

# Agricultural Equipment Technology

Program Number: 10-070-1

## Associate in Applied Science Degree

Transportation Program Cluster

Center for Construction, Manufacturing, Apprenticeship & Transportation

Program offered at Madison Campuses

For information call: (608) 246-6102 or (800) 322-6282 Ext. 6102

### About the Program

The Agricultural Equipment Technology Program is designed to develop competent and professional agricultural equipment service technicians for entry-level employment in agricultural equipment dealerships.

This course of study will specialize in agricultural tractors, combines and implements. Students will gain technical expertise in hydraulics, power trains, electronics, fuel systems, heating, air conditioning and engine service. They will round out their professional skills with training in management, salesmanship, mathematics and people skills. In addition to classroom and laboratory instruction at Madison College, students will be expected to obtain and maintain a sponsoring dealer that will provide related work experience during the scheduled internships. This program leads to an associate degree in applied science. Graduates of the program will be qualified for a rewarding career as an agricultural equipment technician.

In conjunction with the program, Madison College has entered into an agreement with the John Deere Company to provide a section of the Agricultural Equipment Technology Program specifically for the company and its dealers. This partnership will be known as John Deere TECH Program. The classroom and laboratory situations, dealer sponsorship, and equipment studied will be John Deere. John Deere TECH students will be required to obtain and maintain a John Deere dealer sponsor while completing the program.

This program also will provide the opportunity to receive the required John Deere core certifications in Electrical, Hydraulics & Service Advisor (Computer Diagnostic System).

### Application Process

To apply to the program, students must submit a complete application. A completed application consists of 1.) Application; 2.) Application fee; and 3.) High school transcripts – or - GED/HSED test scores – or – college transcript showing an Associate, Bachelor, or higher degree from an institution other than Madison College.

### Unique Requirements for Admission:

1.) Satisfactory score on the COMPASS or ASSET; 2.) Signed sponsorship papers from a John Deere dealership.

### Unique Requirements for Graduation

Students must meet two 2.0 GPA requirements to graduate. 1.) GPA for entire program must be 2.0 or above; 2.) GPA of combined occupational courses (070) must be 2.0 or above.

## Curriculum

The courses listed below outline the requirements for graduation for students entering this program in the 2011-2012 academic year. Requirements for graduation may vary depending on the semester in which a student is admitted to their program. Current/continuing students should consult their degree progress report available through their student center account for specific graduation requirements. Program requirements are subject to change.

### FIRST YEAR

| First Semester                          | Credits   | Hrs/week<br>Lec-Lab |
|---|-----------|---------------------|
| 10-070-176 Electrical Systems.....      | 5         | 4-4                 |
| 10-070-181 Implements 1.....            | 4         | 1-3                 |
| 10-442-126 Metal Repair Techniques..... | 2         | 2-2                 |
| 10-801-195 Written Communication.....   | 3         | 3-0                 |
| 10-804-107 College Mathematics.....     | 3         | 3-0                 |
| <b>Semester Total</b>                   | <b>17</b> |                     |

### Second Semester

|  |           |      |
|--|-----------|------|
| 10-070-178 Implements 2*.....              | 3         | 2-8  |
| 10-070-183 Hydraulics 1*.....              | 4         | 5-5  |
| 10-070-187 Occupational Experience 1*..... | 2         | 0-48 |
| 10-070-193 Air Conditioning*.....          | 2         | 2-4  |
| 10-104-104 Selling Principles*.....        | 3         | 3-0  |
| <b>Semester Total</b>                      | <b>14</b> |      |

### Summer Session

|                                     |          |     |
|-------------------------------------|----------|-----|
| 10-070-175 Power Transmissions..... | 4        | 2-4 |
| 10-806-139 Survey of Physics.....   | 3        | 2-1 |
| <b>Semester Total</b>               | <b>7</b> |     |

### SECOND YEAR

#### First Semester

|  |           |      |
|--|-----------|------|
| 10-070-177 Fuel Systems*.....                | 3         | 4-4  |
| 10-070-182 Accessories and Electronics*..... | 3         | 4-5  |
| 10-070-184 Hydraulics 2*.....                | 3         | 2-8  |
| 10-070-188 Occupational Experience 2*.....   | 2         | 0-48 |
| 10-531-190 Ag Tech CPR/First Aid*.....       | 1         | 4-0  |
| 10-801-197 Technical Reporting*.....         | 3         | 3-0  |
| <b>Semester Total</b>                        | <b>15</b> |      |

#### Second Semester

|   |           |     |
|---|-----------|-----|
| 10-070-191 Engine Repair Theory.....          | 3         | 1-4 |
| 10-070-195 Engine Repair*.....                | 3         | 1-4 |
| 10-809-195 Economics.....                     | 3         | 3-0 |
| 10-809-197 Contemporary American Society..... | 3         | 3-0 |
| 10-809-199 Psychology of Human Relations..... | 3         | 3-0 |
| <b>Semester Total</b>                         | <b>15</b> |     |

### Summer Session

|   |   |      |
|---|---|------|
| 10-070-189 Occupational Experience 3..... | 2 | 0-48 |
|---|---|------|

\* Meets for 9 weeks.

#### Note:

Proficiency in working with Windows-based computer programs and basic word processing required prior to admission or coursework must be completed by the student by the end of the first year.

*Note: Students are placed in English or mathematics courses based on their scores on the COMPASS or ASSET test or on completion of the appropriate prerequisite/s.*



## Program Courses

**10-070-175 Power Transmission 4 credits**

This course covers the operation, power flow, diagnosis and servicing of collar shift, synchronized, power shift and IVT transmissions. The class also discusses the operation and service of wet and dry clutches differentials, planetary drive axles, P.T.O. drives and mechanical front wheel drives.

**10-070-176 Electrical Systems 1 5 credits**

This class begins with a discussion of the laws of electricity as they relate to the operation of the charging, starting, accessory and lighting systems. Diagnostic testing with use of a digital multimeter and current clamp. Troubleshooting will be demonstrated on alternators, starters, accessory and lighting systems. The student will be introduced to wiring schematics from technical publications. Methods of repair will be demonstrated with methods that are currently used at John Deere dealerships.

**10-070-177 Fuel Systems 3 credits**

This course covers the theory of operation, construction and service of diesel engine fuel systems. Also reviewed is diesel engine compression, ignition, theory combustion, chamber design and procedures for installing, timing of fuel quantity for proper combustion. Electronic fuel delivery and exhaust aftertreatment systems will be discussed as it relates to engine operation. *Pre-req: Electrical Systems (10-070-176).*

**10-070-178 Implements 2 3 credits**

This course provides instruction in the theory of operation and service of the grain combine. Students will learn how the combine processes grain, the basic components, means of service and repair of the machine. Lab work is designed to provide students with hands-on experience on combines, grain platforms and corn heads. Service and adjustment activities include the cylinder, gear boxes and power transmission components. *Pre-req: Implements 1, 10-070-181.*

**10-070-181 Implements 1 4 credits**

This course provides instruction in the theory of operation, adjustment and service of planting equipment. Students will learn the operation and service of corn planters and grain drills. Emphasis is given to how the corn planter seed meters work and how the attachments operate. In addition, the course also provides information on the theory, operation, adjustment and service of forage harvesting machines. Machines covered include mower conditioners, square balers, round balers and forage harvesters. Bearings, clutches, U-joints and other power transmission components also are covered.

**10-070-182 Accessories and Electronics 3 credits**

This course will introduce the student to the type and operation of temperature, pressure, position and speed sensors. Students will be introduced to CCD and CAN Bus on-board communication systems used on today's equipment. Students will be shown the procedure for recalling codes, transmission calibration procedures and on-board diagnostic procedures. This course will provide the electrical certification for John Deere Technicians. *Pre-req: Electrical Systems 1, 10-070-176.*

**10-070-183 Hydraulics 1 4 credits**

This course introduces the student to the hydraulic systems found on 30 through 60 series John Deere Tractors. The component configuration and operational characteristics of these tractors will be introduced. Students will service, test and rebuild a radial piston pump, S.C.V. and other components of the hydraulic system. Students will follow the technical manuals diagnostic procedures to troubleshoot hydraulic system problems found on these tractors.

**10-070-184 Hydraulics 2 3 credits**

This course provides instruction on the 6, 7 and 8000 series John Deere tractors. The component configuration and operational characteristics of these tractors will be introduced. Students will service, test and rebuild the axial piston pump, SCV's and other components of the hydraulic system. Students will follow the technical manual diagnostic procedures to check out and troubleshoot the hydraulic system. This course will provide the hydraulics certification for John Deere technicians. *Pre-req: Hydraulics 1, 10-070-183.*

**10-070-187 Occupational Experience 1 (Spring Session) 2 credits**

Students receive on-the-job experience in the areas of implement repair and service. Areas covered include, but are not limited to, tillage, planting and hay harvesting machines. Students also will be exposed to the operation and function of the dealership service department.

**10-070-188 Occupational Experience 2 (Fall Session) 2 credits**

Students receive on-the-job experience in the areas of combines, corn heads and grain platforms. Other areas covered include set-up, tillage and planting equipment. *Pre-req: Occupational Experience 1, 10-070-187.*

**10-070-189 Occupational Experience 3 (Summer Session) 2 credits**

Students receive on-the-job experience in tractor engine repair, air conditioning, electrical and hydraulic system troubleshooting. Other areas covered include service department operation, warranty work and customer contacts. *Pre-req: Occupational Experience 2, 10-070-188.*

**10-070-191 Engine Repair Theory 3 credits**

Study in this course will allow the student to develop a basic knowledge of combustion engine design and operation with the major emphasis on diesel engines. Experience in the course will provide the student with the skills and knowledge needed to diagnose, overhaul, maintain, adjust and repair engines found in agricultural machines and equipment.

**10-070-195 Engine Repair 3 credits**

Study in this course will allow the student to develop a basic knowledge of combustion engine design and operation with the major emphasis on diesel engines. Experience in the course will provide the student with the skills and knowledge needed to diagnose, overhaul, maintain, adjust and repair engines found in agricultural machines and equipment.

**10-070-193 Air Conditioning 2 credits**

This course covers the theory of operation, service and testing of HVAC (Heating Ventilation and Air Conditioning) units used to cool and heat the operator's station. Lab work consists of leak detecting, evacuation, recycling, charging, retrofit procedures and component installations. Electrical circuits and troubleshooting of systems will also be covered. Air conditioning certification tests are also given to students enrolled in this course.

**10-442-126 Metal Repair Techniques 2 credits**

This course covers safety, layout and measurement, grinding, drill press and lathe operation, filing, threading, properties of metals, oxy-acetylene welding, brazing and cutting, and SMAW, GMAW, GTAW and FCAW.

**10-531-190 Ag Tech CPR/First Aid 1 credit**

A combination of safety, first aid and CPR for emergencies which may occur in the agricultural equipment industry. Prepares students for a standard Red Cross first aid certificate. Presents the instruction and practical content of the American Heart Association's basic life support course.

### Career Potential:

- Service Technician
- Field Service Technician
- Lead Technician
- Shop Foreman
- Service Writer
- Coordinator
- Customer Support Representative
- Ag Equipment Salesperson
- Consumer Products Salesperson
- Service Manager
- Parts Manager
- Parts Counterperson

With additional education and/or work experience, graduates may find employment as:

- Ag Company
- Service Representative
- Ag Company Sales Representative
- Dealer Sales Manager
- Dealership Manager
- Dealership Owner/Operator

*More detailed and updated information on this program may be available at: [madisoncollege.org](http://madisoncollege.org). The college reserves the right to make changes in the regulations and courses announced in this publication without notice.*

*Madison Area Technical College provides equal opportunity in education and employment.*

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