Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Water and Wastewater System
Unit ID:	ENGRG2103
Credit Points:	15.00
Prerequisite(s):	(ENGRG1002)
Co-requisite(s):	Nil
Exclusion(s):	(ENGIN3206)
ASCED:	030999

Description of the Unit:

The primary goals of this unit are to cultivate knowledge & skills for water and wastewater treatment systems. The unit commences by elucidating the importance of water and wastewater treatment in conjunction with hydrology and hydraulics. It will then delve into water quality parameters to establish the necessity for treatment of both water and wastewater and effects of limited or inadequate treatment. Following this, the unit provides details of treatment processes, encompassing physical, chemical, and biological aspects, along with principles and methodologies for designing unit processes. The unit will conclude by addressing principles of waste management.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						
Intermediate			✔			
Advanced						

Learning Outcomes:

On successful completion of the unit the students are expected to be able to:

Knowledge:

K1. Describe differences between different types of water and wastewaters.

K2. Describe the processes involved in the water and wastewater treatment.

Skills:

S1. Analyse problems and design in water and wastewater treatment and design the major components of treatment systems.

S2. Laboratory experiments to calculate optimum chemical dosage in jar test experiments and to evaluate filter`s hydraulic and treatment performances.

S3. Design unit processes for water and wastewater treatment.

Application of knowledge and skills:

A1. Calculate the water demand of communities; variation in demand and prediction of future requirements.

A2. Applying concepts and understanding of water and wastewater treatment to water resources management.

A3. Estimating wastewater outputs and characteristics of communities and other organisations.

A4. Design water supply treatment facilities and wastewater treatment facilities.

A5. Apply concepts of sustainability and water conservation in the creation of water and wastewater treatment and management facilities.

Unit Content:

Topics may include:
1. Need and role of water and wastewater treatment in water resources management
2. Different water quality parameters used to monitor quality
3. Various water and wastewater systems in an urban environment
4. Functions and modes of operation of urban water and wastewater systems and processes
5. Examination of the water supply system, stormwater management system, sewerage system and the interface between these systems

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly*

assessed in each Course.

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	**Assessment task (AT#)**
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: • Using effective verbal and non-verbal communication • Listening for meaning and influencing via active listening • Showing empathy for others • Negotiating and demonstrating conflict resolution skills • Working respectfully in cross-cultural and diverse teams.	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: • Creating a collegial environment • Showing self -awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: • Reflecting critically • Evaluating ideas, concepts and information • Considering alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts • Forming creative solutions in problem solving.	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: • Finding, evaluating, managing, curating, organising and sharing digital information • Collating, managing, accessing and using digital data securely • Receiving and responding to messages in a range of digital media • Contributing actively to digital teams and working groups • Participating in and benefiting from digital learning opportunities.	Not applicable	Not applicable
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, S1, S3, A1, A2, A3, A4, A5	Field and/or plant visits to understand water treatment in industry.	Assessment and/or presentation	10% - 30%
K2, S1, S2, A1, A2, A3, A4, A5	A combination of problem based assignments and laboratory experiments.	Reports	10% - 30%
K1, K2, S3, A2, A3, A4, A5	Test(s) on any or all material covered in the unit.	Test	40% - 60%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool