COURSE INFORMATION

MAG 30 – EQUIPMENT TECHNICIAN

Spring 2010 – Code: 50320

Electrical, Hydraulics & Welding	**M,W**	**8:00-9:40**	**AGR 2**
	M,W	**10:00 -11:50**	**AGM Shop**
	M,W	**1:00-1:50**	**AGR 2**
	M,W	**2:00-2:50**	**AGM Shop**
	F	**7:00-9:40**	**IND 19 Lab**
	F	**10:00-11:40**	**AGR 2**

Instructors: **Gary Wenter**
Office: AGM 5
Office: 638-0317
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Office Hours – Both Instructors
M – TH 3:00 – 4:00 pm

Nick Deftereos
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Mo Tabutol
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Course Description 11 Units 8 lecture and 9 lab hours per week

This course provides in-depth instruction in machine electrical systems, hydraulic systems found on mobile equipment, and welding and fabrication skills common to agriculture and construction equipment. Students will receive hands-on training on starting, charging, and electronic monitoring systems as they develop analytical skills needed for service and repair of diesel equipment. Hydraulic fundamentals and troubleshooting techniques will be reinforced through machine testing and adjusting. Students will also receive training and instruction in welding and fabrication principles and applications required for the entry level equipment technician.

Basic Skills Advisories: Eligibility for ENGL 125, ENGL 126, and MATH 101
Subject Advisories: None

Required Text: Caterpillar 3-ring binder and related materials (by second class meeting).
FOS Welding Textbook

Course Objectives – In the process of completing this course, students will:

A. Identify and safely use various hand and power tools related to welding applications.
B. Select and order appropriate metals and supplies.
C. Demonstrate proper welding techniques.
D. Construct and analyze electrical circuits from schematic diagrams
E. Diagnose faulty electrical components
F. Distinguish between open circuits, short circuits, and shorts to ground in electrical circuit systems
G. Interpret fault identifiers from a machine electronic control module
H. Develop knowledge in hydraulic system nomenclature and symbols

I. Understand the physical laws related to enclosed liquids
J. Solve problems involving pressure and flow
K. Develop competency in the safe diagnosis and troubleshooting of hydraulic systems

Course Outline

A. Shop Safety Practices
B. Metals
C. Arc Welding Processes
D. Oxyacetylene Welding Processes
E. Project Design and Construction
F. Theory of Electricity
G. Electrical Diagnostic Equipment
H. Starting Systems
I. Charging Systems
J. Accessory Circuits
K. Electronic Monitoring Systems
L. Basic Principles of Hydraulics
M. Hydraulic Pumps and Motors
N. Hydraulic Valves
O. Hydraulic Cylinders
P. Hydraulic Accessories
Q. General Maintenance
R. Diagnosis and Testing of Hydraulic Systems

<u>Electrical Labs</u>

Lab 1: Use of the Digital Multimeter
Lab 2: Voltage, Current and Resistance
Lab 3: Series and Parallel Circuits
Lab 4: Machine Component Identification
Lab 5: Battery Load Test
Lab 6: Disassembly and Assembly of Starter Motors
Lab 7: Starting System Tests
Lab 8: Disassembly and Assembly of Alternators
Lab 9: Alternator Output Test
Lab 10: Engine Wiring
Lab 11: Sensors, Senders and Switches
Lab 12: Relays
Lab 13: Schematics
Lab 14: Electrical Troubleshooting

<u>Hydraulic Labs</u>

Lab 1: Intro to Hydraulic Trainers
Lab 2: Relief Valve Operation and Resistance in Parallel
Lab 3: Machine Component Identification
Lab 4: Filters and Fluids
Lab 5: Hydraulic Hoses
Lab 6: Gear Pumps
Lab 7: Vane Pumps
Lab 8: Piston Pumps
Lab 9: Cylinders
Lab 10: Control Valves

Lab 11: Disassemble and Assemble Backhoe Control Valves
Lab 12: Pressure Control Valves
Lab 13: D3C Hydrostatic Tests
Lab 14: PSI Readings on 246 Skid Steer Loader

Hydraulic Labs - Continued

Lab 15: PSI Readings on IT 14G Loader
Lab 16 PSI Readings on 416C Backhoe
Lab 17: PSI Readings on Challenger 65

Welding Labs

Lab 1: Oxyacetylene Welding Assignments
Lab 2: Oxyacetylene Cutting
Lab 3: Shielded Metal Arc Welding Assignments
Lab 4: Gas Metal Arc Welding Assignments
Lab 5: Project Plans and Bill of Materials
Lab 6: Project Construction

Course Outcomes

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

A. Test and adjust hydrostatic drive systems using pressure gauges and appropriate service literature.
B. Demonstrate proper welding techniques using shielded metal arc welding and metal inert gas processes.
C. Select and order appropriate materials and supplies to construct a project
D. Identify and use various hand and power tools related to welding and fabrication.
E. Construct and analyze electrical circuits from schematic diagrams.
F. Diagnose faulty electrical components.
G. Distinguish between open circuits, short circuits, and shorts to ground in electrical circuit systems.
H. Interpret fault identifiers from a machine electronic control module.
I. Use hydraulic system nomenclature and symbols to read and interpret schematics
J. Understand the physical laws related to enclosed liquids.
K. Solve problems involving pressure and flow to determine hydraulic cylinder force and speed.
L. Safely diagnose and troubleshoot hydraulic systems.

Required Materials

Approved eye protection/safety glasses (Z87.1 A.N.S.I.)
Approved foot wear
Two work shirts (approx. $50) – Reedley College Equipment Technician shirt @ Best Uniforms
5091 N. Fresno St. Fresno, CA 93702 Phone: (559) 226-4235

Attendance

Lecture: Attendance is required and roll will be taken at each class meeting. There is no difference between an “excused” or “unexcused” absence. A “tardy” is considered an absence unless the student contacts the instructor at the end of class to change the status from absent to tardy. Two tardies will count as an absence. Any student who misses more than two weeks of class meetings within the first nine weeks of class may be dropped from the class by the instructor (i.e., class meets two time per week, 4 absences; class meets 1 time per week, 2 absences).

Lab: **Attendance in all labs is mandatory**. Students must make prior arrangements with the instructor to be excused from lab. At that time, the instructor will determine what, if any, make-up work will be appropriate.

Quizzes: There will be **no** make-ups for quizzes.

Tests: Make-up tests are limited to students who have made arrangements with the instructor prior to the required testing period or those students who have been excused by the SCCCD Dean of Admissions, Dr. John Cummings.

Grading Policy/Scales/Evaluation Criteria
For maximum point consideration, all written assignments and term reports should be typed and double spaced. Lecture assignments (homework) will be accepted late up to the test for that unit of the course; however, late assignments will be penalized 1/3 of the possible points. Late laboratory assignments will be worth a maximum of 60% of the total points possible.

Point Distribution: 90% = A, 80% = B, 70% = C, 60% = D, 59% and less = D

Assignments & Grades:	Lecture	Homework	100	
		Tests – 6 100/each	600	
		Quizzes	150	
		Final exam	200	
		Lec. Total	1200	
	Lab	Participation 64 10/each (Timeliness, clean-up, work ethic)	640	
		Assignments	560	
		Lab Total		1200
		Total	**=**	**2400***

* Electrical will constitute 40%, Hydraulics 40%, and Welding 20% of total grade.

Cheating & Plagiarism
In keeping with the philosophy that students are entitled to the best education available, and in compliance with Board Policy 5410, each student is expected to exert an entirely honest effort toward attaining an education. Violations of this policy will result in disqualification for the course.

Accommodations for Students with Disabilities
If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the instructor as soon as possible.

Work Ethic
Most students are enrolled in college classes to obtain a quality job or to enhance their skills for advancement with the current employment situation. Employers look for a punctual, responsible individual who is prepare to go to work. Our goal is to replicate the workplace environment where a student can develop and demonstrate these desirable traits.

- Punctual: It is customary to arrive at least 5 minutes before work begins. Individuals will be terminated if they are not punctual.
- Responsible: It is expected that an employee work every scheduled work day. Individuals will be terminated if they are not responsible.
- Prepared: It is expected that an employee be prepared when he/she arrives for work. Students must have work shirts, safety glasses, and appropriate footwear to participate in the laboratory. If a student is not prepared, he/she cannot participate and will receive a zero (see "Responsible).

Language – English is expected to be spoken in class for the following reasons:

- All course content and materials are presented in English, and class discussions all take place in English.
- All lab activities are conducted in groups and must have effective communication between all group members.
- Shop activities can be hazardous and it is vital that instructors receive feedback in English to ensure safe practices.
- This policy is designed so that instructors and all students may communicate in a common language.
- All individuals must have freedom of expression and are allowed and encouraged to communicate in the language of their choice outside of class times, including breaks.

Behavioral Standards

- Each student is responsible for his/her own work. Written assignments are not group assignments and no credit will be awarded for students who turn in the same work. Students suspected of cheating on tests and quizzes will receive no credit for that particular assignment and may be removed from the class.
- Turn off cell phones when in the classroom or shop. Texting in class is **unacceptabl**e.
- There is no smoking allowed in classrooms, shops, or school vehicles. Smoke only in designated areas and not in or around machines or equipment.
- Sleeping is **not** allowed in class. If you cannot stay awake you should go home and get some sleep, or try going to bed at an earlier hour.
- This class is set for the semester. All doctor's appointments, interviews, meetings with counselors, and other types of appointments should be scheduled during your time outside of class.

Important Dates

- Last day to drop and qualify for a refund — January 22
- Martin Luther King Holiday — January 18
- Presidents' Day Holiday — February 12-15
- Last day to drop a class and not receive a letter grade — March 12
- Spring Break — March 29- April 2
- Finals Week — May 17-21

FINAL EXAMS (Three separate final exams):

Electrical Final Exam	Monday, May 17, 8:00 a.m.
Hydraulics Final Exam	Monday, May 17, 1:00 p.m.
Welding Final Exam	Wednesday, May 19, 8:00 a.m.