Western Illinois University - School of Agriculture
AGTM 365: Agricultural Engines (4)
Spring 2013

COURSE MEETS: Lecture: MWF 9:00 to 9:50 in KH 307
Lab: Th 8:00 to 9:50 in KH 307 or KH B1

RECOMMENDED TEXT: Engines & Tractor Power, 4th ed., by Goering & Hansen, ASAE, 2004

LAB FEE: $20.00 fee for this course to cover consumable materials used during labs.

INSTRUCTOR: Dr. Bart Gill

OFFICE: B-22 Knoblauch Hall
Office Telephone: 309.298.2395
Home Telephone: 717.443.7017
E-mail: BE-gill@wiu.edu

OFFICE HOURS: MWF: 10:00 to 11:00 or by appointment
W: 1:00 to 2:00

Dr. Gill’s Spring Semester 2013 Schedule:

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<th>Tuesday</th>
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Course Description: Principles of operation of tractor and small gas engines, diesel fuel systems, power trains, and electrical systems

Overall Course Objectives:
A) Develop knowledge of the principles of operation of an internal combustion engine and drive train.
B) Develop the skill required to successfully perform a major overhaul on a small gas engine and a diesel engine.

COURSE EVALUATION

Grading Scale:
- 90% - 100% = A
- 86% - 89% = B+
- 80% - 85% = B
- 76% - 79% = C+
- 70% - 79% = C
- 60% - 69% = D
- <60% = F
Use of unauthorized notes or aids during quizzes and tests will be dealt with according to University regulations. Student’s rights and responsibilities can be found by going to the WIU home page, Personnel, Provost Page, Student Rights and Responsibilities.

I encourage you to obtain help if you do not understand how to do a "take home" assignment. I am available at most any time to assist you, but if this is not convenient, you may get someone else from the class to explain or demonstrate the task at hand. I do, however, strongly suggest that you do your own work. That is, you must mentally and physically work through the assignment so that you can demonstrate, when required, that you have the required competency (ies).

Assignments are due on the day specified. Assignments turned in after the graded assignment is returned to the rest of the class will be scored ZERO.

**Western Online:**
Students are **required** to use the course website at: [www.westernonline.wiu.edu](http://www.westernonline.wiu.edu) and most assignments will be submitted through the website. Course notes, handouts, and additional material may be posted throughout the semester on this website.

**Weekly Journal:**
At the end of each week (Weeks 1 – 15; 15 total entries worth 10 pts. each) students will be expected to write a journal entry reflecting on the events of the week. At certain points throughout the semester Dr. Gill may assign topics to Journal Entries. The journal entries will be submitted through Western Online. Each journal entry should include a summary of new knowledge gained and how it will assist the student in the future. Also, each entry should consist of the student’s reaction to the new knowledge gained (negative or positive). The final journal entry will focus on your overall experience throughout the class.

**Written Assignments (other than journal entries):**
- Should be typed using 12 pt. font, 1 inch margins, double spaced (unless otherwise noted).
- Should be submitted with a cover sheet including your name, the date, the class, and the assignment title.
- Assignments submitted on Western On-line should be submitted as an attached word document, unless otherwise specified.

**ATTENTION EDUCATION MAJORS**

The changes within the state certification requirements, which go into effect immediately for all of those students who graduate in the spring 2012 and after, state you are required to receive a grade of a "C" or better in this course in order to meet these new requirements. With the new university +/- grading system, receiving a "C-" or below will require you to retake this course or find a substitute course to meet School of Agriculture graduation requirements.
ABSENCE POLICY

Attendance is required; it will be taken each class session. **You are allowed THREE unexcused absences. Starting on the FOURTH, your grade will drop 5% for each additional unexcused absence.** If you anticipate an excused absence, *notify me in advance* (in writing). In cases where advanced notification is not feasible (e.g. accident, or emergency), you must provide notification *by the end of the second working day after the absence*. Notification for all excused absences should include a written explanation indicating the reason for the absence, why notice could not be sent prior to the missed class (if applicable), all documentation required, and suggested arrangements for making up what you missed in class (assignments, participation points, etc.) After two working days, notification and documentation for excused absences may not be accepted.

**Participation and Expectations:**

Class participation will be worth 10% of your final grade. Participation may be addressed in various formats, such as class activities, assessments, discussion, attendance and etc. Check your email every day—when out of the classroom, this is my only way to communicate with you; every effort will be made to notify you of any issues in advance.

*NOTE: Even though you are allowed three absences before you are given an overall grade deduction, you are responsible for what occurs in the classroom on a daily basis. When you are absent, you may miss earning participation points in class.*

ADA COMPLIANCE

“In accordance with University policy and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. For the instructor to provide the proper accommodation(s) you must obtain documentation of the need for an accommodation through Disability Resource Center (DRC) and provide it to the instructor. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire about such particular needs of students. Students who may require special assistance in emergency evacuations (i.e. fire, tornado, etc.) should contact the instructor as to the most appropriate procedures to follow in such an emergency. Contact Disability Resource Center (DRC) at 298-2512 for additional services.”

**SYLLABUS IS SUBJECT TO CHANGE AT THE INSTRUCTOR'S DISCRETION**
AGTM 365
Weekly Schedule

Week 1
1/14 Course introduction & objectives, review of course procedures.
1/16 Lab: Using precision measuring and testing instruments
1/17 Engine components (Chapter 3)
1/18 Engine components cont.

Week 2
1/21 No Class – Martin Luther King Jr. Day
1/23 Development of the agriculture tractor (Chapter 1)
1/24 Engine cycles and timing (Chapter 4)
1/25 Quiz 1 – Engine Components and Development of the agriculture tractor

Week 3
1/28 Engine cycles and timing continued
1/30 Lab: Small four stroke gasoline engine disassembly
1/31 Lab: Disassembly and inspection of small four stroke gasoline engines continued
2/1 Small four stroke gasoline engine carburetor designs and operation

Week 4
2/4 Small four stroke gasoline engine carburetor designs and operation
2/6 Basic thermodynamics of engines (Chapter 2)
2/7 Lab: Small gas engine reassembly, carburetor adjustment, and operation
2/8 WIU Farm Expo – Meet at Western Hall

Week 5
2/11 Basic thermodynamics of engines and engine efficiencies
2/13 Power measurement (Chapter 5)
2/14 Lab: Small gas engine reassembly, carburetor adjustment, and operation
2/15 Power measurement and development of measurement standards

Week 6
2/18 Exam 1
2/20 The intake and exhaust system (Chapter 11)
2/21 Lab: Tractor power measurement
2/22 Intake and exhaust systems

Week 7
2/25 Turbochargers
2/27 Fuels and combustion (Chapter 6)
2/28 Lab: Diesel engine disassembly, parts identification
3/1 Fuels and combustion

Week 8
3/4 Fuel systems and carburetion (Chapter 9)
3/6 Fuel systems, carburetion, and fuel injection
3/7 Lab: Diesel Engine disassembly, measurements, and specifications
3/8 Quiz 2 – fuel systems, carburetion, and fuel injection
Spring Break 3/11–3/15

Week 9
3/18 Fuel systems - diesel engines (Chapter 10)
3/20 Fuel systems - diesel engines
3/21 **Lab:** Diesel Engine disassembly, measurements, and specifications
3/22 The cooling system (Chapter 12)

Week 10
3/25 Lubricants and lubricating systems (Chapter 13)
3/27 Guest speaker – lubricants
3/28 **Field Trip: Randall’s Performance**
3/29 Principles of electricity on agriculture tractors (Chapter 7)

Week 11
4/1 Principles of electricity on agriculture tractors
4/3 Storage batteries: Battery care, maintenance, testing and troubleshooting
4/4 **Lab:** Diesel Engine disassembly, measurements, and specifications
4/5 **Exam 2**

Week 12
4/8 The charging system - generators and voltage regulators
4/10 Diesel engine reassembly video
4/11 **Lab:** Diesel Engine reassembly
4/12 The charging system - alternators, Starter systems

Week 13
4/15 The charging system - alternators, Starter systems continued
4/17 Ignition circuits (Chapter 8)
4/18 **Lab:** Diesel Engine reassembly
4/19 Ignition systems - mechanical breaker points & solid-state ignition systems

Week 14
4/22 Power trains (Chapter 15)
4/24 Student Presentations – Engine Modification Project
4/25 **Field trip - John Deere Combine plant**
4/26 **Quiz 3 – Charging and ignition systems**

Week 15
4/29 Student Presentations – Engine Modification Project
5/1 Student Presentations – Engine Modification Project
5/2 **Lab:** Laboratory cleanup
5/3 Final exam review

**Final Exam** - Wednesday, May 8, from 8:00 - 9:50 AM**

**SCHEDULE IS SUBJECT TO CHANGE AT THE INSTRUCTOR’S DISCRETION**