###### COURSE SYLLABUS

###### Semester: Year: 2013

**Mission Statement:**

Richard J. Daley College provides high-quality education which leads to academic success, career development, and personal enrichment that fulfill diverse community needs.

###### Course (Discipline): Manufacturing Technology Number: 253 Section:       IAI#:

**Course Title:** Industrial Pneumatics **Length of Course (Weeks):** 16

**Credit Hours:** 3 **Lecture Hours:** 2 **Lab Hours:** 2 **Contact Hours:** 4

**Meeting Day(s):**       **Times:**       **Building:**       **Classroom #:**

**Syllabus can be found on Blackboard website at** [**https://ccc.blackboard.com/webapps/login/**](https://ccc.blackboard.com/webapps/login/)**.**

###### Dean, College to Careers in Advanced Manufacturing \_\_Ray Prendergast\_\_\_\_\_\_\_

###### E-mail Address: rprendergast@ccc.edu Phone #: 773-838-7786

#### Address: 7500 South Pulaski Road Chicago, IL 60652

#### Office hours:

**Course Description**:

A study of the basic principles of pneumatics with emphasis on schematics, valves, actuators, compressors, instrumentation, applications, and troubleshooting. Course also includes the use of supplier catalogs and technical manuals. Writing assignments, as appropriate to the discipline, are part of the course.

**Course Prerequisites**:

Eligibility for Math 98 and Reading 99, or Consent of Department Chairperson.

**Students Course is Expected to Serve:**

Students enrolled in the Manufacturing Technology program who are also interested in Factory Automation.

**Course Objectives**:

* Develop an understanding of schematic diagrams of pneumatic systems.
* Identify pneumatic system component parts and understand their function.
* Understand the theory and operation of a complete pneumatic system.
* Understand a variety of applications for pneumatic circuits.
* Demonstrate a systematic approach for the maintenance and troubleshooting of pneumatic systems.
* Understand best practices in workplace safety in the operation of pneumatic systems.

**Student Learning Outcomes:**

Upon completion of this the student will be able to:

* Create an accurate schematic of an actual pneumatic circuit.
* Calculate appropriate cylinder size from load and system operating parameters.
* Assemble, connect, and operate pneumatic circuits using basic components.
* Troubleshoot a pneumatic system faulted by the instructor

**Recommended Texts and Course Materials:**

***Text:***

Shepard, R.J. (2000). Explorer I Manual, The Principles & Applications of Pneumatics (3rd ed.). Gilberts, Illinois: TII Technical Education Systems.

***Materials:***

**Additional Course Requirements:**

N/A

**Recommended Methods of Instruction:**

The methods of instruction will include lecture, classroom discussion/answering questions, and small group work in pneumatics lab.

**Recommended Methods of Evaluation:**

Midterm and final course grades will be based on the following assessments.

Attendance

Laboratory Exercises

Problem Sets

Mid-term exam

Final exam

Grading Scale:

90-100% = A

80-89 = B

70-79 = C

60-69 = D

Below 60 = F

See the Policy on grade designations and grade appeals at:

<http://www.ccc.edu/colleges/daley/departments/Pages/Grade-Appeal-Policy-and-Procedure.aspx>

**NOTE:** Type or copy and paste the link above into a web browser to view its content.

### Topical Outline / Course Calendar:

* Week 1
  + Explorer I System Familiarization
  + History and Application of Pneumatics
  + Fundamentals and Characteristics of Compressed Air
* Week 2
  + Cylinder sizing
  + Graphic Communication Symbols
  + Air Compressors
* Week 3
  + Air Filters
  + Pressure Regulators
  + Lubricators
* Week 4
  + Instrumentation: Theory and Purpose
  + Flow Meters
  + Pressure Gauges
  + Manometers
* Week 5
  + Directional Control Valves: Theory and Purpose
  + Manual Spool Type DCV
  + Solenoid Actuated Spool Type DCV
* Week 6
  + Air Pilot Type DCV
  + Pneumatic Actuators: Theory and Purpose
* Week 7
  + Single Acting Cylinders
  + Mid term exam
* Week 8
  + Double Acting Cylinders
  + Force/Area Relationship of a Cylinder
  + Rotary Actuators: Theory and Purpose
* Week 9
  + Rack and Pinion Rotary Actuators
  + Air Motors
* Week 10
  + Flow Controls: Theory and Purpose
  + Flow Control Valves
  + Needle Valves
* Week 11
  + Check Valves: Theory and Purpose
  + Simple Check Valves
  + Shuttle Valves
  + Venturi Vacuum Generators
* Week 12
  + Maintenance and Troubleshooting
  + Meter-out Cylinder Speed Control
* Week 13
  + Control of an Air Motor
  + Sequenced, Paired Cylinders in a Circuit
  + Cylinders in Parallel
* Week 14
  + Cylinders in Series
  + Two Step Speed Control of a Double Acting Cylinder
  + Differential Pressure Circuit
* Week 15
  + Clamp Press Circuit
  + Air Piloted Control of a Double Acting Cylinder
  + Seal-in Circuit with Unlatching (handout)
* Week 16
  + Review
  + Final exam

This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.