



MASTER COURSE OUTLINE

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COURSE TITLE

Introduction to Mechanized Irrigation Applications II

GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 142

(Formerly:)

CIP Code: 47.0101

Intent Code: 21

Program Code: 780

Credits: 5

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 27.5

Lab Hrs: 55

Other Hrs:

Distribution Designation:

COURSE DESCRIPTION (as it will appear in the catalog)

This class will reinforce the concepts of mechanized irrigation systems acquired from the intro class. Course work will provide an in-depth and practical view of the various propulsion systems, electrical/electronic/digital logic controls and irrigation hydraulic principles. It will focus on technical service and operation aspects irrigation service technicians experience in the field. Instruction using "real-life" lab equipment under authentic conditions provides "hands on" experience similar to actual field work.

PREREQUISITES

IST 141

TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty (Example: Reference materials from Valmont, Lindsay and Reinke)

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.

1. Explain the fundamental operation of various mechanized systems types using proper industry nomenclature.
2. Relate the electrical components utilized on the irrigation systems to those found in other industrial applications.
3. Perform fundamental electrical diagnostic tests at the system and component level using safe troubleshooting techniques.
4. Install and service/troubleshooting of critical controls and drives used in modern irrigation systems
5. Demonstrate a practical knowledge of pumping hydraulic principles and use of pumping curves to operate systems efficiently

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

- 1) Theory of operation
 - a) Pivot
 - b) Structural components

- c) Pivot center
 - d) Spans
 - e) Towers
 - f) End booms
 - g) End guns
- 2) Practical components
- a) Mechanical move systems
 - i) Wheels
 - ii) Gearboxes
 - iii) Drive Lines
 - iv) Structure
 - v) Controls
- 3) Water handling Hydraulics
- a) Pumping curves
 - b) Pumping efficiency
 - c) Liquid pressure & flow dynamics
 - i) Sprinkler types
 - ii) Sprinkler packages
 - iii) Application rates
- 4) Technician safety
- a) Environmental considerations
 - b) System grounding
- 5) Electrical components and circuits
- a) Control circuit (parallel circuit)
 - b) Safety circuit (series circuit)
 - c) Main control panel
 - d) Collector reel
 - e) Span cable
 - f) Tower boxes
 - g) Drive motors
 - h) Booster pump and controls
- 6) SAC (swing arm corner)
- a) Parent system same as a pivot
 - b) Structural
 - c) Steerable swing span
 - d) Sprinkler controls
 - e) Guidance
 - i) Buried wire
 - ii) GPS
- 7) Lateral move
- a) Spans same as pivot
 - b) Power tower or cart
 - i) Hose drag
 - ii) Ditch or canal feed
 - c) Power source
 - i) Cable drag

- ii) On-board generator
- 8) Rigid span
 - a) Guidance
 - i) Buried wire
 - ii) Cable or fence
 - iii) GPS
 - iv) Furrow
- 9) Application of industrial controls and drives
 - a) Classroom theory
 - b) Lab
- 10) Trouble shooting of electrical circuits and components
 - a) Classroom theory
 - b) Lab
- 11) Systematic approach to diagnostic trouble shooting of mechanized irrigation systems
 - a) Classroom theory
 - b) Lab

DEPARTMENTAL GUIDELINES *(optional)*

DIVISION CHAIR APPROVAL

DATE