

## Cert III in Irrigation Technology

Overview of unit competencies, and the different skills and knowledge candidates face to gain from enrolling

### AHCIRG337 - Measure irrigation delivery system performance

By completing this course, students will be able to measure the pressure, flow and distribution uniformity of an irrigation system, monitor the supply of equipment and spare parts, and record system performance. By the end of the course, students will show on at least two occasions, evidence of their knowledge of/skills at;

- applying and measuring and testing techniques
- identifying adverse environmental impacts of irrigation activities and taking appropriate remedial action
- accessing and preparing data records for both print-based and computer-based data
- using computers to record and report data
- calculating pressure differentials, flow rates, crop yields, estimated water usage and actual water usage
- using computers to record and report data.

### AHCIRG338 - Troubleshoot irrigation systems

This unit of competency describes the skills and knowledge required to locate and identify irrigation system faulty components and blockages, shut down and isolate components, replace faulty components, clear blockages and return the irrigation system to normal operating status. This course will give students knowledge of;

- workplace requirements applicable to health and safety in the workplace for troubleshooting and repairing irrigation systems
- environmental impacts of irrigation using water from any ground or underground source
- system malfunctions and their likely causes
- irrigation equipment handbooks
- characteristics and operation of replaceable components of irrigation systems
- isolation procedures.

### AHCIRG339 - Monitor soils under irrigation

This course covers all the knowledge needed to assess physical and moisture properties of soil, monitor soil chemical properties, assess soil health and plant growth under irrigation, and implement strategies to optimise irrigation on the soil plant growing environment. Students will be able to;

- conduct soil structure and texture assessment
- use soil moisture monitoring equipment
- calculate moisture holding capacity of plants, including readily available water (RAW)
- apply the results of soil testing to assess soil properties
- assess the erosion potential of the irrigated soil
- adjust watering practices to meet plant needs.

### AHCIRG340 - Install irrigation pumps

This unit of competency describes the skills and knowledge required to plan and sequence installation tasks, source, install and commission pump and flow control components, and complete irrigation pump installation. At the end of the course, students will be able to demonstrate that they have;

- followed drawings and specifications
- performed work-related calculations
- handled materials safely
- organised equipment and materials for installation work
- matched pump output and flow rate to pipe diameter
- set out and prepared the site
- positioned pumps and control devices
- used power tools and hand tools

- primed and operated pumps
- fixing and joining techniques
- identified and responded to operational problems
- monitored the performance of pumps
- adjusted and set pressure switches and air tanks to suit pump performance and site conditions.

They will also have an understanding of;

- basic principles of hydraulics, flow versus pressure, energy loss due to friction
- discharge and flow rates
- installation procedures for irrigation pumps
- pump components and their principles of operation
- advantages and disadvantages of each pump type
- servicing requirements for pumps
- types of pumps and their application in irrigation, such as centrifugal, vertical turbine, submersible and propeller
- characteristics and application of different valves, pipes and fittings, including fixing and joining techniques and methods
- impellers, rotors and stators
- properties of water, including pressure and flow rates
- pump performance and pressure testing
- automatic pump switches, including timers, pressure switches, constant flow switches and variable speed drives.

#### **AHCIRG342 - Interpret irrigation plans and drawings**

This course gives students the skills and knowledge required to read and interpret plans and drawings, mark out and peg a site from a plan and identify required components applicable to installing irrigation systems.

Students will be able to show that they have;

- interpreted symbols and abbreviations used on plans
- interpreted scale and specifications from plans and drawings
- recognised and marked out features on a site from a plan
- marked out boundaries and infrastructure position from a plan
- used basic industry calculations
- translated documented requirements into on-site activities and site and structural features from two-dimensional to three-dimensional formats.

#### **AHCIRG345 - Install pressurised irrigation systems**

Students will gain the skills and knowledge required to organise resources, set out and prepare an irrigation installation site and install, commission, and complete pressurised irrigation system installation.

There must be evidence that the individual has installed pressurised irrigation systems on at least one occasion and has:

- applied workplace health and safety requirements
- selected materials, tools, equipment, and machinery appropriate to the scope of works
- organised resources for installation work
- set out and prepared the site
- completed installation work
- calibrated testing and monitoring equipment
- commissioned irrigation system.

### **AHCWHS301 - Contribute to work health and safety processes**

This course gives students the skills to carry out enterprise work health and safety policies and procedures.

To achieve in this course, the candidate must provide evidence that they can:

- apply work health and safety policies and procedures
- apply workplace procedures for hazard identification and risk control
- read safety warning signs
- participate in arrangements for maintaining the health and safety of all people in the workplace
- work safely during work operations
- record incidents in the work area in accordance with relevant work health and safety legal requirements
- observe and direct others to follow safe working operations
- communicate safety information within and to work team

### **AHCWRK309 - Apply environmentally sustainable work practices**

This course will allow students to gain the following knowledge;

- basic environmental sustainability principles
- environmental legislation, regulations, standards, codes of practices as may be relevant to industry sector and workplace
- relevant internal and external sources of information that can be used to identify sustainability improvements
- common environmental and energy efficiency issues within the industry
- environmental hazards and risks associated with the relevant industry sector
- organisation's sustainability work policies and procedures
- principles of resources efficiency and life cycle management
- practices for disposal or recycling of waste associated with relevant industry sector
- organisation's recording and reporting systems.

### **AHCCHM101 – Follow basic chemical safety rules**

Throughout this course, students will gain the following knowledge:

- rules and instructions for working with and around chemicals
- common types of chemicals used in the workplace
- common types of chemical application equipment to be maintained and stored
- the structure and purpose of chemical labels and safety data sheets
- basics of hazards and risks of chemical use
- safety signage and symbols for chemical use in the workplace
- level of hazard and risks associated with common chemicals used in the workplace and methods of control
- PPE, when and how it should be worn, stored and maintained
- methods of reporting to supervisors' chemical hazards and risks
- safe methods of transporting, handling and storage of chemicals
- types of emergencies and the procedures for accidents and spills of chemicals
- records commonly kept for chemical use.

**AHCIRG328 - Operate irrigation controller and sensor technology**

This course will give candidates the knowledge required to operate irrigation controllers and sensor technology as part of irrigation installation, construction, and operation. Students will gain the following skills;

- applied workplace health and safety requirements
- selected tools and equipment appropriate to the scope of works
- maintained and checked irrigation controller and sensor equipment for accuracy
- operated irrigation controllers and sensors
- checked the accuracy of controller and sensor equipment, and adjusted
- recorded the results of sampling and testing
- recorded observations and data.

**AHCIRG341 - Operate and maintain irrigation pumping systems**

Students enrolled in this course will gain the skills and knowledge required to prepare, start up, operate, monitor, and shut down an irrigation pumping system and maintain pumps and pumping equipment. Students, by the end of the course, will have knowledge of;

- workplace requirements applicable to health and safety in the workplace for operating and maintaining irrigation pumping systems
- advantages and disadvantages of each pump type
- pump performance and fault finding
- pumps and their application in irrigation, such as centrifugal, vertical turbine, submersible and propeller
- pumps that are suitable as booster and floating pumps
- automatic pump switches, including: timers, pressure switches, irrigation controllers, and flow switches
- properties of water including pressure and flow rates
- irrigation pump system operation and maintenance manual
- reading pump gauges and controls
- amperage testing equipment
- service and maintenance requirements of pumps
- basic principles of hydraulics flow versus pressure
- discharge and flow rates
- impellers, rotors and stators
- pump components and their principles of operation
- valves and their uses.

**AHCIRG344 - Implement an irrigation schedule**

This course gives students the skills and knowledge required to interpret an irrigation schedule, determine irrigation shifts, implement and monitor an irrigation schedule, and record irrigation information and activities.

When they have completed the course they will have an understanding of;ave an understanding of;

- workplace requirements applicable to health and safety in the workplace for implementing an irrigation schedule
- resource requirements and availability
- irrigation strategies
- principles of soil moisture monitoring, including:
  - volumetric soil moisture content
  - percentage compared to soil moisture tension
- consultation requirements and procedures
- effect of irrigation techniques on plant growth
- visual symptoms of plant nutrient deficiencies, water stress and frost

- recording requirements and procedures
- sampling techniques and procedures
- testing techniques and procedures
- interpretation of routine soil moisture tests
- environmental impacts, hazards and controls for irrigation
- water budgeting tools.

#### **AHCIRG346 - Operate pressurised irrigation systems**

This course aims to give students the knowledge and skills to pre-start check, inspect, start up, operate, monitor and shut down pressurised irrigation systems. The knowledge students will gain from this course includes;

- workplace requirements applicable to health and safety in the workplace for operating pressurised irrigation systems
- electrical hazards, including:
  - contact with pumps, motors, other live components
  - short circuits
- standing laterals to remove blockages
- water spray onto power lines
- energy efficiency indicators and benchmarks for pressurised irrigation
- pressurised irrigation equipment operation and maintenance manual
- main components of pressurised irrigation systems
- pump types used in irrigation systems and their operation
- general irrigation methods for low volume systems
- principles of irrigation and the water cycle
- critical measures for moisture availability, including: evapotranspiration, field capacity, infiltration rates, readily available water, water holding capacity, wilting point and soil characteristics
- soil, plant and water relationships
- water requirements of plants and crops consistent with sound environmental management
- environmental impacts of irrigation using water from any ground or underground source
- shutdown sequence and flushing procedures.

#### **AHCIRG347 - Maintain pressurised irrigation systems**

This course will give candidates the ability to interpret a maintenance program, inspect and maintain pressurised irrigation systems, and record and report maintenance activities. To achieve in this course, students will have to show that they have;

- interpreted and applied maintenance procedures
- applied workplace health and safety requirements
- identified adverse environmental impacts of irrigation activities and taken appropriate remedial action
- checked connections and controllers
- checked sprinkler/emitter output and function
- ensured proper operation of automatic flush valves
- removed, serviced and replaced valves and filters
- confirmed operational pressures
- tested irrigation equipment.

#### **AHCIRG348 - Operate and maintain moving irrigation system**

This unit of competency goes over the skills and knowledge required to install, operate and maintain moving irrigation systems. Candidates will gain an understanding of;

- workplace requirements applicable to health and safety in the workplace for operating and maintaining moving irrigation systems
- installation and maintenance requirements of moving sprinkler irrigation systems

- pumps used in moving sprinkler irrigation systems and their operation
- calibration and testing equipment operation and maintenance manual and manufacturer specifications
- behaviour of water on varying terrain and soil types
- monitoring soil compaction and drainage
- soil water retention testing techniques
- soil, plant and water relationships
- water quality and water filtration techniques
- water requirements of plants and crops consistent with sound environmental management
- shutdown sequence.

#### **AHCIRG349 - Recommend irrigation products and services**

This course goes over the skills and knowledge required to recommend irrigation products and services, including researching product range, estimating product quantities, providing product warranty advice, negotiating price and payment options, and providing advice and arranging product services and repairs, to fulfil the needs of a client. Students will learn how to;

- irrigation product components, controls, features and functions
- store irrigation products range, service and repair policy
- manufacturer specifications and workplace safety requirements for a range of irrigation products
- principles of customer service and sales techniques
- principles and practices for recommending irrigation products and services
- irrigation product characteristics, technical capabilities and limitations
- price negotiation techniques and payment options for the store.

#### **AHCLPW313 - Undertake sampling and testing of water**

This unit of competency will mean candidates can plan and carry out sampling and testing of water quality as part of a monitoring program. This will give students knowledge of;

- water monitoring in land management, including:
  - purpose for testing water
  - types of water bodies and their related ecological and environmental characteristics
  - scheduling guidelines for testing water quality
  - standards for water quality
- methods and steps involved in collecting water samples, including water sampling equipment operation and maintenance, sampling techniques and procedures, storing water samples, transporting water samples, packaging and labelling for despatch to laboratories and packaging and labelling procedures for workplace testing
- purpose of water test, equipment used, methods and procedures, including for temperature (in situ), pH, electrical conductivity, dissolved oxygen, turbidity, nitrate and phosphorous
- varied operating conditions, hazards and environmental conditions that may impact sampling and testing in the field.

#### **AHCWRK305 - Coordinate work site activities**

This course allows students to gain the skills and knowledge required to coordinate work site activities for small-scale projects. At the end of the course, they will demonstrate knowledge of;

- environmental awareness associated with undertaking project works to ensure the impact on the environment is minimal
- work schedule programming
- possible causes of disruption to work activities and their effect on quality and time schedules
- responsibilities and requirements for obtaining external agency permits as necessary
- the range, use and availability of materials, equipment and machinery that may be required for the project
- work health and safety issues, legislative requirements and Codes of Practice.

### **PMBWELD301E - Join polyethylene plastic pipelines using butt welding**

This course gives candidates the ability to join polyethylene plastic pipelines using butt welding. The knowledge and skills students will gain from this course are;

- the functions and operating principles of butt welding equipment, components and ancillary equipment
- types of butt welding processes and their effect on the welded product
- Australian Standards relevant to the materials being used and products being made
- production workflow sequences and materials demand
- typical quality standards at each stage of the welding process
- key variables that may affect product quality, and how to manage them, including temperature, pressure, alignment, uniformity, weld bead appearance, tolerance for weld and joint, consistency of weld and mechanical strength of weld
- worksite environment factors that may affect weld quality and appropriate remedies
- typical process and product problems, including early warning signs, possible causes and corrective actions
- organisational procedures relevant to the work environment and job role
- hazards that may arise in the job or work environment, and their possible causes and potential consequences.
- appropriate risk controls.

### **PMBWELD302E - Join polyethylene plastic pipelines using electrofusion welding**

This unit covers the skills and knowledge required to weld polyethylene (commonly referred to as PE) plastic pipes using electrofusion, both in the field and under factory conditions. The candidate will gain knowledge of;

- the function and operating principles of electrofusion welding equipment, components and ancillary equipment
- characteristics of materials and their behaviour in relation to welding process variables and stages of production
- typical quality standards required at each stage of production
- production workflow sequences and materials demand
- key variables that may affect product quality and production output, and how to manage them, including voltage, fusion time, cooling time, alignment and product output rate.
- worksite environment factors that may affect joint quality and appropriate remedies
- typical process and product problems, including early warning signs, possible causes and corrective actions
- organisational procedures relevant to the work environment and job role.

### **AHCINF304 - Install and terminate extra low voltage wiring systems**

This unit covers the skills and knowledge required to install wiring enclosures, cable support systems, cables and accessories in electrical systems of 36 volts or less. Candidates will gain an understanding of;

The candidate must demonstrate knowledge of:

- basic electricity and electrical principles relating to extra low voltage wiring
- applications, materials and techniques relevant to the industry sector
- isolation and tagging procedures
- computerised controller systems
- enterprise policies and procedures
- testing equipment and procedures
- relevant legislation and guidelines for installing extra low voltage wiring.

### **AHCIRG343 - Operate irrigation injection equipment**

This unit allows candidates to learn how to prepare, start-up, operate and shut down irrigation injection equipment, monitor impacts of the injection process and record information on irrigation injection equipment operation. The skills and knowledge they will gain include;

- workplace requirements applicable to health and safety in the workplace for operating irrigation injection equipment, including backflow prevention
- purpose and operation of equipment and instrumentation components
- chemicals, cleaning agents and fertilisers used for injection and their purpose
- safety data sheet (SDS) information for substances to be injected
- services required
- irrigation injection equipment operation and maintenance manual
- basic irrigation injection equipment operating principles and process control systems where relevant
- procedures for prevention of backflow
- process specifications, procedures and operating parameters
- control points and significance and methods of monitoring
- common causes of variation and corrective action required
- correct chemical handling techniques
- environmental issues and controls
- shutdown sequence
- lock-out and tag-out procedures
- irrigation injection equipment cleaning requirements and procedures
- recording requirements and procedures.