• <u>Course Description (Chemical Engineering)</u>

Advisor Counsel				
Yr. : Evry Yr.	Sem. : Evry Sem.	Course Code:	FP0001	
Advisors in the ABEEK (A	ccreditation Board for Engir	neering Education of Korea	program give counsel for	
students in both the accre	edited and the non-accredit	ed to help the students to	meet certain standards in	
achieving program mission	/objectives, student outcome	es, and curriculum including	overall college life such as	
preparation for getting job a	and studying for higher degre	ee, peer relationships, etc.		
	Introduction to Desig	n to Creative Design		
Yr. : 1	Sem. : 2	Course Code:	GC0002	
Establish an understanding	and basic concept of design	n through creative and intere	sting design programs and	
task execution.				
lı	ntroduction to Energy a	nd Chemical Engineering	g	
Yr. : 2	Sem. : 1	Course Code:	GC5001	
This course introduces and	I teaches the concepts and	applications of energy and c	hemical engineering as an	
introductory course for stuc	lents who want to major in cl	nemical engineering.		
	Organic C	hemistry1		
Yr. : 2	Sem. : 1	Course Code:	GC5002	
In this lecture, you will lear	rn about nomenclature of ca	rbon compounds, mechanis	sm, structure and property,	
analysis and identification	methods to understand st	ructure and property of po	lymers, organic advanced	
materials and bio-related m	aterials.			
* Related subjects : Gene	ral chemistry1, General che	emistry2, General chemistry	Lab.1, General chemistry	
Lab.2, Polymer synthe	sis1, Polymer synthesis2, Or	ganic chemistry2, Organic c	hemistry Lab.	
Physical Chemistry Lab.				
Yr. : 2	Sem. : 1	Course Code:	GC5003	
This laboratory course focuses on four parts: (1) understanding of basic concept of physical chemistry through				
various lab. experiments; (2) increasing of capability of experimental set-up, (3) improving of writing ability in				
technical reports (4) learning how to cooperate with experimental lab. coworkers				
Physical Chemistry1				
Yr. : 2	Sem. : 1	Course Code:	GC5004	
The physical chemistry is to systematize the basic theory , laws, and the organizing principles of chemistry and				
is to learn the deviation of basic equations, the physical meaning, and its application.				
Organic Chemistry2				
Yr. : 2	Sem. : 2	Course Code:	GC5006	

In this lecture, you will learn about nomenclature of carbon compounds, mechanism, structure and property,					
analysis and identification	analysis and identification methods to understand structure and property of polymers, organic advanced				
materials and bio-related m	aterials.				
* Related subjects : Gene	ral chemistry1, General ch	emistry2, General chemistry	Lab.1, General chemistry		
Lab.2, Polymer synthe	sis1, Polymer synthesis2, O	rganic chemistry2, Organic c	hemistry Lab.		
	Organic Ch	omietry Lob			
	Organic Chemistry Lab.				
Yr. : 2	Sem. : 2	Course Code:	GC5007		
	nding of basic concept and expe	rimental skill via application of the	eory of organic chemistry to real		
experiments.					
	Physical C	Chemistry2			
Yr. : 2	Sem. : 2	Course Code:	GC5008		
The physical chemistry is to	systematize the basic theo	ry, laws, and the organizing	principles of chemistry and		
is to learn the deviation of t	pasic equations, the physica	I meaning, and its application	۱.		
	Basic Calculations in	n Energy Engineering			
Yr. : 2	Sem. : 2	Course Code:	GC5009		
This course covers the un	it conversion, thermodynam	nic properties, materials, and	d energy balance used for		
basic calculation of energy	engineering such as the uni	t operation and chemical rea	ction engineering		
	Energy and Petrochemistry				
Yr. : 2	Sem. : 2	Course Code:	GC5010		
		Course Code: nd natural gas produced in c			
As a basic materials indust	ry to use oil, the naphtha ar		rude oil is used to produce		
As a basic materials indust ethylene, propylene, BTX w	ry to use oil, the naphtha ar /hich is based on oil product	nd natural gas produced in c	rude oil is used to produce e synthetic resins, synthetic		
As a basic materials indust ethylene, propylene, BTX v fibers, synthetic rubber and	ry to use oil, the naphtha ar /hich is based on oil product	nd natural gas produced in c ion, and these again produce e covers the manufacturing i	rude oil is used to produce e synthetic resins, synthetic		
As a basic materials indust ethylene, propylene, BTX v fibers, synthetic rubber and	ry to use oil, the naphtha an which is based on oil product fine chemicals. This cours energy (solar, fuel cells, hyb	nd natural gas produced in c ion, and these again produce e covers the manufacturing i	rude oil is used to produce e synthetic resins, synthetic		
As a basic materials indust ethylene, propylene, BTX v fibers, synthetic rubber and	ry to use oil, the naphtha an which is based on oil product fine chemicals. This cours energy (solar, fuel cells, hyb	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.).	rude oil is used to produce e synthetic resins, synthetic		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3	ry to use oil, the naphtha an which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hyb Thermoo Sem. : 1	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.).	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3	ry to use oil, the naphtha an which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hyb Thermoo Sem. : 1	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code:	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena	ry to use oil, the naphtha an which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hyb Thermoo Sem. : 1	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code:	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena	ry to use oil, the naphtha ar which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hybe Thermoo Sem. : 1 concerned with heat and	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code:	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena	ry to use oil, the naphtha ar which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hybe Thermoo Sem. : 1 concerned with heat and	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code: energy will be discussed b	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena thermodynamic laws.	ry to use oil, the naphtha ar which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hybe Thermoo Sem. : 1 concerned with heat and Fluid Me Sem. : 1	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code: energy will be discussed b echanics	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011 based on the fundamental GC5012		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena thermodynamic laws.	ry to use oil, the naphtha ar which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hybe Thermoo Sem. : 1 concerned with heat and Fluid Me Sem. : 1 d mechanics on the specific	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code: energy will be discussed to echanics Course Code:	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011 based on the fundamental GC5012		
As a basic materials indust ethylene, propylene, BTX w fibers, synthetic rubber and and applying them to new e Yr. : 3 Maccroscopic phenomena thermodynamic laws.	ry to use oil, the naphtha ar which is based on oil product d fine chemicals. This cours energy (solar, fuel cells, hybe Thermoo Sem. : 1 concerned with heat and Fluid Me Sem. : 1 d mechanics on the specific d gas.	nd natural gas produced in c ion, and these again produce e covers the manufacturing i rid car battery, etc.). Iynamics Course Code: energy will be discussed to echanics Course Code:	rude oil is used to produce e synthetic resins, synthetic ndustry of above materials GC5011 based on the fundamental GC5012		

This course is aimed to immerse yourself in a professional lab experiments that can be applied in practice related to technology based on the theory that can be related to chemical engineering majors such as manipulation, reaction engineering, process control. Students learn to understand themselves through the basic principles and operation of the device which constitute chemical plants and reflect in the device design through data analysis.

Learn about various materials that apply to various energy devices such as fuel cells and secondary batterie Especially, we deal with electrochemistry early in the course of the course, which is equivalent to the bas concepts of the two devices, and find out how each applies to energy devices later in the course. Analytical Chemistry Yr. : 3 Sem. : 1 Course Code: GC5015 You learn about the different analytical methods that are the basis of chemical analysis. It deals with acid sa titration method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Yr. : 3 Sem. : 2 Course Code: GC5018 Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidiffication, liquid extraction, and leaching. <th>Yr. : 3</th> <th>Sem. : 1</th> <th>Course Code:</th> <th>GC5014</th>	Yr. : 3	Sem. : 1	Course Code:	GC5014
concepts of the two devices, and find out how each applies to energy devices later in the course. Analytical Chemistry Yr. : 3 Sem. : 1 Course Code: GC5015 You learn about the different analytical methods that are the basis of chemical analysis. It deals with acid satistization method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the	Learn about various materi	als that apply to various end	ergy devices such as fuel cell	ls and secondary batteries
Analytical Chemistry Yr. : 3 Sem. : 1 Course Code: GC5015 You learn about the different analytical methods that are the basis of chemical analysis. It deals with acid satistization method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic	Especially, we deal with e	ectrochemistry early in the	course of the course, which	n is equivalent to the basi
Yr. : 3 Sem. : 1 Course Code: GC5015 You learn about the different analytical methods that are the basis of chemical analysis. It deals with acid set titration method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the react	concepts of the two device	s, and find out how each ap	plies to energy devices later i	in the course.
You learn about the different analytical methods that are the basis of chemical analysis. It deals with acid satititation method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5019		Analytical	Chemistry	
titration method, oxidative titration method, electrochemical analysis method, separation method, etc. Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5019	Yr. : 3	Sem. : 1	Course Code:	GC5015
Environmental engineering Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products an wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5019	You learn about the differe	nt analytical methods that a	are the basis of chemical ana	lysis. It deals with acid sa
Yr. : 3 Sem. : 1 Course Code: GC5017 Basic concepts on chemical production process to minimize environmental inhibitors such as by-products and wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theored of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5019	titration method, oxidative t	itration method, electrocher	nical analysis method, separa	ation method, etc.
Basic concepts on chemical production process to minimize environmental inhibitors such as by-products ar wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020		Environment	al engineering	
wastes, and effective treatment process of the environmental inhibitors to be utilized as renewable resources Heat Transfer and Mass Transfer Yr. : 3 Sem. : 2 Course Code: GC5018 Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	Yr. : 3	Sem. : 1	Course Code:	GC5017
Heat Transfer and Mass TransferYr. : 3Sem. : 2Course Code:GC5018Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer.Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching.Reaction EngineeringYr. : 3Sem. : 2Course Code:GC5019The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry.Chemical Engineering Experiment 2Yr. : 3Sem. : 2Course Code:GC5020	Basic concepts on chemica	I production process to mir	nimize environmental inhibitor	rs such as by-products an
Yr. : 3Sem. : 2Course Code:GC5018Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer.Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching.Reaction Engineering Yr. : 3Yr. : 3Sem. : 2Course Code:GC5019The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry.Chemical Engineering Experiment 2Yr. : 3Sem. : 2Course Code:GC5020	wastes, and effective treatr	nent process of the environ	mental inhibitors to be utilized	d as renewable resources
Heat related issues on reactors and heat transfer devices in chemical process or chemical reactor, and theorie of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorptio dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020		Heat Transfer a	nd Mass Transfer	
of energy balance with respect to the conduction, convection, and radiation energy transfer. Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Yr. : 3 Sem. : 2 Course Code: GC5019 Yr. : 3 Sem. : 2 Course Code: GC5019 Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	Yr. : 3	Sem. : 2	Course Code:	GC5018
Mass transfer introduces it's basic concept and covers essential techniques such as design and control reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	Heat related issues on read	tors and heat transfer devic	es in chemical process or che	emical reactor, and theorie
reactor or mass transfer and separation apparatus which have functions such as distillation, gas absorption dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemical reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	of energy balance with resp	pect to the conduction, conv	rection, and radiation energy	transfer.
dehumidification, liquid extraction, and leaching. Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020		's basic concept and cove	ers essential techniques such	n as design and control of
Reaction Engineering Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	Mass transfer introduces i			
Yr. : 3 Sem. : 2 Course Code: GC5019 The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020		nd separation apparatus wh	nich have functions such as	distillation, gas absorption
The reaction engineering is to understand qualitatively the large-scale polymerization processes and chemic reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	reactor or mass transfer a		nich have functions such as	distillation, gas absorption
reactions and covers the reaction pathways when implemented in industry. Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	reactor or mass transfer a	action, and leaching.		distillation, gas absorption
Chemical Engineering Experiment 2 Yr. : 3 Sem. : 2 Course Code: GC5020	reactor or mass transfer a dehumidification, liquid ext	raction, and leaching. Reaction E	Engineering	Γ
Yr. : 3 Sem. : 2 Course Code: GC5020	reactor or mass transfer and dehumidification, liquid extra Yr. : 3	raction, and leaching. Reaction E Sem. : 2	Engineering Course Code:	GC5019
	reactor or mass transfer and dehumidification, liquid extra Yr. : 3 The reaction engineering is	Reaction, and leaching. Reaction E Sem. : 2 to understand qualitatively	Engineering Course Code: the large-scale polymerization	GC5019
	reactor or mass transfer and dehumidification, liquid extra Yr. : 3 The reaction engineering is	Reaction, and leaching. Reaction E Sem. : 2 to understand qualitatively action pathways when impl	Engineering Course Code: the large-scale polymerization emented in industry.	GC5019
This subject aims to learn basic experimental practical skills based on energy-related theories such as u	reactor or mass transfer and dehumidification, liquid extreme Yr. : 3 The reaction engineering is reactions and covers the re	Reaction, and leaching. Reaction E Sem. : 2 to understand qualitatively action pathways when impl Chemical Engine	Engineering Course Code: the large-scale polymerization emented in industry. ering Experiment 2	GC5019 on processes and chemica
	reactor or mass transfer and dehumidification, liquid extra Yr. : 3 The reaction engineering is reactions and covers the reactions Yr. : 3 This subject aims to learn	Reaction, and leaching. Reaction E Sem. : 2 to understand qualitatively action pathways when imple Chemical Engine Sem. : 2 basic experimental practical	Engineering Course Code: the large-scale polymerization emented in industry. ering Experiment 2 Course Code:	GC5019 on processes and chemic GC5020 ated theories such as ur

Yr. : 3 Sem. : 2 Course Code: GC5022 Learn about the structure, characteristics, synthesis process and analysis of materials used in chemic engineering. The application field of materials according to their characteristics and structure is discussed. Creative and Integrative Chemical Engineering Design Yr. : 3 Sem. : 1 Course Code: GC5023 In this class, student will perform creative team projects to design materials and integrated systems engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering.Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informatic collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends Res	Chemical Engineering Materials				
engineering. The application field of materials according to their characteristics and structure is discussed. Creative and Integrative Chemical Engineering Design Yr. : 3 Sem. : 1 Course Code: GC5023 In this class, student will perform creative team projects to design materials and integrated systems engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering.Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	Yr. : 3	Sem. : 2	Course Code:	GC5022	
Creative and Integrative Chemical Engineering Design Yr. : 3 Sem. : 1 Course Code: GC5023 In this class, student will perform creative team projects to design materials and integrated systems engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering.Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informatic collection and understanding abilities will be educated. Vr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne gene	Learn about the structure	, characteristics, synthesis	process and analysis of n	naterials used in chemical	
Yr. : 3 Sem. : 1 Course Code: GC5023 In this class, student will perform creative team projects to design materials and integrated systems engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering. Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	engineering. The applicatio	n field of materials according	g to their characteristics and	structure is discussed.	
In this class, student will perform creative team projects to design materials and integrated systems engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering.Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	Cre	ative and Integrative Ch	emical Engineering Des	sign	
engineering with the integrative knowledge of the chemical, electrical, and mechanical engineering.Presentati skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends					
skill, communication skill and information collection and understanding abilities will be educated as well. Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	In this class, student will	perform creative team proj	jects to design materials a	and integrated systems for	
Capstone Design1 Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	engineering with the integra	itive knowledge of the chemic	cal, electrical, and mechanic	al engineering.Presentation	
Yr. : 4 Sem. : 1 Course Code: GC5024 To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	skill, communication skill ar	nd information collection and	understanding abilities will	be educated as well.	
To perform creative team projects and integrated material designs for energy and chemical engineering, bas not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends		Capstone	e Design1		
not only on material design and characterization, but also on introductory design and fundamental engineeri designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated.	Yr. : 4	Sem. : 1	Course Code:	GC5024	
designs. In this subject, with performing team projects, presentation skill, communication skill. and informati collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	To perform creative team p	rojects and integrated mater	ial designs for energy and c	hemical engineering, based	
collection and understanding abilities will be educated. Carbon Materials Yr. : 4 Sem. : 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	not only on material design	and characterization, but als	so on introductory design ar	nd fundamental engineering	
Carbon Materials Yr.: 4 Sem.: 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	designs. In this subject, wit	h performing team projects,	presentation skill, communi	cation skill. and information	
Yr.: 4 Sem.: 1 Course Code: GC5026 It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	collection and understandin	ng abilities will be educated.			
It covers the foundation of carbon materials such as carbon fiber and graphene, which are popular as ne generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	Carbon Materials				
generation materials, and lectures on general contents of carbon materials such as structure and vario applications and technology trends	Yr. : 4	Sem. : 1	Course Code:	GC5026	
applications and technology trends	It covers the foundation of	carbon materials such as c	arbon fiber and graphene,	which are popular as next-	
	generation materials, and lectures on general contents of carbon materials such as structure and various				
Research Project of Science & Engineering1	applications and technology trends.				
Yr.: 4 Sem.: 1 Course Code: GC5027	Yr. : 4	Sem. : 1	Course Code:	GC5027	
Under the supervision of his/her research advising professor, every senior student should learn how to sele	should learn how to select				
his/her bachelor thesis topic, how to process thesis experiment efficiently using correct experimental tools, a	his/her bachelor thesis topic	c, how to process thesis exp	eriment efficiently using cor	rect experimental tools, and	
how to analyze experimental data.					
Catalytic Engineering					
Yr. : 4 Sem. : 1 Course Code: GC5028	Yr. : 4	Sem. : 1	Course Code:	GC5028	
This subject covers the basic concepts and principles of catalyst, catalytic chemical phenomena, instrumen	al phenomena, instrumental				
method of surface analysis, and reaction mechanism concerned with biocatalyst, such as enzyme.	uch as enzyme.				
Process Control					
Yr. : 4 Sem. : 1 Course Code: GC5029	Yr. : 4	Sem. : 1	Course Code:	GC5029	
This course is to understand and covers the chemical process dynamics theory and its control. Also it dea	This course is to understar	nd its control. Also it deals			
with the applications, the control theory, interpretation of multi variable control systems, optimum control theory					
and the stability of system.					

	Capstone Design2				
Yr. : 4	Sem. : 2	Course Code:	GC5030		
To perform creative team p	rojects and integrated mater	ial designs for energy and ch	nemical engineering, based		
not only on material design	and characterization, but al	so on introductory design an	d fundamental engineering		
designs. In this subject, wit	h performing team projects,	presentation skill, communio	cation skill. and information		
collection and understandir	ng abilities will be educated.				
	Research Project of Se	cience & Engineering2			
Yr. : 4	Sem. : 2	Course Code:	GC5031		
Under the supervision of hi	s/her research advising prof	essor, every senior student s	should learn how to discuss		
his/her experimental results	s in comparison with previou	s results, how to write correc	ctly his/her bachelor thesis,		
how to make the presentation	ion materials of his/her thesis	s and how to make feed-bac	k in response to questions.		
	Separatio	n Process			
Yr. : 4	Sem. : 2	Course Code:	GC5033		
This course studies advance	ed engineering principles rel	ated to the separation. It incl	udes the phase separation,		
settlement, filtering, memb	oranes separation, distillatio	on, ion exchange, and diss	olution.Specific topics will		
include the recovery of mat	terials, thermal and biologica	I transformation processes.			
	Polymer	Physics			
Yr. : 3	Sem. : 1	Course Code:	GC5039		
Learn the basic theory ne	eded to understand the pro	pperties of polymeric materi	als and learn the physical		
phenomena of polymeric materials such as size, molecular weight, solubility, molecular weight discernment,					
and amorphous/crystalline	polymers.				
Polymer Processing					
Yr. : 3	Sem. : 2	Course Code:	GC5040		
Various methods (compression, injection, calendering, radiation, etc.) that are used corely to enhance the added					
value of polymeric materials, as well as the principle and characteristics of forming.					
Nanobiotechnology					
Yr. : 4	Sem. : 1	Course Code:	GC5041		
It covers the overall understanding of nanotechnology and materials and their relevance and applications.					