SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electronic Systems Technology Program
Revision Date: August 22, 2022

I. CATALOG DESCRIPTION

Course Number:	ELEC2853
Course Title:	Fluid Power and Robotics
Prerequisite(s):	ELEC1130 or ELEC1131 or by Chair Permission
Catalog Description:	Study of fluid power (hydraulic & pneumatic) systems and devices. Circuitry and various components, their design, operation and application. An introduction to robotic operation and setup circuitry as related to fluid power.
Credit Hours:	2.5
Class Hours:	30
Lab Hours:	23
Total Contact Hours:	53

II. COURSE OBJECTIVES: *Course will:*

A. Discuss fundamentals of industrial fluid power systems.
B. Present individual components used in fluid power systems.
C. Examine plumbing and instrumentation diagrams used in process control.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. Student Learning Outcomes: *Student will be able to:*
- **1.** Demonstrate industrial related hydraulics & pneumatics systems.
- **2.** Explain the function of each component in a system.
- **3.** Read ANSI symbols representing the various components in a system.

B. General Education Learning Outcomes (GELOs)
- **1.** GELO #3: Critical Thinking & Problem Solving
  Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

A. Fluid Power Principles
- **1.** Pascal's law
- **2.** Power transmission (pressure and flow)
- **3.** Viscosity ratings
- **4.** Static head pressure
- **5.** Vacuum
- **6.** Flow rate vs. pressure drop
- **7.** Pump function
- **8.** Pump cavitation
- **9.** Parallel circuitry
- **10.** Hydraulic horsepower

B. Cylinders and Their ANSI Symbols
- **1.** Types
- **2.** Nomenclature
- **3.** Cushions
- **4.** Force
- **5.** Speed

6. Selection and sizing

C. Directional Control Valves and Their ANSI Symbol
- **1.** Spool, Poppet
- **2.** Actuators
- **3.** Pilot control circuitry

D. Pressure Control Valves and Their ANSI Symbols
- **1.** Relief Valves
- **2.** Direct-acting
- **3.** Pilot-operated
- **4.** Unloading valves
- **5.** Pressure reducing valves

E. Flow Control Valves and Their ANSI Symbols
- **1.** Application
- **2.** Series Meter-in
- **3.** Series Meter-out
- **4.** Bypass
- **5.** Check Valve
- **6.** Needle Valve
- **7.** Flow dividers

F. Hydraulic Pumps & Motors and Their ANSI Symbols
- **1.** Positive placement vs. non-positive displacement
- **2.** Fixed displacement Pumps
- **3.** Variable displacement Pumps
- **4.** Pressure compensated Pumps

G. Accessory Items and Their ANSI Symbols
- **1.** Reservoirs
- **2.** Heat exchangers
- **3.** Filters/Strainers
- **4.** Pneumatic F-R-L
- **5.** Accumulators

H. Plumbing and Instrumentation Diagrams
- **1.** Process Control Loops
- **2.** Drawings and Symbols
- **3.** The Master Sheet

V. INSTRUCTIONAL MATERIALS

A. Required Text(s): Womack Educational Publications, *Industrial Fluid Power* (Refer to CID and/or instructor for current edition)

B. Other Resources: None

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:
- **1.** Technology enhanced lecture
- **2.** Classroom discussion
- **3.** Audio visual materials
- **4.** Presentation by experts for the Electronics and Networking industry

VII. METHODS OF EVALUATION

A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
- **1.** Attendance and participation

2. Daily assignments
3. Written exams and/or quizzes
4. Performance and observational assessment

VIII. SPECIFIC COURSE REQUIREMENTS

A. A minimum grade of "D" is required.
B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.