1. **COURSE TITLE\*:** Hydraulics and Pneumatics
2. **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*:** ENDS 2205
3. **PREREQUISITE(S)\*:** PHYS 1117 and MATH 1120 **COREQUISITE(S)\*:** NONE
4. **COURSE TIME/LOCATION: (*Course Syllabus – Individual Instructor Specific*)**
5. **CREDIT HOURS\*:** 3 **LECTURE HOURS\*:** 2

 **LABORATORY HOURS\*:** 1**(2** **contact hours) OBSERVATION HOURS\*:** 0

1. **FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***
2. **COURSE DESCRIPTION\*:**

An introductory course to impart basic knowledge of hydraulic and pneumatic concepts, components and systems for power transmission and control, where laboratory work is performed using industrial components and circuits.

1. **LEARNING OUTCOMES\*:**
2. Explain forces on plain and curved boundaries.
3. Define piping systems and the dynamics of pipe flow.
4. Design piping systems involving friction, systems with laminar and turbulent flow.
5. Understand the difference between absolute and gage pressures.
6. Understand the principles of hydraulic power transmission.
7. Understand Pascal’s Law
8. Understand Bernoulli’s Equation
9. Understand the properties of fluid
10. **ADOPTED TEXT(S)\*:** *Applied Fluid Mechanics*

Eighth Edition By: Mott, Robert L. and Untener, Joseph A.

Pearson

ISBN: 978-0-13-557715-8

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

1. **OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***
2. Vickers Industrial Hydraulics manuals available in lab for reference.
3. Laboratory Exercise Handouts will be furnished by SSCC.
4. Drafting Kit or AutoCAD,
5. Clothes for working in laboratory, Boots (at least no open toe shoes),
	1. One pair of safety glasses and ear protection will be provided by SSCC.

 5) Scientific Calculator 6) Automation Studios software (free to students)

1. **GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

Points

A: 900 – 1000

 B: 800 – 899

 C: 700 – 799

 D: 600 – 699

 F: 0 – 599

1. **GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

|  |  |  |
| --- | --- | --- |
| *`* | ***EXAMPLE ONLY****Total Points* | *% of Grade* |
| Assignments  | 200 | 20% |
| Test x3 | 600 | 60% |
| Final Exam | 200 | 20% |
| Total | 1000 | 100% |

1. **COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

Lecture, independent and group projects and labs, in-class and home assignments, quizzes, tests may be used. This course is combination of in-class lecture, and hands-on laboratory applications, solving problems using methods including software, graphical and mathematical tools.

1. **COURSE OUTLINE: Sample-*(Course Syllabus – Individual Instructor Specific)***

|  |  |  |  |
| --- | --- | --- | --- |
| Module | WEEK | MATERIAL | LEARNING OUTCOMES |
| 1 | 1 | Chapter 1-The Nature of Fluids and the Study of Fluid Mechanics | 1, 3, 8 |
|  | 2 | Chapter 2- Viscosity of Fluids | 1, 6, 7 |
|  | 3 | Chapter 3- Pressure Measurement | 1, 3 |
| 2 | 4 | Test 1Chapter 4- Forces Due to Static FluidChapter 5- Buoyancy and Stability | 1, 2, 3, 5, 8 |
|  | 5 | Chapter 6- Flow of Fluids and Bernoulli’s Equation | 1, 2, 3, 5, 8 |
|  | 6 | Chapter 7- General Energy Equation | 1, 2, 3, 5, 8 |
|  | 7 | Chapter 8- Reynolds Number, Laminar and Turbulent Flow, Energy Losses due to Friction | 1, 2, 3, 5, 8 |
|  | 8 | Chapter 9- Velocity Profiles for Circular Sections and Flow in Noncircular Sections Lab | 1, 2, 3, 5, 6, 7, 8 |
|  | 9 | LabTest 2 | 1, 2, 3, 5, 6, 7, 8 |
| 3 | 10 | Chapter 10- Minor Losses | 1, 2, 3, 4, 6, 7,8 |
|  | 11 | Chapter 13- Pump Selection and Application | 1, 2, 3, 4, 5, 6, 7,8 |
|  | 12 | Chapter 15- Flow MeasurementChapter 16- Forces Due to Fluids in Motion | 1, 2, 3, 4, 6, 7,8 |
|  | 13 | Test 3Lab | 1, 2, 3, 4, 6, 7,8 |
|  | 14 | LabLab | 1, 2, 3, 4, 6, 7,8 |
|  | 15 | LabReview | 1, 2, 3, 4, 6, 7,8 |
| FINAL | 16 | Comprehensive Final Exam, All Lab Reports due | 1-8 |

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

All assignments and tests must be turned in on time (See course syllabus). Late work will receive a zero grade. Due dates will be on the syllabus handed out in class on the first day. Students may work on their own time to complete the assignments. Laboratory exercises are assigned for the student to complete in teams during lab hours, with reports done by each student, individually, outside of class and lab hours.

Examinations can include written and graphical components.

**16. FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17. ACCOMMODATIONS: \***

Students requesting accommodations may contact the Academic Affairs office administrative assistant, Barb Fleming, at bfleming@sscc.edu or 937-393-3431 X-2620.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires an accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first.  For more information about Religious Accommodations, see the full policy at <https://www.sscc.edu/services/accessibility-services.shtml#religious-accommodations>

or contact the Academic Affairs office administrative assistant, Barb Fleming, at bfleming@sscc.edu or 937-393-3431 X-2620.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.