PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

FLUID MECHANICS & POWER APPLICATIONS W/LAB
MET 2022

Class Hours: 2.0 **Credit Hours: 3.0**

Laboratory Hours: 3.0 **Revised: Fall 2010**

Catalog Course Description:

A study of fluid mechanics with hydraulic and pneumatic application. Topics include pressure, fluid flow, fluid energy, system losses, pumps, control valves, system analysis and maintenance.

Entry Level Standards:

Students entering this course must have a working knowledge of advanced algebra and trigonometry.

Prerequisites:

MATH 1710 and 1720; or MATH 1730

Textbook(s) and Other Course Materials:

Applied Fluid Mechanics: Latest Edition. Mott, Merrill Publishing Company, 2000.

Industrial Hydraulic Technology: Bulletin 0221-B1, Parker Hannifin Corporation, Current Printing, 2002. [Lab Text]

I. Week/Unit/Topic Basis:

Week	Topic
1	Basic Fluid Properties Lab: Introduction to Hydraulics
2	Fluid Pressure and Measurement Lab: Hyd. Actuators & Control Devices
3	Introduction to Pneumatics Lab: Check & Flow Control Valves
4-5	Fluid Flow Lab: Directional Control Valves
6	Fluid Energy and system losses Lab: Pressure Control Valves
7-8	Viscosity, Laminar, and Turbulent Flow Lab: Hydraulic Pumps
9-10	Friction Losses and Minor Losses

	Lab: Hydraulic Motors
11-12	Hydraulic Systems Analysis and Maint. Lab: Hydraulic System Components
13	Compressible Fluids Lab: Introduction to Pneumatics
14	Pneumatic System Analysis and Maint. Lab: Pneumatic Logic Circuits
15	Final Exam

II. Course Goals*:

The course will:

A. Guide students to demonstrate an understanding of basic fluid concepts. (I, II, III)

B. Enhance effective understanding of incompressible fluids and hydraulic concepts. (I, II, III)

C. Expand student understanding of compressible fluids and pneumatics. (I, II, III)

D. Guide students to identify, describe, and explain the function of commonly used hydraulic and pneumatic components. (I- IV)

E. Engage and develop the student's skills, knowledge, and abilities regarding the correct identification, reading, and interpretation of Pneumatic & Hydraulic Schematics and Diagrams. (I- V)

* Roman numerals after course goals reference goals of the Engineering Technology Program

III. Expected Student Learning Outcomes*:

The student will be able to:

1. solve problems using both the English and SI system. A
2. identify and apply the basic properties of mass, specific weight, specific gravity, and density. A, B
3. differentiate force and pressure. A, B
4. differentiate absolute, gage, and atmospheric pressure. A, B
5. associate the concepts of pressure and elevation. A, B
6. associate and apply the concepts of energy and losses to various types of fluid flow. A, B, C
7. classify and analyze various types of fluid systems. A, B, C
8. identify the symbols and explain the function of various hydraulic and pneumatic system components. A, B, C, D
9. classify and analyze various types of piping systems. A, B, C, D
10. troubleshoot and maintain basic hydraulic and pneumatic systems. A-E

11. calculate flow rates and pressures for compressible fluids. A-E

12. identify the basic differences between a hydraulic and pneumatic system. A-E

13. document technical information in a neat and orderly format. A-E

14. complete assignments based on oral and written instructions. A-E

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

Evaluation of both classroom and laboratory work is required in this course. Total evaluation will be based on the following point distribution.

A. Unit Exams: **(50 Points)**

There will be 4-5 unit exams administered during the course.

B. Laboratory: **(30 Points)**

Experiments and demonstrations will be performed in the laboratory on many of the topics covered in class. Guidelines and requirements for each project will be provided by the instructor. Laboratory reports will count towards 15 points of the total.

C. Final Exam: **(15 Points)**

The final exam will be a comprehensive examination of the topics covered in the course.

D. Participation: **(5 Points)**

Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions and exercises, quizzes, and regular attendance.

E. Grading Scale:

Final grade for this course will be based on the following alphabetic/numerical scale.

A 93-100
B+ 88-92
B 83-87
C+ 79-82
C 74-78
D 65-73
F Below 65

V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific

circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
• Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
• Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
• Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
• Taking an exam for another student.
• Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
• Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at www.pstcc.edu/departments/swd/.

D. Other Policies:

Safety and Equipment Abuse: Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury will result in automatic failure of the course.