

**Springfield Technical Community College**  
School of Engineering Technologies & Math  
Department of Electrical Engineering Technology  
Course Syllabus

**Course Title:** Fluid Power Technology

**Course Number:** EET-120-D01

**Course Credits:** 3

**Professor:** Rick Jagodowski

**Date:** Spring 2018

**Meeting Day/Time:** F. 9:05-11:35

**Course Description:** This course provides a fundamental understanding of the physical principles of hydraulics and pneumatics in a logical building-block manner, along with a practical working knowledge of the components normally utilized in designing, installing, operating, and maintaining hydraulic and pneumatic systems.

**Pre-Requisites:** None, but you should have a practical understanding of algebra concepts.

**Student Learning Outcomes (SLO's)**

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

- understand common hydraulic & pneumatic devices and their related peripherals.
- apply basic mathematical formulas as a learning tool for fluid power machine operations.
- build & use basic hydraulic and pneumatic circuits and equipment.
- troubleshoot hydraulic and pneumatic systems.
- understand the concepts of absolute, gauge and differential pressures and partial vacuums.
- comprehend fundamental vacuum systems and their operation.
- use various pneumatic & hydraulic diagnostic tools.
- plan and build simple electro-mechanical fluid power control systems.
- conduct themselves in an appropriate and professional manner in laboratory environments.
- create professional documentation as used in the fluid power industry.

**Text & Materials:**

Required:

**Fundamentals of Technology - Principles of Hydraulics**, MB400, Jamie Smith Ed.D.

**Fundamentals of Technology - Principles of Pneumatics**, MB200, Jamie Smith Ed.D.

There is no ISBN number for the above lab manuals/texts. You will most likely have to purchase them through the STCC bookstore. You should also have a USB Flashdrive for storing your work and pdf handout given throughout the semester. Students are also required to be able to access their STCC email addresses and be able to access the CSET Forums at [cset.stcc.edu/forums](http://cset.stcc.edu/forums) to receive & view relevant course notifications, documents & links.

**Supplemental Text (Optional, not required):** **Fluid Power Technology**, 2nd ed., by Robert P. Kokernak, Prentice Hall, 1998, ISBN: 978-0139124877. This text is readily available from on-line sources. The 1<sup>st</sup> edition is very similar and less expensive, so you can get that if you are willing to deal with different page & figure numbers.

**Office Hours:**

Prof. Rick Jagodowski: Bldg. 20 Rm. M120. X-4594 E-mail: [Jagodowski@stcc.edu](mailto:Jagodowski@stcc.edu)

Hours are posted on the door. Other hours by appointment.

## Grading Policy

**\* Attendance & Professionalism:** Attendance is mandatory. Students absent from more than 3 classes may be removed from the class at the professor's discretion. It is the student's responsibility to make arrangements to make up any missed work. Missed work may only be made up if the professor allows. The schedule for any make up work will be at the instructor's discretion. If the student knows in advance he or she may not be in lecture it is the student's responsibility to notify the professor in advance. Attendance will be taken at each lecture & lab session. Be sure to sign in or follow the lab instructor's guidelines to properly record your attendance. Missing a day that has a lab exercise and a class will count as 2 absences.

**\* Policy on course disruptions:** Students are expected to act in a respectful and mature manner. Course disruptions, loud or disruptive behavior, intimidation, violation of the policies and procedures set down in the STCC Student Handbook, or similar problems will result in the student being removed from the lab or lecture.

Be sure to turn off all cell phones or other electronic devices before entering the lecture or lab. Your instructor may have a specific policy in regards to cell phone use, so please check with them if you have any questions. Talking, texting or causing disruptions while lecture is in process is considered disruptive. At the professor's discretion he or she may attempt to correct the student's behavior or remove the student from the class.

The following is the STCC Code of Conduct from [www.stcc.edu](http://www.stcc.edu):

*"Springfield Technical Community College recognizes that all students, as members of the college community, enjoy the freedom of speech and assembly, freedom of association, freedom of the press, right of petition and the right of due process. These rights do not come without responsibilities and respect for others in the College community. Attendance at the College is a privilege and not a right, and enrollment carries with it obligations in regard to conduct, both in and out of class. Students are responsible for knowing and understanding the contents of this Code. Students are responsible for abiding by the laws governing the College and are expected to observe standards of conduct set by the College."*

**\* Professional behavior:** Students are expected to act in a professional and mature manner at all times. Improper behavior will result in a reduced grade and if not corrected may result in removal from the course. The "Professionalism" portion of the grade may be reduced due to being absent or late to the class, "fooling around" or being a disruption to the educational process, having non-course related conversations during lecture/lab, or similar violations of the course rules. This applies to activity any time you are on STCC property or representing STCC or the E.E.T. Department.

**\* Due Dates:** Students are expected to adhere to all due dates set by the course and lab instructors. Failure to comply with these dates may result in a loss of credit up to 25% per week or part of a week for the assignment, at the instructor's discretion.

**\* Quality:** Submission of poor quality work will not be accepted. Submissions which do not meet minimum documentation standards set forth in class, are incoherent, or are illegible will be returned [not graded] to the student. These cases are treated as if no work was submitted.

**\* Academic Honesty:** All students are assumed to do their own work. Using other's work is permitted, under some circumstances, with proper credit to the original author(s). Academic dishonesty of any manner is not tolerated. In the event it is discovered by the professor ALL PARTIES INVOLVED receive a grade of "F" [0.0]. No distinction is made between those "cheating" and those being "cheated from". If a student believes his/her work is being borrowed without consent it is her/his responsibility to report the incident. This is the only means

to escape the consequences. All incidents are examined on a case-by-case basis by the professor whose decision is final. During exams and quizzes we do not allow the use of cell phones or any device with wireless, infrared or similar communications capability.

**\*Homework:** Homework problems will be assigned frequently. Students are encouraged to keep their completed homework assignments in a notebook. The homework notebook may be collected at mid-semester and/or final exam time.

**\*Quizzes:** Quizzes will be unannounced and given frequently. Quizzes will be based upon material covered in lecture or homework/lab assignments. There are no make-ups given for missed quizzes. The two lowest quiz grades will be dropped so that a missed quiz or two should not negatively effect your grade.

**\*Exams:** There are two exams during the semester: a mid-semester and a comprehensive final exam. These exams may be in-class, take home or a combination. They may also consist of closed book & notes or open book & notes formats. Specifics for each exam will be given at least one week before the scheduled exam.

**\*Practical:** Lab assignments are given each week to aid the student in the application of the theory. Each lab Workbook project will be inspected by the instructor for completeness, neatness, creativity, functionality and operational performance. Students will be introduced to MicroSoft Visio to aid in drawing diagrams. An ethical observation of each student's performance will also be assessed (see end of syllabus for more detail). Students are expected to follow directions and procedures. Lab experiments will be performed each week. Students are responsible for completing each assignment. Unless otherwise stated, lab experiments and/or reports should be completed and kept in a notebook within one week after they are assigned. The notebook and/or lab books will be collected at mid-semester and at the end of the semester.

### Grade Evaluation:

<b>Lecture:</b>	Professionalism:	20%	<b>Practical:</b>	Professionalism	25%
	Homework:	5%		Notebook & Documentation	25%
	Quizzes:	25%		Experiments	50%
	Exams (2):	50% (25% each)			

### Grade Determination:

$$\text{Lecture grade} \times 0.70 + \text{Practical grade} \times 0.30 = \text{Final Course Grade}$$

### Class Organization

The course is presented in a combination lecture/lab format. Relevant questions and discussion are encouraged. Presentations may include a combination of blackboard & chalk, computer based presentations (e.g. PowerPoint) & computer simulation. Lectures and labs will include hands-on activities making use of available lab equipment as well as computers and software applications. Internet research will be required for certain topics discussed in the course.

# Course Outline\*

Week	Topic
1	Introduction - course objectives, What is Fluid Power?, Numerical Calculations.
2	Numerical Calculations & Unit Conversions
3	Force
4	Pneumatic and Hydraulic Cylinder Force Calculations
5	Boyle's Law
6	Ideal Gas Law
7	Gas Laws and Processes
8	***** <b>Mid-semester Exam</b>
9	Pneumatic Components and Systems
10	Pneumatic Components and Systems
11	Pneumatic Components and Systems, Vacuum Systems
12	Hydraulics: Liquid Properties and Their Measurement
13	Hydraulics: Liquid Properties and Their Measurement
14	Hydraulic Cylinder Force revisited
15	Columns of Liquids & Liquids in Motion
16	***** <b>Final Exam</b>

\*Note: The instructor reserves the right to modify the course outline as necessary to best serve the educational needs of the students.

## NOTES:

It is important that you read and understand this syllabus! You will be asked to indicate that you have received, read and understand it.

It should be understood that the time to seek help with an academic problem is at the first sign of such a problem. Problems that are allowed to grow out of proportion are much more difficult to deal with and can often be insurmountable. Please make your needs known to me at the earliest possible time and DO NOT wait until a week before a test to seek help! Our Office hours are as posted or by arrangement.

Please note that at any time in the duration of this semester it may be necessary to alter the specified schedules. It is useful as a guide only and should not be taken as hard cold fact. Often during a semester, equipment failures and shortages of materials may hamper completion of a particular topic. We reserve the right to substitute, replace or delete any of the following scheduled lectures or labs.

## **Course Methodology and Philosophy**

S.T.C.C. invests a considerable amount of resources into equipment for student and faculty use. As a member of the faculty, I will make use of all available teaching methods and tools. For lectures, most instruction will be a combination of Power Point and blackboard/whiteboard. Students are encouraged to actively participate by way of relevant questions and comments about the subject matter under discussion. It is my responsibility to make sure that the subject matter is presented in as clear a manner as possible. Your feedback is invaluable to my ability to accomplish this goal.

You, as the student, also have your share of responsibility:

**Attendance:** The scope of the material presented in this course is broad. Attendance is required to experience all the information as presented by the instructor. In addition, your input into the classroom discussion helps other students to better understand the material.

**Preparation:** It is your responsibility to complete all assignments, reading and written, in a timely manner. Thorough preparation will help instill greater confidence in the subject matter and will facilitate lively classroom discussions. Proper preparation for quizzes and tests is also expected.

**Attitude and Behavior:** It is your responsibility to make sure that your contributions to this course, and your attitude toward the people around you, are positive. Foul language and disruptive behavior will not be tolerated in this course. In addition, school property must be treated with respect at all times. This is especially true in laboratories. If you do not understand how to use a particular piece of equipment, you are encouraged to ask for assistance. You should report malfunctioning equipment immediately. Always return equipment and components to their proper locations. Leave your study or work area clean and neat for the next student.

### **Students with Special Needs**

Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Before any accommodations are put in place, you should contact the Office of Disability Services at 755-4785 or stop by Building 27/2nd Floor to coordinate reasonable accommodations for students with documented disabilities.