

2018

List of Courses in English

Course Descriptions



인하대학교  
INHA UNIVERSITY

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### <Mechanical Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
MEG2120	Thermodynamics1	<ul style="list-style-type: none"> <li>- Understating of fundamental thermodynamics</li> <li>- Concept of work, heat and energy</li> <li>- Closed and open system in thermodynamics</li> <li>- First law of thermodynamics</li> <li>- Second law of thermodynamics</li> <li>- Entropy</li> <li>- Power system: steam and gas</li> <li>- Refrigerating system</li> </ul>	○		3
MEG2221	Thermodynamics2	In this class, we will cover the detailed thermodynamic issues including equation of state, ideal gas mixture and psychometric application, reacting mixture and exergy. From the lecture, the advanced thermodynamic system can be designed and further understanding for thermal system can be considered.		○	3
MEG2250	Fluid Mechanics 1	The concepts of conservation laws of mass, momentum, and energy are introduced and related theories are derived. Macroscopic approach using control volumes, microscopic approach using governing partial differential equations, and dimensional analysis are presented and discussed. In addition, some video clips developed recently are shown to enhance students' understanding of the physics associated with fluid flows.		○	3
MEG2076	Linear Algebra	The basic concepts of Linear Algebra, including but not limited to a system of linear equations, matrix and vectors, determinants, vector space and subspaces, linear independence and basis, eigenvalues and eigenvectors, are introduced. Their application in various engineering fields is also discussed. As an introductory course for engineering students, more emphasis will be placed on the methodologies to solve the linear problems, rather than theoretical approach.		○	3



MEG2101	<b>Mechanics of Materials 1</b>	This lecture is primarily focusing on one dimensional structural elements and includes contents below: 1) Tension/ compression on axial members 2) Torsion on shaft 3) Bending on beams 4) Tensor transformation (Mohr circle) 5) Buckling of column.	○		3
MEG2160	<b>Dynamics 1</b>	This course is an introduction to the dynamics of rigid bodies and multibody systems. Topics include: motion of a particle; motion of a rigid body; relative motion; kinetics of translation, rotation, and plane motion; work-energy methods; impulse-momentum methods; mechanical vibration.	○		3
MEG3077	<b>Numerical Analysis</b>	This course is to introduce undergraduate students to numerical methods for solving mathematical problems related to engineering. The topics covered in the course include: fundamental principles of digital computing and the implications for algorithm accuracy and stability, error propagation and stability, the solution of systems of linear equations, including direct and iterative techniques, roots of equations and systems of equations, numerical interpolation, differentiation and integration, fundamentals of finite-difference solutions to ordinary differential equations, and error and convergence analysis.	○	○	3
MEG3165	<b>Automatic Control</b>	This course introduces the design of feedback control systems as applied to a variety of mechanical systems. Topics include the mathematical background (e.g., Laplace transform), properties and advantages of feedback systems, time-domain and frequency-domain performance analysis, stability analysis, the Root Locus method, Nyquist criterion, frequency-domain design, state space approaches, a brief introduction of digital control system.	○		3



MEG3151	Fluid Mechanics 2	The concepts of conservation laws of mass, momentum, and energy are reviewed and applied to duct flows. Flow phenomena in inviscid flows, compressible flows, and open-channel flows are presented and discussed. In addition, some video clips developed recently are shown to enhance students' understanding of the physics associated with fluid flows.	○		3
MEG3185	General Design of Mechanical Engineering 1	This course is designed for juniors. The students carry out team projects for a semester discussing with the professor. Students should prepare their own ideas and design for microfluidic systems to improve the performances with their team colleagues. In addition, the students will have experiences to write the report and to present their design.	○		3
MEG3286	General Design of Mechanical Engineering 2	In any sectors of industry, including Mechanical Engineering, developing commercial software packages is one of the most advanced and promising technologies. Suppose you are a member of technical staff in a global CFD software company. You are now assigned a task of developing a CFD package which requires the concepts of fluid mechanics and coding skills. What would you do? What would be your starting point? This course offers you an opportunity to experience a whole procedure of developing a CFD package, in particular, a Navier-Stokes solver. You will learn the steps including, but not limited to how to lay out your code, how to discretize the governing equations, how to code and debug, and how to postprocess and present your computed results, to name a few.		○	3



MEG3266	<b>Mechanical Measurement</b>	<p>The main objectives of this course are to provide the students with the concepts of mechanical measurement techniques. Basic mathematical and physical concepts are included in the course content, such as regression analysis, statistical analysis.</p> <p>In addition, experimental trainings using measurement devices, sensors, amplifiers, signal conditioning and data acquisition systems are covered. The students will gain experience in understanding various sensory systems through a lab setup. It is also intended to teach in English so that undergraduate students to become familiar with English class. If necessary, class contents will be summarized in Korean at the end of class.</p>		○	3
MEG3227	<b>Heat Transfer</b>	<p>The object of the lecture is to provide the knowledge for understanding, designing, evaluating, and analyzing the heat transfer systems. Utilizing thermodynamics, engineering math, and numerical methods, heat transfer phenomena is analyzed and the analysis results are used for heat transfer system design. The concept of energy conservation is the key idea and it is applied for every analysis.</p>		○	3
MEG4267	<b>Robotics</b>	<p>In this course, we learn about basic background about industrial robot. After briefly describing type of robotic system, sensors and actuators for robot application are to be taught. The coordinate transformation will be introduced followed by kinematics and inverse kinematics of robot. The kinematics problem will be incorporated with the trajectory planning method of the robot motion. Finally, robot dynamics and control will be taught. Especially, computed torque control method and nonlinear sliding mode control method will be introduced.</p>		○	3



MEG4254	<b>Computational Fluids Engineering</b>	Based on basic knowledge of fluid mechanics, students learn about basic theory of computational fluid mechanics which simulates thermo-fluids phenomena by solving governing differential equations numerically, and also learn how to use a commercial CFD code. By practicing with the CFD code, the students learn about grid-generation methods for pre-processing and computer graphics/animation for post-processing. Finally, each student performs analysis/design of a practical thermo-fluids problem by using the CFD code.		○	<b>3</b>
MEG4228	<b>Renewable Energy Technology</b>	Renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat. Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services. From this lecture, we will learn various energy sources and their conversion phenomena as well as how can design the best performance of working system (this lecture for senior student)		○	<b>3</b>



### <Civil Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
CIV2411	<b>Environmental Engineering and Lab</b>	Environmental Engineering is related with Environmental pollution, which the basic knowledge on biology, physics, and chemistry are required. This class is open for all areas of engineering department.	○		3
CIV2420	<b>Energy Resources</b>	This class is open for students in various fields of engineering departments, since energy resources is the field of study that requires a knowledge on physics, chemistry, and biology.		○	3
CIV3330	<b>Hydrology</b>	We study statistical and analytical methodologies to understand hydrologic processes in hydrology	○		3
CIV3340	<b>Design of Hydrologic and Hydraulic Systems</b>	We need hydrologic design before the design of hydraulic structures and so this class will treat the computations of hydrologic design components such as flood discharge and flood level in the river		○	3
CIV3430	<b>Water Supply &amp; Wastewater Engineering</b>	This class is open for students in various fields of engineering departments, because "Water supply and Wastewater Eng." is the field of study that requires a knowledge on physics, chemistry, and biology.		○	3
CIV4220	<b>Rock Engineering</b>	Rock engineering includes fundamental rock engineering principles such as the review of basic mechanic's principles, strength and deformability, rock strength properties and their measurement, shear strength of jointed rock mass, various theories of rock failure, and rock mass classification such as RMR and Q-system. Also, issues related to rock slope engineering and design such as principles of rock slope design, site investigation and geological data collection, structural geology and data interpretation, plane failure, stabilization of rock slope, and numerical analysis will be covered. Student should carry out term project and should make a presentation at the end of Sem.		○	3





CIV4230	<b>Design of Geosystems</b>	It is important to understand on the geotechnical principal of representative geo-infrastructures such as tunnel, retaining wall, and braced excavation. Study on the design and stability analysis of the geosystems is the main subject of this course. Various tunneling methods such as NATM, TBM, Cut and Cover will be introduced. Geomechanical aspects of tunnel, tunnel support system, and practical tunnel design will be carried out in the class. Rankine and Coulomb earth pressure theories, cantilever retaining wall, mechanically stabilized retaining wall will be covered and practical retaining wall design will be carried out. Theory, design and numerical analysis on braced excavation support system will be included in the design of geosystems.	○		3
CIV3211	<b>Soil Mechanics and Lab</b>	Knowledge of clay minerals, soil classification for engineering communication, soil compaction, soil permeability and seepage theory, effective stress concept. Calculation of soil settlement.		○	3
CIV3220	<b>Geotechnical Engineering and Lab</b>	<ul style="list-style-type: none"><li>- Shear strength of soil, and stress path</li><li>- Lateral earth pressure</li><li>- Slope stability analysis</li><li>- Site investigation</li><li>- Bearing capacity of shallow foundations</li></ul>	○		3
CIV4210	<b>Foundation Engineering</b>	Bearing capacity of shallow foundations, reinforced soils. Bearing capacity of mat foundations and design. Load transfer mechanism, equation for estimating pile capacity. Bearing capacity of piles on rock, pile load tests. Drilled shaft and caisson foundations.	○		3
CIV3100	<b>Structural Analysis</b>	The following methods will be taught: (1) analytical methods for statically determinate structures (2) force methods for statically indeterminate structures	○		3



CIV3110	<b>Advanced Structural Analysis</b>	<p>Most of actual structures are statically indeterminate. To analyze statically determinate structures, equilibrium conditions are only required. However, to analyze statically indeterminate structures, additional conditions (or equations) should be formulated from compatibility conditions of displacements. Analytical methods for statically indeterminate structures can be divided into force methods and displacement methods. Last semester in the course of Structural Analysis, some force methods were already studied.</p> <ol style="list-style-type: none"><li>1. This semester, the displacement methods for statically indeterminate structures will be dealt with.</li><li>2. Then, the matrix structural analysis method will be taught and a commercial software will be used to solve structural problems numerically. Some sample cases using the software will be explained together with some homework.</li><li>3. A term project will be assigned to design a structure by running the software.</li></ol>		○	3
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### <Industrial Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
IEN2008	Database	In order to understand database system in fields, both theoretical and practical parts of database will be treated in this course.	○		3
IEN2013	Work Measurement	It consists of basic concepts of work measurement and related case studies. Major subjects included in this class are history of industrial engineering, motion study, time study, ergonomics, and total cost concept. It also includes term project regarding job intervention to improve productivity.		○	3
IEN2201	Database Design	It is a very practical course. At first the fundamental concept of database system need to be understood. And the basic components of database design will be established and enhanced up to real world database models. Additionally, recent issues and applications with database theories, such as distributed database security, data warehousing, data mining techniques, and possibly web related issues will be introduced.		○	3
IEN3204	Information Retrieval	Learn about the overall understanding of information retrieval and the development of web search engine.		○	3
IEN3301	Human Factors Engineering	Human Factors Engineering is one of three main areas in modern industrial engineering. Specifically, it is mainly applications of psychology and physiology to all the aspects of human-machine interface. Major subjects in this course are information theory, vision & visual display, hearing & auditory display, work physiology, musculoskeletal system, kansei engineering, etc.	○		3



<b>IEN4103</b>	<b>Production Economics</b>	Particularly, life-time operational cost evaluation of unconventional energy resources and renewable energy are necessary. In use of systematic approach, the subject can deliver heavy methodology and model based knowledge. The subject will address couple of econometric model of energy supply and demand. Energy intensity, energy efficiency indicators, and ISO/IEC standard oriented technological innovation will be announces within the lens of systematic approach of energy flow.	○		3
<b>IEN4206</b>	<b>Capstone Design in Patent Information System</b>	Intellectual properties course consists of several issues such as Idea generation, Industrial Knowledge Right, Patent Technology Search, International Patent and Coverage, Patent Documentation and experiment, Patent Economic Analysis and evaluation Method etc.	○		3
<b>IEN4208</b>	<b>Financial Engineering</b>	This lecture provides the concepts of financial engineering, especially focusing on mathematical finance. Strongly based on mathematics, various kinds of options, which is the right to sell out or buy in goods or stocks, are dealt with. The basic concept of the geometric Brownian motion, the arbitrage principal, and the Black-Sholes equation will be discussed. A computer simulation study will be provided as well.		○	3



### <Biological Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
BTE2101	Organic Chemistry1	In the first half of this coursework, we will discuss most fundamental structure of organic compounds based on basic knowledge from general chemistry classes. We will further explore properties, structures, and bonding of hydrocarbons, as well as functional groups in organic compounds. In the second half, we will study most commonly used organic reactions including substitution/elimination reactions and structures and reactions of alcohol/ether/exposide/alkene/alkyne. Finally, we will wrap up this coursework with oxidation and reduction reactions.	○		3
BTE2202	Study basic kinetics and transport phenomena	Study basic kinetics and transport phenomena		○	3
BTE2207	Organic Chemistry2	In first a couple of weeks, we will review most important reaction mechanisms including substitution reaction and elimination reaction, followed by reactions of alcohols, ethers, and epoxides. In addition, we will revisit the basic principles and analysis methods of MS and IR, and further explore UV and NMR that are typically used in organic chemistry. Finally, we will wrap up this coursework with benzene, aromatic compounds, carboxylic acids, and amines.		○	3



<b>BTE2206</b>	<b>Instrumental Analysis in Bioengineering</b>	Biomedical optics is an interdisciplinary subject of applying optical methods for diagnostic detection and manipulation of cells and tissues. This course gives an overview of tools and tasks in various biological and biomedical imaging aspects such as Raman spectroscopy, fluorescence microscopy, electron microscopy, dark-field imaging, and others. This discussion of these topics will draw on fundamentals and frontier approaches of biomedical optics to graduate students and high-level undergraduate students. The major focus will be on fundamentals, optical probing of cellular processes, and manipulation of cells and tissues. As part of the course, students will be expected to complete an independent project.		○	3
<b>BTE3101</b>	<b>Biochemical Engineering</b>	In this course, bioprocesses, including biocatalyst, will be analyzed based upon the general engineering principles. Common technologies in bioprocesses, applicable to most microbial system will be studied, which comprise enzyme reaction, recombinant cell, microbial culture, bio reaction, separation and purification, so on.	○		3
<b>BTE3106</b>	<b>Introduction to Nano biotechnology</b>	Nano biotechnology is one of the most emerging research fields in 21st century. Of particular interest, Nano biotechnology is currently applied to almost every research area including medicine, pharmaceuticals, food, cosmetics, agriculture, etc. Nano biotechnology is one good example of interdisciplinary research area; thus it can be approached from many different research disciplines. We will focus on Nano biotechnology with basic knowledge and skills that students have learned from our classes.	○		3



<b>BTE3109</b>	<b>Cell Culture Engineering</b>	This course includes the basic requirements for establishing and maintaining cell cultures both in the laboratory and in large-scale operations. Reflecting the latest developments and trends in the field, the new topics include the latest theory of the biological clock of cell lines, the development of improved serum-free media formulations, the increased understanding of the importance and control of protein glycosylation, and the humanization of antibodies for therapeutic use.	○		3
<b>BTE3211</b>	<b>Functional Nanomaterials for Bio-Imaging</b>	Biomedical optics is an interdisciplinary subject of applying optical methods for diagnostic detection and manipulation of cells and tissues. This course gives an overview of tools and tasks in various biological and biomedical imaging aspects such as Raman spectroscopy, fluorescence microscopy, electron microscopy, dark-field imaging, and others. This discussion of these topics will draw on fundamentals and frontier approaches of biomedical optics to graduate students and high-level undergraduate students. The major focus will be on fundamentals, optical probing of cellular processes, and manipulation of cells and tissues. As part of the course, students will be expected to complete an independent project.	○		3
<b>BTE4107</b>	<b>Bioprocess Engineering</b>	This class includes basic concepts of biological systems and engineering, their applications to bioprocess systems, and optimization of bioprocess problems.	○		3
<b>BTE4202</b>	<b>Bio separation Engineering</b>	With the introduction of basic principles of separation of biological materials, the analysis of individual techniques and the application of bio separation process to actual bio industry are lectured.		○	3
<b>BTE4203</b>	<b>Food Biotechnology</b>	This lecture deals with introduction of food biotechnology, modern biotechnology, genetic engineering, genetic resources, and food biotechnology using microorganism, plant and animal. In addition, recent research articles will be searched for seminar presentation and group discussion.		○	3



<b>BTE4205</b>	<b>Biomaterials Engineering(Capstone Design)</b>	Biomaterials will be used to describe a material implanted in the body, or a material that contacts body fluids outside of the body. Biomaterials often serve as mechanical scaffolds to support cells, but can also be engineered to modify the cellular responses and to change both their chemical and mechanical properties with time. We will introduce the surface, bulk, and biological properties that characterize a biomaterial.		○	3
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### <Materials Science and Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
MSE2002	Materials Science and Engineering 2	In this lecture, students will learn the relationship between the properties and structural elements of polymers, metals and ceramics, as well as the electrical, magnetic and optical properties of composites and materials.		○	3
MSE2003	Physical Chemistry 1	First covers the fundamental laws of thermodynamics and state functions that describe the macroscopic states of material systems. Then, the fundamental concepts are applied to define the reaction equilibrium and the phase equilibrium.	○		3
MSE2004	Physical Chemistry 2	This course consists of two parts. First part is on Modern Physics and the other one is about Kinetics. Quantum Theory is one of the main parts in Modern physics which replaces classical mechanics as the description of motion on an atomic scale. We will consider the basic concepts of quantum mechanics and apply them to a few simple problems such as the harmonic oscillator and rigid rotator to understand the motion of atoms and molecules.  Kinetic theory introduces the calculation of the rates of certain processes by the use of a simple model of atoms and molecules in the gas phase. We will calculate the distribution of molecular speeds, the pressure of an ideal gas, and the rate of collision with a surface, etc.		○	3
MSE2006	Crystallography	In this subject, a wide range of crystallographic topics including basic terminologies, Bravais Lattice, stereo projection, symmetry, point group, space group, cubic and hexagonal structures and their Miller indices of planes and directions, and x-ray diffraction are explained.	○		3
MSE2009	Physical Metallurgy	A theoretical basis controlling the structure of metals; How the structure controls the physical properties of metals;	○		3



MSE3003	<b>Thermodynamics of Materials</b>	Covers laws of thermodynamics and various state functions. Teaches how to apply them to define the equilibrium state and to calculate the equilibrium shift and the thermodynamic properties of various material systems.	○		3
MSE3004	<b>Phase Transformation</b>	Understanding phase transformations in metals Chap.1. Phase transformation and phase equilibria Chap.4. Nucleation and growth during solidification Chap.5. Diffusion controlled transformations Chap.6. Diffusion less transformations		○	3
MSE3009	<b>Electronic Properties of Materials</b>	This course offers a description of how the electronic characteristics of materials originated from their electronic and molecular structure and how these properties can be designed for particular applications, for example, in semiconducting devices and other electronic devices.	○		3
MSE3016	<b>Mass Transport Phenomena</b>	Understanding of Transport Phenomena occurring during the production of metals and materials	○		3
MSE3025	<b>Solid State Electronic Devices</b>	- Understanding quantum physics for semiconducting devices - Introducing diverse semiconducting devices - Understanding basic principles of diverse semiconducting devices	○		3
MSE4006	<b>Electrochemical Devices</b>	Basic concepts of electrochemistry will be studied in terms of thermodynamics, and the applications will be overviewed. Based on the understanding of electrochemistry, study of the structure and operation mechanism of lithium ion battery, which is one of the most widely used electrochemical devices, will be continued. Related materials, and the future research theme of electrochemical devices will be discussed.	○		3
MSE4007	<b>Nano-Properties and Synthesis</b>	This course guides students to understand the physical properties of Nano-scale materials and the principles of Nano-processing technologies. Lectures cover fundamental quantum chemistry, properties of nanomaterials, and synthesis methods of Nano-materials.		○	3



MSE4009	<b>Engineering of Semiconductor Materials</b>	(1) Physical Features of Semiconductors (2) Concepts of Semiconductor Devices (3) Operation Principles of Semiconductor Devices/Systems (4) Applications of Semiconductors and related Industries		○	3
MSE4012	<b>Kinetics of Solid State Reaction</b>	In this lecture, defect chemistry, diffusion, and kinetics will be covered to provide students with fundamental understanding about the materials synthesis through solid state processes and physical features of solid materials. The class consists of the following three sections: 1. Defect chemistry, diffusion: qualitative and quantitative treatments of point defects and diffusion phenomena 2. Kinetics: solid-solid, solid-vapor reactions 3. Applications in various solid-state reactions: oxidation/reduction, fabrication of p-/n-type semiconductors, formation and growth of nanocrystals	○		3
MSE4013	<b>Electronic Packaging Materials</b>	"Electronic Packaging Materials" is used in electronic packaging technology, assembly technique, materials used in packaging, package design (mechanical and thermal) electronic circuit, and the latest advances in packaging technology such as multi-chip modules and display packaging technology. In addition, we are going to study Joining of dissimilar materials, wiring & connecting methods, fracture, thermal management, and their miniaturization.	○		3



### <Energy Resource Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ENR3101	<b>Energy Resources Management</b>	Three lenses of energy resources evaluation, that is, economic, policy, and technological evaluation of energy resources evaluation will be addressed.	○		3
ENR3103	<b>Geostatistics</b>	Students in this class can develop their ability to be able to apply the geostatistics to various fields related with the energy resources engineering. Especially students learn basic knowledge to pursue high level courses like reserve evaluation, resources environment, petroleum and mining design courses which are taught for senior students.	○		3
ENR3201	<b>Economic Geology</b>	We will study fundamental geologic concepts of metal source, metal transportation, and mineral deposition. We can identify ore minerals in the hand specimen, recognition of its micro texture for interpreting ore-genesis by ore microscopy, and reading and understand geologic exploration reports.	○		3
ENR3202	<b>Rock mechanics and Laboratory</b>	-Introduction of rock mechanics -Rock exploration -Strength and modulus of rock -Mechanical and thermal properties of rock -Stresses in circular underground openings -Rock reinforcement	○		4
ENR4201	<b>Blasting and excavation engineering</b>	The lecture about explosives and blasting technique for mining as well as civil engineering projects will be given.	○		3
ENR4206	<b>Environmental Terotechnology</b>	This class covers topics like fundamentals of terotechnology, slope stability, subsidence, soil contamination and management, and ground water.	○		3
ENR4302	<b>Reservoir Engineering</b>	Application of the generalized Darcy's equation: reservoir rock and fluid properties: material balance equation of a reservoir: well testing.	○		3



ENR4303	<b>Geophysical Data Processing</b>	This course aims at learning seismic data processing theory and practical processing skills. In the beginning stage, the standard data format, SEG-Y, and visualization of seismic data is dealt with. After dealing with the introductory topics, a number of data processing steps are followed. The processing steps are comprised of filter, CMP gather, velocity analysis, NMO correction, stacking, migration, multiple removal, etc.	○		3
ENR3301	<b>Petroleum Engineering and Experiment</b>	Reservoir rock and fluid properties of hydrocarbon bearing formations ; Lithology, porosity, effective and relative permeability, fluid saturations, capillary characteristics, compressibility, rock and fluid interactions.	○		4
ENR2301	<b>Petroleum Geology</b>	This course lecture the fundamental theory and application on petroleum exploration, development, and production and include the generation, migration, reservoir, trap, depositional environment, formation evaluation, and volumetric calculation of oil and gas resources.		○	3
ENR3205	<b>Resources development environment</b>	This class is divided into three parts. The first part will deal with mine EIA which test, predict, and evaluate the environmental impact of newly developed mines. With the EIA we can minimize the environmental destruction, climate change and mine reclamation problems. The second part will deal with mine air quality, noxious gases, explosion and dust which happen during mine development. To control this, we will learn ventilation technology. The third part will deal with acid mine drainage(AMD) which is the largest part of mine environmental problems caused after mine development completed.		○	3



ENR3302	<b>Well Logging</b>	Learn the basic principles needed to interpret the well log data to obtain the geophysical information from a reservoir. By using information obtained from wireline well logs, students will learn basic method to calculate porosity and fluid saturation, to determine lithology of rocks and to evaluate the formation of potential hydrocarbon production. The course will cover the following subjects: principles, types of logging tools, determination of porosity and lithology, determination of water saturation, interpretation of formation and analysis of gas formation.		○	3
ENR3303	<b>Drilling engineering</b>	This course is one of important Petroleum Engineering subjects along with reservoir engineering, production engineering and this course will provide the basic and fundamental knowledge on drilling operation.		○	3
ENR3304	<b>Seismic Exploration</b>	In the first quarter, the lecture focuses on the general properties of waves and the understanding of seismic events. Before mid-term exam, seismic acquisition will be covered for both land and marine environment. The basic processing techniques will be followed. Finally, interpretation will be overviewed in terms of structure, stratigraphy, attribute and amplitude.		○	3
ENR4103	<b>Energy Policy</b>	Advanced Energy and Resource Policy addresses main energy policy trends of OECD and other resource based countries. And the subject deals with forecasting and foresight techniques of future energy society using some econometrics and network analysis. Carbon tax, REC, RPS, TIF and other policy tools will be addressed and discussed.		○	3



<b>ENR4204</b>	<b>Geochemistry and Geochemical Exploration</b>	In the first half, we will study a geological distribution of major, minor, trace, and isotopic elements in the rocks of Earth crust and mantle, and its fundamental principles. In the second half of the class, we will study geochemical exploration methods, analytical geochemistry with various techniques including "state of the art" spectroscopic and spectrometric techniques. We will study several geochemical techniques to explore mineral deposit by using the "geochemical anomaly" In the end of the course.		○	3
<b>ENR4304</b>	<b>Unconventional Energy Resources(Capstone Design)</b>	- Resources and reserves size on heavy oil, oil sands, shale gas, coalbed methane, gas hydrate would be lectured and also recovery technologies to develop these resources will be introduced. - Developing oil sands field and shale gas field would be assigned as a team project.		○	3
<b>ENR2104</b>	<b>Energy Resources Economics</b>	Theories, focusing on demand management rather than supply expansion of energy resources, will be announced. And various policy issues will be addressed. For your research capability to be enhanced, a few important academic papers and methodologies will be touched.		○	3
<b>ENR3203</b>	<b>Mineral Processing Technology</b>	This lecture focuses on the general concepts of mineral processing technology.		○	3
<b>ENR4305</b>	<b>Oil Property Evaluation</b>	Learn the basic concepts of time value of money, cash flow analysis, investment decision analysis and apply them to the oil and gas development business by evaluating the oil property properly from the technical and economical point of view and write a report of the project evaluation.		○	3
<b>ENR4203</b>	<b>Capstone Design in Mine</b>	This class covers study of ore reserve estimation, and study of surface and underground mine design and optimization methods. For surface mines, it will be taught the analysis of elements of surface mine operation and design of surface mining system components with emphasis on minimization of adverse environmental impact and maximization of efficient and sustainable use of mineral resources.		○	3



### <Naval Architecture & Ocean Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
NOE1011	Int. To Naval Architecture & Ocean Engineering	Students will be able to understand the general aspects of naval architecture and ocean engineering, basic terminology, introduction and characteristics of various types of ships and offshore structures. In addition, through each subject, students will learn about the connection with future major courses in naval architecture and ocean engineering.	○		3
NOE3101	Resistance	This course covers the physics and basic theory of ship resistance. It is intended to educate students to have the knowledge of various resistance components, model-ship extrapolation, model-ship correlation, and prediction of resistance. Wave-making resistance and friction resistance will be introduced, and the technologies to reduce ship resistance will be discussed. After this course students will be able to predict the resistance of a new design hull form using numerical simulation and empirical data.	○		3
NOE4301	Basic Theory of Finite Element Analysis	This subject introduces a fundamental theory of finite element analysis (FEA) as the differential equations are transformed to the finite element analysis model. Also, students will experience the FEA codes (ANSYS, ABAQUS, CFX, etc.). During the practices, students will experience the static strength analysis of beam and plate, heat transfer analysis, and thermal flow analysis.	○		3





<b>NOE4306</b>	<b>Heat Transfer</b>	<p>This course is a 15-week subject, serving as the advanced undergraduate course in heat transfer.</p> <p>Topics to be covered include: unsteady heat conduction in one or more dimensions, steady conduction in multidimensional configurations, numerical simulation of conduction; forced convection in laminar and turbulent flows.</p> <p>Problems and examples will emphasize modelling of complex systems drawn from manufacturing, ship and offshore platform design, consumer products, and energy systems.</p>	○		3
<b>NOE2004</b>	<b>Fluid Mechanics</b>	<p>This course covers the physics and basic theories of fluid mechanics. It is intended to educate students to understand physical phenomena and apply the theories to solve problems related to hydrostatics, fluid motion, internal and external flow.</p>		○	3
<b>NOE3108</b>	<b>Propulsion</b>	<p>This course covers fundamental propulsion hydrodynamics and design of marine propeller. It is intended to educate students to have the knowledge of systematic propeller series data, propeller cavitation, propeller induced hull pressure, relation between propeller and main engine as well as propeller geometry in order to design marine propeller. And students will perform the model test to compare a stock propeller and a new propeller designed by them.</p>		○	3
<b>NOE3403</b>	<b>Engineering of Offshore Structures</b>	<p>Offshore structures are subjected to various environmental loads including hydrostatic pressure, wind, wave, current, tide, ice, earthquake, temperature, fouling, marine growth and scouring. In this class, the principle theories and equations for the estimation of major environmental loads are introduced together with actual example calculations. The stable conditions of the mostly applied jacket structures are demonstrated considering local and global conditions. Also the stable requirements for loading out, transportation and installation are included in the course.</p>		○	3



<b>NOE3404</b>	<b>Coastal and Ocean Engineering</b>	The aim of this course is to teach students the basic properties of various coastal and ocean structures in ocean environmental conditions. Hydrodynamic analyses of fixed-type or floating-type structures in waves and currents are also taught. The effect of environmental forces on the wave-structure interaction will be taught. For hydrodynamic coefficients, wave diffraction and radiation theory for 6-degree of freedom motion are introduced. This course also includes introduction of basic parameters of coastal and ocean structure design.		○	3
<b>NOE4405</b>	<b>Design of Marine Pipeline</b>	To understand the basic and important concept of subsea pipeline design, there are many areas to be considered including the necessary offshore survey and its equipment, international codes and standards, governing equations, external loads, pipe materials, etc. From the course, students will learn the key aspects of offshore structure design and practical design method of subsea pipeline.		○	3
<b>NOE4308</b>	<b>Design of Outfitting Equipment and CAD Exercises</b>	General process and tools for outfitting Design Exercise of outfitting design including pipe and steel structure using CATIA, SM3D, S5D, CAESAR-ii. Exercise of Pipe design applicable to FAB in electric factory.		○	3



### <Chemical Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
CHE2107	Material Science and Engineering1	(1) The products and goods that we are currently using are made from various materials. Each material has its own property and is classified as metals, ceramics and polymers. (2) In this class, the kinds and properties of materials are studied and the material structures which determine the material properties are understood. Therefore, the capability to select the proper materials and the knowledge to process the materials will be achieved. (3) Recently, as the IT and NT keep developed, a variety of materials which are employed to various semiconductor memories, displays, and various electronic devices have been increasing and will be studied.	○		3
CHE3204	Chemical Engineering Thermodynamics	Chemical Engineering Thermodynamics		○	3
CHE3201	Chemical Reaction Engineering	To learn kinetics and reaction rate based on thermodynamics and physical chemistry How to design reactors including batch, CSTR, and PFR Optimization of Reaction conditions	○		3
CHE4201	Process Control	In this class, we are going to learn the basic theory of a process control system, and its application to industry. In particular, the following subjects will be taught. - To develop a steady-state and dynamic model of a process. - To understand basic components in a control system and types of controllers - To design a control system		○	3
CHE4308	Polymer Chemistry	Principles of polymer chemistry, polymerization kinetics and mechanism, structure and properties, polymerization techniques including classical method and novel CRP method are to be taught.	○		3



CHE4307	<b>Physical Properties of Polymers</b>	This 3-unit course is designed for undergraduate students to obtain a fundamental understanding of physical properties of polymers. This course introduces polymer structures, polymer conformations, thermodynamics of polymer solutions, viscoelasticity, and etc.		○	3
CHE4304	<b>Nano Engineering</b>	This course provides an introduction to nanotechnology and Nano-engineering utilized in Chemical engineering. Properties of nanomaterials and their applications in diverse fields will be discussed including; 1) Introduction to the characteristics of nanoscale, synthetic methods, and structure-property relationships. 2) Controlling physical properties of nanomaterials 3) Characterization tools 4) Applications of nanomaterials		○	3
CHE4204	<b>Catalyst Engineering</b>	Catalyst is a substance that increases the rate of chemical reaction. In chemical engineering, solid catalyst is used for gas/liquid reactions. Basic physical chemistry concept and theories will be introduced in the first 4 weeks. Furthermore, adsorption, methods of preparation, textural properties and rate of reaction will be introduced. Industrial applications of typical catalysts will be described in the remaining weeks. Basic knowledge in physical and organic chemistry, materials science, thermodynamics and reaction engineering courses from sophomore and junior years can be integrated in a comprehensive way.	○		3



### <Environmental Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ENV3108	<b>Industrial Wastewater Treatment (Capstone Design)</b>	Students will make their design on the process since they should read 10 numbers of SCI papers relevant to their project topic and may visit to the field.		○	3
ENV3201	<b>Atmospheric Environment</b>	<p>The course consists of Atmospheric Environmental fundamentals, Modeling of atmospheric dispersion, Combustion as described below</p> <p>Atmospheric Environmental Fundamentals</p> <ul style="list-style-type: none"> <li>- Definitions and classification of air pollutants, status of air pollutant concentration and emissions.</li> <li>- Meteorological parameters affecting atmospheric dispersion such as atmospheric stability and mixing height</li> </ul> <p>Modeling of Atmospheric Dispersion</p> <ul style="list-style-type: none"> <li>- The concept of modeling and derive the governing equation from fluid mechanics fundamentals</li> <li>- air quality modeling starting from a simple model</li> </ul>	○		3



ENV4403	<b>Capstone Design of Soil and Groundwater Remediation</b>	Introduction to soil, ground water and its contamination; causes, nature, complexity of contaminants; contaminant bioavailability, physicochemical process relevant to contamination Major class of contaminants: Heavy metals, Pesticides, aromatic organics, their nature, source, fate and ecological implication Physiochemical process involved in contaminant bioavailability - absorption, adsorption, partitioning, bioavailability and sequestration Fate and transport of soil and ground water contaminants Assessment site characterization of contaminated land and ground water, - sampling Contaminant risk assessment, Eco toxicological testing, microcosm studies, and Human exposure. Selection of proper remedial technologies screening matrices Physico-chemical properties of contaminants guiding selection of remediation method Existing remediation strategies to ground water, soil Current and future in-situ remediation approaches, Assessment of post-remediation performance.	○		3
ENV3110	<b>Physicochemical Water Treatment</b>	1.Learning principles of physical and chemical processes in conventional drinking water treatment 2.Utilizing the principles to design drinking water treatment processes and to solve problems in Environmental Engineering 3.Main contents of this course will be Coagulation/Flocculation, Sedimentation, Filtration, Adsorption, Ion Exchange, Membrane, and Disinfection	○		3



ENV3111	<b>Biological Water Treatment</b>	The objectives in this lecture are to acquire basic principles for biological wastewater treatments. This lecture consists of fundamentals of biological wastewater treatment, reactor engineering, activated sludge process, biochemical kinetics, oxygen transfers and mixing, membrane bioreactors, anaerobic/aerobic digestions and sludge treatment. This lecture also covers emerging issues in wastewater treatment such as resource recovery, handling with micro pollutants and water reclamation etc.		○	3
ENV2007	<b>Basic Calculation in Environmental Engineering</b>	1) Understanding principles of Unit System, Materials & Energy Balances, and Gas-Liquid Systems 2) Learning how to establish Material Balances and Energy Balances for solving problems of simple processes in Environmental, Chemical, and Biological Engineering	○		3



### <Electrical Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
EEE2002	Engineering Circuit Analysis 2	The aim of this course is to ensure that the undergraduate students can gain a deep understanding of first- and second-order DC switching circuit response and methods of sinusoidal AC circuit analysis with applications to AC power analysis and multi-phase AC circuit analysis. We will also study the circuit analysis methods based on the Laplace and Fourier transform.		○	3
EEE2005	Digital Logic Circuits	This course is the most basic course for understanding digital systems. We study the basic principles about the logic circuit design and technical and applicational knowledge through this course. This course is also a prerequisite to the courses such as "Embedded system design" and "Computer architecture".		○	3
EEE3004	Electrical & Electronic measurements	This lecture is for the students who understands general electrical engineering skills and wants to learn more about measurements and instrumentation. To use instruments effectively, it's necessary to understand basic measurement theory and how it relates to practical measurements in physics and medicine.		○	3
EEE3114	Automatic Control	Basic approaches are discussed for analysis of control system. Ordinary differential equation, transfer function, block diagram and state equation are introduced to determine the stability of the system. In addition, transient and steady-state response of the output are investigated from varied theories, and typical PID controller design is discussed. Some simulations are made using Matlab package for verification of the control theories.	○		3





EEE3102	<b>Control System Capstone Design</b>	Varied control algorithms for the plant will be introduced. The objective of controller design is to obtain zero steady-state error for given reference inputs under some disturbance. Root locus method, bode plot, Nyquist plot, and Nichols chart are discussed and verified through the Matlab software package. In addition, modern control algorithms are introduced in the time domain.		○	3
EEE3105	<b>Computer Control(Capstone Design)</b>	Following contents are discussed: definition of discrete-time system, introduction of computer-based control system, and system performance with stability. Moreover, varied digital algorithms are introduced for the plants to be stabilized and to track the given reference inputs. The z-transform and discrete equations are investigated for analysis of overall digital system.		○	3
EEE3106	<b>Computer Architecture</b>	In this lecture, we aim at studying the working principle and architecture of modern digital computers. Firstly, we deal with the basic logic circuits and the representation of data. We study the register transfer language and the architecture of a basic computer. We then learn how to program the basic computer using an assembly language, which is a machine language. We also study the central processing unit (CPU), pipelining techniques, etc.	○		3
EEE3108	<b>Sensor Engineering</b>	Operation principle of sensors and transducers that detect various physical/chemical/biological state, signal processing and device system technology, smart sensor and microsystem that are based on MEMS technology for the current and next generation, its feature, merits and practical application from the current viewpoint will be introduced. Concept of Ubiquitous Sensor Network(USN) and its technology foresight will be discussed further.	○		3



EEE3109	<b>Embedded System Capstone Design</b>	In this course, students study how to use microcontrollers, which are important in designing embedded systems, and actually build their own embedded systems on a team basis. Students use the Arduino, which is the famous open-source hardware platform, in order to develop the embedded systems. Students study how to use the Arduino board and software libraries. They also learn the conventional programming method, where we use the manipulation of registers of the microcontrollers. Students study how to use various peripherals and the way of controlling them to develop the related device drivers. Students will experience the whole process of developing their own embedded application by doing team-based project works, where advanced topics such as electric pianos, line following robots, customized MP3 players are handled.		○	3
EEE3113	<b>Motor Control(Capstone Design)</b>	We study the basic principles of the electric motors. We then study the driving method and control method of the various electric motors using C-language and micro-controllers.	○		3
EEE3206	<b>Electronic Display</b>	Basic operation principle of LCD and OLED, leaders of flat panel display for the current and next generation, its feature and merits from the current viewpoint, technology foresight will be introduced. Fundamentals, driving and fabrication technologies, hereafter perspectives on its application and development for (AM)OLEDs, Flexible Display and e-papers will be discussed further.		○	3
EEE3306	<b>Motor Application</b>	You are going to learn the basic power electronics theory. Based on that, practical circuits with parasitic components are analyzed and designed for some applications. This lecture covers analysis and design of buck, boost, buck-boost and fly back converters.		○	3



<b>EEE3318</b>	<b>High Voltage Engineering</b>	As a basic subject for electrical engineer , we study on the high voltage engineering for design of high voltage system and high voltage electrical apparatus. And study on the theory of electrical discharge and many practical research results for applications		○	3
<b>EEE3319</b>	<b>Energy Conversion</b>	About solar system and engineering ,we will study and do the design project	○		3



### <Electronic Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ECE2250	Electronic Circuits1	The course covers Chapter 1(signals, symbols of devices, applications of the electronics such as SoC, SiP, and amplifiers). The fundamentals of the semiconductors are briefly discussed in chapter 2, including the intrinsic and extrinsic semiconductors, transport theory (diffusion and drift), energy band diagram, temperature property. The chapter 3 presents the structure, electrical property (dc and ac), and device models of the p-n junction diode. The special diodes and the application circuits such as rectifiers and clamping circuits are also discussed in chapter 3. The physical structure of MOSFETs is presented to express the I-V characteristics and the small signal characteristics in chapter 4. The MOSFET bias circuits are handled to calculate the operating points and the small signal model parameters. The DC and AC characteristics of the basic amplifiers (CS, CG, CD) are dealt in chapter 5. The small signal model parameters and hybrid-pai model are discussed. The basic applications from each basic amplifier are discussed. Chapter 5 describes about the structure and electrical property of the BJTs. In addition to this, the dc and ac characteristics of the basic amplifiers(CE, CB, CC) are included.		○	3
ECE3312	Communication System	This course deals with basic knowledge of wireless communication systems. The lecture contains signal and systems, linear systems, random variables and process. Then, based on these knowledge, fundamental structures of telecommunication systems.		○	3



ECE3314	<b>Data Structure</b>	Writing elegant and efficient programs requires practice and skills that will be developed in this course. While increasingly fast computers may tempt us to use sloppy code, today's powerful machines are also solving phenomenally complex problems, manipulating terabytes of data, and threading thousands of simultaneous processes. The obvious (slow) solutions will rarely work on these processor-intensive and memory-hogging real-world problems. This course will help you evaluate the correct algorithms to use for practical applications.	○		3
ECE3320	<b>Signal and System</b>	This course provides basic fundamental theories that are used in communication system, multimedia system, biomedical engineering systems, etc. The topics treated in this classes are the definitions of signal and system, analysis of time domain and frequency signal and systems.	○		3
ECE3325	<b>Operating System</b>	The course aims at introducing the student fundamental concepts of existing Operating Systems in computer system. Our aim is to learn process management, memory management, I/O, disk driver, process synchronization, file system and related algorithms and practice basic usage of Linux system.		○	3
ECE3350	<b>Probability and Statistics</b>	-Probability Models for Electronic Engineering -Basic Concepts of Probability Theory -Random Variables -Random Processes - Statistics	○	○	3
ECE3410	<b>Radio Wave Engineering</b>	This course studies on basics in microwave circuit and wireless communication systems. The following topics will be covered: Transmission line, Microwave network, Antenna, and Microwave Receiver design.		○	3
ECE4325	<b>Video System Capstone Design</b>	- Basics of digital image processing and computer vision	○		4



		(Especially, students may deal with deep learning) - Programming practice using MATLAB and OpenCV.			
<b>ECE4343</b>	<b>Analog Circuit Capstone Design</b>	In this course, IC design motivation and IC process is briefly reviewed from the viewpoint of circuit designer, followed by analog device and circuit modeling technique. Basic CMOS amplifier design concept is reviewed and students warm up with basic amplifier design activity throughout homework. CMOS basic amplifier design skill will be extended to design CMOS operational amplifiers, which will be topics of term projects. Each student will be exposed to design CMOS opamps and make a presentation of his/her work during the class. Excellent outcomes of term projects may be delivered to MPW (Multi Project chip Wafer), so that the students associated with them may have an opportunity to fabricate his/her own CMOS opamps IC chip. Applications of opamps will be discussed as well.	○		4
<b>ECE4401</b>	<b>Introductory Digital Signal Processing</b>	- Understand mathematical representations for communication as well as signal processing. - This lecture handles the following topics 1. Discrete-time signals and systems 2. Z-transform 3. Sampling of continuous-time signals 4. Transform analysis of linear time-invariant systems 5. Structures for discrete-time systems 6. Filter design techniques		○	3
<b>ECE4413</b>	<b>Mobile Communications</b>	- Statistics, Random Process & Traffic Theory to understand Mobile Communications (MC) - Wireless Channel Characteristics, Concept of Cellular Systems, Multiple Access, Network Protocols - OFDM & 3GPP LTE Systems		○	3



ECE4422	<b>Photoelectronics Engineering</b>	This course introduces fundamental concepts of various optoelectronic devices including LEDs, lasers, photodetectors, etc. The basics of light will be also studied by considering the wave nature of light. In addition, students will learn how to use an FDTD simulation tool for optical cavity design that is pivotal for many optoelectronic devices.		○	3
ECE4430	<b>Fundamentals of RFIC Design</b>	This is an introductory course on RF Integrated Circuit and active components in microwave engineering. The following topics will be covered: Introduction to RFIC design, active device technology and, LNA, mixer and oscillator design.	○		3
ECE4466	<b>VLSI Capstone Design and Project</b>	<ul style="list-style-type: none"><li>- To understand the principles of hierarchical design of CMOS digital VLSI systems.</li><li>- To utilize CAD tools to explore design alternatives and enhance productivity.</li><li>- To experience the above goals through practical homework assignments implementing custom integrated circuits</li></ul>	○		4



## <Information and Communication Engineering>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ICE1001	<b>Introductory Information &amp; Communication</b>	The course will offer an opportunity for the students to learn the basic principles of information technology in practical terms rather than in theoretical terms. The course will be taught based on practical examples of information technology that are used in everyday lives and will try to guide the students to understand the underlying principles and concepts in more practical and realistic terms. The course will cover the subjects on the concepts of switching, analog-to-digital conversion, sampling, information theories relating to the information capacity, computer technology, coding, and game theories.	○		3
ICE3001	<b>Signals and Systems</b>	Properties of analog and digital signals and their formal representations and manipulations. Properties of linear time-invariant systems. Representation of systems by differential and difference equations. Fourier series, Fourier transform, Laplace transform, and Z-transform analysis.		○	3
ICE3013	<b>System Programming</b>	Learn how to write advanced system level programs in Linux.	○		3
ICE3014	<b>Operating System</b>	Understand the 5 basic OS concepts: Interrupt, Process, File, Memory, Device. Learn the concepts through reading, analyzing, and modification of Linux kernel code.		○	3
ICE4020	<b>Information Security</b>	Basic system attack techniques are explained. Encryption techniques are introduced. SSL concepts are explained.		○	3





ICE4026	<b>Information and Coding Theory</b>	Students will learn coding and decoding schemes for Hamming code, BCH code, and Convolutional code.		○	3
ICE3004	<b>Semiconductor Devices</b>	In this course, all the lectures will be given in English. Therefore, only those who want to study this subject in English should register. Semiconductors are basic and fundamental materials and its devices are the key technology for the current and future human life. Unique characteristics of semiconductors, diode as fundamental building blocks of all Integrated Circuits and important concept and operation of MOS devices are discussed.	○		3
ICE2002	<b>Engineering Circuits Analysis</b>	To provide the students with an understanding of, and a proficiency in the analysis of, electrical circuits containing both active and passive components under both steady state and dynamic (time varying) conditions. These goals will be accomplished by studying and applying the following topics: * Active component models: both independent and dependent sources * Passive component models: Resistors, Capacitors, Inductors, Switches * Power and Energy relationships. * Network Laws: Ohm's law, Kirchhoff's voltage and current laws. * Nodal and Mesh analysis techniques. * Thevenin's and Norton's theorems, Superposition. * Transient response of RL, RC, and RLC circuits. * Phasors in the analysis of sinusoidal circuits.	○		3
ICE3005	<b>Electronics Circuits 2</b>	This course focuses on analog integrated circuit (IC) design in the CMOS technology for various applications such as semiconductor IC microsystems and mobile communications system. Topics covered include deep	○		3



		understanding of key amplifiers, current mirrors, frequency responses, operational amplifiers.			
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<Physics>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
PHY2016	Electromagnetism	This course will cover Vector Analysis, Electrostatics, Potentials, Magnetostatics, Magnetic Fields in Matter, and Electrodynamics.		○	3
PHY2112	Advanced Classical Mechanics and Lab.	We are going to study on momenta (linear and angular), rigid body, center of mass, variational principle, generalized coordinate, Hamiltonian, which are the advanced mechanics		○	3
PHY2203	Mathematics for Physics	It is a course that deals with the contents of infinite series, complex, linear algebra, partial differential, and multiple integral in basic mathematical techniques of understanding of physical phenomena. There will be an indispensable requirement to solve problems using Matlab program as well.	○		3
PHY2204	Mathematical Physics I	Vectural analysis, Fourier transform, differential equation, and calculus of variation will be covered. It also contains assignments using computational simulation such as MATLAB.		○	3
PHY3006	Theory of Relativity	During the course we learn the Theory of Relativity, consequences of the Special and General relativity, experimental facts, etc.		○	3
PHY4309	Applied Photonic Science	o Cover basic photonic and optoelectronic devices, such as waveguides, optical fibers, lasers, LEDs, solar cells and photodetectors o Introduce selected topics in Nano-optics such as plasmonics, metamaterials, photonic crystals, micro cavity resonators and photoacoustics.	○		3
PHY4404	Semiconductor Physics	- Study the band gap and basics electrical property of semiconductor materials - Study the working mechanism and related electronic structure of semiconductor devices	○		3



PHY4406	<b>Advanced Solid State Physics</b>	<p>Modern science technologies are confronted with fundamental limitations in many field.</p> <p>In order to overcome these technical limits, new advanced solid state physics raised recently, including nanoscience, spintronic, multifunctional materials.</p> <p>These new approaches with new properties are considered as the possible solutions for the fundamental limitations.</p> <p>This class will cover modern advanced solid state physics.</p>		O	3
PHY4501	<b>Nuclear Physics</b>	<p>Nuclear theory based on Quantum Mechanics. Strong, weak and EM interactions in atomic nuclei.</p>	O		3
PHY4604	<b>Biophysics</b>	<p>Quantitative and physics modeling of biological systems are presented, such as the organization of cellular ingredients, random walk approach to polymer conformation and molecule transport, fluids friction in fluids, entropic force, statistical physics of biological dynamics and so on.</p>		O	3
PHY4605	<b>Physics and Numerical Analysis Lab</b>	<p>This course aims at upper division undergraduate students in physics and related fields. Instead of typical 'lecturing' how to program, the class will help you to acquire the skills to develop the programs.</p> <p>We will provide information, support, motivation, structure, and guidance.</p>		O	3



<Ocean Sciences>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
OCN2502	<b>Introduction to Marine Benthology</b>	<p>This course will examine the diversity of the marine organisms living on the sea floor according to the different habitats through lectures, field and laboratory exercises.</p> <p>Students will review briefly the ecology of the major Korean shorelines including the tidal flats, salt marshes, rocky shores, and estuaries, and some ecologically important subtidal habitats.</p> <p>The ecological processes of how these benthic organisms respond to their environment and interact with it are also main topics in this course.</p> <p>This course may also be involved in the pollution and conservation. Therefore, lab studies will focus on field collection and observation of the major benthic phyla, with emphasis on the benthic fauna such as crustaceans, mollusks, and polychaetous annelids that may be found in the field trips and remain ecologically significant today.</p>		○	3
OCN3504	<b>Marine Invertebrate Zoology and Lab</b>	<p>This course will examine the diversity of marine invertebrates, through lectures, field and laboratory exercises. Students will review the major branches on the tree of life from Porifera to Chordata, introducing the basics of body construction among different invertebrate phyla.</p> <p>For each phylum, we will study the body plan and ecological adaptations that made the group successful.</p> <p>Lab studies will focus on field collection and observation of the major benthic</p>	○		3



		<p>phyla, with emphasis on the benthic fauna such as crustaceans, mollusks, and polychaetous annelids that may be found in the field trips and remain ecologically significant today.</p>			
<b>OCN4509</b>	<b>Estuarine Ecology and Lab</b>	<p>This interdisciplinary course addresses the ecology of estuaries and that part of the inshore waters with which estuaries directly interact.</p> <p>We will investigate the general ecological principles that govern the productivity and diversity of estuaries, including their hydrodynamics, sedimentology, chemistry and plant and animal community structure. Because most big cities are situated around estuaries, we will also discuss the anthropogenic influence on the estuarine ecosystem.</p> <p>The processes in estuarine and coastal zones affect coastal and oceanic water quality, shelf productivity and the global climate. Investigating, monitoring and protecting these systems, thus, is central in oceanographic and environmental sciences.</p> <p>This course will also be strongly oriented toward field studies. During the Semester, each student will conduct an independent research project. A research report will be prepared in the style of a term paper and an oral presentation will be required.</p>	○		3
<b>OCN4213</b>	<b>Sequence of strata And Paleo-depositional environments and Lab</b>	<p>Evolution and reconstruction of Quaternary stratigraphy around the Korean peninsula</p>		○	3
<b>OCN2202</b>	<b>Coastal Geomorphology and Lab</b>	<p>This course will cover the processes and landforms associated with sedimentary systems in the estuarine, coastal and shelf environments.</p>	○		3
<b>OCN3203</b>	<b>Sedimentology and Lab</b>	<ol style="list-style-type: none"> <li>1. What is Sedimentology?</li> <li>2. Sediment origin and properties</li> </ol>	○		3



		<ul style="list-style-type: none"> <li>3. Sediment grain size and properties</li> <li>4. Fluid mechanics</li> <li>5. Sediment transport</li> <li>6. Gravity flow</li> <li>7. Sediment structures</li> <li>8. Field trip (TBA)</li> <li>9. Sediment environments</li> <li>10. Sedimentary basins</li> </ul>			
OCN4212	<b>Coastal Sedimentary Environments and Lab</b>	<p>This course is designed for junior or senior students to understand a variety of sedimentary processes occurring in the coasts. Coast is the area where land meets the sea or ocean or a line that forms the boundary between the land and the ocean.</p> <p>The mixture of freshwater and salt water (brackish water) in estuaries provides lot of sediments and nutrients to the water column. During the class, we will discuss how the sediments delivered from the land can evolve in the coastal systems, and how the anthropogenic activities along coastal lines can influence the transport and fate of sediments in the view of "Scientists." We will have a field excursion to visit several important sites, attempting to understand the ongoing sedimentary processes in west or east coast of Korea Peninsula.</p>	○		3
OCN3305	<b>Introduction to Ocean Circulation</b>	<ul style="list-style-type: none"> <li>1.Review of ocean circulation occurring in the ocean</li> <li>2.Study the formation mechanism of ocean circulations</li> <li>3.Understand the relationship between ocean circulation and atmospheric motions</li> </ul>		○	3



OCN2302	<b>Marine Meteorology</b>	The class deals with physical processes of the coupled atmosphere-ocean system. The main topics covered by this class include heat budget, atmosphere structure, convection, atmospheric general circulation, ocean circulation, atmosphere-ocean dynamics, climate change, and climate physics.	O		3
OCN3206	<b>Coastal Sediment Dynamics and Lab</b>	This course approaches coastal and estuarine geological sedimentary processes (erosion, transport and deposition) from the perspective of quantitative physical processes. This course provides students with theoretical descriptions of fluid and sediment dynamics on topics of the physics of boundary layers, initiation of motion, suspended load, bed load and bed forms. Then, students will acquire knowledge of sediment transport through hands-on experiences in laboratory and field experiments.		O	3
OCN4407	<b>Isotope geochemistry</b>	The objective of this lecture is to introduce the basic concept and biogeochemical properties of radiogenic isotopes, which are used as environmental tracers, in order to give us understand the climate and environmental changes and the origin of materials cycling in earth's surface. Students will learn about the case study of their practical application, which will be helpful to assess the present and the past changes in various environments.		O	3





OCN4512	<b>Marine Animal Behavior and Lab.</b>	Animal behavior or behavioral ecology is not only interesting but also important to understand adaptation of animals to changing environments. The most important biological aspects of animals are related to behavior such as foraging, mating, competition, and communication. In this course, I will focus on behavioral ecology of marine animals.		O	3
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### <Business Administration>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
BUS2101	Financial Management	Gain practical understanding of the tools commonly used in financial careers, such as: - Time value of money, long-term financial planning - fixed income instruments, and stock valuation - Financial Statement analysis - Financial decision making (NPV, IRR, etc.)	○	○	3
BUS2201	Organizational Behavior	The course will cover major topics in organizational behavior from three aspects: Individuals in organizations, team and leadership behaviors, and the organization. The topics include individual differences, perceptions and attributions, learning, motivation, decision making, designing organizations, organizational culture, organizational change, leadership, developing teams, managing conflict and negotiation, organizational communication, organizational differences, job stress and satisfaction.		○	3
BUS2301	Financial Accounting	This course is designed to provide an introduction to concepts and issues in financial accounting, to learn how to prepare financial reports from economic events/transactions, and to learn how to interpret financial reports and apply financial accounting concepts to real business world. The general approach of this course is lecture, problem-solving, and discussion of matters relevant to the topic. Note: According to our department policy, this course will cover briefly the first half of the financial accounting and focus mainly on the second-half of the textbook. It is strongly recommended to take this course after Principle of accounting.	○		3



<b>BUS2401</b>	<b>Operations Management</b>	This course focuses on management and improvement of operations management. Student will be understand establishing a competitive advantage through operations requires and understanding of how operations management functions contribute to service and productively growth.	○		3
<b>BUS2501</b>	<b>Principles of Marketing</b>	This course is designed to teach the fundamental concepts involved in the marketing function of modern organizations. The focus is on surveying the breadth of concepts and issues in the marketing of products and services to consumers. This is done in two steps: first, students are taught how to understand the marketing environment and then how to implement successful marketing strategies in such an environment. Student will also have an hands-on approach in applying the concepts learned by developing a complete marketing plan for a product of their choice.		○	3
<b>BUS3201</b>	<b>leadership</b>	The course will focus on leadership by examining theories, concepts, methods and case studies. The goal of this course is to encourage students to develop an understanding business ethics, sustainable development and corporate social responsibility. The goal of this course is to encourage students to develop an understanding of leadership and to provide insight into cultural and global context in which organizations are embedded.	○		3



BUS3204	<b>Human Resource Management</b>	As environment within which an organization operates has become dynamic, external and internal forces are consistently changing the rules which organization must amend or adopt new strategies to remain competitive. A change in strategy will determine the direction of each function within the organization, including the human resources management function. This course provides an overview of relevant theory and practice of human resource management (HRM) with emphasis on the people in organizations within which peoples' activities must be finely turned, properly implemented, and continuously monitored to achieve desired outcomes.		○	3
BUS3203	<b>Business Strategy</b>	This course is aimed to give students insights into strategic management and to cultivate their ability to meet the challenge from current global business environment. It covers the topics of the tools of strategic analysis, business strategies, and corporate strategies.		○	3
BUS3701	<b>CSR Strategy &amp; Cases</b>	CSR (Corporate Social Responsibility) has been a global trend in last decade. Yet, what really defines CSR and how it could be a global business strategy is a question that needs to be answered by many companies. We will look at this from the stakeholder's point of view	○		3
BUS4201	<b>International Business</b>	This course is aimed to give students insights into global business and to cultivate their ability to meet the challenge from current global business environment. It covers the topics of international business environment, international business theory, international business strategy, and multinational corporation.	○		3



### <Global Finance and Banking>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
BUS2101	Financial Management	Gain practical understanding of the tools commonly used in financial careers, such as: - Time value of money, long-term financial planning - fixed income instruments, and stock valuation - Financial Statement analysis - Financial decision making (NPV, IRR, etc.)		○	3
GFB2401	Financial Market	Financial markets, such as bond and stock markets, are crucial to promoting greater economic efficiency by channeling funds from people who do not have a productive use for them to those who do. Well-functioning financial markets are a key factor in producing high economic growth. Activities of financial institutions also have direct effects on personal wealth, the behavior of business and consumers, and the cyclical performance of the economy. Emphasis is on understanding different types of markets and institution, their role and interaction between them and consequence on both trading and price determinations.		○	3
GFB3201	Financial Derivatives	This course introduces the theoretical and practical aspects of financial futures, options, and other derivatives. We will learn structures of the derivatives market, hedging strategies, interest rates as an underlying asset for derivatives, pricing of options, and so on.	○		3



GFB3401	<b>Financial institution management</b>	Survey of analytical methods in banking, including the study of the powers of various regulations and supervisory agencies at the domestic and international levels, and their influences on the financial industry. Emphasis is placed on managerial aspects of commercial banking. Prerequisites: BUS 2101 (Financial Management)	○		3
GFB3403	<b>Money and Banking</b>	Emphasis will be placed almost equally on both class lectures and "Team-Plays". 1. Lectures Due to the nature of "English-taught" class, I do not think it is a reasonable idea if you plan to cover the entire textbook. Instead, I will try to put a considerable portion of the course for a small number of "core" chapters so that we can achieve the aforementioned course objectives more effectively. 2. "Team-Plays" You will have an opportunity to apply your financial knowledge to the real financial world through the "Stock Investing Game". This game will proceed throughout the semester along with the lectures. The details about the game will be explained at the beginning of the Sem. Additionally, we will study together the so-called "Future money", the nature of cryptocurrencies and the future of them.	○		3



GFB3405	<b>International Finance and Banking</b>	<p>International Finance will introduce students to global financial markets and operations of multinational firms. This course will provide students with a basic knowledge of how international financial markets work; an understanding of exchange rates and why currency values fluctuate; methods used to manage risk in the global markets; and an in-depth understanding of the process and techniques used to make international investment decisions.</p> <p>Topics to be discussed will include foreign exchange markets, international financial markets, international banking, currency derivative markets, Euromarkets, risk management, and investment decisions in the global marketplace.</p>		○	3
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### <Logistics>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
APL4517	<b>Demand Forecasting Methods and Practice</b>	<p>Demand forecasting is the activity of estimating the quantity of a product or service that consumers will purchase. It provides key input in making pricing decisions, in assessing future capacity requirements, or in making decisions on whether to enter a new market.</p> <p>Matching supply with demand plays a key role in modern logistics and supply chain management. By better understanding nature, techniques and applications of demand forecasting, logistics managers can operate and make future plan their logistics and supply chain systems including labors, assets, inventory, in more efficient manner. This course is designed to help students understand:</p> <ol style="list-style-type: none"> <li>1) why demand forecasting plays a key role in logistics and supply chain management,</li> <li>2) What kinds of demand forecasting methods are available,</li> <li>3) How the forecasting methods can be applied to the real world logistics management.</li> </ol>	○		3
APL3510	<b>Cost-Benefit Analysis on Logistics Issues</b>	<ul style="list-style-type: none"> <li>- Designed to provide the principles, concepts, and techniques of engineering economic factors.</li> <li>- Topics include comparing alternatives, depreciation and income taxes, replacement analysis, probabilistic risk analysis, and capital financing and allocation</li> </ul>		○	3





<b>APL2103</b>	<b>Global Logistics Management</b>	<p>This lecture contains the wide knowledge of global logistics.</p> <p>As the ocean and air transportation have played an important role in the development of the world economy, this class focuses on the global transportation by ocean and air. The professor has endeavored to use an easy to understanding presentation style with many examples from today's transportation to help the student understand transportation management issues.</p>	○		3
<b>APL4315</b>	<b>Technology Management in Logistics</b>	<p>Technology Management is a relatively brand new topic in business management, especially in logistics and SCM domain. However, various types of technologies have been used for centuries in order to gain competitive advantages in war, politics and commerce.</p> <p>Technology Management is at the intersection of science, engineering, management and behavioral science and it is also a viral competency in managing supply chains and logistics operation. As such, managing technology is a powerful tool that companies can use it to compete in an increasingly challenging global economy. It requires an understanding of how science becomes a technology, how technologies are developed into products, how products meet market demands, which is very important strategic skill set in global supply chain environment.</p> <p>This course addresses the role technology managers in technology-based logistics and supply chain management business.</p>		○	3



<b>APL2202</b>	<b>Manufacturing Logistics</b>	<p>The objective of this course is to teach various methods required for analyzing the problems in manufacturing logistics systems and world-class cases how the methods are used in real practices.</p> <p>Students can expect to learn methods and cases on facility planning and layout, process analysis, aggregate planning, material requirements planning, inventory management, and operations scheduling.</p>		○	3
<b>APL3304</b>	<b>Airline Service Management</b>	<p>This course introduces fundamentals of network analysis and its application in supply chain and logistics system analysis. Students will learn how to represent facilities, supply &amp; demand centers, and their linkages into a network data model to evaluate its characteristics such as centrality, connectivity and accessibility.</p> <p>Geographic Information System (GIS) will also be introduced to solve facility location, service area delimitation, and vehicle routing problems on a realistic freight transportation network models</p>	○		3
<b>APL3306</b>	<b>Logistics Information System</b>	<p>Starting with digital economy and management paradigm shift, we introduce basics about supply chain management. After that, different types of information systems, business models, and strategies are discussed. Most of topics will be elaborated with business cases.</p>		○	3
<b>APL3308</b>	<b>Logistics Simulation</b>	<p>The materials in this course include system and simulation modeling based on basic knowledge on probability and statistics. Commercial software package (Sigma) will be introduced to strengthen capabilities of students in solving real-world logistics problems.</p>	○		3



### <English Language Education>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
EEG3327	English Reading Comprehension 3	Students will learn the current approaches of reading and strategies fostering reading.	○		3
EEG1531	Practical English Grammar	Students will learn English grammar on the basis of 1 lecture and group work	○		3
EEG2612	Theories in TEFL	Students will learn about theories, principles and methods in second/foreign language learning and teaching.		○	3
EEG1522	English Reading Comprehension 1	By the end of the course students are expected to have developed high level reading abilities, analytical and critical thinking abilities required as a good English teacher. They will feel comfortable using an English-English dictionary and find it most effective and enjoyable to think, read and write in English only.	○		3
EEG3370	Development of EFL teaching skills	By the end of the course students are expected to understand various TEFL methodologies, to have mastered general and context-embedded principles in TEFL and how to implement them in the classroom, and to be fully aware of different contexts of teaching and have learned how to design and select syllabus and materials according to them. They can understand elements of interactive class focusing on any skills areas or with integrated skills approaches. They will have learned what the profession means and how to be an effective and reflective teacher.	○		3



EEG4403	<b>English Language Teaching method</b>	Students will develop deeper understanding of language teaching pedagogy through reading and discussing book chapters and articles on current issues in ESL/EFL. The course will use "How Languages Are Learned"(HLL) as the main textbook, but it will be accompanied by PLLT to solidify and complement the knowledge from HLL. For PLLT chapters, we will use the 2007 version that most of the students already own, but the professor will also introduce the newly added information from the new version of PLLT (2014) to students in class.	○		3
EEG3702	<b>Materials and Methods in TEFL (Capstone Design)</b>	<p>1. Class video analysis and practice: Through this student learn how to conduct class, give instructions for activities and manage the classroom more effectively and communicatively in English.</p> <p>2. Textbook analysis and activities analysis: As students examine current middle school and high school English textbooks and various activities in them for close analysis, they learn how theories that they have learned in the previous semesters (esp. TBP) can be connected and realized in actual class they teach. Students will also learn how to design activities following some of the current SLA theoretical frameworks.</p> <p>3. Lesson plan analysis and planning lessons: Students will learn how to evaluate, modify and design activities for various purposes, and they will have multiple chances to practice writing lesson plans and receive feedback, and practice giving instructions based on the practical pedagogical knowledge that they have</p>		○	3



		gained from the video analysis and the textbook analysis. 4. Project-based collaborative activities for capacity development			
EEG4417	<b>Topics in English Education</b>	1. Analyses of past teachers' exam questions, types, and answer keys 2. Exam-level vocabulary provision 3. Reviews and pointers for SLA theories and practices 4. Introducing current issues and hot topics in SLA theories and practices 5. Preparing students for the pedagogical interview part of the teachers' exam		○	3
EEG4402	<b>English process-based assessment</b>	The course will provide a broad introduction to the concepts and issues in the field of assessment of second language learning. It will help students to understand theoretical principles of testing and apply these principles to developing testing items.	○		3
EEG1512	<b>Introduction to English Education &amp; Career research</b>	The course will offer an introduction to the field of English language teaching and learning in terms of teaching methods. It will provide each method's guiding principles and perspective on the larger question of how languages are learned.		○	3
EEG2602	<b>English Reading Comprehension 2</b>	This course is designed to help students develop high-intermediate level academic reading skills and strategies by reading a wide range of texts through pre-, while-, and post-reading phases.		○	3



EEG4347	<b>British and American Drama</b>	This course uses materials from a variety of cultural products such as Shakespearean drama, Victorian drama, American theatre, TV shows such as Breaking BAD, The Game of Throne, The Simpsons. We will use bits from these materials to practice the basic terms and concepts of drama performance.	○		3
EEG4804	<b>Reading in English and American Fiction</b>	Students are expected to read a variety of short fiction in English and to understand the literary meaning through active discussion.	○		3
EEG2642	<b>Introduction to English Literature</b>	Students are expected 1)to read the major texts from English and American Literature, 2)to discuss the texts and the social/cultural contexts, and 3) to understand the important literary terms and analytical tools.		○	3
EEG1521	<b>English Listening Comprehension 1</b>	This course is designed to help students improve listening skills. Students will also use class time to converse in English and improve oral speaking/listening skills.	○		3



<Economics>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ECO1101	Principles of Economics1	Economics is the social science of choices, whether that choice is made by an individual, a firm, a government or a planet. It is a science in that economists try to explain and rationalize behavior through models and hypothesis testing. It is social because, at the end of the day, interaction between economic agents is what drives the most interesting and engaging questions in the discipline. This course will introduce to you what it means to "think like an economist." We begin with the foundations that underlie all of economics. We then divide and explore the two broad divisions within economics: microeconomics, which deals with individual agents' behavior, and macroeconomics, which deals with broad trends of the economy. To tie theoretical concepts to our concrete world, we will organize our weekly lectures along a set of "theme questions." In this spring semester, we will mainly cover the first part: microeconomics	○		3
ECO1102	Principles of Economics2	By the end this class, you should have a solid understanding of many (not all!) important concepts and theories in macroeconomics. After completing this course, students will be able to define what macroeconomics is. explain differences between micro and macroeconomics. explain how to measure nation's income. explain what real economy means. explain how the real economy grows. explain how monetary system works. explain what inflation and deflation are. explain why fiscal and monetary policies are used		○	3
ECO2201	Microeconomics	1. Students will understand and analyze a variety of situations using the model of rational self-interest.		○	3



		<p>2. Students will be able to use indifference curve analysis to explain individual behavior.</p> <p>3. Students will be able to analyze the role of private property, prices, profit and loss in allocating scarce resources.</p> <p>4. Students will be able to understand and analyze various market structures, including perfect competition, monopoly, oligopoly, and monopolistic competition.</p> <p>5. Students will be able to apply the concepts and models learned in class to a variety of issues, including current events.</p>			
ECO2202	Macroeconomics	The following concepts will be discussed in the class: GDP and goods market, interest rate, IS-LM model, IS-MP model, labor market, Phillips curve, AS-AD model, consumption, investment, economic growth, monetary policy, fiscal policy		○	3
ECO3305	Modern Economics	<p>This course is an analysis of the modern economy and how it works. Emphasis will be on applied economics as opposed to theory only. This is a separate and distinct course from ECO3306.</p> <p>This course will focus on present day modern economics with some analysis of past economies.</p> <p>The modern economy is evolving changing at such a rate that economists and governments are unable to keep up with the changes in in order to solve modern economic problems, such as the global financial crisis of 2008. For non-economic majors; This class is not based on economic theory or economic math. No previous economic knowledge is required. For non-economic majors; This class will not be theory or math bases.</p> <p>Also no previous knowledge or economics is required for this class. Economists, governments, businesses, and society need to find new solutions that can solve new problems.</p>		○	3





		English will not be evaluated in this course. There is no textbook for this course. About 25% of this course will be lecture, 25% discussion; I-class blog analysis, 50% in-class participation on modern economy analysis, I-class blog analysis.			
<b>ECO3306</b>	<b>The Analytic Study for Economic Problems</b>	The structure of this course will be 25% lecture and 75% analyzing economic problems. Lectures will usually be related to economic news and or analysis of economic problems related to economic news. Students will be involved in analyzing current economic problems using applied economics. All lectures and writing will be in English. Students must be able to read, write and ask questions in English. The focus of this class is not textbook economic theory. Instead the use of practical, applied analysis to understand, analyze and give ideas for solution to economic and society problems or situations. English ability will not be evaluated. There is no textbook for this class.	○	○	3
<b>ECO3343</b>	<b>Labor Economics</b>	This class provides an introduction to the theories and policies that have become central to the study of labor economics.	○(once every two years)		3
<b>ECO3381</b>	<b>Economic Development</b>	This class provides an introduction to the theories and policies that have become central to the study of development economics. After completing this course, students will be able to define what development is, and how to measure it. Explain how poverty is defined and measure it with various measures. explain how inequality is defined and measure it with various measures. explain how economic growth is defined and measure it with various measures. Explain the interaction of economic growth, and poverty and inequality. explain various economic growth theories and their policy recommendations. Explain the role of international trade for economic growth. explain the interaction of		○(once every two years)	3



		technology, and economic growth and welfare. Explain the interaction of population and economic growth. explain surplus labor. explain rural-urban migration theories. explain specific feature of rural labor market in the developing countries. explain what famine is and potential solution.			
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### <Communication & Information>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
COM1100	Introduction to Communications	Students will be expected to use concepts, skills, and knowledge of communication.		○	3
COM2400	Introduction to Advertising	This course will focus on: (1) Resources available to ad planners for making correct choices for successful advertising campaigns. (2) Measurement of marketing objectives and accountability for dollars spent (3) Evaluation of all types of media available in the market	○	○	3
COM3412	Integrated Marketing Communication	This course will focus on: (1) Integrated marketing Communications (2) Contact Point, MOT, Touch Point (3) Marketing Strategy		○	3
COM3433	Sales Promotion Strategy	Sales promotion is a type of marketing strategy aiming either at the consumer or at the distribution channel.  The chief tools of sales promotion are special packs, continuity programs, discounts, refunds, sweepstakes, and contests, offering premiums and rebates. we will study all of these techniques in this class.	○		3
COM2332	Genres in Popular Culture	Survey of standard genres in media, including representative texts.		○	3
COM3101	English Readings on Communication	In this class we will read together a book, entitled "The man who lied to his laptop," in the format of a mixture of lecture, student translation, discussion, and presentation. We will also do several activities related to the class topics.	○		3



COM3331	<b>Media Narratives</b>	<p>Narratives in everyday experience are taken for granted so much that we tend to overlook them in media studies.</p> <p>Moreover, the great pleasure they are capable of providing induces some guilt, in the sense that they are associated with some of the most successful products (and therefore with capitalist profit) and are made for and consumed by mass audiences.</p> <p>Yet it is precisely these qualities that necessitate our devoting attention to narratives in media? in terms of not only how they frame and structure media content, but also how they relate to and affect contemporary social anxieties.</p> <p>This course will look at how various types of mass media select, package, and present narratives, with a view on how students may better prepare for media content preparation.</p> <p>It will also delve into critical questions pertaining to the consumption of narrative texts in media, and consider a future (such as the digital realms of the internet and online games) where narrative is everywhere yet nowhere, since most content continues to unfold in time but no "grand story" is ever finalized.</p>	○		3
COM4331	<b>Gender and Culture Studies</b>	Critical survey of ideas of gender as manifested in cultural products.	○		3
COM4332	<b>Theories of Film and Video</b>	Survey of film theories & approaches to film criticism.		○	3



### <Public Administration>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
PAD2214	Reading in Public Administration 1	Students are expected to participate actively in the learning process throughout the Sem. This means thinking critically about all readings prior to attending classes and joining in our weekly discussions.		○	3
PAD2116	Readings in Public Administration 2	This course offers more detailed techniques of understanding readings such as summarizing and critics of articles, editing of personal written assignments, and manuscript specifications (The Chicago Manual of Style,14th edition).	○		3
PAD3108	Financial Administration	The purpose of this course is to examine the institutions and techniques of modern financial administration. The practices and fundamental concepts of government budgeting, revenue structure, and financial management will be introduced. Illustrations from federal, state and local budget and tax systems will be considered. Budgeting and financial management case studies in the United States, Korea, and other countries will be also discussed in the class.	○		3
PAD2218	Public Sector Problem-Solving Theories	This course provides an introduction to public policy and the practice of policy analysis. The course considers a number of fundamental public policy questions. Those include 1) what are the rationales for collective interference in private affairs? 2) what are the limitations to collective actions? 3) what are the generic instruments of public policy?		○	3



		4) what are the appropriate roles of policy analysts in democratic societies?			
<b>PAD2209</b>	<b>Introduction to Public Policy Studies</b>	<p>This course is designed to expose students to the art and science of policy analysis from both a philosophical and technical perspective.</p> <p>Students will also be exposed to the basic concepts, tools, and techniques used by analysts in today's public and nonprofit organizations.</p> <p>Students will also learn how to perform a policy analysis.</p>		○	3
<b>PAD2111</b>	<b>The Public Policy Process: Theory &amp; Practice</b>	<p>Policy research &amp; evaluation is an important subject and all students should be well versed in the basic concepts and techniques of the discipline.</p> <p>The product of policy analysis is usable knowledge that informs decision makers; this advice can come in a variety of forms and is performed by a wide range of practitioners in the public, private, and nonprofit sector.</p> <p>This course is designed to expose students to the art and science of policy analysis from both a philosophical and technical perspective.</p> <p>Students will also be exposed to the basic concepts, tools, and techniques used by analysts in today's public and nonprofit organizations.</p>	○		3
<b>PAD2112</b>	<b>Organizational Theory</b>	<p>Upon completion of the course, you should have:</p> <ol style="list-style-type: none"> <li>1) Gained a basic understanding of prominent organization theories</li> <li>2) Acquired the knowledge and abilities necessary to think critically about organizational action and the behavior of individuals within organizations, and</li> <li>3) Learned tools and strategies for understanding, interpreting, and responding</li> </ol>	○		3



		to the internal and external contexts of public organizations.			
<b>PAD3211</b>	<b>Organizational Management and Leadership</b>	<p>The main goals of this course are to offer a venue for students to become exposed to and develop a knowledge and understanding of management and leadership concepts necessary to functioning successfully and responsibly in organizations. The goals are, first, to help students enhance their ability to design and implement coherent organizational policies and practices by developing a keen awareness of some of the pitfalls and possibilities often associated with operating inside often large, complex bureaucratic structures. The development of operating frameworks and approaches for effective management and leadership will be emphasized, and comparisons will be drawn between the public, private, and nonprofit organizations as well as their interrelationships. Second, the course will stress the importance of leadership, and the rewards as well as challenges of operating within the public sector environment.</p>		○	3



### <English Language & Literature>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
ENG2201	<b>Introduction to English Linguistics</b>	We will go through all the subfields of Linguistics and try to explain why those subfields should be studied in order to study Language. Another important topic in this course is to define Grammar which, we think, is essential to learn a language	○	○	3
ENG2101	<b>Introduction to English Literature</b>	This is one of the required introductory-level courses toward fulfillment of the English Major. As such, the course aims to acquaint students with elementary methodology of analyzing literature through select works of poetry. There will be lectures, classroom discussions, writing assignments and a poem recital. Students are expected to follow the course schedule carefully and come to class having read the assigned works. There will be two major exams. Homework assignments must be turned in on time. Your writing assignments and exam answers must all be in English.	○	○	3
ENG2002	<b>English Discussion &amp; Presentation</b>	This is a course in public speaking and discussion. Students will give speeches that are focused on self-introduction, a process, informative, visual aid, persuasive and a final author speech. Most speeches will be carefully planned with at least written outlines. However, some will be unplanned and short. Creativity and practice will result in higher skill and better grades	○	○	3





ENG2003	<b>Advanced English Discussion &amp; Presentation</b>	<p>A class focused on practical presentations and useful discussion methods. Discuss a variety of topics, but will look more at topics that will be useful in your professional life.</p> <p>Some presentations will be to the whole class and some in smaller groups. The goal is clear, correct and well-planned oral communication.</p> <p>This will include the sort of real life situations that student may encounter in their careers</p>	○	○	3
ENG2302	<b>Expressive Writing</b>	<p>Focus will be on the writing process. Particular stress on developing Topic Sentences, Thesis Statements, writing introductions and conclusions, and paragraph development.</p>	○	○	3
ENG2303	<b>Technical Writing</b>	<p>There will be at least one assignment each week as well as several shorter essays based on research in the first eight weeks. The second half of the semester will be spending on one full-length (about 10 pages) academic research project. All aspects of academic writing will be explored, learned and practiced. We will follow the MLA style in all our writings.</p>	○	○	3
ENG2103	<b>British &amp; American Short Stories</b>	<p>This course is designed for students to study the background, techniques, and diversity of the short story. We will look closely at the art of storytelling by reading various short stories. Some of the questions we will ask ourselves in order to understand the genre are—How is the short story put together? What makes the story compelling? What intellectual and emotional response is the author trying to evoke?</p>		○	3
ENG2105	<b>Children's &amp; Young Adult Literature in English</b>	<p>We will study children's literature, both history and different genres, read several children's books closely, and do reading related activities.</p>	○		3



ENG3208	<b>English in Societies</b>	<p>This course deals with English from regional, social and cultural perspectives. It will focus on variations (regional and social) of English which are closely related to social variables such as culture, power, gender, social class, and age.</p> <p>Then it discusses multilingual societies, and teaches politeness in English-speaking societies.</p>		○	3
ENG3311	<b>Analytic Writing</b>	<p>Expectations:</p> <ol style="list-style-type: none"> <li>1. To advance English written skill.</li> <li>2. To improve English vocabulary.</li> <li>3. To develop a publishable proficiency across of range of writing genres.</li> <li>4. To identify examples of written excellence and the analysis of said samples.</li> <li>5. To incorporate ideals of excellence into personal writing.</li> <li>6. To understand the mean of being a 'professional' writer.</li> <li>7. To develop critical and argumentative faculties of a high level.</li> </ol>	○	○	3
ENG2006	<b>Media English</b>	<p>Media English pertains to a student's level of literacy regarding the media delivered English content they receive. In this respect, media English goes beyond mere reading and writing. In order to be functionally literate in our media-saturated world, all of us have to be able to read the messages that daily inform us, entertain us and sell to us.</p> <p>Now that the Internet is a fact of life, the critical thinking skills that help young people navigate through traditional English-based media are even more important. As such the evaluative, analytical, creative and persuasive skills of students will be enhanced. Writing, reading and discourse play a big role in this course.</p> <p>As such, this course will be split in to three broad sections: key concepts, debates, and research methods. This course may include role-play and group activities. Students are expected to speak English at all times and interact freely in class.</p>		○	3



ENG4122	<b>Understanding of the British Commonwealth (Capstone Design)</b>	<p>This course is mainly content based and centered on a range of topics quite related with the British Commonwealth countries such as Zombi capitalism (Britain), Independence (Northern Ireland), Stolen generation (Australia), Global Warming (Tuvalu and Maldives), and Immigration (Africa). Each topic will be reviewed first with printed ones selected from newspapers and magazines and then surveyed with video media clips later. At the very second stage of individual topic, students are expected to conduct their own group presentations and discussions upon their chosen topics for 30 min. Finally, every other week there will be a 30 min. quiz on each topic (six times). six issues in total (two weeks per each issue) read the text -&gt; watch the media -&gt; group presentation -&gt; debate and discussion (writing assignment and quiz) 1. Zombie capitalism in Britain 2. Independence Terror from Northern Ireland 3. Aborigines and Stolen generation in Australia 4. Slum and Poverty in India 5. Global Warming in Tuvalu and Maldives 6. Mass Immigration from Africa</p>		○	3
ENG2306	<b>Cultural Archetype and Media</b>	<p>This is an introductory course on Western mythologies that have had the greatest impact on the Western tradition. The major portion of the course is covered by Greek and Roman as well as Norse mythology in Europe. Also examined and analyzed will be mythic archetypes in literature and film. The course will focus on major Greek sagas and their later use as well as important books of the Bible as a basis of western art and literature. There will be a lot of discussion--both in small groups and as a class--and presentations. Active class participation is required.</p>		○	3



### <Kinesiology>

Course Number	Course Title	Course Description	Semester		Credit
			Spring	Fall	
KIN2011	Health Education	Its personalized approach emphasizes behavior change and provides your students with current, practical information and tips to incorporate in their daily lives. This lecture offers a variety of resources for students to turn active learning into active living, portable perforated reference, and exercise videos. Encourage students to use these resources to achieve and maintain their personal health and wellness goals.	○		3
KIN1004	Human Anatomy	The course will cover structural and functional analysis of skeleton and muscles in human body. The course will cover the circulatory system too, Lecture notes will be handed out two weeks in advance		○	3
KIN2016	Sport Business Administration	The sport industry is an ever-evolving field of study with a diverse landscape of career and management opportunities. The foundation of the management skills and practices learned in this field are applicable to a variety of businesses and organizational needs.  This course serves as an introduction to the field of sport management, offering a variety of information pertaining to the foundations of sport management, the differing levels of sport (e.g. youth, recreation, amateur, and professional), the various sport industry segments, international sport, and current industrial and financial issues in sport. Additionally, students will be introduced to the INHA sport management program that will provide further educational and experiential learning opportunities necessary	○		3



		in their career preparation to becoming future sport managers.			
KIN3016	<b>Profession of Sport in English</b>	<p>Students will be working with partners and groups a lot of the time to use their reading, writing, speaking and listening skills in English.</p> <p>Their leadership skills will be used together with their English skills to teach to each other, do presentations and communicate efficiently about sports related topics.</p> <p>Topics will include anatomy of the body and movements, sport specific vocabulary, famous sport athletes, injuries and prevention and controversial discussion topics in sport.</p> <p>No textbook will be used for this course. The teacher will provide handouts posted on the Blackboard system or given in class as there are a variety of topics that will be covered.</p>	○		2
KIN3101	<b>Methodology of Training</b>	<p>Based on the results of exercise physiological studies on the effects of exercise on the body, training was conducted by using individual and specific training procedures in consideration of gender, age and physical fitness level, Application process. In other words, it is a discipline that needs to identify the effect of training through learning theories of training and applying methods.</p> <p>Therefore, this course aims to cultivate students the ability to write training programs on their own, based on not only the theory of training but also the specificity of the various sports.</p>	○		3
KIN3110	<b>Special Populations and Exercise</b>	<p>It will provide students with fundamental knowledge of disease specific pathology and treatment guidelines at the clinical aspects of exercise physiology by examining the relationship between exercise and chronic disease in the special populations.</p>		○	3



		The key areas of special populations are endocrinology, the metabolic system, the cardiovascular system, the respiratory system, bone health, and the neuromuscular system.			
KIN4104	Exercise Therapy	Exercise is one of important manners for maintaining and continuing healthy body from injury. Understanding the fundamental theories is essential to apply safe and effective therapeutic exercise. This class will provide fundamental information and various practical techniques for future health care professionals	○		3
KIN3108	Evaluation of Sports Injuries II	Based on understanding upper extremity functional anatomy, students will study regarding upper extremity orthopedic injuries and assessment techniques. "Evaluation of Sports Injuries II" class is focused on the upper extremity orthopedic injuries. "Evaluation of Sports Injuries I" class will be focused on the lower extremity orthopedic injuries		○	3
KIN1101	Growth & Aging	It will provide students with fundamental knowledge and skills of growth development including bone structure, skeletal muscle structure, fat structure, cardiorespiratory system as well as aging including cardiopulmonary system, musculoskeletal system, and nervous system, and sensory system	○		3
KIN3208	Sports Marketing	This course provides students with undergraduate-level preparation in the marketing of sport services, sport teams, and sport programs. It begins by examining broader trends in the latest research on how people think and how that understanding impacts marketing, followed by an examination of the unique		○	3



		<p>challenges and opportunities of marketing sport to fans.</p> <p>The course then proceeds to explore strategic marketing through real-world industry experiences. The course concludes with the development of an in-depth marketing plan for a real-world industry partner.</p> <p>This course provides the basis for understanding how to use sport as a marketing tool, as well as how to generate sport revenues and participation via effective marketing strategies. It builds on that understanding by providing the hands-on practice necessary to becoming an effective sport marketer.</p>			
<b>KIN3209</b>	<b>Sports Business English</b>	<p>Effective writing is hard work even for the best writers, but the principles are simple. Our students do not require unusual talent or special skills.</p> <p>They will be easy to understand and easy to put into use. This course aims to help you do that with less difficulty and more confidence, and get the results you are looking for in the sport business.</p>		○	2
<b>KIN4103</b>	<b>Pathological Physiology</b>	<p>It will provide students with fundamental knowledge and skills of pathophysiology including metabolic syndrome, diabetes, obesity, hypertension/hyperlipidemia, myocardial infarction, chronic heart failure, COPD, cancer, osteoporosis, spinal cord injury, and stroke.</p>	○		3