

Nutrient Removal in Wastewater: Recovery and Reuse

Overview

Most of the existing sewage treatment plants are able to remove organic matter at high rate; however, they are not suitable to treat the increasing concentration of nutrients, mainly nitrogen and phosphorus. Discharge of partial municipal wastewater with high concentrations of nutrient can cause severe environmental damage – eutrophication of surface waters. Major modifications on sewage treatment plants are necessary to achieve the required level of nutrients to reduce environmental negative impact. The course aims to take a step forward to unravel the basics and newly technologies for domestic wastewater treatment.

This course is organized to provide the basis of the microbiology and mathematical description of organic matter and nutrient removal from domestic wastewater and an ad-hoc design of different aerobic processes, such as activated sludge systems, sequential batch reactor, rotating bathing reactor and algal-bacterial processes. The topics will cover the fundamentals of microbial carbon and nutrient removal in both aerobic and anaerobic processes; guidelines for the design and operation of several systems and; guidelines of operation and maintenance of sewage treatment processes for odor pollution control and biogas upgrading.

Course participants will learn these topics through lectures and short assignments. Also two short tests in the middle of the course will be applied to stimulate research motivation of participants.

Dates	July 2nd - July 6th Number of participants for the course will be limited to 30
	Schedule of Lectures: July 2, 2018 10.00 AM – Inauguration of Programme 10.30 AM – Tea break 11.00 AM - 12.00 Noon – Introduction; Microbiology of Carbon and Nutrient removal 12.00 Noon – 1.00 PM – Activated Sludge fundamentals 1.00 PM – 1.30 PM – LUNCH BREAK 1.30 PM – 2.30 PM – Design of modified activated sludge processes 2.30 PM – 3.30 PM - Tutorial: Practical design of activated sludge 3.30 PM – 3.45 PM – tea break July 3, 2018 9.30 AM – 10.30 AM – Activated sludge system for Carbon removal 10.30 AM – 11.30 AM – Activated sludge for nutrient removal 11.30 AM – 11.45 AM – Tea break 11.45 AM - 12.45 PM – Tutorial: Practical design of activated sludge for nutrient removal 12.45 AM – 01.45 PM – Exam 1 01.45 PM – 02.15 PM – Lunch break 02. 15 PM –03.15PM - Tutorial: Practical design of activated sludge for nutrient removal

	<p>July 4, 2018 9.30 AM – 10.30 AM – IWA modelling (ASM1) 10.30 AM – 11.30 AM – Influence of design and operational conditions 11.30 AM – 11.45 AM – TEA BREAK 11.45 AM - 12.45 PM – Tutorial: Software use 12.45 PM – 01.45 PM – Assignment and tutorials 01.45 PM – 02.15 PM LUNCH BREAK</p> <p>July 5, 2018 9.30 AM – 10.30 AM – Solid- liquid separation theory 10.30 AM – 11.30 AM – Solid- Liquid separation technologies 11.30 – 11.45 AM – TEA BREAK 11.45- 12.45 – Tutorial: Secondary settler design 12.45 PM – 1.15 PM LUNCH BREAK 1.15 PM – 2.15 PM – Tutorial: Secondary settler design 2.15 PM – 3.15 PM - SHORT TEST – EXAM</p> <p>July 6, 2018 9.30 AM – 10.30 AM – Odor pollution Control 10.30 AM – 11.30 AM – Odor pollution Control 11.30 AM – 11.45 AM – TEA BREAK 11.45 AM- 12.45 PM – Tutorial: Design of odor treatment 12.45 PM – 1.15 PM LUNCH BREAK 1.15 PM- 2.15 PM – Tutorial: Design of odor treatment 2.15 PM – 03.15 – Exam 1 03.15 PM – 03.45 PM - Valedictory function 03.45 PM – TEA BREAK</p>
<p>You Should Attend if...</p>	<ul style="list-style-type: none"> ▪ you are a junior engineer, assistant engineer and executive engineer from public health department/ central/ state pollution control boards ▪ you are sanitary, environmental and civil engineer or designer engineer in private/ public sector ▪ you are biochemist, biotechnologist and chemist ▪ you are researcher in the environmental field working on water and wastewater treatment ▪ you are a student of all level (B.Tech, M.Tech and Ph.D.)
<p>Fees</p>	<p>The participation fees for taking the course is as follows: Participants from abroad : US \$500 Industry/ Research Organizations: Rs. 12,500 Academic Institutions: 5,500 Students: 2,000 The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis. Registration fee: 500</p>

The Faculty



Dr. Beni Lew is a senior researcher in the Volcani Center in Israel. His research interests include systems and *technologies for water and wastewater treatment* – physical, chemical and biological processes.



Dr. Abid Ali Khan is an Assistant Professor of Jamia Millia Islamia, New Delhi. His research interest is Post treatment of Anaerobic Effluent, Enhanced Anaerobic Digestion and Nutrient Removal from Wastewater.

PROGRAM SCHEDULE

Nutrient Removal in Wastewater: Recovery and Reuse

INAUGURAL CEREMONY: July 02, 2018 10:00AM - 10:30 AM

Tea Break: 10.30 AM

Program Schedule

Lecture No.	Date	Time	Lecture Topics
1 - 2	July 02	11.00 AM – 4.00 PM	Lecture Topics
L1	Day 1	11:00-12:00 NOON	Introduction to the microbiology of carbon and nutrient removal
L2		12:00 - 1.00 PM	Activated sludge fundamentals <i>Assignment 1</i>
		1:00 - 1:30 PM	<i>LUNCH BREAK</i>
		1:30 – 2.30 PM	Design of modified activated sludge processes
T1 (AAK)		2:30 - 3:30 PM	Tutorial 1: Practical design of activated sludge
		3:30- 4:00 PM	<i>TEA BREAK</i>
3 - 4	July 03	9.30 AM – 4.00 PM	Lecture Topics
L3	Day 2	9:30 - 10:30 AM	Activated sludge system for carbon removal
L4		10:30 - 11:30 AM	Activated sludge for nutrient removal
		11:30 - 11:45 AM	<i>TEA BREAK</i>
T2-1		11:45 - 12:45 PM	Tutorial: Practical design of activated sludge for nutrient removal
		12:45 - 1:45 PM	Exam (Short Test – 1)
		1:45- 02:15 PM	<i>LUNCH BREAK</i>
T2-2		02:15- 03:15 PM	Tutorial: Practical design of activated sludge for nutrient removal & <i>Assignment 2</i>
	03:15 - 03:45 PM	<i>TEA BREAK</i>	
<i>PTO</i>			

5 - 6	July 04	9.30 AM – 4.00 PM	Lecture Topics
L5	Day 3	10:00 - 11:00 AM	IWA modelling (ASM1)
L6		<i>11:00 – 11.30 AM</i>	<i>TEA BREAK</i>
		11:30 - 12:30 PM	Influence of design and operational conditions
T3-1		12:30 - 01:30 PM	Tutorial : Software use
		<i>01.30 – 02.00 PM</i>	<i>LUNCH BREAK</i>
T3-2		<i>02.00 – 3.00 PM</i>	Tutorials and <u>Assignment 3</u>
		<i>03.00 – 03.30 PM</i>	<i>TEA BREAK</i>
7 - 8	July 05	9.30 AM – 4.00 PM	Lecture Topics
L7	Day 4	10:00 – 11:00 AM	Solid – liquid separation theory
L8		<i>11:00 - 11:15 AM</i>	<i>TEA BREAK</i>
		11:15 - 12:15 PM	Solid – liquid separation technologies
T4-1		12:15 - 01:15 PM	Tutorial: Design of primary clarifiers
		<i>01.15 – 01.45 PM</i>	<i>LUNCH BREAK</i>
T4-2		01.45 – 02.45 PM	Tutorial : Design of secondary clarifier
		02.45 – 03.45 PM	Exam (Short Test – 2)
	<i>03:45 - 04:15 PM</i>	<i>TEA BREAK</i>	
9 - 10	July 06	9.30 AM – 4.00 PM	Lecture Topics
L9	Day 5	09:30 - 10:30 AM	Odor Control Systems
L10		10:30 - 11:30 AM	Upgradation of existing wastewater treatment system for nutrient removal
		<i>11:30 - 11:45 AM</i>	<i>TEA BREAK</i>
T5-1		11:45-12:45 PM	Tutorial : Design of odor treatment systems
		<i>12.45 – 01.15 PM</i>	<i>LUNCH BREAK</i>
T5-2		01.45 – 2.15 PM	Tutorial : Biological treatment systems (BNR processes)
		02.15 – 03.15 PM	Final Exam
		04.00 – 04.30 PM	Valedictory Function
		<i>04:30 - 05:00 PM</i>	<i>TEA BREAK</i>