

CVX4348 Water and Wastewater Engineering

Level	4
Course Code	CVX4348
Course Title	Water and Wastewater Engineering
Credit value	3
Core/Optional	Elective (Civil)
Course Aim/s	To provide an understanding of the application of engineering principles for the facilitation with an adequate quantity of potable water and how the wastewater that comes out as effluent could be removed in an hygienic manner
Course Learning Outcomes (CLO):	<p>At the completion of this course student will be able to:</p> <p>CLO1: Describe engineering principles to supply an adequate quantity of potable water from surface and groundwater resources</p> <p>CLO2: Describe water distribution systems, and estimate pipe sizes and related appurtenances</p> <p>CLO3: Design unit processes of water treatment plant based on the source water quality to achieve SLS of potable water standards.</p> <p>CLO4: Explain and estimate wastewater generation, collection and transmission through separate and combined sewer system</p> <p>CLO5: Explain the characteristics of wastewater and biological and physicochemical wastewater treatment methods and industrial systems to meet the CEA discharge guidelines.</p> <p>CLO6: Design unit structures of water supply systems and wastewater treatment system using sound engineering principles and design a septic tank system for rural/households</p> <p>CLO7: Assess the requirement for final disposal of wastewater and draw flow diagrams for wastewater treatment unit processes</p> <p>CLO8: Perform laboratory tests to identify water quality and wastewater quality with respect to stipulated standards in Sri Lanka; and carry out tests to determine the requirement of water treatment.</p>
Content (Main topics, sub topics)	<p>Outline Syllabus:</p> <p>Unit 1: Basic principles of water supply systems Session 1: Introduction to water resources Session 2: Water use trends and forecasting Session 3: Conveying and distributing water Session 4: Water storage, appurtenances of water distribution Session 5 : Water Quality</p> <p>Unit 2: Water treatment Session 6: Preliminary treatment Session 7: Flocculation, coagulation and sedimentation Session 8: Filtration and Chlorination Session 9: Advanced water treatment</p> <p>Unit 3: Sewerage systems and river pollution Session 10: Wastewater collection and storm water engineering Session 11: Sewer appurtenances, transmission and maintenance Session 12: Wastewater characteristics Session 13: River pollution and management</p> <p>Unit 4: Wastewater treatment and disposal Session 14: Wastewater and treatment concepts Session 15: Preliminary and primary treatment of wastewater Session 16: Aerobic biological treatment Session 17: Anaerobic biological treatment Session 18: Advanced wastewater treatment Session 19: Low cost technologies of wastewater treatment</p> <p>Unit 5: Sludge management and Wastewater reuse</p>

	<p>Session 20: sludge treatment and disposal Session 21: Wastewater reuse and reclamation Session 22: In-situ wastewater treatment systems:</p>
	<p>Design:</p> <p>Design unit structures of water and wastewater treatment processes and disposal to be through of water and wastewater plant design</p> <p>Laboratory Work:</p> <ol style="list-style-type: none"> 1. <i>Perform</i> laboratory tests to identify suitability of water for domestic use and <i>Identify</i> pathogenic bacteria using coliform group 2. <i>Use lab instruments to measure</i> potable water quality parameters such as colour, residual chlorine, pH turbidity <i>compute</i> Coagulant dosage Salinity and conductivity hardness and alkalinity 3. <i>Use lab equipment and APHA methodologies to measure wastewater quality:</i> Dissolved oxygen BOD, NO₃, PO₄ 4. <i>Determine suitability of treated water by testing residual chlorine</i> 5. Perform jar test to determine coagulant dose for water purification <p>Field Visit:</p> <p>Visit water and wastewater treatment plants to understand the practical aspects and unit processes of water and wastewater treatment. Prepare a Field report describing the performance and unit cost of unit process</p>