Course Description

Introduction to Creative Design			
Yr. : 1	Sem. : 2	Course Code:	GC3002
This course is aim to cultivate the basic design ability through considerating actual limited factors of industry standard, economical efficiency, environment, morals, confidence to guide creative solution method of engineering problem.			
Environmental Ecology			
Sem. : 2	Sem. : 1	Course Code:	GC3001
This course handles basic concepts of water treatment technology, restoration of rivers and lakes, ecotechnological water management and environmental microbiology by grafting environmental engineering onto ecology. It also studies management and sustainable development of forestry, agriculture, and lake/river ecosystems with ecotechnology.			
Environmental Organic Chemistry			
Sem. : 2	Sem. : 1	Course Code:	GC3044
This course studies chemical structures and characteristics, and chemical reactions of various organic compounds used in environmental engineering.			
Basic Principles and Calculations in Environmental Engineering			
Sem. : 2	Sem. : 1	Course Code:	GC3005
The course is an introduction to the analysis of Environmental processes with an emphasis on mass and energy balances. Stoichiometric relationships, ideal and real gas behavior are also covered. Topics also include an introduction to the first law of thermodynamics for open and closed systems and the solution of problems with comprehensive mass and energy balance calculations.			
Environmental Fluid Mechanics			
Sem. : 2	Sem. : 1	Course Code:	GC3010
On the completion of this subject, students shall; i) be familiar with the theory and principle of fluid mechanics, ii) understand the theory of static and dynamic fluid mechanics, iii) understand the basic concept and theory of fluid mechanics closely related to water environmental engineering.			
Fundamental Experiment for Environmental Engineering			
Sem. : 2	Sem. : 1	Course Code:	GC3045
On the completion of this subject, students shall be familiar with the practical way of analysis for the various water quality parameters such as TOC, BOD, COD, solids, TN, TP, DO, pH, alkalinity and etc.			
Physico-Chemical Wastewater Treatment Process			

Sem. : 2	Sem. : 2	Course Code:	GC3006
The purpose of this subject is to provide the candidate of B.Sc on Environmental Engineering students with a basic knowledge and in-depth exposure to physico-chemical process in water and wastewater treatment. It is just not a theoretical subject but is one of essential undergraduate subjects which cover the principle, design and operation of water and wastewater treatments with the emphasis on physical and chemical treatment processes.			
Environmental Chemistry			
Sem. : 2	Sem. : 2	Course Code:	GC3046
This course studies chemical structures and characteristics, and chemical reactions of various compounds used in environmental engineering.			
Introduction to Air Pollution			
Sem. : 2	Sem. : 2	Course Code:	GC3009
This course focuses on understanding the atmospheric phenomena and the destruction of natural balance, including noise pollution, inevitably brought about by human activities, It provides an overview of the history of air pollution, air pollutants, effect of air pollution on climate, air quality management, and indoor air pollution.			
Transport Phenomena			
Sem. : 2	Sem. : 2	Course Code:	GC3047
This course will provide student important topics on transport phenomena including momentum, heat and mass transport encountered in environmental engineering. Special focus will be placed on theoretical understanding of the principles of transport phenomena and acquiring the ability of analyzing and upgrading the real environmental process. In more details, student should have an ability to solve a problem involved in environmental process by studying fluid mechanics, steady and unsteady state mass and heat transport and so on.			
Environmental Reactions Engineering			
Sem. : 2	Sem. : 2	Course Code:	GC3048
This course studies mass transfer, chemical reactions, and mass balance of organic/inorganics compounds in environmental engineering.			
Water Environmental Policy			
Sem. : 2	Sem. : 2	Course Code:	GC3050
This course will teach purposes; (1) The first half of the 1990s focused on counter-measures against major pollution incidents. (2) Strong and advanced water management policies such as the Total Water Pollution Load Management System (TPLMS), riparian buffer areas system, water use charge system, and resident support system and land purchase system were introduced. (3) The “Master Plan for Water Environment Management (2006~2015) formulated in 2006 emphasized the ecologically sound water environment and the safety from			

hazardous substances, which reflected the new people's demand.			
Management of Solid Wastes and Resource Recovery			
Sem. : 3	Sem. : 1	Course Code:	GC3012
It deals with general aspects involved in the management of municipal solid wastes focusing on the materials and energy recovery. Engineering design and operational features of waste generation, collection, material recovery, energy recovery.			
Air Pollution Control Engineering			
Sem. : 3	Sem. : 1	Course Code:	GC3049
Principles of particulate and gaseous emission control; design and operation of particulate and gas control equipment for stationary and mobile sources to meet emission standards.			
Water Supply System Engineering			
Sem. : 3	Sem. : 1	Course Code:	GC3039
On the completion of this subject, students shall; i) understand the theory, principle and application of water intake, treatment, and distribution systems, ii) be able to design water supply systems.			
Biological Water and Wastewater Treatment Process			
Sem. : 3	Sem. : 1	Course Code:	GC3015
On the completion of this subject, students shall; i) understand the theory, principle and application of typical wastewater treatment process, ii) be familiar with the overall process of wastewater treatment plant with the emphasis of biological process, iii) be able to assess in the design of unit operations in biological process.			
Design and Operation of Environmental Engineering Systems			
Sem. : 3	Sem. : 1	Course Code:	GC3020
The objectives of this course are to understand the physicochemical characteristics of contaminants and to learn how to apply basic and advanced principles for the design and operation of environmental engineering systems.			
Soil and Groundwater			
Sem. : 3	Sem. : 2	Course Code:	GC3013
The objectives of this course are to understand the characteristics of soil and groundwater and the behavior of contaminants in soil and groundwater systems and to learn how to apply environmental engineering processes for contamination sites using basic principles.			
Instrumental Analysis and experiments			
Sem. : 3	Sem. : 2	Course Code:	GC3018
In this course you will be given a survey of instruments that are used in analyses of various environmental pollutants. Two powerful analyzing methods, the spectroscopy and chromatography, will be dealt in depth. For each instruments, the basic theory, system composition and function of each parts, maintenance, and			

quantification method will be provided. SEM and XRD for characterization of inorganic materials will be also given in this course.

Ecological Design for Environment Engineering

Sem. : 3	Sem. : 2	Course Code:	GC3016

Following economic activities of people, urbanization and industrialization has been progressed rapidly, though associated environmental pollutions have also aggravated over time and limit human activities because of the boomerang effect. These environmental problems resolved by nature-friendly eco-engineering techniques, and is learning to be applied to the field.

Experiments on Soil and Solid wastes

Sem. : 3	Sem. : 2	Course Code:	GC3021

This experimental course helps student to understand characteristics of solid wastes and soils, and the basic principles of treatment processes through several experiment.

Sewage System Engineering

Sem. : 3	Sem. : 2	Course Code:	GC3041

On the completion of this subject, students shall; i) understand the theory, principle and application of rainwater drainage, collection, sewer distribution system and wastewater treatment system, ii) be able to design sewage systems. Also, water reuse and resource recovery from wastewater shall be addressed.

Experiments on Air Environments

Sem. : 3	Sem. : 2	Course Code:	GC3030

Through experiments, the course focuses on understanding the purification principle and technology of gas and particulate air pollutants released into the air. Studies how the amount and the physical/chemical properties of air pollutants released from their source are measured. Practices operating and designing particulate collectors and gas purification equipment. In general, the course aims at understanding, applying, and improving on the preventive technologies that can reduce the discharge of air pollutants at their source.

Capstone Design

Sem. : 4	Sem. : 1	Course Code:	GC3026

This course fulfills the requirement of an engineering capstone design elective. The objective of the course is to provide the student with a meaningful, major engineering design experience that builds upon the fundamental concepts of mathematics, basic sciences, the humanities and social sciences, engineering topics, and communication skills. Further, this design experience includes the student's application of knowledge and skills acquired in earlier coursework and requires students to develop and apply an understanding of engineering standards and realistic constraints such as economic, environmental, sustainability, ethical, health and safety, social, and political considerations.

Chemical Safety Engineering

Yr. : 4	Sem. : 1	Course Code:	GC3002
This course studies types, characteristics and potential risks of chemicals, safety management of chemical processes and systems, and environmental safety, which are core knowledges in the School of Integrated Chemical Materials Engineering.			
Advances in Water Pollution Control			
Sem. : 4	Sem. : 1	Course Code:	GC3027
On completion of this subject, students are expected to (i) understand the principles, concepts and interpretations of the conventional/fundamental physico-chemical processes, (ii) be familiar with the major types of water and wastewater treatment processes, and (iii) understand the basic objectives, processes and technologies of water supply and wastewater treatment.			
Environmental Research 1			
Sem. : 4	Sem. : 1	Course Code:	GC3025
On the completion of this subject, students shall; i) be involved in various types of research activities such as literature review, survey, data collection, analysis, operation of experimental unit, and mathematical modelling, ii) be able to write a technical paper based on the experimental results.			
Environmental Modeling			
Sem. : 4	Sem. : 1	Course Code:	GC3028
The objective of this course is to learn how to predict the fate and transport of contaminants in water, air, and soil using basic and advanced principles.			
Treatment of Hazardous Wastes			
Sem. : 4	Sem. : 1	Course Code:	GC3042
Theoretical backgrounds for proper treatment of hazardous wastes will be provided in the first part of the course including legal classification of hazardous wastes and physical and chemical properties of hazardous wastes and their application in handling and treatment processes. Special emphasis will be placed on design and operation of the chemical and biological treatment processes and landfill technology.			
Hazardous Gas Control Engineering			
Sem. : 4	Sem. : 1	Course Code:	GC3023
Hazardous Gas emission sources, behavior of pollutants in the atmosphere, theory and practice of control of gaseous air pollutants at their sources.			
Environmental Research 2			
Sem. : 4	Sem. : 2	Course Code:	GC3031
On the completion of this subject, students shall; i) be involved in various types of research activities such as literature review, survey, data collection, analysis, operation of experimental unit, and mathematical modelling, ii) be able to wirte a technical paper based on the experimental results.			

Clean Technology			
Sem. : 4	Sem. : 2	Course Code:	GC3032
Handles the following topics : wastewater reuse, waste recycling, sludge source and characteristics, sludge treatment system, stabilization, anaerobic and aerobic sludge digestion, composting, conditioning, disinfectin of waste, dewatering, heat dry, sludge reduction.			
Practical Affairs in Environmental Plants			
Sem. : 4	Sem. : 2	Course Code:	GC3043
It deals common and practical affairs in various environmental plants such as water and wastewater treatment plants and solid wastes treatment facilities with a special emphasis on the mechanics and energy balance. To provide a practical knowledge for environmental engineers, the national standards on the design and operation of environmental plants will be used.			
Creative Environmental Engineering Design			
Sem. : 4	Sem. : 2	Course Code:	GC3051
This course studies fundamentals and applications of environmental engineering processes design.			
Science and Technology of Bioenergy			
Sem. : 4	Sem. : 2	Course Code:	GC3052
It contains the general aspects involved in the production of bioenergy from biomass with a special focus on basic science and engineering design. Production and use of biogas, bioethanol, hydrogen, biobutanol, and syngas will be dealt in details.			