all types of automobiles. Includes instruction in brake systems, electrical systems, engine performance, engine repair, suspension and steering, automatic and manual transmissions and drive trains, and heating and air condition systems.

**Collision Repair and Refinishing Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct and finish automobile bodies, fenders, and external features. Includes instruction in structure analysis, damage repair, non-structural analysis, mechanical and electrical components, plastics and adhesives, painting and refinishing techniques, and damage analysis and estimating.

**Construction Equipment Systems Technology:** A program that prepares individuals to apply technical knowledge and skills in the field maintenance and repair of construction equipment, and in the general maintenance and overhaul of such equipment. Includes instruction in inspection, maintenance, and repair of tracks, wheels, brakes, operating controls, pneumatic and hydraulic systems, electrical circuitry, engines and in techniques of welding and brazing.

**Diesel and Heavy Equipment Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain diesel engines in vehicles such as Heavy Duty Trucks over one ton classification, buses, ships, railroad locomotives, and equipment; as well as stationary diesel engines in electrical generators and related equipment.

**Motorcycle Mechanics:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain motorcycles and other similar powered vehicles. Includes instruction in lubrication and cooling systems, electrical and ignition systems, carburetion, fuel systems and adjustments of moving parts.

**Recreational Vehicle Maintenance and Repair Technology:** A program that prepares individuals to apply technical knowledge and skills to build, test, inspect, repair, service and maintain recreational vehicles, systems, and interior and exterior components. Includes instruction in brake, hydraulic, and towing systems; electrical systems; propane systems and propane and electric appliances; carpentry; plumbing; welding; and structural frames.

### I. General Education Academic Core

Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.10: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of general education; 3 semester hours must be in communications. General education is optional in certificate programs.
## Mobile Equipment Maintenance and Repair

### Recommended General Education Academic Core

<table>
<thead>
<tr>
<th>Courses listed below are recommended general education courses for this curriculum standard. Colleges may choose to include additional or alternative general education courses to meet local curriculum needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended certificate and diploma level curriculum courses. These courses may not be included in associate degree programs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication:</th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>* COM 101 Workplace Communication</td>
<td>3 SHC</td>
<td>3-6 SHC</td>
<td>Optional</td>
</tr>
<tr>
<td>COM 110 Introduction to Communications</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>COM 120 Intro Interpersonal Com</td>
<td>3 SHC</td>
<td></td>
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</tr>
<tr>
<td>COM 231 Public Speaking</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* ENG 101 Applied Communications I</td>
<td>3 SHC</td>
<td></td>
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<tr>
<td>* ENG 102 Applied Communications II</td>
<td>3 SHC</td>
<td></td>
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<tr>
<td>ENG 110 Freshman Composition</td>
<td>3 SHC</td>
<td></td>
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<tr>
<td>ENG 111 Expository Writing</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>ENG 114 Prof Research &amp; Reporting</td>
<td>3 SHC</td>
<td></td>
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<tr>
<td>ENG 116 Technical Report Writing</td>
<td>3 SHC</td>
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</table>

<table>
<thead>
<tr>
<th>Humanities/Fine Arts:</th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 110 Technology and Society</td>
<td>3 SHC</td>
<td>0-3 SHC</td>
<td>Optional</td>
</tr>
<tr>
<td>HUM 115 Critical Thinking</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUM 230 Leadership Development</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHI 230 Introduction to Logic</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>PHI 240 Introduction to Logic</td>
<td>3 SHC</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Social/Behavioral Sciences:</th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECO 151 Survey of Economics</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECO 251 Principles of Microeconomics</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* SOC 105 Social Relationships</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>SOC 210 Introduction to Sociology</td>
<td>3 SHC</td>
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<tr>
<td>SOC 215 Group Process</td>
<td>3 SHC</td>
<td></td>
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</tr>
<tr>
<td>* PSY 101 Applied Psychology</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* PSY 102 Human Relations</td>
<td>2 SHC</td>
<td></td>
<td></td>
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<tr>
<td>PSY 118 Interpersonal Psychology</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>PSY 135 Group Processes</td>
<td>3 SHC</td>
<td></td>
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</tr>
<tr>
<td>PSY 150 General Psychology</td>
<td>3 SHC</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Natural Sciences/Mathematics:</th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 110 Math Measurement &amp; Literacy</td>
<td>3 SHC</td>
<td>0-3 SHC</td>
<td>Optional</td>
</tr>
<tr>
<td>MAT 121 Algebra/Trigonometry I</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 143 Quantitative Literacy</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 152 Statistical Methods I</td>
<td>4 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHY 110 Conceptual Physics</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHY 121 Applied Physics I</td>
<td>4 SHC</td>
<td></td>
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</tr>
</tbody>
</table>
II. Major Hours. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work-based learning may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. Below is a description of each section under Major Hours.

A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.

B. Program Major(s). The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.

C. Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

<table>
<thead>
<tr>
<th>Mobile Equipment Maintenance and Repair</th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Major Hours Required:</td>
<td>49 SHC</td>
<td>30 SHC</td>
<td>12 SHC</td>
</tr>
<tr>
<td>A. Technical Core:</td>
<td>19-27 SHC</td>
<td>17-21 SHC</td>
<td></td>
</tr>
<tr>
<td>*Fundamental Transportation Skills. Choose one minimum:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRN 110 Intro to Transport Tech</td>
<td>2 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRN 111 Chassis Maint/Light Repair</td>
<td>4 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRN 112 Powertrain Maint/Light Repair</td>
<td>4 SHC</td>
<td></td>
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<tr>
<td>TRN 170 PC Skills for Transp</td>
<td>2 SHC</td>
<td></td>
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<tr>
<td>HET 134 Diesel Fuel and Power Sy</td>
<td>3 SHC</td>
<td></td>
<td></td>
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<tr>
<td>*Intermediate Transportation Skills. Choose one minimum:</td>
<td></td>
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<tr>
<td>TRN 120 Basic TranspElectricity</td>
<td>5 SHC</td>
<td></td>
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<tr>
<td>TRN 130 Intro to Sustainable Transp</td>
<td>3 SHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRN 180 Basic Welding for Transp</td>
<td>3 SHC</td>
<td></td>
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<tr>
<td>Specialized Transportation Skills. Choose one minimum:</td>
<td></td>
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<tr>
<td>TRN 140 Transp Climate Control</td>
<td>2 SHC</td>
<td></td>
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<tr>
<td>TRN 145 Adv Transp Electronics</td>
<td>3 SHC</td>
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</tr>
<tr>
<td>WLD 110 Cutting Processes</td>
<td>2 SHC</td>
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<tr>
<td>B. Program Major(s).</td>
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</tr>
<tr>
<td>For both AAS Degree and Diploma, select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Agricultural Systems Technology</td>
<td></td>
<td></td>
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<tr>
<td>ELN 112 Diesel Electronics System</td>
<td>4 SHC</td>
<td></td>
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<tr>
<td>PME 111 Harvest and Spraying Equip</td>
<td>4 SHC</td>
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<tr>
<td>PME 112 Consumer Products</td>
<td>2 SHC</td>
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<tr>
<td>PME 121 Component Controls</td>
<td>2 SHC</td>
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<tr>
<td>Alternative Transportation Technology</td>
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<tr>
<td>ATT 115 Green Trans Safety and Service</td>
<td>2 SHC</td>
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<td>ATT 125 Hybrid-Electric Transportation</td>
<td>4 SHC</td>
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<td>ATT 140 Emerging Transp Techn</td>
<td>3 SHC</td>
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<tr>
<td>Program</td>
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<td>Course Name</td>
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<tr>
<td>Automotive Customizing Technology</td>
<td>AUB 111</td>
<td>Painting and Refinishing I</td>
<td>4 SHC</td>
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<tr>
<td></td>
<td>AUC 111</td>
<td>Auto Customizing Research</td>
<td>3 SHC</td>
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<tr>
<td></td>
<td>AUC 112</td>
<td>Auto Custom Fabrication</td>
<td>4 SHC</td>
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<tr>
<td>Automotive Light-Duty Diesel Technology</td>
<td>LDD 112</td>
<td>Intro Light-Duty Diesel</td>
<td>3 SHC</td>
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<td>LDD 116</td>
<td>Diesel Electric-Drive</td>
<td>4 SHC</td>
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<tr>
<td></td>
<td>LDD 181</td>
<td>LDD Fuel Systems</td>
<td>4 SHC</td>
</tr>
<tr>
<td>Automotive Restoration Technology</td>
<td>ARS 112</td>
<td>Auto Restoration Research</td>
<td>3 SHC</td>
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<tr>
<td></td>
<td>ARS 113</td>
<td>Automotive Upholstery</td>
<td>4 SHC</td>
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<tr>
<td></td>
<td>ARS 114</td>
<td>Restoration Skills I</td>
<td>4 SHC</td>
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<tr>
<td>Automotive Systems Technology</td>
<td>AUT 141</td>
<td>Suspension and Steering Sys</td>
<td>3 SHC</td>
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<td></td>
<td>AUT 151</td>
<td>Brake Systems</td>
<td>3 SHC</td>
</tr>
<tr>
<td></td>
<td>AUT 181</td>
<td>Engine Performance I</td>
<td>3 SHC</td>
</tr>
<tr>
<td>Collision Repair and Refinishing Technology</td>
<td>AUB 111</td>
<td>Painting and Refinishing I</td>
<td>4 SHC</td>
</tr>
<tr>
<td></td>
<td>AUB 121</td>
<td>Non-Structural Damage I</td>
<td>3 SHC</td>
</tr>
<tr>
<td></td>
<td>AUB 131</td>
<td>Structural Damage I</td>
<td>4 SHC</td>
</tr>
<tr>
<td>Construction Equipment Systems Technology</td>
<td>HYD 134</td>
<td>Hyd/Hydrostatic Construction</td>
<td>4 SHC</td>
</tr>
<tr>
<td></td>
<td>PME 117</td>
<td>Equipment Braking Systems</td>
<td>3 SHC</td>
</tr>
<tr>
<td></td>
<td>PME 118</td>
<td>Undercarriage Components</td>
<td>2 SHC</td>
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<tr>
<td></td>
<td>PME 221</td>
<td>Const Equip Servicing</td>
<td>2 SHC</td>
</tr>
<tr>
<td>Diesel and Heavy Equipment Technology</td>
<td>HET 110</td>
<td>Diesel Engines</td>
<td>6 SHC</td>
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<tr>
<td></td>
<td>HET 114</td>
<td>Power Trains</td>
<td>5 SHC</td>
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<tr>
<td></td>
<td>HET 125</td>
<td>Preventive Maintenance</td>
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<td></td>
<td>MRN 121</td>
<td>Marine Engines</td>
<td>4 SHC</td>
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<tr>
<td></td>
<td>MRN 147</td>
<td>Marine Power Trains</td>
<td>4 SHC</td>
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<tr>
<td></td>
<td>MRN 150</td>
<td>Adv. Marine Electricity</td>
<td>5 SHC</td>
</tr>
<tr>
<td>Motorcycle Mechanics</td>
<td>MCM 111</td>
<td>Motorcycle Mechanics</td>
<td>7 SHC</td>
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<tr>
<td></td>
<td>MCM 114</td>
<td>Motorcycle Fuel Systems</td>
<td>5 SHC</td>
</tr>
<tr>
<td></td>
<td>MCM 115</td>
<td>Motorcycle Chassis</td>
<td>3 SHC</td>
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</tbody>
</table>

**C. Other Major Hours.**

To be selected from the following prefixes:

ACC, ARS, ATR, ATT, AUB, AUC, AUM, AUT, BMS, BPR, BTB, BUS, CIS, CSC, CTS, DBA, DDF, DEA, DFT, ELC, ELN, FBG, GRA, HET, HYD, ISC, LDD, LOG, MAC, MCM, MEC, MKT, MPS, MRN, MSM, NOS, PHY, PME, RCT, RVM, SST, TDP, TRN, WBL, WEB, and WLD

Up to two semester hour credits may be selected from ACA.

Up to three semester hour credits may be selected from the following prefixes: ARA, ASL, CHI, FRE, GER, ITA, JPN, LAT, POR, RUS and SPA.
III. Other Required Hours
A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

IV. Employability Competencies
Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

A. Interpersonal Skills and Teamwork – The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.

B. Communication – The ability to effectively exchange ideas and information with others through oral, written, or visual means.

C. Integrity and Professionalism – Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.

D. Problem-solving – The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.

E. Initiative and Dependability – Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.

F. Information processing – The ability to acquire, evaluate, organize, manage, and interpret information.

G. Adaptability and Lifelong Learning – The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.

H. Entrepreneurship – The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

*An Employability Skills Resource Toolkit has been developed by NC-NET for the competencies listed above. Additional information is located at: http://www.nc-net.info/employability.php

**The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: http://www.nc-net.info/NC_career_clusters_guide.php or http://www.careertech.org.

Summary of Required Semester Hour Credits (SHC) for each credential:

<table>
<thead>
<tr>
<th></th>
<th>AAS</th>
<th>Diploma</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum General Education Hours</td>
<td>15</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Minimum Major Hours</td>
<td>49</td>
<td>30</td>
<td>12</td>
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<tr>
<td>Other Required Hours</td>
<td>0-7</td>
<td>0-4</td>
<td>0-1</td>
</tr>
<tr>
<td>Total Semester Hours Credit (SHC)</td>
<td>64-76</td>
<td>36-48</td>
<td>12-18</td>
</tr>
</tbody>
</table>