

BAEN 412, HYDRAULIC POWER
SPRING 2015 Schedule
Lecture: MW 9:10 – 10:00 (SCTS 215)
Laboratory: Tuesday 3:00 – 4:50 pm (AEPM 203)

COURSE SYLLABUS

Course Description:

Introduction to hydraulic power systems; energy and power relationships; hydraulic fluid properties; frictional losses in pipelines; hydraulic pumps, cylinders, valves and motors; servo and proportional valves; circuit designs and analysis; conductors, fittings and ancillary devices; maintenance of hydraulic systems; pneumatic components and circuits; electrical controls and fluid logic; electro-hydraulic systems; agricultural and industrial applications.

Text:

Fluid Power with Applications, Anthony Esposito, 7th Edition, Pearson Prentice Hall, Upper Saddle River, New Jersey, 2009. ISBN-13:978-0-13-513690-4 (TJ843. E86 2009) and Supplemental Handouts

Prerequisite: AGEN 340 (Fluid Mechanics and Hydrology) or its equivalent
AGEN 375 (Design Fundamentals for Agricultural Machines and Structures) or its equivalent

Instructor:

Sergio Capareda, Ph.D.
Scoates 303D
Consultation Hours:

Phone: 458-3028
8-am to 3pm T-F

E-mail: scapareda@tamu.edu

Teaching Assistant:

Dr. Amado “Madz” Maglinao
Hobgood 121

E-mail: aoshi_magz@yahoo.com

Specific Skills to be Acquired

At the completion of this course, students should be able to

1. Identify the different types of hydraulic systems and various properties of hydraulic fluids;
2. Calculate energy and power relationships in hydraulic systems and frictional losses in pipelines;
3. Identify the different types of hydraulic pumps, cylinders, valves and motors;
4. Identify and understand the operation of servo and proportional valves;
5. Analyze circuit diagrams and be able to construct various hydraulic systems;
6. Identify various conductors, fittings and ancillary devices;
7. Develop circuit diagrams, construct and test to specifications;
8. Construct pneumatic circuits and diagrams;
9. Analyze fluidic circuit designs and Examine electro-hydraulics on tractors and other machines;
10. Analyze electrical hydraulic controls systems

COURSE GRADING AND FORMAT

Grading:

Exams (3)	45%	A	90 - 100 %
Laboratory Exercises	25%	B	80 - 89 %
Quiz/HW/Attendance	20%	C	70 - 79 %
Practical Exam	<u>10%</u>	D	60 - 69 %
Total	100%	F	<60 %

Students may be exempted from taking the final exam if they have passing score and are satisfied with their grades. For those taking the final exam, final exam score will be 40% of their final grade.

Exams:

There will be three long exams and given in the laboratory period. Exams may include both problems to solve and short answer/multiple choice questions. Exams will be closed book and closed notes. Conversion tables, formulas and monographs will be provided for the exam. Make-up exams will be given only for those having a university excused absence (see Student Rules). Make-up exams will be scheduled by the instructor.

Lab Exercises:

Lab exercises are always due a week after the laboratory exercise has been performed. Some laboratory exercises are individual work. The laboratory class will be divided into teams for the purpose of working on exercises in class and to facilitate collecting work to be graded.

Homework and Quizzes:

Homework problems will be assigned at every lecture class and due the following class. No late homework will be accepted. Unannounced quizzes will be given periodically. No make-up quizzes will be given. For a quiz missed due to a university excused absence, that quiz will not be included in calculating the final grade.

Academic Integrity:

“An Aggie does not lie, cheat, or steal, or tolerate those who do.” Please see the Aggie Honor System Office web site at <http://www.tamu.edu/aggiehonor> for rules and procedures regarding academic integrity.

Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Cain Hall Room B118. The phone number is 845-1637. Also, as a courtesy, please advise me as soon as possible if you need accommodations for a disability.

Attendance:

Attendance will be taken during each class. It is the student's responsibility to learn the material and make up any assignments missed. In the event that you must miss an exam, it is the student's responsibility to make arrangements to make the test up. Refer to the Texas A&M University Student Rules for any questions you have on attendance. <http://student-rules.tamu.edu/rules7.htm>
Attendance will be used to add bonus points at the end of the class. Two and a half points will be added to the pre-final score of the student has no absences. No points will be given if the student has more than 3 absences.

Emergency and Safety Issues in Laboratory:

Safety is a number one priority in handling courses at TAMU. Each student must be aware of procedures in case of emergency, know the location of first aid kits, fire extinguisher and emergency exits at the lab. Each student must submit a completed and duly signed acknowledgement form for physical and chemical hazards at the lab and at Howdy. They must also be aware of important campus security phone numbers, and persons to call to in case of emergency.

BAEN 412 CLASS SCHEDULE: SPRING, 2015		
Week	Lecture Dates	Lab Date
1	Jan 21	Jan 20
2	Jan 26, 28	Jan 27
3	Feb 2, 4	Feb 3
4	Feb 9,11	Feb 10
5	Feb 16, 18	Feb 17
6	Feb 23 25	Feb 24
7	Mar 2, 4	Mar 3
8	Mar 9, 11	Mar 10
***** Spring Break *****		
9	Mar 23, 25	Mar 24
10	Mar 30, Apr 1	Mar 31
11	Apr 6, 8	Apr 7
12	Apr 13, 15	Apr 14
13	Apr 20, 22	Apr 21
14	Apr 27, 29	Apr 28
15	May 4	

Major Exam Dates		
Exam 1	Feb 17	Tuesday
Exam 2	Mar 31	Tuesday
Exam 3	Apr 28	Tuesday
Finals	May 8 (8-10 am)	Friday

LABORATORY SCHEDULE SPRING 2015

Week	Date	Topic	Read
1	1-20-15	1-Introduction to Hydraulics Trainer and Tour	Ch 1
2	1-27-15	2-Power Up and Cavitation	Ch 9 and Handouts
3	2-03-15	3-Control of Cylinders: Single/Double Acting Cylinders	Ch 9 and Handouts
4	2-10-15	4-Basic Sequencing Circuits	Ch 9 and Handouts
5	2-17-15	Exam 1	Chapters 1-6
6	2-24-15	5-Regenerative Circuits	Ch 9 and Handouts
7	3-03-15	6-Counterbalance Applications	Ch 9 and Handouts
8	3-10-15	7-Hydraulic Circuit Design and Analysis	Ch 9 and Handouts
9	16-20	SPRING BREAK	
10	3-24-15	8-Speed Control of Cylinders/Motors: Rotary Circuits	Ch 9 and Handouts
11	3-31-15	Exam 2	Chapters 7-12
12	4-07-15	9-Cylinder Deceleration Circuits	Ch 9 and Handouts
13	4-14-15	10-Pneumatics Lab	Ch 13 and 14
14	4-21-15	11-Practical Exam	Review All Exercises
15	4-28-15	Exam 3	Chapter 13-18

BAEN 412 HYDRAULIC POWER
CLASS LECTURE SCHEDULE
Spring 2015

Week	Class	Date	Topic	Read
1	1	1-21-15	Course Introduction (L1)	Chapter 1
	2	1-26-15	Physical Properties of Hydraulic Fluids (L2)	Chapter 2
2	3	1-28-15	Energy and Power Relationships Part 1 (L3)	Chapter 3
3	4	2-02-15	Energy and Power Relationships Part 2 (L4)	Chapter 3
	5	2-04-15	Frictional Losses in Pipelines (L5)	Chapter 4
4	6	2-09-15	Hydraulic Pumps and Pump Selection (L6)	Chapter 5
	7	2-11-15	Hydraulic Cylinders (L7)	Chapter 6
5	8	2-16-15	Review for Exam 1	Chapter 1-6
	9	2-18-15	Review of Exam 1 and Return Exam 1	Chapters 1-6
6	10	2-23-15	Hydraulic Motors (L8)	Chapters 7
	11	2-25-15	Hydraulic Valves (L9)	Chapters 8
7	12	3-02-15	Hydraulic Circuit Design & Analysis 1 (L10)	Chapter 9
	13	3-04-15	Hydraulic Circuit Design and Analysis 2 (L11)	Chapter 9
8	14	3-09-15	Conductors and Fittings (L12)	Chapter 10
	15	3-11-15	Ancillary Devices (L13)	Chapter 11
9		3-16-15	Spring Break	
		3-18-15	Spring Break	
10	16	3-23-15	Maintenance of Hydraulic Systems (L14)	Chapter 12
	17	3-25-15	Introduction to Automation Studio	Chapter 18
11	18	3-30-15	Review for Exam #2	Chapters 7-12
	19	4-01-15	Review of Exam #2 and Return of Exam 2	Chapters 7-12
12	20	4-06-15	Pneumatics 1:Components (L15)	Chapter 13
	21	4-08-15	Pneumatics 2: Circuits and Applications (L16)	Chapter 14
13	22	4-13-15	Basic Electrical Controls (L17)	Chapter 15
	23	4-15-15	Fluid Logic Control Systems (L18)	Chapter 16
14	24	4-20-15	Advanced Electrical Controls (L19)	Chapter 17
	25	4-22-15	Other Computer Software and Design Software	Chapter 18
15	26	4-27-15	Review for Exam 3	Chapters 13-18
	27	4-29-15	Return Exam 3 and Finals Review	Chapters 13-18