KMUTT programs provided for AIMS

1. Automation Engineering
2. Chemical Engineering
3. Civil Engineering
4. Computer Engineering
5. Electrical Communication and Electronic Engineering
6. Environmental Engineering

❖ SECTION A: Program Information

Field in the AIMS Programme ☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism ☐ International Business ☐ Food Science and Technology ☑ Engineering ☐ Economics		
Name of Academic Programme:	Bachelor of Engineering Program in **Automation Engineering** (International Program)	
International Courses taught in English for exchanged undergraduate students		
Course/Subjects	Course Description and strengths	Credit
Semester 1 Year 1		
Gen 101 (Physical Education)	This course aims to study and practice sports for health, principles of exercise, care and prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	3
LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	3
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functions The Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflextion points, Overview of curve sketching, Related rates, Indeterminated forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, Thedefinite intergrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution). Applications fo the Definite	3

	Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical shell method), Length of plane curves, Area of surfaces of revolution Improper Integraals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration Numerical integration ; Trapezoidal rule and simpson's ruleFunction of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extrema, Maxima and minima, Saddle points	
Phy 103 (General Physics for Engineering Students 1)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3-dimensions. Newton' s laws of motion. Energy and work. Linear momentum. Rotation. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
CPE 110 (Computer Engineering Exploration)	Introduction to practical concepts of computer systems and its components including basic electric circuits, electronic devices, logic gates and digital circuits, and hardware interfacing. Hands-on experience focuses on computer simulations and experiments on the mentioned topics.	3
CPE 100 (Introduction to Computer Engineering)	Programming concepts will be covered while the syntax and semantics of C language will be emphasized. Lab hours will focus on programming experience. Subject matter includes input, output, expression grammar, library function calls, selection structures, looping construction, arrays, writing functions, understanding pointers, file processing, and using structures. An introduction to object-oriented programming with C++ will also be covered.	3
LNG 211 (Effective Listening)	The aim of the course is to provide additional practice in English-language listening, in support of students' existing core discipline. The class concentrates on listening tips and strategies, with particular focus on note-taking skills. Emphasis is given to topics in the students' core discipline and the use of realistic recordings of conversations and lectures in their field of study.	3
Semester 2 Year 1		
MTH 102 (Mathematics 2)	Scalars and vectors, Iner product, Vectors product, Scalar triple product, Line and Plane in 3-space Mathematical induction, Sequences, Series, The integral test, The comparison test, The ratio test, The alternating series and absolute convergenc tests, Binomial expansion, Power series, Taylor's formula Periodic functions, Fourier series, Polar coordinates, Areas in polar coordinates, Definite integral over plane and solid regions, Double integrals, Double integrals, Double integrals in polar form, Transformation of variable in multiple integrasl, trpl integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates	3
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self- discipline, respect for democracy, public awareness, and harmonious co-existence.	3
CPE 112 (Discrete Mathematics for Computer Engineers)	Basics of logic: relations, mathematical reasoning and logical reasoning, propositional logic, and predicate logic. Introduction to logic programming, graphs, trees, finite automata and context-free grammar, and the Turing machine. Introduction to the complexity analysis of algorithms and to number theory.	3
CPE 130 Algorithms and Data Structures)	Introduction to data representation and structure, array, linked-listed, stacks and queues, trees, graphs, analysis of algorithms, recursion, sorting and searching algorithms, hashing, heap tree, binary search tree, AVL tree, breadth first search, dept first search, string processing, and data compression.	3
INC 111 (Basic Engineering Circuit Analysis)	Units and scales, charge, current, voltage, power, electrical sources, Ohm's law, Kirchhoff's law, resistors in series and parallel, voltage and current division, nodal analysis, mesh analysis, superposition, Thevenin and Norton equivalent circuits, maximum power transfer, delta-wye conversion, capacitance and inductance combinations, basic RL and RC circuits, RLC circuits, natural and force response from RL,	3

	RC, and RLC circuits, phasor analysis, AC circuit power analysis.	
Semester 1 Year 2		
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
MTH 201 (Mathematics 3)	Basic concepts: types, order, degree. First order equations: separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations. Higher order equations: linear equation, solution of linear equation with constant coefficients and with variable coefficients. Applications of first and second order equations. Laplace transforms, Introduction to Partial Differential Equations.Vectors: vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar field, divergence of a vector field, curl of a vector field.Vector integration: line integrals, surface integrals, volume integrals	3
CPE 220 (Digital Systems Design)	Number systems, codes, logic gates, Boolean algebra, logic functions, multi-level combinational logic and simplification, flip-flops and related devices, sequential logic design and optimization, types of registers and counters including design and implementation, programmable and steering logic, PALs and PLAs, multiplexers and selectors, logic design in computer simulation program.	3
CPE 221 (Digital System Laboratory)	Experiments on digital circuit design using both simulation programs and actual circuits. The experiments consist of basic logic gates, clock generation circuits, counter circuits, encoder circuits, decoder circuits, shift register current, arithmetic circuits, multiplexer and demultiplexer circuits, digital-to-analog and analog-to-digital circuits, and design and implementation of Field Programmable Gate Array (FPGA) circuits.	2
CPE 231 (Principles of Programming Languages)	Programming language paradigms and the principle of programming language design are provided. The structure and design principles of programming languages consist of syntax and semantic, notion of type, role of variable declarations, bindings and scope, sequence control, subprogram control, and abstract data type. Four programming language paradigms include imperative programming, object-oriented programming, functional programming, and script programming.	3
INC 211 (Mathematics for Signals and Systems)	Introduction to differential and difference equations. Linear constant-coefficient differential and difference equations. Homogeneous and particular solution of linear differential and difference equations with constant coefficients. The Laplace and z-transforms and their applications to solution of systems governed by differential and difference equations. Numerical methods to solve differential equations. Introduction to partial differential equations. Elementary of continuous-time (CT) and discrete-time (DT) signals and systems: classification of signals and system properties. Representation of discrete and continuous linear time invariant (LTI) systems in the time domain with response developed via the convolution sum and the convolution integral.	3
Semester 2 Year 2		
Gen 121 (Learning and Problem Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be familiar with learning processes through projects based on their interest. These include setting up learning targets; defining the problems; searching for information; distinguishing between data and fact; generating ideas, thinking creatively and laterally; modeling; evaluating; and presenting the project.	3
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment, etc.	3
STA 302 (Statistics for Engineers)	Probability theory: axioms for probability in discrete sample space, counting sample point, independent and dependent event. Bayes' theorem, binomial, poisson, normal distribution, joint distribution, distribution of sums and averages, central limit theorem, covariance and correlation, sampling distribution : F-distribution, estimation and	3

	hypothesis testing, least squares methods.	
INC 212 (Signals and Systems)	Continuous-time Fourier series and Fourier transform. Frequency-domain analysis of signals. The Laplace transform and the transfer function representation. Time-domain and frequency-domain analysis of LTI systems using the transfer function representation. Sampling theorem. Discrete-time signals in the frequency domain: the discrete time Fourier transform (DTFT), the discrete Fourier transform (DFT), and the Fast Fourier Transform (FFT) algorithm. The z-transform and z-transfer function representations. Time-domain and frequency-domain analysis of discrete-time. Elementary design of digital filters. Application examples from communications, control, and signal processing. Computer and demonstrations for signal and system analysis using MATLAB.	3
INC 221 (Electronic Devices and Circuit Design)	Basic semiconductor physics and p-n junction theory. Diodes and zener Diodes characteristics and specifications. Wave shaping circuits, simple DC power supply and DC voltage multiplier circuit design. Bipolar Junction Transistor (BJT) and Field Effect Transistor (FET) : operations, characteristics and specifications. DC biasing technique. Analysis and design of BJT and FET amplifiers. Operational amplifiers (opamp) : theory of operation, characteristic and specifications of devices, linear and non-linear applications. Analysis and design of selected electronic circuits such as power supply, filter circuit, and amplifiers. Experiments and application of electronic devices.	3
INC 241 (Programmable Language Control)	Introduction to automation, Sensors and actuators, Hardwire control, Structure of PLC: modules and their functionalities: input-output, and power supply. Guidelines for wiring related to PLC, sequence control, programming languages and instruction sets. Laboratories: programming for controlling simulation models: lifts, motor controls, and conveyors. Man-machine Interface.	3
Semester 1 Year 3		
MEE 224 (Thermal Engineering)	Definitions and basic concepts. Properties of a pure substance. Heat and work. The first and the second laws of thermodynamics. Entropy. Power and refrigeration cycles. Pump and compressor. Internal combustion engine. Air-conditioning unit.	3
CPE 332 (Database and ERP Systems)	Introduction to the practical concepts in database system analysis, design and implementation. Hands-on experience will also be emphasized in developing front-end software for a backend database of a client-server, 3-tier architecture with web browser interface. Theoretical aspects of relational databases general to all database products will be the focus, while specific database products including Microsoft SQL, Oracle, and MySQL will be covered. Database concepts covered include data modeling, SQL, database design, normalization, multi-user databases, access standards such as ODBC, ADO, and XML. Concepts in Enterprise Resource Planning will be covered throughout such as manufacturing, MRP, finance, human resource management, and inventory management.	3
CPE 325 (Computer Architecture and Systems)	Topics cover processor technology, Input and output, memory hierarchy, interleaved memory, bus, cache, pipelined architectures, computer arithmetic, and multiprocessors technology. The course will also discuss machine instructions and assembly language to be applied to actual microprocessor design for physical control and data communications.	3
INC 331 (Industrial Process Measurement)	Introduction to metrology engineering. Basic concepts of measurement methods. Process instrumentation symbology and diagram static and dynamic characteristics of signals. Probability and statistics, uncertainty analysis. Motion and dimensional measurement. Force, torque and shaft power measurement. Pressure, flow and level measurement. Temperature and heat – flux measurement. Miscellaneous measurements. Reliability, choice and economic of process control system.	3
INC 341 (Feedback Control Systems)	Open-loop and Closed-loop control. Mathematical models. Analysis of transfer functions and state equations. Block diagrams. Signal-flow graph. Linearization. Analysis of steady-state response. Routh-Hurwitz criterion. Frequency-domain analysis: Nyquist's stability, Polar plot, Bode plot, Nichol's chart. Root locus. Compensator design in time and frequency domain. Design with MATLAB.	3
INC 352 (Process Control and Instrumentation Drawing)	Introduction to process control and instrumentation drawing. Process control and instrumentation equipment. Symbols and abbreviations. P&ID diagram. SAMA diagram. Protection code. Hazardous Code. Color code. Piping specifications and related standard.	1
LNG 212 (Oral Presentation Skills)	The aim of the course is to reinforce knowledge of the basic elements of effective oral presentation. Importance of verbal and nonverbal communication will be highlighted throughout the course. Training on pronunciation, the use of transition signals and effective use of visual aids will also be focused. Self and peer assessment will also be	1

	encouraged to foster further improvement.	
Semester 2 Year 3		
EEE 118 (Electromechanical Energy Conversion)	Review of electromagnetic concepts, Faraday's law, flux cutting rule, force law, Ampere's law and magnetic circuital law, magnetic materials and permanent magnets, flux density, field intensity, permeability, magnetic saturation hysteresis and eddy current loss. Transformer: voltage induces in a coil, polarity of a transformer, equivalent circuit of a practical transformer, measuring transformer impedances, autotransformer, voltage regulation. Direct current generators: construction; field, armature, commutator and brushes, induced voltage separately excited generator, sheet, compound, differential compound generator, load characteristics. Direct current motors: construction; field armature, commutator and brushes, induced voltage separately excited generator, sheet, compound, differential compound generator, load characteristics. Direct current motors: counter emf, mechanical power and torque, armature speed control, field speed control, shunt, series and compound motor, reversing the direction of rotation, three phase Induction motors: construction, rotating field, direction of rotation, starting characteristics of a squirrel – cage motor, wound rotor motor. Three- phase Alternators : construction, stator, rotor. Equivalent circuit of an alternator, alternator under load, synchronization and alternator synchronous motors: starting a synchronous motor, motor under load, mechanical and electrical angles, v-curve. Single-Phase Motor: construction, torque-speed characteristic, principle of operation, capacitor – start motor, capacitor-run motor, shade-pole motor, series motor, hysteresis motor.	3
CPE 341 (Computer Networks)	Fundamental concepts and protocols in computer communication networks, particularly IP networks. Packet switching and circuit switching networks, layered network architectures. Application layer protocols, socket programming, TCP/IP protocol suite, unicast and multicast routing protocols, link layer protocols and multiple access networks. Wired and wireless local area network standards, and basic mobile Internet protocols.	3
CPE 342 (Computer Network Laboratory)	Experiments for supporting the study of computer networking protocols. Network protocol analyzer software, basic router configuration commands, network interface and routing protocol configuration in computers and routers for IP networking. Analysis of TCP protocols, IP routing and addressing protocols. Operations of application layer protocols and network management protocols.	2
INC 354 (Process Instrumentation Laboratory)	Experiments on measurement of various process variables, such as temperature, pressure, flow, and level. Instrument calibration. Process control. Digital filters.	1
INC 342 (Industrial Process Control)	Process Control terminology and definition referring to ISA standard. Principles of continuous process. Review of control system foundation. Mathematical modeling of process. Theoretical and experimental process characteristics. Process instrumentation symbology and diagram referring to ISA standard. Final control elements. Controller. Converter. Regulator. Theoretical and experimental controller tuning. Control structures: single loop, cascade, feedforward, ratio, selective, override, and multivariable control. Self – tuning controller. Computer simulation of process control systems. Examples of industrial process control such as boiler control, distillation control, steam turbine controls, and water treatment control.	3
INC 361 (Microprocessor Systems and Applications)	Microprocessor system architecture. Address space for programming. Data and I/O. Data organization. Addressing mode. Assembly language instruction set. Assembly and other high level language programming. Software development tools: editor, assembler, compiler, simulator, and debugger. Microprocessor boards. Input/output devices of microprocessor systems and input/output programming. Principles of interrupt and interrupt programming. Background/foreground programming.	3
INC 441 (Automation System Technology)	Automation network technology. Distributed control systems. Batch control systems. Supervisory control systems and data acquisition. Automation software. Automation network security. Safety for automation systems. Principals of quality control. Statistic methods in quality control. Control chart. Sampling Principles.	3
LNG 213 (Laboratory Report Writing)	The aim of the course is to reinforce knowledge of the basic elements of writing at the sentence, paragraph ad essay level as well as to enable students to write a report in a format appropriate to their content-area courses e.g. a lab report. Grammar and organization will be combined with student practice at every step. In addition, the class will cover an introduction to summarizing and paraphrasing skills in order to reinforce students' awareness of problems about plagiarism.	1
Semester 1 Year 4		

Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans and aesthetics amidst the diversity of global culture. It is concerned with the perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments.	3
INC 451 (Process Control Laboratory)	The aim of the course is to provide a hands-on laboratory course and computer-based laboratory experiences to solve industrial-based problems which integrate the system aspects of industrial control systems, including plant modeling, real-time programming, plant-computer interface and control algorithm design. Students will work as part of terms. Oral group presentation, written group report and demonstration are required as part of the project.	1
INC 457 (Control and Instrumentation Engineering ProjectStudy)	An individual or a group of students propose a topic related to control and instrumentation engineering, study the topic's feasibility, and design the overall system under the department's supervision.	1
Pre 394 (Industrial Safety)	Nature of accident in industrial and need of accident prevention. Planning for safety such as plant layout, machine guarding, maintenance, etc. Safety in specific hazard such as handling of materials, welding, boiler operation, silo, electricity, toxic materials, flammable and explosive materials. Organization and administration of safety program. Safety training and cost study in accidental.	3
Genxxx (General Education Elective 1)		3
Incxxx (Elective 1)		3
XXXxxx (Free Elective1)		3
Semester 2 Year 4		
Gen 351 (Thai Indigenous Knowledge)	This is a study of indigenous knowledge in different regions of Thailand with a holistic approach, including analyses from scientific, technological, social science and anthropological perspectives. Students will learn how to appreciate the value of indigenous knowledge and recognize the ways in which such knowledge has been accumulated—lifelong learning of indigenous people and knowledge transfer between generations. Students will learn to become systematic, self-taught learners.	3
INC 458 (Control and Instrumentation Engineering Project)	Continue implementing the designed proposal from INC457 until the project is complete in both theory and functionality.	3
INCxxx (Elective 2)		3
XXXxxx (Free Elective 2)		3

Field in the AIMS Programme ☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism ☐ International Business ☐ Food Science and Technology ☑ Engineering ☐ Economics	
Name of Academic Programme:	Bachelor of Engineering Program in **Chemical Engineering** (International Program)
International Courses taught in English for exchanged undergraduate students	

Course/Subjects	Course Description and strengths	Credit
Semester 1 Year 1		
Che 100 (Introduction to Chemical Engineering)	Orientation on chemical engineering. Overview of chemical process industries. Processes and process variables. Introduction to engineering calculation. Chemical and physical characteristics of processes. Stoichiometry and chemical compositions. Fundamentals of material and energy balances. Introduction to separation processes and equipment.	3
Chm 103 (Fundamental Chemistry)	Stoichiometry. Basic of the atomic theory and electronic structures of atoms. Periodic properties. Chemical bonds. Representative elements. Nonmetal and transition metals. Properties of gas, solid liquid and solution. Chemical equilibrium. Ionic equilibrium, ionic equilibrium, chemical kinetics and electrochemistry.	3
Chm 160 (Chemistry Laboratory)	Practice on basic laboratory techniques in topics concurrent with CHM 103	1
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use	3

	of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self-discipline, respect for democracy, public awareness, and harmonious co-existence	
LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	3
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functions The Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflexion points, Overview of curve sketching, Related rates, Indeterminate forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, The definite integrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution) Applications to the Definite Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical shell method), Length of plane curves, Area of surfaces of revolution Improper Integrals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration Numerical integration ; Trapezoidal rule and simpson's rule Function of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extreme, Maxima and minima, Saddle points	3
Phy 103 (General Physics for Engineering Students I)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3- dimensions. Newton's laws of motion. Energy and work. Linear momentum. Roration. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
Phy 191 (General Physics Laboratory I)	A laboratory course that accompanies the topics covered in PHY 101/PHY 103.	1
Semester 2 Year 1		
Che 103 (Material Energy and Balances)	Analysis and design of chemical processes using chemical engineering principles. Fundamental of material and energy balances. Chemical and physico-chemical properties and processes such as humidity, saturation, solubility and crystallization. Thermodynamics parameters such as enthalpy, heat of reaction, heat of solution and heat of mixing. Simultaneous uses of material and energy balances. Material and energy balances on steady and unsteady state processes. Material and energy balances on multiple units, recycling, bypassing and purging. Application of computers in process analysis and simulation.	3
Gen 121 (Listening and Problem Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be	3

	familiar with learning processes through projects based on their interest. These include setting up learning targets; defining	
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
MEE 111 (Engineering Drawing)	Instruments and their use. Applied geometry. Lettering. Orthographic drawing and sketching. Dimensions and notes. Orthographic projection of points, lines, planes, and solids. Auxiliary view: points and lines; planes and solids. Pictorial drawing: Isometric and oblique drawing and sketching. Sections and conventional practice. Drawing and the shop. Dimensioning standard features, dimensions of size, location and correlation. Surface texture. Fits and tolerance. Geometric tolerance. Screw threads, threaded fasteners, keys and splines, rivets and welding. Gears. Springs. Working drawing: assembly, details, Introduction to computer aided drafting	3
MTH 102 (Mathematics 2)	Scalars and vectors, Iner product, Vectors product, Scalar triple product, Line and Plane in 3-space Mathematical induction, Sequences, Series, The integral test, The comparison test, The ratio test, The alternating series and absolute convergenc tests, Binomial expansion, Power series, Taylor's formula Periodic functions, Fourier series, Polar coordinates, Areas in polar coordinates, Definite integral over plane and solid regions, Double integrals, Double integrals, Double integrals in polar form, Transformation of variabl in multiple integrasl, trpl integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates	3
PHY 104 (General Physics for Engineering Students 2)	Emphasized on the applications of the laws of physics. Electric fields. Gauss's law. Electric potential. Capacitance. Current and resistance. Circuits. Magnetic fields due to currents. Induction and inductance. Maxwell's equations. Electromagnetic oscillations and Ampere's law. Alternating current. Electromagnetic waves. Interference. Diffraction. Photon and matter waves. Atoms.	3
PHY 192 (General Physics Laboratory 2)	A laboratory course that accompanies the topics covered in PHY 102/ PHY 104.	1
Semester 1 Year 2		
Che 200 (Computer Programming for Chemical Engineering)	Computer system. Computer hardware. Interaction between hardware and software. Operating system. Programming fundamentals. Variable types including binary, integer, floating point, and arrays. Operators and flow control. File I/O. Graphical User Interface. Applications of numerical and programming for solving chemical engineering problems.	3
Che 210 (Industrial Organic Chemistry)	Overview of organic chemistry fundamentals and different types of organic compounds. Basic products of industrial synthesis such as olefins, oxidation products of ethylene, alcohols, aromatics, and macromolecules. Organic chemistry in various industries including petrochemical industries, chemical industries, and food industries.	3
Che 241 (Thermodynamics 1)	A general balance equation and conserved quantities. Mass balance and energy balance (the first law of thermodynamics). Thermodynamic properties of matter. Applications of the combined mass and energy balances. Entropy balance and the second law of thermodynamics. Reversibility. Helmholtz free energy. Gibbs free energy. Applications of the combined energy and entropy balances. Heat engine. Heat pump. Lost work. Power generation cycles. Refrigeration. Liquefaction processes.	3
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment,	3

	etc.	
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
LNG 108 (Content Based Language Learning)	This course is content-based. It integrates a variety of skills—listening, speaking, reading, writing, thinking—and enables English language learning through content area learning. The teaching requires cooperation from both content area teachers and the English language teacher to design learning activities that are highly learner-centered and dynamic. The content depends on the interest and needs of learners, or the requirements of the learners' academic departments.	3
Mth 201 (Mathematics 3)	Basic concepts : types, order, degree First order equations : separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations Higher order equations : linear equation, solution of linear equation with constant coefficients and with variable coefficients, Applications of first and second order equations Laplace transforms, Introduction to partial differential equations Vectors : vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar fild, divergence of a vector field, curl of a vecor field Vector integration : line integrals, surface integrals, volme integrals	3
Semester 2 Year 2		
Che 212 (Industrial Organic Chemistry Laboratory)	Laboratory test of change in physical properties of organic compounds. Determination and Synthesis of some common industrial organic compounds.	1
Che 213 (Analytic Chemistry and Instruments)	Introduction to analytical chemistry. Errors in chemical analysis. Gravimetric methods of analysis, titrimetric methods of analysis and analysis by electrochemistry. Separation and analysis using chromatographic methods. Spectroscopic methods including AA, MS, IR, NMR, UVVIS, and ICP. Surface analysis by SEM and structural analysis using X-ray Diffraction. Analysis of particle size.	3
Che 230 (Introduction to Transport Phenomena)	Control volume for mass balance. Newton's second law of motion. Shear stress in laminar flow. Analysis of a differential fluid element in laminar flow. Differential equations of fluid flow. Boundary layer theory. Basic mechanisms of heat transfer. Fourier's law and general heat conduction equation. One-dimension steady-state conduction through composite wall. Convective heat transfer and the correlations for internal and external flow. Radiation heat transfer. Basic mechanisms for mass transfer. Fick's law and general diffusion equation. Steady state diffusion with and without chemical reaction. Convective mass transfer Correlations for different flow geometry. Interphase mass transfer. Two resistance theory and overall mass transfer coefficients.	3
Che 242 (Thermodynamics 2)	PVT behaviour. Volumetric equation of state. Maxwell's relation. Criteria for equilibrium in one-component systems. Stability of thermodynamic systems. Molar Gibbs free energy and fugacity of pure component. Phase rule for one-component systems. Partial molar properties, Generalized Gibbs-Duhem equation. Criteria for equilibrium in multicomponent-system. Phase rule for multicomponent-system. Ideal gas mixture. Partial molar Gibbs free energy and fugacity of a component in a mixture. Excess mixture properties. Activity coefficient equations. Vapor-liquid equilibria Computational calculations of thermodynamic properties and phase equilibria. Reaction equilibria.	3
Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans and aesthetics amidst the diversity of global culture. It is concerned with the perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments	3
Gen 101 (Physical Education)	This course aims to study and practice sports for health, principles of exercise, care and prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	3
MEE 214 (Engineering	Introduction to statics, force system and equilibrium. General consideration on	3

Mechanics)	structure, friction and virtual work. Introduction to dynamics, kinematics and kinetics of particles. Kinetics of systems of rigid bodies.	
Semester 1 Year 3		
Che 333 (Fluid Mechanics and Equipment Design)	Fluid statics and applications. Equations of fluid flow. Flow in pipes. Flow measurement. Pump. Agitation. Particulate flow through fluid. Sedimentation. Flow in packed bed and filtration. Fluidization. Centrifuge. Particulate size distribution and size reduction. Cyclone.	3
Che 334 (Heat Transfer and Equipment Design)	Fundamentals of heat transfer and heat exchanger, Double pipe heat exchanger . Design of shell and tube heat exchanger. Series & parallel arrangement. Boiling and condensation : theory. Condenser and reboiler. Evaporator. Plate heat exchanger. Plate fin heat exchanger. Drier and Cooling tower.	3
Che 391 (Applied Statistics and Probability for Chemical Engineering)	Fundamentals of statistics and probability as well as their application in practice. Statistical analysis for unplanned and planned data. Statistical techniques such as estimation theory, test of hypothesis and regression. Fundamental concepts of experimental design and analysis. Some practical applications including quality control and reliability.	3
Gen 341 (Thai Indigenous Knowledge)	This is a study of indigenous knowledge in different regions of Thailand with a holistic approach, including analyses from scientific, technological, social science and anthropological perspectives. Students will learn how to appreciate the value of indigenous knowledge and recognize the ways in which such knowledge has been accumulated—lifelong learning of indigenous people and knowledge transfer between generations. Students will learn to become systematic, self-taught learners.	3
MTH 303 (Numerical Methods)	Computer number representation and roundoff, interpolation, numerical integration the solution of nonlinear equations, the solution of system of linear equations; function approximation and data fitting, the solution of ordinary and partial differential equations	3
PRE 290 (Industrial Organization and Management)	The nature of management. The structure of organization and the industrial system. Quality Control concept. Facilities Planning. Product development and demand forecasting. Material control. Financial Management. Marketing Management	3
Semester 2 Year 3		
Che 301 (Chemical Process Industries)	Introduction to chemical process industries which include raw materials and chemical reactions leading to products. Principles of separation techniques. Process flow sheets of standard symbols. Process utilities such as water supply, energy and wastes. Illustration of process plants such as paper, cement, sugar, petrochemical and food industries. Visits to industrial plants.	3
Che 335 (Mass Transfer and Equipment Design)	Introduction . Mass transfer between phas . Equilibrium. Phase rule. Mass transfer equipment. Equilibrium stage operation. Distillation (binary). Multicomponent distillation. Sieve column design. Liquid-liquid extraction. Solid-liquid leaching. Absorption/Stripping. Packed column design. Adsorption. Fixed bed column design.	3
Che 343 (Chemical Kinetics and Reactor Design)	Review of kinetic theories. Definition of the rate of reaction. Types of reactor. Rate constant. Order of reaction. Elementary and nonelementary reactions. Reversible reactions and equilibrium conversion. Stoichiometric relationships in reaction rate. Isothermal reactor design with different type of reactors: batch, plug flow reactor (PFR) and continuous stirred tank reactor (CSTR). Design equations for multiple reactions in each type of reactor. Collection and analysis of rate data with differential and integral method. Method of initial rates. Method of half-lives. Nonisothermal reactor design for continuous-flow reactors at steady state. Application to the CSTR. Adsorption and solid catalyst reaction. Effect of mass transfer in heterogeneous of gas-catalyst reaction.	3
Che 481 (Chemical Engineering Laboratory 1)	Chemical Engineering Laboratory 1 is designed to expose the students to the mechanisms and operation of the equipment related to fluid mechanics, size reduction and separations. Students will learn how to analyze the data obtained from the experiments.	1
EEE 102 (Electrotechnology 1: Power)	Basic dc and ac circuit analysis; voltage, current and power; transformers; Introduction to electrical machinery; generators, motors and their uses; concepts of three-phase system; method of power transmission; introduction to some basic electrical instruments	3
Pre 380 (Engineering Economics)	Basic concepts in economic analysis. Cost concepts. Time value of money. Measuring the worth of investment comparison of alternatives. Depreciation and income tax consideration. Replacement analysis. Decision making under risk and uncertainly. Break-even analysis.	3
Semester 1 Year 4		

Che 461 (Process Dynamics and Control)	Modeling of processes and control systems . Applications of Laplace Transform and block diagram of the Process. Dynamics of the first and higher order processes. Feedback control. Stability analysis of the control loop. Frequency response and control system designs. Forward and multivariable process control. Introduction to control system instrumentation. Introduction to advanced control system e.g. cascade, override, etc. Introduction to automatic control.	1
Che 471 (Engineering Materials and Selection)	Introduction to materials and selection. Mechanical and physical properties of materials. Mechanical testing. Factor affecting properties and structure-property-processing relationship. Phase diagram, grain structure and deformation of solids. Classification, structure and properties of engineering materials, i.e., metals, ceramics, polymers and composites. Processing and treatment of engineering materials. Construction materials. Fundamental of corrosion theory, types of corrosion and corrosion prevention. Materials selection and uses in engineering design.	3
Che 482 (Chemical Engineering Laboratory 2)	Chemical Engineering Laboratory 2 is designed to expose the students to the mechanisms and operation of the equipment related to heat and mass transfer, chemical kinetics and process control. Students will learn how to analyze the data obtained from the experiments.	1
Che 483 (Undergraduate Seminar)	The undergraduate seminar requires each student to search a research paper in the areas of chemical engineering and to give a presentation in the class under supervision of an advisor. The fundamental knowledge and references are necessary for analysis and understanding of the content of that research. The students will be trained to give presentation and to participate in academic discussion. Submission of report is required after the presentation	1
Che 484 (Chemical Engineering Project 1)	Students are required to choose interested research problems (projects) related to chemical engineering. They are encouraged to work in groups under supervision of the staff members of the department. Each group has to prepare a project proposal which consists of well defined objectives and methodology of the selected project and present the proposal to the staff members and other students.	1
Semester 2 Year 4		
Che 452 (Chemical Engineering Plant Design)	The hierarchical approach to conceptual synthesis and design of chemical processes. Selection of batch/continuous processes. Inputoutput and recycle structure of the process flowsheet. Separation system. Heat exchanger networks. Cost diagram. Preliminary process optimization. Process retrofit. Safety and waste minimization in process design. Process design project of a chemical plant.	3
Che 453 (Computer-aided Process Design for Chemical Engineer)	Application of process simulation software in the basic design of chemical engineering equipment and chemical process design. Process flowsheeting. Basic principle in process design. Application of process simulation software as a tool in chemical process and equipment design, Design of major unit operations in chemical engineering such as reactor, heat exchanger or distillation column. Selection of suitable physical property methods in simulation. Design vs rating of chemical engineering equipment. Equipment sizing. Analytical tools for optimum process design such as sensitivity analysis or optimization procedure.	3
Che 473 (Chemical Plant Safety)	Principles of chemical plant safety and loss prevention. Principle of safety management. Toxicology and chemical industrial hygiene. Toxic release and dispersion models. Fires and explosions. Design for prevent fire and explosion. Introduction to reliefs and relief sizing. Hazard Identification and risk assessment. Legislation and safety laws.	3
Che 485 (Chemical Engineering Project 2)	This course is the continuation of CHE 484. Students are guided by the staff members of the department to work as a team. They will learn how to make a plan and work accordingly. They have to prepare report after they have completed the experiments and analyzed results. Each group will have an oral examination.	3

Field in the AIMS Programme ☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism ☐ International Business ☐ Food Science and Technology ☑ Engineering ☐ Economics		
Name of Academic Programme:	Bachelor of Engineering Program in **Civil Engineering** (International Engineering)	
International Courses taught in English for exchanged undergraduate students		
Course/Subjects	Course Description and strengths	Credit

Semester 1 Year 1		
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functions The Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflextion points, Overview of curve sketching, Related rates, Indeterminated forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, Thedefinite intergrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution) Applications fo the Definite Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical shell method), Length of plane curves, Area of surfaces of revolution Improper Integraals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration Numerical integration ; Trapezoidal rule and simpson's rule Function of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extrema, Maxima and minima, Saddle points	3
Phy 103 (General Physics for Engineering Students 1)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3-dimensions. Newton' s laws of motion. Energy and work. Linear momentum. Rotation. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
Phy 191 (General Physics Laboratory 1)	A laboratory course that accompanies the topics covered in PHY 101/PHY 103.	1
Chm 103 (Fundamental Chemistry)	Stoichiometry. Basic of the atomic theory and electronic structures of atoms. Periodic properties. Chemical bonds. Representative elements. Nonmetal and transition metals. Properties of gas, solid liquid and solution. Chemical equilibrium. Ionic equilibrium, ionic equilibrium, chemical kinetics and electrochemistry.	3
Chm 160 (Chemistry Laboratory)	Practice on basic laboratory techniques in topics concurrent with CHM 103	1
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self-discipline, respect for democracy, public awareness, and harmonious co-existence	3
LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	3
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
Gen 101 (Physical	This course aims to study and practice sports for health, principles of exercise, care and	3

Education)	prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	
CVE 100 (Computer Programming for Civil Engineering)	Computer concepts, computer components, hardware and software interaction, EDP concepts, program design and development methodology, high-level language programming.	3
Semester 2 Year 1		
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
MTH 102 (Mathematics 2)	Scalars and vectors, Iner product, Vectors product, Scalar triple product, Line and Plane in 3-space Mathematical induction, Sequences, Series, The integral test, The comparison test, The ratio test, The alternating series and absolute convergenc tests, Binomial expansion, Power series, Taylor's formula Periodic functions, Fourier series, Polar coordinates, Areas in polar coordinates, Definite integral over plane and solid regions, Double integrals, Double integrals, Double integrals in polar form, Transformation of variabl in multiple integrasl, trpl integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates	3
PHY 104 (General Physics for Engineering Students 2)	Emphasized on the applications of the laws of physics. Electric fields. Gauss's law. Electric potential. Capacitance. Current and resistance. Circuits. Magnetic fields due to currents. Induction and inductance. Maxwell's equations. Electromagnetic oscillations and Ampere's law. Alternating current. Electromagnetic waves. Interference. Diffraction. Photon and matter waves. Atoms.	3
PHY 192 (General Physics Laboratory 2)	A laboratory course that accompanies the topics covered in PHY 102/ PHY 104.	1
CVE 111 (Engineering Drawing)	Instruments and their uses, applied geometry, lettering, freehand sketches, dimensions notes and tolerancing, orthographic projection of points and lines, planes, and solids, pictorial drawings; isometric and oblique drawing and sketching, perspective view, auxiliary view, section view. practices in drawings. detail and assembly drawings, details of civil engineering and system facilities drawings, basic computer-aided drawing.	3
CVE 131 (Engineering Mechanics 1)	System of forces (in plane and 3D) on particles and rigid bodies, equilibrium of rigid bodies, distributed forces, analysis of simple trusses and frames, forces in beams and cables, friction, principle of virtual work and stability.	3
Pre 151 (Engineering Materials)	Atomic and crystalline solids structure. Defects and imperfections in solids. Diffusion. Mechanical behavior and properties. Dislocation and strengthening mechanisms. Phase diagrams. Phase transformations and thermal processing of metals. Metallic and non-metallic materials structures and their applications including ferrous alloys, non-ferrous alloys. Ceramics, polymers, composite, etc. Corrosion and degradation of materials.	3
Semester 1 Year 2		
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3

LNG 108 (Content Based Language Learning)	This course is content-based. It integrates a variety of skills—listening, speaking, reading, writing, thinking—and enables English language learning through content area learning. The teaching requires cooperation from both content area teachers and the English language teacher to design learning activities that are highly learner-centered and dynamic. The content depends on the interest and needs of learners, or the requirements of the learners' academic departments.	3
MTH 201 (Mathematics 3)	Basic concepts: types, order, degree. First order equations: separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations. Higher order equations: linear equation, solution of linear equation with constant coefficients and with variable coefficients. Applications of first and second order equations. Laplace transforms, Introduction to Partial Differential Equations.Vectors: vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar field, divergence of a vector field, curl of a vector field. Vector integration: line integrals, surface integrals, volume integrals	3
CVE 233 (Mechanics of Materials)	Force and stress, stress-strain relationships, ductile and brittle failure, stress in beams, shear force and bending moment diagrams, deflection of beam, torsion, buckling of column. Mohr's circle and combined stress.	3
CVE 232 (Engineering Mechanics 2)	Kinematics and kinetics of particles: rectilinear and curvilinear motions, equation of motion, work and energy, impulse and momentum. Plane motion of rigid body : equation of motion, work and energy, impulse and momentum, introduction to vibration.	3
CVE 221 (Surveying)	Introduction to surveying work and leveling, error and class in surveying, principles and application of Theodolites, distance and direction measurement, error in surveying and acceptable error, data correction, triangulation; precise determination of azimuth, precise traverse plane coordinate system, precise leveling, topographic survey, map plotting; precise leveling, map projection, UTM coordinates and fundamental of GPS system.	3
CVE 223 (Surveying Practices)	Surveying practice will follow theorem in the lecture class. The practices emphasis on, how to get accuracy and precise field data in the required level of the theorem. First half of semester will start with horizontal distance measurement by tape, vertical distance measurement, vertical control traverse, profile leveling and cross-section leveling. The second half of semester starts with angle measurement and their application, vertical angle measurement, horizontal angle measurement, direction method, repetition method and repetition around a point, horizontal control traverse and producing topographic map.	1
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self- discipline, respect for democracy, public awareness, and harmonious co-existence.	3
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment, etc.	3
Semester 2 Year 2		
CVE 224 (Surveying Project)	Surveying project will be the practicing for application. It will start with horizontal control traverse, circular curve, compound circular curve, reverse curve and vertical curve. Then objects along the horizontal control traverse will be collect by Total Station for doing a digital topographic map.	1
CVE 225 (Surveying Field Camp)	An eighty hours field camp. Field exercises include: alignment survey and traverse, curve ranging, volume and area of earth work by profile and cross section, route survey and construction survey, contours, triangulation, topographic map. In addition to group field reports on each exercise.	1
CVE 236 (Civil Engineering Materials)	The fundamental engineering behaviors, properties, and introduction to material testing of various civil engineering materials, behaviors of steel and rebar, properties and characteristic of wood, classification and properties of cement, aggregates and concrete, properties and characteristic of asphalt, the fundamental behavior and	3

	properties of additional civil engineering materials	
CVE 237 (Structural Analysis 1)	Introduction to structural analysis: equilibrium of shear forces and moments in beam and frame, analysis of trusses. Deflections of beams and frames by methods of virtual work and strain energy, structures subjected to moving loads, influence lines, analysis of statically indeterminate structures by method of consistent deformation, concept of long span structures	3
CVE 281 (Fluid Mechanics)	Properties of fluid, fluid statics, macroscopic balance of mass, energy and momentum in steady incompressible flow, flow of inviscid fluid, similitude and dimensional analysis, phenomena of real fluid flow, steady incompressible flow in closed conduits, open channel flow, flow measurements.	3
CVE 361 (Engineering Geology)	Introduction to geology, mineral, rock and engineering rock classification, weathering, mass movement, ground water, structural geology, application of engineering geology in civil engineering works	2
CVE 240 (Applied Mathematics for Civil Engineers)	Introduction to probability and statistics, matrix, solution of linear and nonlinear equations by numerical methods, solution of partial differential equations by separation of variables and numerical methods.	3
Gen 121 (Learning and Problems Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be familiar with learning processes through projects based on their interest. These include setting up learning targets; defining the problems; searching for information; distinguishing between data and fact; generating ideas, thinking creatively and laterally; modeling; evaluating; and presenting the project.	3
Semester 1 Year 3		
CVE 335 (Cement and Concrete Materials)	History of cement, classification and properties of cements, aggregates, additives and admixtures, concrete mix design and quality control, testing of fresh and harden concrete and ingredients, properties of concrete, creep and shrinkage, guide to durable concrete, pozzolanic materials, introduction to high strength concrete.	3
CVE 338 (Structural Analysis 2)	General principles for statically indeterminate structures; degree of statically and kinematically indeterminacy, concepts of force and displacement methods, analysis of indeterminate structure by method of consistent deformation, theorem of Castigliano, three-moment equation, slope-deflection method, moment distribution, column analogy. Influence lines, introduction to matrix analysis of structure, Introduction to plastic analysis, approximate analysis.	3
CVE 362 (Soil Mechanics)	Soil formation, index properties and classification of soils, compaction, permeability of soils, principle of effective stresses within a soil mass, stress distribution, compressibility of soils, shear strength of soil, earth pressure theory, slope stability bearing capacity.	3
CVE 363 (Soil Mechanics Laboratory)	Soil boring, soil classification, Atterberg limits, grain size analysis, specific gravity, soil permeability test, compaction, field density, California bearing ratio, shear strength, unconfined compression test, direct shear test, unconsolidated undrained triaxial test, consolidation test.	1
CVE 385 (Hydrology)	Hydrologic cycle, watershed and measurements from topographic map, precipitation, streamflow, evaporation transpiration and evapotranspiration, infiltration, groundwater, hydrograph analysis and unit hydrograph theory, synthetic unit hydrograph, flood routing, probability concepts of hydrology, flood frequency analysis	3
CVE 394 (Hydraulics Laboratory)	Experimental works including presentation and analysis of results on fluid properties, fluid statics, principle of energy and momentum equation, energy loss in pipe, flow measurement in pipe, flow measurements in open channel, hydraulic jump, hydraulic machines.	1
CVE 311 (Engineering Management)	Principle of management, productivity improvement, human relation, safety, engineering and sustainable, commercial laws, principles of engineering economics and finance; marketing; project management	3
Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans and aesthetics amidst the diversity of global culture. It is concerned with the perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments	3
Semester 2 Year 3		
CVE 414 (Construction Estimating and Specifications)	Contract (FIDIC), specifications, bidding documents, principle of estimating, construction equipment and materials, profit, Budding and tendering, case study of cost estimating.	3
CVE 341 (Steel and	Study on structural properties of steel and timber, behavior and design of steel and	3

Timber Designs)	timber structures subjected to axial loads, bending moments, shear forces, and combined actions, design of joint connections of steel and timber structures, design of composite structures, design of built up members, design of plate girder, introduction to Load and Resistance Factor Design (LRFD), design practices, construction technique	
CVE 342 (Reinforced Concrete Designs)	Design concepts of strength design, in comparison with working stress design, properties of concrete and reinforcing steel bars, building codes requirements. Fundamental behavior in thrust, flexure, torsion, shear, bond and interaction among these forces. Design of reinforced concrete structural members by strength and working stress design concepts, design practice and detailing construction technique.	4
CVE 364 (Foundation Engineering)	Subsurface investigation, bearing capacity of foundation, spread and mat foundation design, pile and caisson foundation design, settlement analysis, earth pressure problems and retaining structures. Elementary of soil improvement construction technique.	3
CVE 371 (Highway Engineering)	Historical development of highways, department of highway administration. Principles of highway planning, traffic study. Geometric design and operations. Highway finance and economic, subgrade soils, flexible and rigid pavement design, highway materials, construction and maintenance of highways.	3
CVE 382 (Hydraulic Engineering)	Application of fluid mechanic principles to study and practice of hydraulic engineering. design and analysis of piping systems, water hammer, turbines and pumps, open channel flow and design, sediment transport in stream, reservoirs, dams, spillways, hydraulic models, drainage.	3
Semester 1 Year 4		
CVE 401 (Engineering Project Proposal 1)	Preparation of a proposal report showing objectives, concepts, methodology, work schedule and budgetary for a selected project in the field of civil engineering	1
Gen 351 (Thai Indigenous Knowledge)	This is a study of indigenous knowledge in different regions of Thailand with a holistic approach, including analyses from scientific, technological, social science and anthropological perspectives. Students will learn how to appreciate the value of indigenous knowledge and recognize the ways in which such knowledge has been accumulated—lifelong learning of indigenous people and knowledge transfer between generations. Students will learn to become systematic, self-taught learners.	3
Semester 2 Year 4		
CVE 402 (Civil Engineering Project)	Conduct the study of the approved project and present major findings in form of project report.	3
CVE 415 (Construction Management)	Project delivery system, organization and structure of construction industry, site layout, construction progress, scheduling tools: CPM, PERT, line of balance, network compression. project control: construction regulation, safety in construction . Human resource management, quality assurance system.	3

Field in the AIMS Programme

☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism
☐ International Business ☐ Food Science and Technology
☑ Engineering ☐ Economics

Name of Academic Programme:	Bachelor of Engineering Program in **Computer Engineering** (International Program)

International Courses taught in English for exchanged undergraduate students

Course/Subjects	Course Description and strengths	Credit
Semester 1 Year 1		
Gen 101 (Physical Education)	This course aims to study and practice sports for health, principles of exercise, care and prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	3
Gen 121 (Learning and Problem Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be familiar with learning processes through projects based on their interest. These include setting up learning targets; defining the problems; searching for information; distinguishing between data and fact; generating ideas, thinking creatively and laterally; modeling; evaluating; and presenting the project.	3

LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	
LNG 211 (Effective Listening	The aim of the course is to provide additional practice in English-language listening, in support of students' existing core discipline. The class concentrates on listening tips and strategies, with particular focus on note-taking skills. Emphasis is given to topics in the students' core discipline and the use of realistic recordings of conversations and lectures in their field of study.	3
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functions. The Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflextion points, Overview of curve sketching, Related rates, Indeterminated forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, Thedefinite intergrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution). Applications fo the Definite Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical shell method), Length of plane curves, Area of surfaces of revolution Improper Integraals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration Numerical integration ; Trapezoidal rule and simpson's rule Function of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extrema, Maxima and minima, Saddle points	3
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
MTH 102 (Mathematics	Scalars and vectors, Iner product, Vectors product, Scalar triple product, Line and Plane	3

2)	in 3-space. Mathematical induction, Sequences, Series, The integral test, The comparison test, The ratio test, The alternating series and absolute convergenc tests, Binomial expansion, Power series, Taylor's formula. Periodic functions, Fourier series, Polar coordinates, Areas in polar coordinates, Definite integral over plane and solid regions, Double integrals, Double integrals, Double integrals in polar form, Transformation of variabl in multiple integrasl, trpl integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates	
Phy 103 (General Physics for Engineering Students 1)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3-dimensions. Newton' s laws of motion. Energy and work. Linear momentum. Rotation. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
Chm 103 (Fundamental Chemistry)	Stoichiometry. Basic of the atomic theory and electronic structures of atoms. Periodic properties. Chemical bonds. Representative elements. Nonmetal and transition metals. Properties of gas, solid liquid and solution. Chemical equilibrium. Ionic equilibrium, ionic equilibrium, chemical kinetics and electrochemistry.	3
CPE 112 (Discrete Mathematics for Computer Engineers)	Basics of logic, relations, mathematical reasoning and logical reasoning, and propositional logic. Introduction to logic programming, graphs, trees, finite automata and context-free grammar, and the Turing machine. Introduction to the complexity analysis of algorithms and the number theory.	3
CPE 113 (Algorithms and Data Structure)	Introduction to data representation and structure, array, linked-listed, stacks and queues, trees, graphs, analysis of algorithms, recursion, sorting and searching algorithms, hashing, heap tree, binary search tree, AVL tree, breadth first search, dept first search, string processing, and data compression.	3
Semester 1 Year 2		
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
LNG 108 (Content Based Language Learning)	This course is content-based. It integrates a variety of skills—listening, speaking, reading, writing, thinking—and enables English language learning through content area learning. The teaching requires cooperation from both content area teachers and the English language teacher to design learning activities that are highly learner-centered and dynamic. The content depends on the interest and needs of learners, or the requirements of the learners' academic departments.	3
MTH 201 (Mathematics 3)	Basic concepts: types, order, degree. First order equations: separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations. Higher order equations: linear equation, solution of linear equation with constant coefficients and with variable coefficients. Applications of first and second order equations. Laplace transforms, Introduction to Partial Differential Equations. Vectors: vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar field, divergence of a vector field, curl of a vector field. Vector integration: line integrals, surface integrals, volume integrals	3
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment, etc.	3
CPE 214 (Signals and Systems)	Introduction to signal and system. Continuous-time signals and systems: mathematical representation of signals, frequency-domain representation of signals, time-domain representation of systems, transform-domain representation of systems and continuous-time system architecture. Discrete-time signals and systems: mathematical representation of signals, frequency-domain representation of signals, time-domain representation of systems, transform-domain representation of systems and discrete-time system architecture. First order and higher order differential equations. Frequency response, Fourier analysis and Laplace transforms	3

CPE 221 (Circuits and Electronics for Computer Engineers)	Electrical units and definitions; fundamental laws; natural response; forced response; complete response; power; RMS value; AC circuits and polyphase circuits. Introduction to semiconductor devices; diodes, bipolar junction transistor(BJT), field-effect transistor(FET). DC biasing and AC small-signal analysis of BJT and FET amplifiers, frequency response consideration, operational amplifiers, basic DC power supply, A/D and D/A conversions, some useful circuits.	3
CPE 222 (Circuit and Electronic Laboratory)	Using some electronic measuring equipment with safety considerations to experiment on some useful electrical and electronic circuits that coincide with the CPE 221 course.	2
Semester 2 Year 2		
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self-discipline, respect for democracy, public awareness, and harmonious co-existence	3
Pre 290 (Industrial Organization and Management)	The nature of management. The structure of organization and the industrial system. Product development and demand forecasting. Organization structure. Plant engineering and physical facilities planning. Industrial safety and production standard. Production planning and control. Material management. Budgetary and cost control. Quality planning and control. Work Improvement.	3
STA 302 (Statistics for Engineers)	Probability Theory; axioms for probability in discrete sample space, counting sample point, independent and dependent event. Bayes' Theorem, Binomial, Poisson, Normal distribution, Joint distribution. Distribution of Sums and Averages, Central Limit Theorem, Covariance and Correlation, Sampling Distribution : F-distribution, estimate and test of hypothesis. Least squares methods.	3
CPE 223 (Digital System Design)	Number systems, codes, logic gates, Boolean algebra, logic functions, multi-level combinational logic and simplification, flip-flops and related devices, sequential logic design and optimization, types of registers and counters including design and implementation, programmable and steering logic, PALs and PLAs, multiplexers and selectors, logic design in computer simulation program.	3
CPE 224 (Digital System Laboratory)	Experiments on digital circuit design using both simulation programs and actual circuits. The experiments consist of basic logic gates, clock generation circuits, counter circuits, encoder circuits, decoder circuits, shift register current, arithmetic circuits, multiplexer and demultiplexer circuits, digital-to-analog and analog-to-digital circuits, and design and implementation of Field Programmable Gate Array (FPGA) circuits.	2
CPE 231 (Principles of Programming Languages)	Programming language paradigms and the principle of programming language design are provided. The structure and design principles of programming languages consist of syntax and semantic, notion of type, role of variable declarations, bindings and scope, sequence control, subprogram control, and abstract data type. Four programming language paradigms include imperative programming, object-oriented programming, functional programming, and script programming.	3
Semester 1 Year 3		
CPE 223 (Computer Architecture and Systems)	Topics cover processor technology, input and output, memory hierarchy, interleaved memory, bus, cache, pipelined architectures, computer arithmetic, and multiprocessors technology. The course will also discuss machine instructions and assembly language to be applied to actual microprocessor design for physical control and data communications. Experiments focus on microcomputer, microprocessor and microcontroller interfacing with physical devices.	3
CPE 332 (Database and ERP Systems)	Introduction to the practical concepts in database system analysis, design and implementation. Hands-on experience will also be emphasized in developing front-end software for a backend database of a client-server, 3-tier architecture with web browser interface. Theoretical aspects of relational databases general to all database products will be the focus, while specific database products including Microsoft SQL, Oracle, and MySQL will be covered. Database concepts covered include data modeling, SQL, database design, normalization, multi-user databases, access standards such as ODBC, ADO, and XML. Concepts in Enterprise Resource Planning will be covered throughout such as manufacturing, MRP, finance, human resource management, and inventory management.	3
CPE 3xx (Computer Engineering Elective 1)		3
Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans and aesthetics amidst the diversity of global culture. It is concerned with the	3

	perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments	
LNG 212 (Oral Presentation Skills)	The aim of the course is to reinforce knowledge of the basic elements of effective oral presentation. Importance of verbal and non-verbal communication will be highlighted throughout the course. Training on pronunciation, the use of transition signals and effective use of visual aids will also be focused. Self and peer assessment will also be encouraged to foster further improvement.	3
Pre 380 (Engineering Economy)	Basic concepts in economic analysis. Cost concepts. Time value of money. Measuring the worth of investment comparison of alternatives. Depreciation and income tax consideration. Replacement analysis. Decision making under risk and uncertainly. Break-even analysis.	3
Semester 2 Year 3		
CPE 301 (Seminar)	Under the supervision of faculty members, each student works independently, selects a topic from an academic paper in computer engineering, and prepares for a presentation and discussion in class. The selected topic may be related to the project topic in CPE 402.	1
CPE 333 (Software Engineering)	This course introduces students to principles and techniques used to create functionally correct, easy to use, robust, reliable, and maintainable software systems. The course covers all phases of the software development lifecycle, focusing on practical approaches that can be applied in each phase. Lectures are supplemented by homework assignments to encourage problem-based learning. The course also includes a team-based collaborative term project that requires students to analyze a proposed software system and produce a set of development artifacts typical of a real-world software development project.	3
CPE 334 (Operating Systems)	Theoretical aspects of Operating systems: memory management, process management, I/O management, and information management. Issues on Job Control Language, Assembler, Loader, and Linker are covered. Some operating systems, compilers, interpreters and utilities are studied in detail.	3
CPE 341 (Computer Networks)	Fundamental concepts and protocols in computer communication networks, particularly IP networks. Packet switching and circuit switching networks, layered network architectures. Application layer protocols, socket programming, TCP/IP protocol suite, unicast and multicast routing protocols, link layer protocols and multiple access networks. Wired and wireless local area network standards, and basic mobile Internet protocols.	3
Gen 351 (Thai Indigenous Knowledge)	This is a study of indigenous knowledge in different regions of Thailand with a holistic approach, including analyses from scientific, technological, social science and anthropological perspectives. Students will learn how to appreciate the value of indigenous knowledge and recognize the ways in which such knowledge has been accumulated—lifelong learning of indigenous people and knowledge transfer between generations. Students will learn to become systematic, self-taught learners.	3
CPE 3xx (Computer Engineering Elective 2)		3
LNG 213 (Laboratory Report Writing)	The aim of the course is to reinforce knowledge of the basic elements of writing at the sentence, paragraph and essay level as well as to enable students to write a report in a format appropriate to their content-area courses e.g. a lab report. Grammar and organization will be combined with student practice at every step. In addition, the class will cover an introduction to summarizing and paraphrasing skills in order to reinforce students' awareness of problems about plagiarism.	3
Semester 1 Year 4		
CPE 442 (Computer Engineering Project 1)	Students work in groups of 1-3 persons under the supervision of faculty members. Each group is encouraged to develop and design a systematic method to investigate and solve computer and information technology related problems that demand theoretical backing. The objective is to have students gain experience in systems development for a relatively large size project.	3
CPE 442 (Computer Network Laboratory)	Experiments supporting the study of computer networking protocols. Network protocol analyzer software, basic router configuration commands, network interface and routing protocol configuration in computers and routers for IP networking. Analysis of TCP protocols, IP routing and addressing protocols. Operations of application layer protocols and network management protocols.	2
CPExxx (Computer Engineering Elective 3)		3

Genxxx (General Education Elective)		3
XXXxxx (Free Elective)		3
Semester 2 Year 4		
CPE 403 (Computer Engineering Project 2)	Continuation and the completion of the project initiated in CPE 402 course.	3
CPExxx (Computer Engineering Elective 4)		3
XXXxxx (Free Elective 2)		3

Field in the AIMS Programme ☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism ☐ International Business ☐ Food Science and Technology ☑ Engineering ☐ Economics		
Name of Academic Programme:	Bachelor of Engineering Program in **Electrical Communication and Electronic Engineering** (International Program)	
International Courses taught in English for exchanged undergraduate students		
Course/Subjects	Course Description and strengths	Credit
Semester 1 Year 1		
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	3
Chm 103 (Fundamental Chemistry)	Stoichiometry. Basic of the atomic theory and electronic structures of atoms. Periodic properties. Chemical bonds. Representative elements. Nonmetal and transition metals. Properties of gas, solid liquid and solution. Chemical equilibrium. Ionic equilibrium, ionic equilibrium, chemical kinetics and electrochemistry.	3
Chm 160 (Chemistry Laboratory)	Practice on basic laboratory techniques in topics concurrent with CHM 103	1
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functions The Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflextion points, Overview of curve sketching, Related rates, Indeterminated forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, Thedefinite intergrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution). Applications fo the Definite Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical	3

	shell method), Length of plane curves, Area of surfaces of revolution Improper Integraals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration. Numerical integration ; Trapezoidal rule and simpson's rule. Function of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extrema, Maxima and minima, Saddle points	
Phy 103 (General Physics for Engineering Students)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3-dimensions. Newton' s laws of motion. Energy and work. Linear momentum. Rotation. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
Phy 191 (General Physics Laboratory)	A laboratory course that accompanies the topics covered in PHY 101/PHY 103.	1
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others, tolerance, acceptance of differences, self-discipline, respect for democracy, public awareness, and harmonious co-existence	3
Semester 2 Year 1		
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
Phy 104 (General Physics for Engineering Student 2)	Emphasized on the applications of the laws of physics. Electric fields. Gauss' law. Electric potential. Capacitance. Current and resistance. Circuits. Magnetic fields due to currents. Induction and inductance. Maxwell's equations. Electromagnetic oscillations and Ampere's law. alternating current. Electromagnetic waves. Interference. Diffraction. Photon and matter waves. Atoms.	3
Phy 192 (General Physics Laboratory 2)	A laboratory course that accompanies the topics covered in PHY 102/PHY 104.	1
Gen 101 (Physical Education)	This course aims to study and practice sports for health, principles of exercise, care and prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	3
EIE 104 (Electric Circuit Theory)	Circuit elements. Electric circuit theory and analysis methods: Kirchhoff's laws, Node and Mesh Analysis, Thevenin and Norton equivalent circuit, superposition theorem. Analysis of circuits with DC and sinusoidal signals. Phasors, phasor diagram and complex frequency. Power and energy. Three phase circuit analysis. Two port network theory.	3
MEE 111 (Engineering Drawing)	Instruments and their use. Applied geometry. Lettering. Orthographic drawing and sketching. Dimensions and notes. Orthographic projection of points, lines, planes, and solids. Auxiliary view : points and lines; planes and solids. Pictorial drawing : Isometric and oblique drawing and sketching. Sections and conventional practice. Drawing and the shop. Dimensioning standard features, dimensions of size, location and correlation. Surface texture. Fits and tolerance. Geometric tolerance. Screw threads, threaded fasteners, keys and splines, rivets and welding. Gears. Springs. Working drawing : assembly, details, Introduction to computer aided drafting	3
MEN 111 (Engineering Materials)	Atomic structure and bonding, crystal structure and geometry, solidification, crystalline defect and imperfections and diffusion in solids, thermal and electrical properties of	3

	materials, mechanical properties of metals and phase diagram, phase transformations and heat treatment, carbon and alloy steel, non-ferrous metals and alloys, polymeric materials, thermoplastic, elastomers, thermosetting, ceramics and glass, composite materials, failure, fatigue and creep. Oxidation, corrosion and other effects, design and materials selection process.	
Semester 1 Year 2		
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
LNG 108 (Content Based Language Learning)	This course is content-based. It integrates a variety of skills—listening, speaking, reading, writing, thinking—and enables English language learning through content area learning. The teaching requires cooperation from both content area teachers and the English language teacher to design learning activities that are highly learner-centered and dynamic. The content depends on the interest and needs of learners, or the requirements of the learners' academic departments.	3
MTH 201 (Mathematics 3)	Basic concepts: types, order, degree. First order equations: separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations. Higher order equations: linear equation, solution of linear equation with constant coefficients and with variable coefficients. Applications of first and second order equations. Laplace transforms, Introduction to Partial Differential Equations. Vectors: vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar field, divergence of a vector field, curl of a vector field. Vector integration: line integrals, surface integrals, volume integrals	3
Gen 121 (Learning and Problems Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be familiar with learning processes through projects based on their interest. These include setting up learning targets; defining the problems; searching for information; distinguishing between data and fact; generating ideas, thinking creatively and laterally; modeling; evaluating; and presenting the project.	3
EIE 205 (Electronic Engineering Practice)	A course of electrical practice designed on basic measurement using multimeter and oscilloscope, Printed Circuit Board (PCB) design, soldering and electronic circuit assembly.	1
EIE 208 (Electrical Engineering Mechanics)	Complex numbersystems and complex functions. Matrices: basic matrix operations, eigenvectors and similarity, characteristic equations, diagonalization, canonical forms. Introduction to fields and vector space. Signals and Fourier Transform (FT): continuous and discrete signals, trigonometric Fourier series, complex Fourier series, Fourier integral, signal analysis with FT. Systems and Laplace Transform (LT): Linear system characteristics and representations, initial-state response, zero-state response, zero-input response, transient and steadystate response, impulse response, and system analysis with LTand FT.	3
EIE 210 (Electronic Devices and Circuit Design 1)	Principle of electron tube operation, basic semiconductor physics and P-N junction theory. Diode and zener diode characteristics and applications; wave shaping circuits, simple DC power supplies and DC voltage multiplier circuit design. Bipolar junction transistor (BJT) and field effect transistor (FET); Operations, characteristics, specifications, and DC biasing techniques. Analysis and design of BJT and FET amplifiers. Operational amplifier (op-amp): characteristics, specifications, and applications	3
EIE 231 (Digital Circuits and Logic Design)	Number systems and computer arithmetic. Computer codes; Binary code, BCD code, Gray code ASCII code, etc. Boolean algebra and truth table. Analysis and synthesis of combination logic: switching functions, canonical forms, Karnough's map, Quine-McCluskey's method, hazards, multi-level NAND-NOR Circuits. Typical combination logic functions using logic gates. Analysis and synthesis of sequential logic: asynchronous and synchronous sequential circuits. State transition diagrams, state tables, state assignments, minimization of states, flipflop implementations. Typical sequential of logic functions using flip-flops: latch, registers, shift registers counters. Logic design for sequence control applications, typical programmable logic controller functions and	3

	programming.	
Semester 2 Year 2		
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment, etc.	3
EIE 201 (Electrical Systems and Safety)	Generation, transmission and distribution of electrical energy systems. Selection of wire and cable conductor according to permissible against physical damage temperature rise and voltage drop. Wiring regulations for electrical installation. Electrical installation in industrial and building relate to safety; panel board, metering equipment fuses and circuit balances protection of conductor against overloads, motors and electric shock, grounding systems calculation and design considerations for office building and industrial lighting.	3
EIE 207 (Basic Electrical and Electronic Laboratory)	Experiments on fundamental laws and concepts of electrical and electronic engineering, electrical and electronic measurements.	1
EIE 206 (Computer Languages and Applications for Electrical Communication and Electronic Engineering)	This course introduces some computer languages and applications that are necessary for studying and working in the field of Electrical Communication and Electronic Engineering, programming languages include C, JAVA, etc., applications that help calculating and analyzing data, simulation, and applications for circuit design and drawing, the use of the internet for data acquisition, etc.	3
EIE 211 (Electronic Devices and Circuit Design 2)	Analysis and design of selected electronic circuits for communications and instrumentation by using discrete and IC devices; theory of operations, characteristics and specifications of the devices, frequency response, feedback, oscillator, noise reduction in electronic circuits and printed circuit design techniques.	3
MEE 214 (Engineering Mechanics)	Introduction to Statics. Force system and equilibrium. General consideration on structure. Friction and virtual work. Introduction to dynamics. Kinematics and kinetics of particles. Kinetics of system of particles.	3
EIE 221 (Principles of Communication Systems)	Signal classification (random, periodic and nonperiodic) and transformation: Fourier series and Fourier transform. Analog signal transmission and reception: AM, FM and PM. Analog to digital conversion: pulse code modulation (PCM) including sampling theory and quantization, delta modulation. Baseband digital transmission (binary and multidimensional). Digital transmission via carrier modulation and demodulation: ASK, FSK, PSK. Multiplexing techniques: time division multiplexing (TDM) and frequency division multiplexing (FDM).Source and channel encoding.	3
EIE 240 (Electrical and Electronic Management)	Basic concepts of experimental methods regards as measurement: accuracy, precision. Calibrations, standard and treatment of data, principles of operation, characteristics, as well as appropriate range extension for electrostatic, permanent magnet moving-coil, moving iron, electrodynamics, induction etc. AC/DC bridges and potentiometer. Operation principles and characteristics of instruments for power measurement: phase – sequence indicator, power-factor meter, single and poly-phase wattmeter, var meter and watt-hour meter. Basic principle of oscilloscope, introduction to digital instrument: digital voltmeter, digital multimeter and counter.	3
XXXxxx (Free Elective 1)		3
XXXxxx (Free Elective 2)		3
Semester 1 Year 3		
Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans and aesthetics amidst the diversity of global culture. It is concerned with the perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments	3
EIE 301 (Introduction to Probability and Random Processes for Engineers)	Definition, scope and history of probability, limitation of classical and relative frequency-based definitions, set, field, sample space and events, axiomatic definition of probability, combinatorics, joint and conditional probabilities, independence, total probability, Bayes' rule and applications, definition of random variables, continuous and discrete random variables, cumulative distribution function (cdf), probability mass function, moment, expectation, some special distributions for engineer.	3
EIE 312 (Electronic	Experiments on operations, characteristics and some applications of discrete electronic	1

Engineering Laboratory)	devices, operational amplifier and digital circuits.	
EIE 325 (Electromagnetic Field and Waves)	Three-dimensional vector analysis for engineers. Electrostatic fields: Coulomb's law and electric field intensity, electric flux density, Gauss's law and divergence, energy and potential, conductors, dielectrics and capacitance, Poisson and Laplace equations. Steady magnetic fields: Magnetostatic fields: Biot-Savart's laws, Ampere's circuitry law, curl and Stoke's theorem, magnetic flux density, magnetic forces, materials and inductance. Time-varying fields and Maxwell's equations: Faraday's law, Maxwell's equation, retarded potentials. Uniform plane wave, motion of wave in dielectrics and conductors, skin depth, pointing vector and power of wave, incident and reflection of uniform plane waves, standing wave ratio, transmission line equation and parameters, Smith's chart, waveguide.	3
EIE 326 (Electronic Communication)	Element of radio systems. Modulation and demodulation: AM, FM, PM. Noises and their influences in the radio systems. Radio receiver circuits: AM, FM, PM. Single sideband techniques. Frequency synthesis techniques. Communication techniques in modern radio equipment. Television. Introduction to digital communication. Spread spectrum communication.	3
EIE 334 (Microprocessors)	Introduction to digital computer system, microprocessor system and general structure, machine and instruction cycle, general bus structure, instruction flow in CPU, data flow in microprocessor, registers and counters used in microprocessor. Selected popular microprocessor architecture and instruction set, addressing mode in microprocessor. Examples of useful subroutines such as binary addition and subtraction, binary multiplication and division, BCD to binary and binary to BCD conversions, microprocessor memory, I/O instruction, I/O interrupt, parallel and serial I/O transfer method, programmable I/O interface.	3
Semester 2 Year 3		
Gen 351 (Modern Management and Leadership)	This course examines the modern management concept including basic functions of management—planning, organizing, controlling, decision-making, communication, motivation, leadership, human resource management, management of information systems, social responsibility—and its application to particular circumstances.	3
EIE 314 (Advanced Electronics Laboratory)	A laboratory course to accompany the topic, covered in EIE 211 and EIE 231.	1
EIE 324 (Communication and Telecommunication Laboratory)	Experiments on basic communications and telecommunications both systems and circuits: AM and FM modulation/ demodulation, pulse modulation, digital communication, optical communication and microwave communication experiments.	1
EIE 335 (Digital Circuit and Microprocessor Laboratory)	Experiments on digital circuit design, microprocessor programming, microprocessor interfacing, and microprocessorbased systems.	1
EIE 341 (Linear Control Systems)	Systems stability. Routh's stability criterion. Dynamic analysis: characteristics function, Root-locus method, frequency response method, Bode plots, Polar plots, Nyquist stability criteria, M-circles, N-circles and Nichols chart. Control system design: lead, lag and lead-lag compensation PID controllers.	3
EIE 373 (Co- operative Preparation)	Principles, concepts, and processes of co-operative education including related rules or regulations. Proper communication and human relations in workplace. Presentation techniques. Formal report writing. Studying problems faced by the industries in the area of telecommunication or electronic engineering for the co-operative study.	1
EIExxx (Elective 1)		3
EIExxx (Elective 2)		3
EIExxx (Elective 3)		3
Semester 1 Year 4		
EIE 479 (Co-operative Study)	Self-learning and practicing essential skills in telecommunication or electronic engineering in an industrial firm. Acquiring experiences and conceptual thinking as a professional engineer. Analyzing the problems and solving them via the theoretical and the practical approaches. Executing the proposed plan to solve the project problem. Completing a final oral presentation and submitting a final report.	6
Semester 2 Year 4		
EIE xxx (Elective 4)		3
EIE xxx (Elective 5)		3
EIE xxx (Elective 6)		3
EIE xxx (Elective 7)		3
Genxxx (General		3

Education Elective 1)		
Genxxx (General Education Elective 2)		3
Pre 380 (Engineering Economics)	Basic concepts in engineering economic. Cost concepts based on activity and quality. Time value of money. Measuring the worth of investment comparison of alternatives. Depreciation and income tax consideration. Replacement analysis. Decision making under risk and uncertainty. Break-even analysis.	3

Field in the AIMS Programme ☐ Agriculture ☐ Language and Culture ☐ Hospitality and Tourism ☐ International Business ☐ Food Science and Technology ☑ Engineering ☐ Economics		
Name of Academic Programme:	Bachelor of EngineeringProgram in **Environmental Engineering** (International Program)	
International Courses taught in English for exchanged undergraduate students		
Course/Subjects	Course Description and strengths	Credit
Semester 1 Year 1		
CPE 100 (Computer Programming for Engineers)	Lecture: Introduction to the components of a computer system, hardware/software interactive, EDP concepts, and program development including flowcharts, data and structure variables, mathematical and logical operations, input/output, user interfacing, structured programming, decisions and repetitive loop structures, subprograms with functions and procedures, structure type declarations, arrays, records, file processing. Lab: Design, development and testing of programs to solve case problems related to that given in the lectures.	3
CVE 111 (Engineering Drawing)	Instruments and their uses, applied geometry, lettering, sketching dimensions and notes, orthographic projection of points and lines, planes, and solids, isometric and oblique drawing and sketching perspective view, auxiliary view: points and lines, planes and solids, sections and conversion, Practices in drawing.	3
LNG 106 (Academic Listening and Speaking)	This course aims at developing academic listening and speaking skills necessary for learners in international programs. The teaching and learning styles involve an integration of English with content areas related to the learners' fields. The course aims to enable learners to be able to listen to English lectures in their fields, ask and appropriately respond to questions, share ideas and express opinions, and read and summarize text. Learners will discuss and lead a discussion, make an effective oral presentation, and actively participate in the session.	3
LNG 105 (Academic English for International Students)	The course aims at developing academic English skills necessary for learners in an international program. The learning and teaching involves the integration of the four language skills, thinking skills and autonomous learning. In terms of reading, the course focuses on academic reading, reading for main ideas, summarizing skills, critical reading and interpretation skills. In terms of writing, the emphasis is on process writing and academic writing to enable learners to effectively use the information gained from reading to support their statements, and to use appropriate citation to avoid plagiarism. Learners are also going to use dictionaries, grammar books, and appropriate information and communication technology to assist their writing. In terms of speaking, the focus is on impromptu situations, oral presentation, and the sharing and exchanging of ideas on issues related to the learners' content areas. In terms of listening, the focus is on listening to English lectures and taking notes.	3
Pre 151 (Engineering Materials)	Atomic and crystalline solids structure; Defects and imperfections in solids; Diffusion. Mechanical behavior and properties; Dislocation and strengthening mechanisms. Phase diagrams; Phase transformations and thermal processing of metals; Metallic and non-metallic materials structures and their applications including ferrous alloys, non-ferrous alloys. Ceramics, polymers, composite, etc.; Corrosion and degradation of materials.	3
Mth 101 (Mathematics 1)	Limits and Continuity : The concept of limit, computation of limits, Limits involving infinity, continuity, Limits and continuity of trigonometric functionsThe Derivative : Slopes and rates of change, The derivative, The chain rule, Higher order derivatives, Derivatives of transcendental functions (Trigonometric, Inverse trigonometric, Logarithmic, Exponential, and Hyperbolic functions), Implicit differentiation, Differentials, Linear approximations, The mean value theorem Applications of Differentiation : maximum and minimum values, Applied maximum and minimum problems, Increasing and decreasing functions, Concavity and inflextion points,	3

	Overview of curve sketching, Related rates, Indeterminated forms and L'Hopital's rule Integration : Antiderivatives and indefinite integrals, Thedefinite intergrals, Average values and the fundamental theorem of calculus, Integration by substitution, Techniques of integration 9integration by parts, Integration of rational functions using partial fractions, Trigonometric techniques of integration : Integrals involving powers of trigonometric functions, Trigonometric substitution). Applications fo the Definite Integral : Area between curves, Volume of solids of revolution (Disc method, Cylindrical shell method), Length of plane curves, Area of surfaces of revolution Improper Integraals : improper integrals with infinite intervals of integration, Improper integrals with infinite discontinuities in the interval of integration, Improper integrals with infinite discontinuities over intervals of integration Numerical integration ; Trapezoidal rule and simpson's rule. Function of several variables : Graph of equation, Limit and continuity, Partial derivative, Differentials, Chain rule, Critical points, Second order partial derivative, Relative extrema, Maxima and minima, Saddle points	
Phy 103 (General Physics for Engineering Students)	Emphasized on the applications of the laws of physics. Vectors. Motions in 1-, 2-, and 3-dimensions. Newton' s laws of motion. Energy and work. Linear momentum. Rotation. Torque and angular momentum. Equilibrium and elasticity. Fluids. Oscillations. Waves and sound. Thermodynamics. The kinetic theory of gases.	3
Phy 191 (General Physics Laboratory)	A laboratory course that accompanies the topics covered in PHY 101/PHY 103.	1
Semester 2 Year 1		
Chm 103 (Fundamental Chemistry)	Stoichiometry. Basic of the atomic theory and electronic structures of atoms. Periodic properties. Chemical bonds. Representative elements. Nonmetal and transition metals. Properties of gas, solid liquid and solution. Chemical equilibrium. Ionic equilibrium, ionic equilibrium, chemical kinetics and electrochemistry.	3
Chm 160 (Chemistry Laboratory)	Practice on basic laboratory techniques in topics concurrent with CHM 103	1
CVE 131 (Engineering Mechanics 1)	System of forces (in plane and 3D) on particles and rigid bodies, equilibrium of rigid bodies, distributed forces, analysis of simple trusses and frames, forces in beams and cables, friction, principle of virtual work and stability.	3
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
LNG 211 (Effective Listening	The aim of the course is to provide additional practice in English-language listening, in support of students' existing core discipline. The class concentrates on listening tips and strategies, with particular focus on note-taking skills. Emphasis is given to topics in the students' core discipline and the use of realistic recordings of conversations and lectures in their field of study.	3
MTH 102 (Mathematics 2)	Scalars and vectors, Iner product, Vectors product, Scalar triple product, Line and Plane in 3-space. Mathematical induction, Sequences, Series, The integral test, The comparison test, The ratio test, The alternating series and absolute convergenc tests, Binomial expansion, Power series, Taylor's formula. Periodic functions, Fourier series, Polar coordinates, Areas in polar coordinates, Definite integral over plane and solid regions, Double integrals, Double integrals, Double integrals in polar form, Transformation of variabl in multiple integrasl, trpl integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates	3
PHY 104 (General Physics for Engineering Students 2)	Emphasized on the applications of the laws of physics. Electric fields. Gauss's law. Electric potential. Capacitance. Current and resistance. Circuits. Magnetic fields due to currents. Induction and inductance. Maxwell's equations. Electromagnetic oscillations and Ampere's law. Alternating current. Electromagnetic waves. Interference. Diffraction. Photon and matter waves. Atoms.	3
PHY 192 (General Physics Laboratory 2)	A laboratory course that accompanies the topics covered in PHY 102/ PHY 104.	1
Gen 111 (Man and Ethics of Living)	This course studies the concept of living and working based on principles of religion, philosophy, and psychology by fostering students' morality and ethics through the use of knowledge and integrative learning approaches. Students will be able to gain desirable characteristics such as faithfulness, social responsibility, respect of others,	3

	tolerance, acceptance of differences, self- discipline, respect for democracy, public awareness, and harmonious co-existence.	
Semester 1 Year 2		
CVE 233 (Mechanics of Materials 1)	Tension, compression and shear, Analysis of stress and strain, Torsion, Shear force and bending moment, Deflections of beams, Theory of columns.	3
MTH 201 (Mathematics 3)	Basic concepts: types, order, degree. First order equations: separation of variable, homogeneous equations, exact & non-exact equations, integrating factor, first order linear equations, Bernoulli's equations. Higher order equations: linear equation, solution of linear equation with constant coefficients and with variable coefficients. Applications of first and second order equations. Laplace transforms, Introduction to Partial Differential Equations. Vectors: vector function, curves, tangent, velocity and acceleration, curvature and torsion of a curve, directional derivative, gradient of scalar field, divergence of a vector field, curl of a vector field. Vector integration: line integrals, surface integrals, volume integrals	3
Gen 121 (Learning and Problems Solving Skills)	This course aims to equip students with the skills necessary for life-long learning. Students will learn how to generate positive thinking, manage knowledge and be familiar with learning processes through projects based on their interest. These include setting up learning targets; defining the problems; searching for information; distinguishing between data and fact; generating ideas, thinking creatively and laterally; modeling; evaluating; and presenting the project.	3
Gen 101 (Physical Education)	This course aims to study and practice sports for health, principles of exercise, care and prevention of athletic injuries, and nutrition and sports science, including basic skills in sports with rules and strategy from popular sports. Students can choose one of several sports provided, according to their own interest. This course will create good health, personality and sportsmanship in learners, as well as develop awareness of etiquette of playing, sport rules, fair play and being good spectators.	3
Gen 231 (Miracle of Thinking)	This course aims to define the description, principle, value, concept and nature of thinking to enable developing students to acquire the skills of systematic thinking, systems thinking, critical thinking and analytical thinking. The Six Thinking Hats concept is included. Moreover, idea connection/story line and writing are explored. Examples or case studies are used for problem solving through systematic thinking using the knowledge of science and technology, social science, management, and environment, etc.	3
ENV 211 (Environmental Chemistry)	Fundamental principles of environmental, atomic theory, chemical bonding and structure, reactions, thermochemistry, chemical equilibrium, acid-base equilibrium, chemical kinetics, electrochemistry, metals and solid state materials. Chemical and physical characteristics of water and wastewater. Applications of basic principles for water chemistry, atmospheric chemistry, geochemistry, organic chemistry and nuclear chemistry.	3
ENV 213 (Surveying for Environmental Engineering)	Fundamentals and concepts of engineering survey. Distance and direction measurements, leveling, contour. Error in surveying, acceptable error and data collection. Introduction to the capabilities and techniques of usage of theodolites and develop the basic usage skills, horizontal and vertical angles, triangulation, precise determination of azimuth, precise transverse plane coordinate system, precise leveling, area and volume determinations. Fundamentals and practical skills of positioning, global position systems, computer aided drafting-topographic and pollution map.	3
Semester 2 Year 2		
LNG 107 (Academic Reading and Writing)	The course aims at developing academic reading and writing skills necessary for learners in international programs. The teaching and learning styles involve an integration of English into learners' content areas to enable them to read academic articles in their chosen fields. Learners will be able to extract main points from the text, purposefully select required information to support their writing, write different forms of reports in their fields, use information obtained from reading and their own experiment in writing an essay, and effectively use references and citations throughout the writing process.	3
LNG 108 (Content Based Language Learning)	This course is content-based. It integrates a variety of skills—listening, speaking, reading, writing, thinking—and enables English language learning through content area learning. The teaching requires cooperation from both content area teachers and the English language teacher to design learning activities that are highly learner-centered and dynamic. The content depends on the interest and needs of learners, or the requirements of the learners' academic departments.	3
Gen 241 (Beauty of Life)	This course aims to promote the understanding of the relationship between humans	3

	and aesthetics amidst the diversity of global culture. It is concerned with the perception, appreciation and expression of humans on aesthetics and value. Students are able to experience learning that stimulates an understanding of the beauty of life, artwork, music and literature, as well as the cultural and natural environments	
CVE 281 (Fluid Mechanics)	Properties of fluid, fluid statics, macroscopic balance of mass, energy and momentum in steady incompressible flow, flow of in viscid fluid, similitude and dimensional analysis, phenomena of real fluid flow, steady incompressible flow in closed conduits, open channel flow, flow measurements.	3
ENV 214 (Environmental Engineering Statistics)	Role of statistics in environmental engineering. Environmental sampling, sampling and non-sampling errors, systematic sampling, ratio estimation, choosing sample sizes, data quality objective process. Models for data, statistical, linear regression and generalised linear models, discrete and continuous statistical distribution. Drawing conclusion from data, observational and experimental studies, true and quasiexperiments, design-based and model-based inference, test of significance and confidence interval. Environmental monitoring, purposely chosen monitoring site, designed based on optimisation, detection of changes by analysis of variance and Chi-squared test	3
ENV 215 (Environmental Biology)	Basic concepts of cell and its structure. Principles of bacteriology, growth, control and metabolism. Biodegradation of organic compounds and actions of enzymes as related to stabilisation of organic matter. Fundamental concepts related to energy, food chain, productivity and limiting factors. Basic concepts of ecology, stream ecology, biota dymanics in wastewater treatment environment. Roles of microorganisms in biological wastewater treatment systems, aerobic and anaerobic processes, nutrient removal. Biodegradation of xenobiotics in biological treatment systems.	3
ENV 212 (Laboratory of Water Analysis in Environmental Engineering)	Introduction to methods for determination of water and wastewater characteristics, sample collection and preservation. Skill practices for reliable analysis of water quality and wastewater characteristics. Basic instrumentation applications. Laboratory analysis of water and wastewater characteristics e.g. solids, DO, BOD, COD, nitrogen, phosphorus, etc. Technic for general microbiological analysis, e.g. sterile techniques, microscopic observation, dye staining, measure of cell growth, determination of coliform bacteria, etc. Data interpretation and application of data to environmental engineering practice e.g. water treatment system, neutralisation, chemical coagulation, water softening and activated carbon adsorption.	3
Genxxx (General Education Elective		3
Semester 1 Year 3		
CVE 362 (Soil Mechanics)	Soil information, index properties and classification of soils, compaction, permeability of soils and seepage problems, principle of effective stresses within a soil mass, stress distribution, shear strength of soil, earth pressure theory, compressibility of soils, slope stability	3
CVE 363 (Soil Mechanics Laboratory)	Boring soil classification, Atterberg limits, grain size analysis (sieve and hydrometer), specific gravity, permeability, compaction, field density, California bearing ratio, shear strength, unconfined compression test, direct shear test, unconsolidated undrained triaxial teat, consolidation test.	1
CVE 385 (Hydrology)	Hydrologic cycle, hydrometeorology: precipitation, evaporation and evapo-transpiration, streamflow, probability concepts in hydrology, infiltration, Groundwater: rainfall-runoff relationship, hydrograph analysis and unit hydrograph theory, flood routing, Introduction to catchment modelling	3
EEE 100 (Electrotechnology Power)	Magnetic aspects of electrical machines: magnetism, magnetic circuits, magnetic core losses. Voltage induced in a conductor as sinusoidal wave, phasor representation. Active, reactive and apparent power in single and three- phase circuits. Single and three- phase transformers. Direct current and alternating generators: construction, induced voltage, efficiency. Direct current and alternating motors: construction, efficiency, speed control, forward and reverse control, selection, application, maintenance. Electrical measurements. Introduction of semiconductor devices for power electronics.	3
ENV 343 (Building Sanitation)	Fundamentals of building sanitation, laws and regulations. Design of cold water supply system, hot water supply system, waste and vent pipe system, fire protection system, site drainage, wastewater treatment and solid waste management for individual building. Design concepts and options for increased sustainability. Integrated concepts of environmental friendly and energy saving materials.	3
Gen 351 (Modern Management and	This course examines the modern management concept including basic functions of management—planning, organizing, controlling, decision-making, communication,	3

Leadership)	motivation, leadership, human resource management, management of information systems, social responsibility—and its application to particular circumstances.	
XXXxxx (Free Elective)		3
Semester 2 Year 3		
CVE 382 (Hydraulic Engineering)	Design and analysis of piping systems, water hammer, turbines and pumps, open channel flow and design, sediment transport in stream, reservoirs, dams, spillways, hydraulic models, drainage.	3
CVE 394 (Hydraulic Laboratory)	Experimental works including presentation and analysis of results on flow phenomena, methods of flow control, calibration and uses of flow measuring devices.	1
ENV 341 (Unit Operation in Environmental Engineering)	Principles, designs and applications of physical and chemical unit operations in water and wastewater treatment, mixing, sedimentation, floatation, filtration, equalisation, coagulation and flocculation, chemical precipitation, ion-exchange, absorption and adsorption, aeration and mass transfer opertations.	3
ENV 342 (Water Supply Engineering)	Importance of water, nature and sources of water. Water crisis related to environment. Estimating of water demand, requirement and consumption in household, industrial, and public units. Estimating the quantities of natural raw water resources, river, lake and groundwater. Evaluation of surface and groundwater quality and standards. Criteria for selecting water sources for water supply system and standards for water supply. Introduction to water reuse and household water saving equipments. Water treatment processes, aeration, pH adjustment and softening, coagulation and flocculation, sedimentation, filtration and disinfection. Design of distribution system.	3
ENV 381 (Air Pollution and Control Engineering)	Types and sources of air pollutant. Effects of air pollution on health and environment. Regulations and standards for ambient air quality. Applications of meteorological data for predicting fate and transport of air pollutants in the atmosphere. Global circulation of air pollutants. The use of dispersion models to predict pollutant concentrations in the atmosphere, photochemical reactions of stratospheric ozone, global impacts of acid rain. Emission of pollutants from stationary and mobile sources. Principles of particulate and gaseous pollutant control. Measurements for air pollutants, sampling and analysis method. Laws and regulations.	3
ENV 331 (Industrial Safety Management)	Occupational health and safety regulation and standards. Nature of accident in industry and need of accident prevention. Risk perception, assessment and management. Prevention and control of occupational accidents. Planning for safety such as plant layout, machine guarding, maintenance and etc. Prevention and control of workplace hazards. Personal protective equipment. Audits and emergency planning. Safety in industry, typically specific hazards. Management of safety programme. Safety training. Case studies in accident analysis	3
ENV 332 (Environmental Law)	Background of environmental law. Law and standards; Factory Acts; Hazardous Substance Acts; Environmental Regulation and Decrees; Public Health Acts; Implementation and Enforcement; Related International laws and regulations.	3
XXXxxx (Free Elective)		3
Semester 1 Year 4		
ENV 401 (Environmental Engineering Project Proposal)	Proposal preparation that clearly states the objectives, idea, methodology, working plan, and budgetary of a selected project in the field of environmental engineering.	1
ENV 434 (Environmental Impact Assessment and Management)	Concepts of environmental impact assessment and methodology. Assessments of physical resources; air, water, noise. Assessments of ecological and biological resources. Human use values and quality of life values, culture, socioeconomic. Interrelationship of engineering aspects and environmental parameters. Planning of environmental quality evaluation, monitoring, prevention and mitigation measures. Establishment and organisation of environmental agencies. Industrialisation and Urbanisation management, resource conservation. Management approaches and program implementation. ISO 14000 series, Cleaner Technology.	3
ENV 441 (Environmental Engineering Laboratory)	The study of environmental unit operation and process through laboratory experiments including, physical unit operation; sedimentation ,filtration, etc. physico-chemical unit operation; coagulation, adsorption, etc. Biological unit process; activated sludge rotating biological contactor etc.	1
ENV 444 (Biological Unit Process)	Fundamentals of biological unit processes in wastewater treatment. Fundamental of reactor engineering. Kinetics of biochemical systems. Mathematical model of ideal biochemical reactors. Applications of the biological operations including attached and suspended growthsystems e.g. F/M ratio, SRT, SVI etc. Aerobic and anaerobic processes in combined and separated operations.	3
ENV 471 (Solid Waste	Development of municipal solid waste management system, generation source,	3

Management)	composition, quantities and characteristics of municipal solid waste. Handling at source and collection, transfer and transport. Processing and transformation technologies. Source reduction and recycling. Disposal of solid waste and residual matter, incineration, composting and sanitary landfill.	
ENVxxx (Environmental Engineering Elective)		3
Semester 2 Year 4		
ENV 402 (Environmental Engineering Project)	Conducting of a study of the approved project proposal. Presenting major finding results in form of an oral presentation and submitting a project report to a project committee appointed by department.	3
ENV 445 (Wastewater Engineering and Design)	Wastewater characteristics. Wastewater flow rates. Design of wastewater collection systems, combined and separated sewers, pump and pumping stations. Wastewater treatment and effluent standards. Design of facilities for wastewater treatment, disinfection, sludge treatment and disposal.	3
ENV 446 (Industrial Water Pollution Control)	Production processes and characteristics of wastewater generated by major industries. Concepts and practical guidelines for wastewater minimization and clean technology in production processes. Technologies for industrial wastewater treatment. Control and monitoring of wastewater treatment plant and facilities. Modification and performance improvement of existing wastewater treatment. Laws and regulations with regard to industrial wastewater management and control.	3
ENV 472 (Hazardous Waste Management)	Definition, laws and environmental legislations, classification of hazardous wastes, physico-chemical properties, toxicology. Types and characteristics of hazardous waste. Risk assessment and management. Handling and transportation. Fundamentals of treatment and disposal processes, stabilisation, solidification, land disposal, site remediation.	3
Genxxx (General Elective 2)		3

❖ SECTION B: Academic Calendar

	1st Semester	2nd Semester	Summer Session (if any)
Classes begin	The mid of August	The early of January	The early of June
Midterm examinations	The early of October	The early of March	Upon an appointment between lecturer and students
Final examinations	The early of December	The early of May	
Classes end	The mid of December	The end of May	The end of July

❖ SECTION C: Grading System

KMUTT lecture subjects are usually 3 credits. Such a subject would have 3 hours of lectures per week for 15 weeks. Students are expected to perform 6 hours of self-study per week. The following is grading scores.

Letter Grades	GPA Points	Definitions
A	4.00	Excellent
B+	3.50	Very Good
B	3	Good
C+	2.50	Fairly Good
C	2.00	Fair
D+	1.50	Fairly Poor
D	1.00	Poor
F	0	Failure
Fe	0	Failure: absent from examination

Fa	0	Failure: insufficient attendance
W	-	Withdrawal
S	-	Satisfactory
I	-	Incomplete
U	-	Unsatisfactory
Aud.	-	Audit

SECTION D: **Admission Requirements**

- Be a full-time undergraduate student.
- Have GPA min of 2.75 (out of 4).
- Have a TOEFL score of at least 550.
- Have successfully completed at least one year of academic study at your university.
- Have a strong interest in living in Thailand and are ready to accept cultural differences.

SECTION E: Contact Information

Contact of main coordinators			
Name	(1) Ms. Parichart Kreaktarvuth		
Position	Education Service Officer, The Office of International Affairs		
Tel	+662 4708344	Fax	+662 4708346
Email	parichart.kre@kmutt.ac.th		
Name	(2) Ms. Praphasiri Thitipravati		
Position	International Center for Engineering Program Manager, Faculty of Engineering		
Tel	+662 4709024	Fax	+662 4709026
Email	praphasiri@gmail.com		
Name	(3) Asst. Prof.Dr. Chawin Chantharasenawong		
Position	Associate Dean for International Affairs, , Faculty of Engineering		
Tel	+662 4709024	Fax	+662 4709026
Email	chawin.cha@kmutt.ac.th		