

CATALOG INFORMATION

Dept and Nbr: AGMEC 50      Title: AG MACHINE/EQUIP SKILL  
Full Title: Agricultural Machinery and Equipment Skills  
Last Reviewed: 12/12/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading: Grade Only  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
This course involves design principles, selection, maintenance, safe tractor and agricultural equipment operation. Emphasis on proper techniques for the operation and service of common farm implements.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: This course involves design principles, selection, maintenance, safe tractor and agricultural equipment operation. Emphasis on proper techniques for the operation and service of common farm implements. (Grade Only)  
Prerequisites/Corequisites:  
Recommended: Eligibility for ENGL 100 or ESL 100  
Limits on Enrollment:

Transfer Credit: CSU;  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Fall 2017	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

### **CID:**

### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Select appropriate tractor and equipment for field jobs.
2. Demonstrate safe operation of tractors and common farm implements based on Operational, Safety, and Health Administration (OSHA).
3. Perform basic operator level inspection and maintenance of tractors and farm implements.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Operate tractors and other field vehicles safely and efficiently.
2. Summarize basic tractor operating principles.
3. Operate specialty equipment safely and efficiently.
4. Match tractors and farm implements to jobs.
5. Recognize and identify the primary tractor parts and their functions.
6. Demonstrate proficiency in tractor setup and adjustment.
7. Demonstrate proficiency in attaching equipment to the drawbar, three point hitch, power take-off shaft, and auxiliary hydraulic outlets.
8. Identify the power systems in tractors.
9. Demonstrate proficiency in the use of tractor controls.
10. Diagnose basic operational conditions of equipment.
11. Evaluate service records and set-up appropriate service plans.
12. Perform basic preventive maintenance and repairs.
13. Analyze application requirements for spray, seed, and fertilizer applications.
14. Calculate equipment calibrations for spray, seed, and fertilizer applications and validate application quantity.

### **Topics and Scope:**

#### **I. Introduction**

- A. Overview of farm equipment

- B. History of the tractor engine
- C. Tractor types and configuration
- D. Tractor safety and accident prevention
- E. Tractor types and engine types
  - 1. Utility tractors
  - 2. Row crop tractors
  - 3. Orchard tractors
  - 4. Industrial tractors
  - 5. Garden tractors
  - 6. Rotary tiller (walk behind tractors)
  - 7. Implement carries
- F. Operating principles
- II. Tractor Operation Skills
  - A. Pre-starting maintenance and safety checks
    - 1. Starting the tractor engine
    - 2. Tractor driver responsibilities
    - 3. Basic operating principles
  - B. Tractor movement
  - C. Implement hook-up and backup
- III. Tractor Safety
  - A. California division of industrial safety
  - B. Hand signals
  - C. Starting and stopping
  - D. Hazards
  - E. Cal OSHA regulations
- IV. Farm Tractors and Engines
  - A. Tractor system identification
  - B. Engine types
  - C. Basic operating principles
- V. Power Systems
  - A. Engine
  - B. Clutch
  - C. Transmission
  - D. Final drives
  - E. Hydraulic
  - F. Power Take-Off (PTO) shaft
- VI. Controls
  - A. Starting and stopping
  - B. Steering
  - C. Hitches
  - D. Hydraulic
  - E. Electric
  - F. Auto guidance
- VII. Implements
  - A. Attachments
  - B. Adjustments
  - C. Efficiency
- VIII. Tractor Field Operations
  - A. Pre-operation
    - 1. Ballast
    - 2. Stability
    - 3. Daily maintenance

- B. Primary tillage
- C. Fertilizing (pre-plant)
- D. Seeding
- E. Irrigating
- F. Cultivating and mowing
- G. Spraying and fertilizing (post-plant)
  - 1. Calculating calibrations
  - 2. Validating application quantities

#### IX. Farm Machinery and Tractor Maintenance and Repairs

- A. Definition and importance of maintenance and repairs
- B. Operator's manual
- C. Maintenance and repair records
- D. Engine tune-up
- E. Service and adjustment to engines and equipment
- F. Tools and supplies
- G. Inspection and evaluation

Concepts covered in lecture will be covered in lab.

### Assignment:

#### Lecture Related Assignments:

1. Reading assignments, approximately 15 -20 pages per week
2. Weekly lab reports, including pre-operation; tractor & equipment operation and controls; calibrations for fertilizing, seeding and spraying; pre-evaluation of servicing requirements; completed service report
3. Four quizzes; two tests; final exam

#### Lab Related Assignments

1. Machinery and equipment operation skills
2. Preoperation and post operation tractor and farm implement inspection logs
3. Performing basic service and maintenance inspection
4. Skill/performance exams: tractor and equipment operation

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Weekly operational logs
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Writing 5 - 10%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab reports, service and maintenance inspection reports
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Problem solving 20 - 40%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Performance exams, Tractor & common farm equipment operation

Skill Demonstrations  
20 - 30%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes, test, final: Multiple choice, True/false, Matching items, Completion, Short answer

Exams  
30 - 40%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation

Other Category  
0 - 10%

### **Representative Textbooks and Materials:**

Fundamentals of Machine Operation: Tractors. 5th ed. Deere & Company Service Publications. 2014

Fundamentals of Machine Operation: Preventive Maintenance. 8th ed. Deere & Company Service Publications. 2015

National Safe Tractor and Machinery Operation Program: Student Manual. 2nd Edition. National Safety Council. Hobar Publications. 2013

Instructor prepared materials