I. **OVERVIEW**

The following information will appear in the 2009 - 2010 catalog

**INTEC 262**  
**Hydraulics/Pneumatics**  
3 Units  

*Also offered as:* AGM - 262: Hydraulics/Pneumatics  
Principles and technical application of hydraulics and pneumatics systems in industry. Course is repeatable - three completions allowed. Field trips might be required. Course is not applicable to the associate degree.

II. **LEARNING CONTEXT**

*Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:*

A. **COURSE CONTENT**

1. **Required Content:**

   a. History of fluid use and development
      i. Hydraulics in industry
      ii. Pneumatics in industry
      iii. Use of power in agriculture and industrial applications
      iv. The place of fluid power/energy relationship in equipment design

   b. Uses and application of hydraulics and pneumatics in industry
      i. Systems
      ii. Applications
      iii. Basic physical science and mechanical laws governing hydraulics

   c. Components of hydraulics and their management
      i. Pumping Systems
      ii. Valves
         a. Directional Control
         b. Flow Control
         c. Pressure Control
      iii. Cylinders and other Cylinder and Motros activators
      iv. Seals and packing
v. Lines and fittings
vi. Other system components
vii. Filters Reserces and Fluid Heat Exchangers
viii. Pneumatic system components and differences
d. Transmissions—hydrostatic
   i. Types
   ii. Application in power equipment
e. Fluid properties
   i. Function and characteristics
   ii. Fluid passages and transmission lines
   iii. Pressure drops
f. Maintenance of hydraulic and pneumatic systems
   i. Servicing and adjusting
   ii. Inspecting and testing
   iii. Repairing and overhauling
   iv. Troubleshooting

B. **HOURS AND UNITS**

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<th>INST METHOD</th>
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<td>Lect</td>
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C. **METHODS OF INSTRUCTION (TYPICAL)**

Instructors of the course might conduct the course using the following method:

1. Classroom Lecture
2. Overview of Technical Manuals
3. Students to augment classroom lecture will complete problem-solving situations.
4. Pneumatic and Hydraulic System Demonstrations
5. Use of Multi-media: Videos, DVD, powerpoints
6. Industry Guest Speakers and/or Field Trips to local Facilities
D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
   Time spent on coursework in addition to hours of instruction (lecture hours)
   a. Weekly Chapter Reading Assignments
   b. Weekly Homework Assignments
   c. Per Term 1-2 complex projects (Pneumantic and Hydraulic Design Problems that include
      equipment specifications, system design and material selection and pricing)
   d. Assigned technical manuals for review and assessment

2. EVIDENCE OF CRITICAL THINKING
   Assignments require the appropriate level of critical thinking
   Typical Exam/Quizzes or Homework questions:
   - Please describe in detail three stages of air treatment and all relevant components in a
     typical pneumatics system.
   - Compare and contrast the benefits and costs of piston, rotary, dynamic and screw
     compressors.
   - List at least three reasons why valve positioners are used to improve pneumatic-operated
     actuators.
   - What are the two techniques used to measure viscosity? Explain the differences.
   - Given a specific scenario. Design a hydraulic/pneumatic system that meets the design
     criteria.
   - Quizzes and Exams would also require students to examine schematic symbols and be
     able to read diagrams identifying components, systems, flow, etc.

Design Project Example:
Your job is to design a hydraulic system that will operate a screw conveyor and 5 tank valves. the
system must include a reservoir, hydraulic cylinders, directional control, pressure relief, flow control,
filter, pump, motor and anything else you deem necessary that will drive a golf cart. The worst case
situation is that the cart will drive on dirt, climb a 20% slope, and accelerate to 20 miles per hour.
the rear wheel diameter of the cart is 1 foot. Design the motor first then the pump, then add all
required components.

E. TEXTS AND OTHER READINGS (TYPICAL)

2. Other: FOS Hydraulics, Deere, Deere & Co. Publishing

III. DESIRED LEARNING

A. COURSE GOAL
   As a result of satisfactory completion of this course, the student should be prepared to:
Identify common components and apply basic design concepts in hydraulic and pneumatic equipment.

B. STUDENT LEARNING GOALS
Mastery of the following learning goals will enable the student to achieve the overall course goal.

1. Required Learning Goals
   Upon satisfactory completion of this course, the student will be able to:
   a. Identify the components which make up common industry hydraulic and pneumatic systems.
   b. Explain common terms and identify problems related to pneumatics and hydraulics.
   c. Apply basic hydraulic and pneumatic design concepts to stationary and mobile equipment.
   d. Outline common fluid system service procedures.
   e. Analyze and test fluid systems for failures.
   f. Develop good service procedures to prolong system life.
   g. Match fluids to appropriate hydraulic systems.
   h. Examine each of the five main system components.
   i. Test for and diagnose common hydraulic system and preventive system problems.
   j. Outline the development history, technical applications, and limitations of hydraulic and pneumatic systems.

IV. METHODS OF ASSESSMENT (TYPICAL)

A. FORMATIVE ASSESSMENT
   1. Classroom discussion
   2. Quizzes
   3. Weekly homework assignments

B. SUMMATIVE ASSESSMENT
   1. Evaluation of student projects
   2. Mid Term and/or Final Exam