

Semester:	4		
Course Code:	ENCM 22782		
Course Name:	Wastewater Management		
Credit Value:	2		
Status:	Compulsory		
Pre-requisite:	ENCM 12742		
Co-requisite:	None		
Hourly Breakdown:	Theory	Practical	Independent Learning
	26	12	62
Intended Learning Outcomes:			
<p>After completion of this course unit, the student will be able to;</p> <ol style="list-style-type: none"> 1. explain the process of wastewater treatment, 2. design basic wastewater treatment units for a community/institution, 3. evaluate the performance of existing wastewater treatment plants, 4. make decisions on the possibilities of reuse of wastewater, and 5. design and operate wastewater treatment plants using computer models. 			
Course Content:			
<p>Types and Characteristics of wastewater /Sewage; Quantity estimation of sewage, Estimation of wastewater flows and organic load: BOD Model; Self-purification of natural streams: O₂ sag analysis; Preliminary treatment of wastewater: screening and grit removal; Primary treatment of wastewater: process and designing of primary treatment unit (sedimentation tank); Secondary treatment of wastewater: activated sludge and suspended growth Processes and treatment units (activated sludge plant, Oxidation ditches, sequencing batch reactors, trickling filters, bio-towers, rotating biological contractors etc.); Design criteria for activated sludge plant and trickling filters; Tertiary treatment of wastewater: lagoons, land treatment, constructed wetlands; disinfection; Sludge management: treatment and disposal; Centralized vs decentralized wastewater treatment systems, Treatment of industrial wastewater: oil separation, flow equalization, sedimentation, neutralization, oxidation reduction, precipitation, coagulation and flocculation, dissolved air floatation systems, disinfection, filtration; Wastewater reuse: urban, agricultural, recreational, environmental and industrial; guidelines and regulations on wastewater reuse; Policies and institutional set up for wastewater management in Sri Lanka, Effluent tolerance limits and discharge standards, Environmental legislations and standards; Status of Wastewater Generation, Collection, and Treatment in Sri Lanka, Emerging Trends and Concerns in Wastewater Treatment: Application of membrane bioreactors.</p> <p>Field study at a centralized and decentralized wastewater treatment plants.</p>			
Teaching /Learning Methods:			
A combination of lectures, field studies, computer-based learning, self-studies, field based assignments and small group discussions.			
Assessment Strategy:			

Continuous assessment and end of semester examination. Percentage given for each sub-component indicates the percent contribution to the final marks.

Continuous Assessment 40 %		Final Assessment 60 %		
Details:		Theory	Practical	Other
Quizzes	10	60	-	-
Assignments	20			
Field reports	10			

Recommended Readings:

1. Davis, M. (2013). Water and Wastewater Engineering, McGraw-Hill Science, India.
2. Karia, G. L. & R. A. Christian (2013). Waste Water Treatment: Concepts & Design Approaches, 2nd edition, PHI Learning Pvt. Ltd, New Delhi.
3. Mackenzie, D. & S. Masten (2013). Principles of Environmental Engineering & Science, McGraw-Hill Science.
4. Tchobanoglous, G., F. Burton & H. D. Stensel (2012). Wastewater Engineering: Treatment and Reuse, McGraw-Hill Science, India.
5. Gomes, K. (2009). Wastewater Management, Oxford Book Company, Jaipur, India.