

DEPARTMENT OF ENVIRONMENTAL ENGINEERING

The aim of the Department of Environmental Engineering is to teach and train students to be engineers with a competent knowledge (theoretical and practical) of surveying, planning and design, consulting and operating in the following fields:

1. water supply and treatment
2. drainage system and wastewater treatment
3. environmental sanitation
4. industrial environment
5. air pollution control
6. water pollution control and management
7. urban and rural sanitation
8. solid waste management
9. hazardous wastes treatment
10. environmental management

Moreover, students are obliged to use their own creative idea and self-responsibility. They are also encouraged to take an interest in techniques, foresee problems in the future and develop a sustainability of man and nature

HEAD:

Khemarath Osathaphan, Ph.D. (Oregon State)

PROFESSORS:

Chavalit Ratanatamskul, Ph.D. (Tokyo)
Orathai Chavalparit, Ph.D. (Wageningen)
Pisut Painmanakul, Ph.D. (INSA-Toulouse)
Viboon Sricharoenchaikul, Ph.D. (Georgia Tech)

ASSOCIATE PROFESSORS:

Benjaporn Suwannasilp Ph.D. (Stanford)
Chanathip Pharino, Ph.D. (MIT)
Khemarath Osathaphan, Ph.D. (Oregon State)
Manaskorn Rachakornkij, Ph.D. (New Jersey)
Patiparn Ph.D. (Tokyo)
Pichaya Rachdawong, Ph.D. (Wisconsin-Milwaukee)
Sirima Panyametheekul, Ph.D. (Imperial College)
Sutha Khaodhiar, Ph.D. (Oregon State)
Tawan Limpiyakorn, Ph.D. (Tokyo)

Wiboonluk Pungasmi, Ph.D. (Tokyo)

ASSISTANT PROFESSORS:

Achariya Suriyawong, Ph.D. (Washington)
Chaiyaporn Puprasert, Ph.D. (INSA-Toulouse)
Dao Suwansang Jancharoen Ph.D. (Illinois at Urbana-Champaign)
On-anong Larpparisudthi Ph.D. (Coventry)
Sarun Tejasen, Ph.D. (Oregon State)

LECTURERS:

Jenyuk Lohwacharin Ph.D. (Tokyo)
Win Trivitayanurak Ph.D. (Carnegie Mellon)

**ENVIRONMENTAL ENGINEERING CURRICULUM
FIRST YEAR CURRICULUM
COMMON TO ALL ENGINEERING STUDENTS**

COURSE NO.	SUBJECT	CREDITS	COURSE NO.	SUBJECT	CREDITS
THIRD SEMESTER			SIXTH SEMESTER		
2103213	ENG MECHANICS I	3	2107452	PHYS CHEM TREAT	3
2107214	AQUA CHEM ENV ENG	3	2107462	HAZ WASTE TREAT	3
2107311	BIO ENV ENG	3	2107481	INT ENV IMP ASSMT	3
2107448	NOISE/VIB CTRL	2	2108306	FIELD PRACTICE TOPO SURV	1
2301312	DIFF EQUATIONS	3	2112342	PRIN HYDROLOGY	3
xxxxxxx	GENERAL EDUCATION	3	2112344	HYDRAULICS LAB I	1
xxxxxxx	FREE ELECTIVE	3	xxxxxxx	GENERAL EDUCATION	3
		20			17
FOURTH SEMESTER			SUMMER SEMESTER		
2107253	ENG STAT I	3	2100301	ENGINEERING PRACTICE	2
2107215	WASTE CHEM ENV ENG	2			
2107312	UNIT OP ENV ENG	3	SEVENTH SEMESTER		
2107449	IND SAFE MANAGE	2	2107412	WASTE ENG DES	4
2107451	PRIN PUB HLTH	2	2107444	BUILDING SAN	3
2112346	HYDRAULICS I	3	2107482	ENV ENG PROJ I	1
xxxxxxx	GENERAL EDUCATION	3	2112440	HYDRAULIC ENG	3
		18	5500208	COM PRES SKIL	3
FIFTH SEMESTER			xxxxxxx	GENERAL EDUCATION	3
					17
2100311	ENG ESSENTIALS	3	EIGHTH SEMESTER		
2104203	ENG MANAGEMENT	3	2107411	WAT SUPP ENG DES	4
2107313	UNIT PROC ENV ENG	3	2107450	ENV SYS MANAGE	3
2107445	AIR POL CONT & DESIGN	4	2107483	ENV ENG PROJ II	2
2107484	SOLID WASTE ENG	3	5500308	TECH WRIT ENG	3
2108298	SURVEYING	3	xxxxxxx	FREE ELECTIVE	3
2503312	INTRO URB REG PLAN	3			15
		22			

TOTAL CREDITS FOR GRADUATION = 147

**COURSE DESCRIPTIONS IN
ENVIRONMENTAL ENGINEERING (B.ENG.)**

2107211 Introduction to Environmental Sanitation and Engineering 3(3-0-6)

An introduction course to the field of Sanitary and Environmental Engineering for rural and urban development; topics include the communicable diseases and methods of communication, control of disease vectors, excreta disposal, refuse collection and disposal, building sanitation, industrial hygiene, air and noise pollution, sources of water supply and treatment, wastewater collection, treatment and disposal.

2107212 Chemistry for Environmental Engineering I 2(1-3-2)

Condition : Prerequisite 2302127, 2302163

Chemical and physical characteristics of water, general considerations, methods for determination and application of data to environmental engineering practice; instrumentation; laboratory analysis of water; interpretation of water analysis results as related to their treatment: neutralization, precipitation, coagulation, water softening, ion exchange, corrosion, adsorption, chlorination.

2107213 Chemistry for Environmental Engineering II 2(1-3-2)

Condition : Prerequisite 2302127,2302163

Chemical and physical characteristics of wastewater, general considerations, methods for determination and application of data to Environmental Engineering practice; sample collection and preservation; determinations of solids, DO, BOD, COD, Nitrogen (in all forms related to Environmental Engineering practice), phosphorus and phosphates, grease and oil, volatile acids and sulfides; instrumentation for wastewater analysis.

2107214 Aquatic Chemistry for Environmental Engineering 3(2-3-4)

Chemical and physical characteristics of water, general considerations, methods for determination and application of data to environmental engineering practice; instrumentation; laboratory analysis of water; interpretation of water analysis results as related to their treatment; neutralization, precipitation, coagulation, water softening, ion exchange, corrosion, absorption, chlorination; basic principles of acid-base equilibria, solubility equilibria, oxidation-reduction equilibria, fundamentals of process kinetics, fundamental of surface and colloidal chemistry, water stabilization, water softening and neutralization.

2107215 Wastewater Chemistry for Environmental Engineering 2(1-3-2)

Chemical and physical characteristics of wastewater, general considerations, methods for determination and application of data to environmental engineering practice; sample collection and preservation; determinations of solids, DO, BOD, COD, nitrogen (in all forms related to environmental engineering practice), phosphorus and phosphates, grease and oil, volatile acids, sulfides and gas analysis; instrumentation for wastewater analysis.

2107219* Urban Environments Engineering 3(3-0-6)

Urban environments in general, pollution problems in urban area : wastewater, solid waste, noise pollution, air pollution, and hazardous waste : sources of pollution; destruction of the urban environment; especially solution to its urban problems in such scientific, especially engineering aspect; management of pollution, especially pollution control and treatment; improvement guidelines for urban development; regulations and laws related to buildings in urban area, participation of people living in urban are, and case studies.

(* Elective course for non Environmental Engineering Students)

2107220 Environments and Daily life 3(3-0-6)

A learning process of environment in daily life; the use of case studies and social knowledge which are key information in analyzing the importance of in dairy life; integrated ecological system; natural resources and related environment; integration the of outcome of the study with related disciplines in order to understand and realize the importance of environment and guidelines for participation for better environment.

2107221 Environmental Studies 3(3-0-6)

Basic knowledge and important perspectives on global environment with emphasis on case studies; ecosystem; biogeochemical cycles; population studies; energy; wetland; water pollution; air pollution; noise pollution; solid waste disposal; hazardous waste; waste treatment system design; environmental responsibility.

2107311 Biology for Environmental Engineering 3(2-3-7)

Cell and its structure, principles of bacteriology, population growth, roles of bacteria in public health, coliform bacteria, methods of collection and bacteriological examination of water & sewage, principles of immunization, disinfection and sterilization, actions of enzymes as related to stabilization of organic matter, biodegradation of organic compounds, fundamental concepts related to energy, food chain, productivity and limiting factors, positive and negative interactions among microbial populations, basic concept of ecology, habitat and ecological niche, Nitrogen, Carbon, Sulfur, Phosphorus cycles, freshwater ecology and biota dynamics in wastewater treatment environments.

2107312 Unit Operations for Environmental Engineering 3(3-0-6)

An overview of unit processes and application of unit operations in water and waste treatment as well as air pollution control: aeration and gas transfer, mixing, sedimentation, aerosol separation, filtration, coagulation, precipitation, ion exchange, adsorption.

2107313 Unit Process for Environmental Engineering 3(2-3-4)

Reactor design, flow model, reaction kinetics, screening, sedimentation, filtration, coagulation-flocculation, absorption, stripping, sorption, stoichiometry of biological process, microbial growth kinetics, activated sludge system.

2107411 Water Supply Engineering and Design 4(3-3-6)

Condition : Prerequisite 2107212,2107312

Sources of public water supply, quality and quantity requirements: water standards, population prediction, water consumption and flow variation; design of water distribution systems; design of water treatment plant; planning.

2107412 Wastewater Engineering and Design 4(3-3-6)

Condition : Prerequisite 2107311, 2107312, 2107213

Wastewater flow rates and characteristics; collection, transportation and pumping; wastewater treatment objectives; methods and design fundamental of process analysis; facility design of physical, chemical and biological treatment for primary and secondary processes; land treatment and disposal.

2107441 Air Pollution Control 3(3-0-6)

Basic knowledge in air pollution: major pollutions, sources, effects on health and welfare, meteorological transport. Sampling and analysis, techniques for control of emissions of particulates and gas, air pollution control regulations and standards, air quality management, enforcement systems.

2107444 Building Sanitation 3(3-0-6)

Fundamentals of Building Sanitation; law & regulations; design of building water supply (hot, cold & drinking water), building drainage and vent systems; fire protection; site drainage; building wastewater and solid wastes disposal and treatment, swimming pool system design.

2107445 Air Pollution Control and Design 4(3-3-6)

Basic knowledge in air pollution: major pollutions, sources, effects on health and welfare, meteorological transport, sampling and analysis, techniques for control of emissions of particulates and gas, air pollution control regulations and standards, air quality management, enforcement systems.

2107446 Treatment of Industrial Wastewater 3(3-0-6)

Condition : Prerequisite 2107412

Industrial wastewater effluent standards; laws and regulations; industrial wastewater monitoring systems; sources, quantity and qualification characteristics of industrial wastewater; industrial wastewater treatment technology; water pollution control and management in major industries; case studies on wastewater reuse and product recovery.

2107448 Noise and Vibration Control 2(2-0-4)

Behavior of sound waves; instrumentation; practical measurements; environmental impact of noise and vibration; regulations and criteria for noise and vibration control in environmental systems; use of acoustic materials, noise and vibration barriers.

2107449 Industrial Safety Management 2(2-0-4)

Nature of accident in industry and need of accident prevention; planning for safety such as plant layout, machine guarding and maintenance, etc; safety in industry; management of safety program; safety training; case studies in accident analysis.

2107450 Environmental Systems and Management 3(3-0-6)

Basic interrelating effects on environmental in terms of environmental engineering aspects; the functions of government and other agencies in environmental management; an analysis for decision making in environmental protection programs; public policy and action; arrangement of organizations and institutes related to environmental management including their structures and roles; policy development; management approaches and program implementation; case studies of specific environmental protection.

2107451 Principles of Public Health 2(2-0-4)

Health aspects of environmental quality; some principles of epidemiology with special emphasis on community and occupational environment; environmental health standards and requirements; engineering control of some urban and rural pollution problems; other topics in application of engineering principles in environmental protection.

2107452 Physico-chemical Treatment 3(3-0-6)

Theoretical approach to physico-chemical treatment processes : Chemical reaction treatment, Oxidation-

reduction treatment, Flocculation, Sedimentation, Precipitation, Separation units, Floatation, Adsorption, Membrane Processes.

2107453 Public Health Engineering 3(3-0-6)

Public health and safety in different environmental quality settings; principles, of managing the environment and safety of working places; managing and promoting the safety during work; law and regulations related to public health; Implementation of engineering principles to manage and minimize environmental problems in working places, communities and metropolitan.

2107460 Introduction to Hazardous Waste Treatment 3(3-0-6)

An introduction course to hazardous waste treatment technology: topics include definition, classification, regulations, sources, impacts on environment, chemical, biological, thermal, stabilization/solidification treatment, and final disposal method.

2107462 Hazardous Waste Treatment 3(3-0-6)

Basic principles of management and treatment of both organic and inorganic hazardous waste; the treatment system includes physical, chemical, biological, or thermal process as well as final disposal method.

2107480 Sanitary System in Architecture 2(2-0-4)

Fundamentals of building sanitary engineering ; conceptual design and installation of building water supply and hot water supply, wastewater collection, rain water drainage, wastewater treatment, fire protection, swimming pool water treatment , solid wastes collection and disposal.

2107481 Introduction to Environmental Impact Assessment 3(3-0-6)

Development of environmental impact study with exphasis on environment parameters including physical resources, ecological resources, human use values and quality of life values. Interrelationship between engineering aspects and environmental parameters and case studies.

2107482 Environmental Engineering Project I 1(0-3-1)

Practical interesting project on problems in various fields of Environmental Engineering.

2107483 Environmental Engineering Project II 2(0-3-2)

Practical interesting project on problems in various fields of Environmental Engineering.

2107484 Solid Waste Engineering 3(3-0-6)

Condition : Prerequisite 2107213

Quantity and composition of solid wastes; impacts to environment; disposal methods - alternatives and selection; leachate problem; volume and size reduction; transportation; components separation; landfilling; incineration; composting; integrated process and management.

2107491* General Water Supply Engineering 3(3-0-6)

Sources of Water supply; drinking water standards; quantity required, ground water collection; water transmission and distribution; water treatment technique: screening, coagulation and flocculation, sedimentation, filtration, disinfection, softening, iron removal, taste and odor removal.

2107494* Industrial Water Supply and Wastewater Treatment 3(3-0-6)

Sources of water supply; industrial water standards; water treatment techniques: screening, coagulation and flocculation, sedimentation, filtration, softening, demineralization and disinfection; industrial wastewater characterization; effluent standards; industrial wastewater treatment processes.

2107495 Advanced Topics in Environmental Engineering I 3(3-0-6)

Condition : Senior Standing

Study topics of current inerest and new developments in various fields of environmental engineering.

2107496 Advanced Topics in Environmental Engineering II 3(3-0-6)

Condition : Senior Standing

Study topics of current interest and new developments in various fields of environmental engineering.

2107497 Special Problems in Environmental Engineering I 3(2-3-4)

Condition : Senior Standing

Study or investigation of special problems in Environmental Engineering.

2107498 Special Problems in Environmental Engineering II 3(2-3-4)

Condition : Senior Standing

Study or investigation of special problems in Environmental Engineering.

2107499 Environmental Engineering Project 3(0-6-3)

Condition : Senior Standing

Practical interesting project on problems in various fields of Environmental Engineering.

(*Elective course for non Environmental Engineering Students)

