Apprenticeship Manitoba

Manitoba

Wastewater Treatment Operator

Rev. January 28, 2013

Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: A1 Trade Safety Awareness (A & C Board Standard)

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and incident-free working environment.

It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of Water and Wastewater Technician apprenticeship training program both in school and on-the-job. Unit content is supplemented throughout Technical Training by trade-specific information about Water and Wastewater Technician safety hazards and precautions presented in the appropriate contexts of discussion and study. Percentage of unit mark for each section is at the discretion of the instructor.

Objectives and Content: **Percent of Unit Mark (%)**

1. Identify safety and health requirements. **%**

a. Overview of *Workplace Health and Safety Act:*
   - Rights and responsibilities of employees under the Act.
   - Rights and responsibilities of employers.
   - Rights and responsibilities of supervisors under the Act.

b. Fourteen (14) Regulations.

c. Codes of Practice.

d. Guidelines.

e. Right to refuse.

f. Explanation of right-to-refuse process:
   - Rights and responsibilities of employees under the Act.
   - Rights and responsibilities of employers.
   - Rights and responsibilities of supervisors under the Act.
   - Rights and responsibilities of employees under the Act.

2. Identify personal protective equipment (PPE) and PPE procedures. **%**

a. Employer and employee responsibilities as related to PPE.
b. Standards: CSA; ANSI, and Guidelines.
c. Work protective clothing and danger if it fits poorly.
d. Gloves – importance of proper selection for handling chemicals, cold items, etc.).
e. Headwear – Appropriate headwear when required and the approved type of head wear.
f. Eye protection – Comparison/contrast between eyeglasses, industrial safety glasses, and safety goggles.
g. Foot protection – standards/requirements for selection and use.
h. Hearing protection:
   - Noise hazards and noise-hazard rating standards (re: when protection is required).
   - Regulations.
   - Types of hearing protection.
i. Respiratory protection – Variety; standards for use and selection.
j. Fall-protection equipment standards – Manitoba standards and guidelines; ANSI (U.S. standards); etc.
k. Ladders and scaffolding.
l. Safety principles for working around hoisting, transport, and materials-handling equipment (e.g. boom trucks, forklifts, pallet trucks, semis, etc.).

3. Identify electrical safety. **%**

a. Effects of electric current on the human body.
b. Three factors that affect the severity of an electric shock.
c. The effects of electrical arc and blast of the human body and on equipment.
d. Hazards/precautions re: working with and/or around energized equipment.

4. Identify fire safety. **%**

a. Types of fires.
b. Types of fire-fighting equipment.
c. Classification of fire extinguishers (A, B, and C).
d. Location of fire extinguishers and fore exits.
e. Fire alarms and drills.

5. Identify ergonomics. **%**

a. Definition/scope of ergonomics as a field of knowledge.
b. Ergonomically hazardous conditions and precautions regarding:
   - Postures during work.
   - Repetitive activity/impacts.
   - Force.
   - Lifting.
   - Tool use.
   - Safety equipment.
   - Hand-tool accidents.
   - Equipment.
   - Materials handling (including lifting, carrying, and putting down a load).

6. Identify hazard recognition and control. **%**

a. Safe work practices.
b. Basic risk assessment.
c. Injury prevention and control measures.
d. Hazards/precautions re: use of pneumatic tools.

7. Describe the hazards of confined-space entry. **%**

a. Definition and identification of confined space(s).
b. Confined space hazards:
   - Physical.
   - Biological.
c. Precautions when working in confined space.
d. Emergency Response Plan.
e. Self-Contained Breathing Apparatus (SCBA).

%

8. Identify First Aid/Cardiopulmonary Resuscitation (CPR).

a. Overview of First Aid Regulation.
b. Employer obligations re: First Aid:
   - Who is certified to provide First Aid?
   - What is to be done while awaiting First Aid?
   - Where is First Aid Kit?
c. Describe basic First Aid requirements and techniques:
   - Definition and scope/limits of First Aid interventions.
   - Procedure for specific intervention re: cuts; burns; abrasions; sprains, fractures; suffocation; shock; electrical shock.
   - Interface with other services and agencies (e.g. Workers' Compensation claims.)
d. Describe basic CPR requirements and techniques.
   - Definition and scope/limits of CPR interventions.
   - Varieties of CPR training and certification.
   - Obtaining certification.

9. Identify safety requirements as they apply to the WHMIS. **%**

a. WHMIS as a system.
b. Manitoba provincial regulation under the Safety and Health Act; WHMIS in other provinces.
c. Federal Hazardous Product's Act.
d. WHMIS generic training, including:
   - Identification, use, and format of WHMIS information tools.
   - WHMIS and labeling by manufacturers, suppliers, and workplace sources.
   - Definition and hazards/precautions re hazardous materials.
   - Compliance with government safety standards and regulations.
e. WHMIS special-purpose certifications and associated rationale.
f. Typology of WHMIS labels, symbols, and classifications.
g. Scope and use of Materials Safety Data Sheets (MSDS).

10. Describe the identification and control of specified hazards. **%**

a. Safe work procedures.
b. Importance and scope of industrial housekeeping requirements.
c. Employer responsibilities.
d. How/where to store materials.
e. Safety hazards/precautions re:walkways, stairs, floor/wall/roof openings, etc.
f. Safe work procedures.

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: **A2 Orientation I:**
The Structure & Scope of Water and Wastewater Technician Trade Learning (A & C Board Standard)

Level: One
Duration: 7 hours
Theory: 7 hours
Practical: 0 hours

Overview:

Jobsite learning and teaching have long been fundamental to Water and Wastewater Technician trade-practice, including its safety, health, and environmental implications. The chance to gain maximum benefit from workplace trade learning can be shaped by such complex factors as production schedules and jobsite politics. As adult trade-learners, Water and Wastewater Technician apprentices at all levels of skill-development are encouraged to use their eyes, ears, prior knowledge, and interpersonal skills to encourage journeypersons to teach as well as to supervise them. This requires understanding the trade's dynamics, including the roles and responsibilities that order jobsite activity. Unit content outlines the trade's skill-requirements and long-term career possibilities. It includes suggestions about trade-related learning styles/strategies. It also introduces the concept of skills stewardship, stressing the obligations that apprentices incur in learning from journeypersons to 'pay it forward' by assisting other newcomers who will follow them into the trade. The unit's purpose is to provide this essential information about learning to learn as a Water and Wastewater Technician apprentice. Elsewhere in Technical Training, senior apprentices explore the importance of learning to teach in trade workplaces – a central function of Water and Wastewater Technician journeywork.

Objectives and Content: **Percent of Unit Mark (%)**

1. Describe the structure and scope of the trade. **30%**

a. Historical background, including apprentice experiences
b. Structure/scope of the trade
- International and national characteristics
- Important features of practicing the trade in Manitoba
- Trade and industry organizations
- Generalists and specialists
- Lead hands and other immediate supervisors
- Geographic mobility
- Job hierarchies and innovations

2. Describe the Manitoba Water and Wastewater Technician Apprenticeship Program. **40%**

a. Concept and significance of skills stewardship
- To the trade
- To apprentices

- To journeypersons
- To employers

b. Practical Training: on-site component of program
   - Roles/responsibilities of employer and journeyperson(s)
   - Roles/responsibilities of Training Coordinator
   - Roles/responsibilities of apprentice, including record-keeping re: job experience
c. Technical Training: off-site component of program
   - Roles/responsibilities of instructors (including Related'-area faculty)
   - Roles/responsibilities of apprentices
d. Attendance requirements
e. Progression requirements
f. Reporting of grades
g. Other (as may be specified by instructor)

3. Describe special opportunities and challenges re: Water and Wastewater Technician training. **40%**

a. Adapting personal learning goals to program contexts
   - Principles of adult learning (including importance of self-direction)
   - Description/recognition of learning and teaching styles
   - Significance of work culture and interpersonal skills re: trade-learning
   - Integrating Technical Training and Practical Training content
   - Possibilities and perils of peer learning
   - Budgeting and other necessary personal arrangements
   - Identifying sources of support (e.g. upgrading trade-related math skills)
b. On-site learning challenges and opportunities
   - Significance of jobsite supervision roles and teaching styles (e.g. journey-level skills-coach vs. mentor)
   - Communication with journeypersons and employers
   - Coverage of prescribed tasks/subtasks that define the scope of trade, and the content of the certification exam administered to apprentices who are completing their program
   - Getting help and fixing mistakes
   - Maintaining personal record of trade-learning challenges/achievements (e.g. a learning journal, and/or a personal training plan, if possible, discussed with employers and others supporting the apprenticeship journey to certification)
c. In-school opportunities/challenges
   - Personal arrangements that support progress in Technical Training
   - "Baggage-handling" – self-assessing potential impacts of previous experiences (favourable/unfavourable) on current learning; availability of supports
   - Techniques for note-taking, record-keeping, and review
   - Relations with instructors (including 'Related'-area faculty)
   - College resources (library, support services, etc.)

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: A3 Orientation II: The Job of Journeywork: Workplace Skills-Coaching & Mentoring (A & C Board Standard)

Level: One

Duration: 7 hours

Theory: 2 hours

Practical: 5 hours

Overview:

Water and Wastewater Technician Technical Training offers an entry-level orientation to the challenges of apprenticeship learning. The present unit introduces senior apprentices to the responsibilities of workplace *teaching* that they will assume as supervising journeypersons. Tradeworkers have a particularly rich tradition of refreshing and sharing their skills from one generation of practitioners to the next. This unit orients senior apprentices to some of the practical and conceptual tools that can enable them to contribute to this trade heritage when they themselves become certified journeypersons. The journeyperson's obligation to assist trade learners to develop skills and knowledge is complex and challenging. It involves safety considerations, employer expectations, provincial regulations, as well as the tradition of skills stewardship that links modern practice with the long history of workplace teaching and learning that defines the apprenticeable trades. The ability to offer timely, appropriate support to apprentices is itself an important area of trade learning.

This unit presents material intended to help refine this ability through reflection and discussion by senior apprentices, and dialogue with their instructor. The detailed descriptors under each unit-objective reflect Manitoba and Canadian standards prescribed for journey-level supervisory capabilities, as well as key topics in current research on the importance of workplace teaching and learning in trades-apprenticeship systems. Thus, descriptors represent suggested focal points or guidelines for potentially-worthwhile exploration. Delivery of this content will vary with the discretion of individual instructors, and with the experiences senior apprentices bring forward for group/individual reflection on the skills-stewardship dimension of their own future practice as journeypersons.

Objectives and Content: **Percent of Unit Mark (%)**

1. **Describe the scope, substance, and significance of journey-level status.** **20%**
   a. Historical background, including trainee experiences
      - Origin, definition, and examples of journey-level status
      - Obligations to employers, trade clients, and apprentices
      - Concept of skills stewardship, and its rationale
      - Customary responsibilities of journeyperson as workplace trainer/supervisor
      - Overview development of formal systems for regulating/recognizing journey-level competence in designated apprenticeable trades
      - Contributions of 'unticketed journeymen' and other informally-qualified Water and Wastewater Technicians to workplace trade-learning
      - Achievements/limitations of informal systems for workplace training

- Trends (e.g. succession planning in the trades; recognition of credentials and prior learning; defined standards for on-the-job trades education and training)

b. Regulatory/legal dimensions of journey-level status in designated trades
   - Rights and obligations re: the Provincial Occupational Analysis [POA], and Provincial examination
   - Manitoba provincial requirements [e.g. *Apprenticeship and Trades Qualifications Act; General Regulation*; the *Trade Re Water and Wastewater Technician Regulation*; relevant policies of the Apprenticeship and Trades Qualifications Board of Manitoba]
   - Trade-specific requirements re: Practical Training supervision and documentation; importance of quality assurance and broad-scope coverage of prescribed task-content; ratios, etc.

c. Other (as may be specified by instructor)

2. Compare/contrast role-options and responsibilities of the supervising journeyperson. **30%**

a. Recognizing the variability of supervision assignments, situations, and roles
b. Source and specification of the supervision assignment
c. Formal vs. informal roles (e.g. mandated by an employer's succession plan)
d. Implicit vs. explicit standards and content: training goals are/are not codified; assessment measures are/are not used,
e. Accountability for results: subject/not subject to third-party notification; completion of supervision assignment itself is/is not assessed by third party; journeyperson is/is not required to prepare performance evaluation that could affect apprentice's employability or wage-rate, etc.
f. General vs. task- or job-specific supervision assignments: e.g. scope of expectations re: content of supervisory task(s)
g. Long-term vs. short-run supervision assignments – e.g., considerable latitude/little latitude for apprentice to learn from mistakes
h. Formally vs. informally structured – e.g. supervision assignment is part of a prescribed cycle of assignments involving coordination among multiple journeypersons; apprentice is trained according to an individual Training Plan negotiated with employer
i. Typology of common supervisory role-options and what is implied by each:
   - Coach role: is often initiated by someone other than apprentice, and limited to a particular skill set, task, or production requirement
   - Mentor role : often initiated by apprentice, and relatively open-ended regarding content, duration, etc.
   - Peer role: typically involves individual upgrading or cross-training of one journeyperson by another; can include senior apprentice assisting less-experienced trade learner
   - Managerial role(s): can shade over into hire/fire issues as lead-hand or site-boss
   - Coordinator role: often a senior-level journeyperson appointed by an organization to assume responsibilities for monitoring progression of groups of apprentices
   - Other roles: may be improvised by journeyperson
j. Possibilities, perils, and likelihood of role-overlap in 'real-life' trade practice
k. Importance of clarifying all roles, expectations, and implications involved in accepting a supervision assignment
l. Role of Apprenticeship Training Coordinator (ATC), Manitoba Apprenticeship Branch
m Resources for developing skills and knowledge re: providing journey-level supervision
   - Books and journals (not always trade-specific)
   - Websites
   - Conversation with trade instructors, journeypersons, and peers
   - Workshops
n. Other (as may be specified by instructor

3. Describe/demonstrate common requirements re: providing journey-level supervision. **30%**

a. Review Unit A2 content re: challenges/opportunities opportunities of Apprenticeship learning adapted to journey-level supervision assignments and a journey-level standpoint
   - Application of adult education concepts to trades teaching/learning (e.g. responsibilities and expectations of adult learners)
   - Practical significance of 'styles' of adult learning and teaching
   - Helping apprentices to integrate Technical Training (in school) and Practical Training (on-the-job) learning experiences
   - Providing help and guidance re: new tasks and skills
   - Providing help and guidance re: fixing mistakes
   - Learning/teaching "the ropes" – socialization of learner within a community of trade practice (e.g. how to borrow a tool, interrupt a journeyperson, 'recruit' an advisor)
   - Coverage/documentation of prescribed tasks and subtasks (Ironworker NOA), including responsibility re: logbook sign-off (where applicable)
   - Consultation with Apprenticeship Training Coordinator (ATC), Manitoba Apprenticeship Branch
   - Communicating with apprentices and employers about supervision assignments and assignment specifications, including the limits of the trainers' own responsibilities and competence (e.g. substance-abuse intervention)
   - Benefits of maintaining a personal record of achievements, ideas, and needs as a workplace trainer

b. Individual reflection and guided group discussion re: personal experiences of workplace learning as an apprentice
   - Identification of best and worst practices of supervising journeypersons
   - Assessment of personal experiences (if any) to date in supervising, coaching, or guiding other people to learn or improve their skills (e.g. entry-level apprentices, members of athletic team, younger family members, etc.), and how this might compare/contrast with the journey-level support of apprenticeship learning
   - Identification of workplace and other factors that can contribute to good and bad trades teaching/learning experiences
   - Development of personal standards re: responsibility to share one's knowledge and skill with others in the workplace (e.g., use/misuse of humour, rigour, discretion, craft-pride, etc.)

c. Comparison/contrast of discussion results with current knowledge/resources re: workplace skills coaching methods as applicable to journey-level supervision assignments
   - Qualities of a good workplace coach
   - Components of workplace skills coaching
   - Processes and recommended practices re: workplace coaching
   - Troubleshooting problems re: supervision assignments

d. Other (as may be specified by instructor)

4. Describe workplace coaching skills **20%**

a. Identifying purpose of the lesson
   - explaining the point of the lesson
   - role of the coach in specific coaching situation
   - Other (specified by instructor)

b. Linking the lesson
   - Learner needs
   - Lesson sequence
   - Focus on learner
   - Selection/timing of coaching opportunities

c. Demonstration of skill/task to be learned
   - Starting the coaching session

- Demonstration
- Hands-on trial
- Recap for learner

d. Practice of skill/task to be learned
   - Nature and importance of practice
   - Setting up for learner practice
   - Types of practice
   - Recycling and reinforcing skill/task learning

e. Providing feedback to the learner
   - Value of feedback
   - Kinds of feedback
   - Guidelines and tips

f. Assessment
   - Value of assessing learner progress
   - Assessing level of skill
   - Planning further steps toward skill/task mastery

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: A4 Trade Science and Trade Electricity

Level: One

Duration: 18 hours

Theory: 14 hours

Practical: 4 hours

Overview:

The apprentice will learn about trade mathematics, water chemistry for water and wastewater facilities. The apprentice will learn about basic electricity for water and wastewater facilities specific to the trade of water and wastewater technician.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify trade science.	**70%**
a. Trade mathematics.	
b. Water chemistry.	
2. Identify trade electricity.	**30%**
d. Trade electricity specific to water facilities.	
e. Trade electricity specific to wastewater facilities.	

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: A5 Computer Software Applications

Level: One

Duration: 10 hours

Theory: 3 hours

Practical: 7 hours

Overview:

The apprentice will be introduced to the functions and applications of a computer. The applications introduced are three of the most frequently used in the trade. The applications include word processing, spreadsheets, file maintenance and introduction to the internet.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify computer software applications.	**100%**
a. Functions of a computer.	
b. Applications of a computer:	
• Word processing.	
• Spreadsheets.	
• File maintenance.	
• Introduction to the internet.	

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: B1 Introduction to Process Control

Level: One

Duration: 10 hours

Theory: 3 hours

Practical: 7 hours

Overview:

The apprentice will be introduced to the basic control concepts and equipment used to control water treatment and wastewater treatment plants. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify process control concepts.	**50%**
a. Basic control concepts used to control water treatment and wastewater treatment plants.	
b. Equipment used to control water treatment and wastewater treatment plants.	
2. Perform process control concepts.	**50%**
a. Basic control concepts used to control water treatment and wastewater treatment plants.	
b. Equipment used to control water treatment and wastewater treatment plants.	

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: B2 Support Systems

Level: One

Duration: 36 hours

Theory: 32 hours

Practical: 4 hours

Overview:

The apprentice will be introduced to chlorination equipment, types of pumps used in water and wastewater facilities, pump piping systems, pump hydraulics, pump theory, pump operation, and maintenance. The apprentice will also learn about the maintenance and operation of air compressors and standby power units. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify support systems.	**75%**
a. Chlorination equipment.	
b. Types of pumps used in water and wastewater facilities.	
c. Pump piping systems.	
d. Pump hydraulics.	
e. Pump theory.	
f. Pump operation.	
g. Pump maintenance.	
h. Maintenance of air compressors.	
i. Operation of air compressors.	
j. Standby power units.	
k. Ventilation.	
l. Instrumentation.	
2. Perform support systems procedures.	**25%**
a. Chlorination equipment.	
b. Types of pumps used in water and wastewater facilities.	
c. Pump piping systems.	
d. Pump hydraulics.	
e. Pump theory.	
f. Pump operation.	
g. Pump maintenance.	
h. Maintenance of air compressors.	
i. Operation of air compressors.	
j. Standby power units.	
k. Ventilation.	
l. Instrumentation.	

Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: B3 Hydraulics and Blueprint Reading

Level: One

Duration: 15 hours

Theory: 5 hours

Practical: 10 hours

Overview:

The apprentice will learn about hydraulics and blueprint reading. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe hydraulics. a. Pumps.	**25%**
2. Describe blueprint reading.	**25%**
3. Perform hydraulic procedures. a. Pumps.	**25%**
4. Perform blueprint reading.	**25%**

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: D3 Wastewater Treatment I

Level: One

Duration: 49 hours

Theory: 42 hours

Practical: 7 hours

Overview:

The apprentice will learn about technician responsibilities, wastewater sources, treatment facilities, components and processes. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify wastewater treatment.	**75%**
a. Technician responsibilities. b. Wastewater sources. c. Treatment facilities. • Lagoon. f. Components and processes: • Racks. • Screens. • Comminutors. • Grit removal. • Sedimentation. • Flotation. • Trickling filters. • Rotating biological contractors. • Activated sludge. • Waste stabilization ponds. • Disinfection. • Chlorination. • Residual handling.	
2. Perform wastewater treatment.	**25%**
a. Wastewater sources. b. Treatment facilities. • Lagoon c. Components and processes: • Racks. • Screens. • Comminutors.	

- Grit removal.
- Sedimentation.
- Flotation.
- Trickling filters.
- Rotating biological contractors.
- Activated sludge.
- Waste stabilization ponds.
- Disinfection.
- Chlorination.
- Residual handling.

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: D4 Wastewater Treatment II

Level: One

Duration: 49 hours

Theory: 42 hours

Practical: 7 hours

Overview:

The apprentice will learn about activated sludge plants, sludge digestion, handling solids, effluent disposal, plant safety, equipment maintenance procedures, flow measuring devices, plant operation and maintenance, preparation and analysis of plant data.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify wastewater treatment.	**100%**
a. Activated sludge plants.	
b. Sludge digestion.	
c. Handling solids.	
d. Effluent disposal.	
e. Plant safety.	
f. Equipment maintenance procedures.	
g. Flow measuring devices.	
h. Plant operations.	
i. Plant maintenance.	
j. Preparation of plant data.	
k. Analysis of plant data.	

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: D5 Wastewater Treatment Laboratory Analysis I

Level: One

Duration: 14 hours

Theory: 7 hours

Practical: 7 hours

Overview:

The apprentice will be introduced to glassware, lab equipment and wastewater testing procedures using Quality Assurance/ Quality Control (AQ/AC) practices. Analysis includes: Biochemical oxygen demand, dissolved oxygen, dissolved solids, settleable solids, suspended solids, total solids, and temperature. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify safety procedures and wastewater treatment laboratory analysis.	**50%**
a. Laboratory equipment. b. Laboratory water testing procedures. c. Glassware. d. Wastewater testing procedures: • Quality Assurance/ Quality Control (AQ/AC) practices: e. Wastewater treatment laboratory analysis. • Biochemical oxygen demand • Dissolved oxygen. • Dissolved solids. • Settleable solids. • Suspended solids. • Total solids. • Temperature. • Alkalinity. • pH.	
2. Perform safety procedures and wastewater treatment laboratory analysis.	**50%**
a. Laboratory equipment. b. Laboratory water testing procedures. c. Glassware. d. Wastewater testing procedures: • Quality Assurance/ Quality Control (AQ/AC) practices:	

e. Wastewater treatment laboratory analysis.
   - Biochemical oxygen demand.
   - Dissolved oxygen.
   - Dissolved solids.
   - Settleable solids.
   - Suspended solids.
   - Total solids.
   - Temperature.
   - Alkalinity.
   - pH.

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: D6 Wastewater Treatment Laboratory Analysis II

Level: One

Duration: 14 hours

Theory: 7 hours

Practical: 7 hours

Overview:

The apprentice will be introduced to chemical oxygen demand, coliforms, E. coli, nitrate, phosphate, sulphate, sludge volume index. Volatile suspended solids are analyzed using Quality Assurance/ Quality Control (AQ/AC) practices. Laboratory activities are included in this unit of instruction.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify wastewater treatment laboratory analysis.	**50%**
a. Chemical oxygen demand b. Coliforms c. E. coli d. Nitrate e. Phosphate f. Sulphate g. Sludge volume index h. Volatile suspended solids analysis • Quality Assurance/ Quality Control (AQ/AC) practices	
2. Perform wastewater treatment laboratory analysis.	**50%**
a. Chemical oxygen demand b. Coliforms c. E. coli d. Nitrate e. Phosphate f. Sulphate g. Sludge volume index h. Volatile suspended solids analysis i. Quality Assurance/ Quality Control (AQ/AC) practices	

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Apprenticeship Manitoba

Wastewater Treatment Operator

Unit: A6 Pre-Provincial Review

Level: One

Duration: 39 hours

Theory:	Instructor's discretion	hours
Practical:	Instructor's discretion	hours

Overview:

This unit offers apprentices a systematic review of skills and knowledge required to pass the Provincial Certification Examination. It provides the connections between on-the-job learning and the content of in-school technical training. The unit includes pertinent information about the significance of Provincial certification and the main features of the Provincial exam. **No testing is prescribed for this instructional unit; a Pass grade will be awarded for participation in this unit.**

Objectives and Content:

1. **Describe the significance, format, & general content of Provincial Certification Examination.**
   a. Scope and aims of Provincial Certification Examination system; value of certification.
   b. Obligations and entitlements of candidates for Provincial certification.
      - Relevance of Provincial Certification Examination to current, accepted trade practices; industry-based national validation of test items.
      - Supplementals Policy (retesting) by the Apprenticeship Branch.
      - Confidentiality of examination content; the certified journeyperson's own stake in examination security (value of credential).
      - Limitations on use of calculators (cannot be programmable).
   c. Multiple-choice (four-option) item format; Apprenticeship Branch standards for acceptable test items (e.g. no "trick"-type questions; specifications for use of metric/imperial units).
   d. Important government materials relevant to the Provincial Examination for apprentice water and wastewater technicians.
      - Provincial Occupational Analysis (POA); prescribed scope of the skills and knowledge which comprise the trade.
      - POA "Pie-chart" and its relationship to content distribution of Provincial Examination items.
      - Manitoba Apprentice POA-based Practical Record Book

2. **Identify resources, strategies, and other key considerations for maximizing successful completion of written exams used in certifying tradespeople.**
   a. Personal preparedness.
   b. Proper rest and nutrition, eye-testing.
   c. Making room for a personal study regimen.
   d. Focused reflection on prior test taking.
   e. Self-assessment and a Personal Study Plan:
      - Preliminary self-assessment of individual strengths and weaknesses in trade-related skills and knowledge; usefulness of old tests; reflection on the in-school and on-the-job components of the Apprenticeship Program.

- Use(s) of approved textbooks, chapter tests, study guides, and notetaking in preparing for an examination.
- Study groups; perils and possibilities.
- Formulation of a personal study plan, including an approximate timetable, which describes and schedules a course of action for reviewing all relevant material(s) and for strengthening areas of deficient skills and knowledge.

3. Review program content.

a. Trade Safety Awareness (A & C Board Standard).
- Identify safety and health requirements.
- Identify personal protection equipment (PPE) and PPE procedures.
- Identify electrical safety.
- Identify ergonomics.
- Identify hazard recognition and control.
- Describe the hazards of confined-space entry.
- Identify First Aid/Cardiopulmonary Resuscitation (CPR).
- Identify safety requirements as they apply to the WHMIS.
- Describe the identification and control of specified hazards.

b. Orientation I: The Structure & Scope of Water and Wastewater Technician Trade Learning. (A & C Board Standard).
- Describe the structure and scope of the trade.
- Describe the Manitoba Water and Wastewater Technician Apprenticeship Program.
- Describe special opportunities and challenges re: Water and Wastewater Technician training.

c. Trade Science and Electricity.
- Identify trade science.
- Identify trade electricity.

d. Computer Software Applications.
- Identify computer software applications.

e. Introduction to Process Control.
- Identify process control concepts.
- Perform process control concepts.

f. Support Systems.
- Identify support systems.
- Perform support systems procedures.

h. Hydraulics and Blueprint Reading.
- Describe hydraulics.
- Describe blueprint reading.
- Perform hydraulic procedures.
- Perform blueprint reading.

j. Wastewater Treatment I
- Identify wastewater treatment.
- Perform wastewater treatment.

k. Wastewater Treatment II.
- Identify wastewater treatment.

l. Wastewater Treatment Laboratory Analysis I.
- Identify safety procedures and wastewater treatment laboratory analysis.
- Perform safety procedures and wastewater treatment laboratory analysis.

m Wastewater Treatment Laboratory Analysis II.
- Identify safety procedures and wastewater treatment laboratory analysis.
- Perform safety procedures and wastewater treatment laboratory analysis.