Program: Bachelor of Engineering Program in Mechanical Engineering
Degree: Bachelor of Engineering (Mechanical Engineering)
Study Plan:

Year	First Trimester	Cr	Second Trimester	Cr	Third Trimester	Cr
FRESHMAN	102111 Fundamental Chemistry I	4	103102 Calculus II	4	103105 Calculus III	4
	102112 Fundamental Chemistry Lab. I	1	105101 Physics I	4	105102 Physics II	4
	103101 Calculus I	4	105191 Physics Lab. I	1	105192 Physics Lab. II	1
	202108 Digital Literacy	2	202201 Life Skills	3	202202 Citizenship and Global Citizens	3
	202109 Use of Application Programs for Learning	1	213102 English for Communication II	3	531100 Engineering Materials I	2
	213101 English for Communication I	3	523102 Computer Programming	2	535100 Engineering Workshop Skills	1
	585101 Engineering Graphics I	2				
	Total	**17**	**Total**	**17**	**Total**	**15**
SOPHOMORE	213203 English for Academic Purposes	3	202203 Man, Society and Environment	3	202207 Man, Economy and Development	3
	533261 Manufacturing Processes	4	581346 Product Design for Engineers	3	523202 Computer Programming for Engineers	2
	533262 Manufacturing Processes laboratory	1	585202 Mechanical Engineering Mathematics II	2	582211 Mechanics of Materials	4
	582201 Engineering Statics	4	585203 Engineering Dynamics	4	585206 Thermodynamics II	3
	583100 Engineering Materials II	2	585204 Thermodynamics I	4	585207 Fluid Mechanics	4
	585200 Mechanical Engineering Fundamentals	1	585205 Electrical Engineering I	3	585208 Engineering Graphics II	2
	585201 Mechanical Engineering Mathematics I	2				
	Total	**17**	**Total**	**19**	**Total**	**18**

Year	First Trimester	Cr	Second Trimester	Cr	Third Trimester	Cr
JUNIOR	213204 English for Specific Purposes	3	581352 Entrepreneurship for Engineers	3	213305 English for Careers	3
	585301 Mechanics of Machinery	4	585304 Mechanical Vibration	4	585308 Power Plant Engineering	4
	585302 Heat Transfer	4	583305 Refrigeration and Air Conditioning	4	585309 Automatic Control Systems	4
	585303 Machine Design I	4	585306 Machine Design II	3	585310 Computer-Aided Engineering I	2
	585340 Mechanical Engineering Laboratory I	1	585307 Industrial Automations	3	585311 Electrical Engineering II	3
	General Education Elective I	2	General Education Elective II	2	585341 Mechanical Engineering Laboratory II	1
	Total	**18**	**Total**	**19**	**Total**	**17**
SENIOR	585401 Computer-Aided Engineering II	2	585496 Cooperative Education I	8	585402 Mechanical Engineering Project	4
	585440 Mechanical Engineering Laboratory III	1			Free Elective II	4
	585495 Pre-cooperative Education	1			General Education Elective III	2
	Technical Elective I	4			General Education Elective IV	2
	Technical Elective II	4				
	Free Elective I	4				
	Total	**16**	**Total**	**8**	**Total**	**12**

Program: Bachelor of Engineering Program in Mechanical Engineering
Degree: Bachelor of Engineering (Mechanical Engineering)
Course Description:

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
General Education Courses				
202108 Digital Literacy	2(2-0-4)	None	Selecting sources of information for research; using digital technology in information retrieval; collecting and evaluating information qualities; analyzing and synthesizing information; writing reports and referencing; security, effects, ethics, morals, and laws regarding media and digital technology using	
202109 Use of Application Programs for Learning	1(0-2-1)	None	Basics of computer programming; using application software for document management; presenting information; data management for calculation and creative database management; designing and developing a website for working in a daily life	
202201 Life Skills	3(3-0-6)	None	Knowing and understanding self and others; rational thinking and analyzing; systems and holistic thinking; creative decision-making and problem-solving; self-directed learning in a context of lifelong learning; work-life balance; sufficiency in living; self-care; stress and emotion management; solutions to life issues	
202202 Citizenship and Global Citizens	3(3-0-6)	None	Important characteristics of citizens; roles of Thai and global citizens; important concepts of international relations; international organizations; transboundary impacts; critique and lesson-learned from international phenomena	

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
202203	Man, Society and Environment	3(3-0-6)	None	Conditions of being human; cultural diversity; social order; ecological system; natural resources and environment; utilization of natural resources; sustainable development	
202207	Man, Economy and Development	3(3-0-6)	None	Economy and social development; trends of economic and social development; exclusive development; inclusive development; innovation-based development; creative economy; community engagement; social entrepreneurship	
Language Courses					
213101	English for Communication I	3(3-0-6)	None	Developing students' abilities for effective communication in social settings; focusing on integrated skills with the primary emphasis on listening and speaking; developing communication and language learning strategies; and promoting autonomous learning using various resources	
213102	English for Communication II	3(3-0-6)	213101 English for Communication I	Further developing students' abilities for effective communication in social and academic settings; focusing on integrated skills, particularly listening and speaking for academic purposes; further developing communication and language learning strategies; and reinforcing autonomous learning using various semi-academic materials from a variety of resources	

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
213203 English for Academic Purposes	3(3-0-6)	213102 English for Communication II	Course content dealing with English for academic purposes for effective communication in an academic field of study; text-based activities involving integrated language skills with an emphasis on reading; exposure to both authentic and semi-authentic materials from both printed and audiovisual materials, as well as online resources	
213204 English for Specific Purposes	3(3-0-6)	213203 English for Academic Purposes	Further enhancement of students' language skills and ability in science and technology content; exposure to authentic language in science and technology from both printed and audiovisual materials, as well as online resources; focus on text-based tasks involving integrated skills with an emphasis on reading and writing	
213305 English for Careers	3(3-0-6)	213204 English for Specific Purposes	Developing English skills needed for employment preparation, covering such topics as job search, resumes, cover letters, and job interviews; effective communication skills in the workplace; skills needed in preparing for the Test of English for International Communication (TOEIC)	
General Education Elective Courses				
202111 Thai for Communication	2(2-0-4)	None	Principles of Thai Language; skill of using Thai in speaking; listening; reading; and writing; composition in Thai for communication and work presentation	

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
202175	Art Appreciation	2(2-0-4)	None	Definition of art; artists' aspiration for art creation from various perspectives; values and aesthetic for soul; contexts of arts; visual culture towards art interpretation; roles and effects of arts in a society and world cultures through various perspectives; artwork creation valuable for self and others; arts and museums; public arts; music and art therapy; arts for sufficient life	
202181	Holistic Health	2(2-0-4)	None	Concepts regarding holistic health and health balance; weight control; sleep and relaxation; concentration and mental health; stress management; body strengthening; alternative healthcare	
202222	Professional and Community Engagement	2(1-2-3)	None	Projects and activities for building students' working experiences with a community or a professional group that enhance life skills and respond to visions and objectives of a community or a professional group	
202241	Law in Daily Life	2(2-0-4)	None	Basic principle of law; hierarchy of law; population registry law; useful law in daily life law concerning person; property, juristic act and contract; loan agreement; service contract; made-to-order contract; contract of sale; property rental contract; hire-purchase contract; surety ship agreement; mortgage contract; basic law of family and inheritance; consumer protection law; basic law of intellectual property	

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
202324	Pluri-Cultural Thai Studies	2(2-0-4)	None	Understanding of Thai society and cultural systems; plurality in Thai economic and political development; significance of plural folk wisdoms; concept of sufficiency economy in global trends	
202331	ASEAN Studies	2(2-0-4)	None	Origins and purposes of ASEAN community; unity based on a socio-cultural diversity; respects for rights, civic responsibility and human dignity under different types of governments in each ASEAN Member State; living together happily and peacefully with ASEAN friends; quality of life in education and working systems	
202373	Design Thinking	2(2-0-4)	None	Creative thinking; questioning and problem-solving; brainstorming and society need-based service design; prototyping; appropriate application of innovation; lesson-learned	
Major Courses **Science and Mathematic Foundation Courses**					
102111	Fundamental Chemistry I	4(4-0-8)	None	Atomic theory and electronic structure of atoms, periodic properties of atoms, representative elements and transition metals, chemical bonding, stoichiometry, gases, liquids, solids, chemical equilibrium, general properties of acids and bases, chemical kinetics.	1. Gain knowledge and understanding of atomic theory and electronic structure of atoms, periodic properties of atoms, representative elements and transition metals, chemical bonding, stoichiometry, gases, liquids, solids, chemical equilibrium, general properties of acids and bases, and chemical kinetics.Solve problems in the class. 2. Describe the subject in details to others. 3. Learn, honest, punctual, disciplined, responsible, and voluntary.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
102112 Fundamental Chemistry Laboratory I	1(0-3-0)	102111 Fundamental Chemistry I or study concurrently	Experimental works in the laboratory which include the basic techniques in experimental chemistry, properties of gases and liquids, metallic models, chemical equilibrium, acid-base titrations, chemical kinetics and various types of chemical reactions.	Students will gain knowledge and understanding about safety practice in laboratory. They are expected to have experimental skill on each topic. They will know how to record data, discuss and conclude the results. Moreover, they will have familiarity with materials, apparatus and equipment that they use in each class.
103101 Calculus I	4(4-0-8)	103001 Foundations for Calculus Limits, or 999103 Mathematics Placement Test	Limits, continuity, the derivative, applications of the derivative, inverse functions, indeterminate forms, the definite integral and the fundamental theorem of calculus.	Students will have an understanding of the concepts of limit, continuity, the derivative and the definite integral of a function of a single variable. In particular, they will be able to compute limits of functions and the derivatives of various functions, and apply the product, quotient and chain rules of differentiation. Moreover, they will be able to compute limits of indeterminate forms applying l'Hopital's rule, and finally they will also be able to compute the indefinite and definite integrals of basic functions, including integration by substitution.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
103102 Calculus II	4(4-0-8)	103101 Calculus I	Techniques of integration (of functions of a single variable), improper integrals, numerical integration, mathematical induction, sequences and series, Taylor expansion of elementary functions, vectors and geometry in three dimensions, lines and planes, vector valued functions, functions of several variables, partial derivatives and applications.	Students will master the various integration techniques, including integration by parts, partial fractions and trigonometric substitution. They will be able to compute improper integrals, and to compute definite integrals numerically. They will be able to work with sequences, series and Taylor series. Moreover, students will develop facility in 3 dimensions, such as 3-dimensional vector geometry, lines and planes. They will be able to compute partial and directional derivatives, and find the local extrema of a function of two variables.
103105 Calculus 3	4(4-0-8)	103102 Calculus II	Polar coordinates, surfaces in three-dimensional space, multiple integration, integrals of vector-valued functions, line integrals, first order and second order linear ordinary differential equations with applications.	Students will be able sketch surfaces in 3 dimensions. They will be able to work in the Cartesian, polar, cylindrical and spherical coordinate systems, and to integrate functions of two and three variables in theses coordinate systems. Furthermore, they will be able to integrate vector valued functions and compute line integrals. Finally, students will have the skills to solve first order and linear second order differential equations.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
105101 Physics I	4(4-0-8)	103001 Foundations for Calculus, or 999103 Mathematics Placement Test	The content of Physics 1 includes kinematics and dynamics of a particle, work-energy theorem, conservative forces and conservation of mechanical energy, kinematics and dynamics of a system of particles, conservation of momentum, kinematics and dynamics of rigid bodies, angular momentum, harmonic oscillations, damp and forced harmonic oscillations, mechanical waves, sound waves, basic fluid statics and dynamics, kinetic theory of gas, and thermodynamics.	1. define and describe the following quantities, principles and relations: displacement velocity, acceleration, Newton laws' of motion, work, kinetic energy, potential energy, mechanical energy, momentum, moment of inertia, angular displacement, angular velocity, angular acceleration, angular momentum, torque, period and frequency of oscillation, wavelength and wave speed, intensity and intensity level of sound, pressure, buoyancy force, Pascal's principle, viscosity, flow rate, continuity equation, Bernoulli's principle, state equation of ideal gas, and laws of thermodynamics. 2. calculate the physical quantities related to the motion in one, two and three dimensions of a particle or a rigid body, 3. apply Newton laws' of motion to obtain acceleration, angular

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
				acceleration, or unknown forces, 4. apply the work-energy theorem to calculate physical quantities related to motion, 5. recognize the situations, where the mechanical energy or total momentum of a system is conserved, 6. identify if an oscillation is underdamped, overdamped or critically damped, 7. apply the continuity equation and Bernoulli's principle to calculate the speed and pressure of fluids, 8. apply the equation of state to obtain state quantities of an ideal gas, and 9. implement the laws of thermodynamics to calculate the heat flowing in and out of an ideal gas that undergoes reversible processes.
105102 Physics II	4(4-0-8)	105101 Physics I	This course covers electrostatics, circuits and magnetism, Maxwell's equations, physical optics and introductory quantum mechanics.	1. to describe, in words, the various concepts in electromagnetism, in physical optics, and in quantum mechanics that come into play in particular situations; 2. to represent these electromagnetic, physical optic, and quantum mechanics phenomena mathematically in those situations; 3. to predict outcomes in other similar situations.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
105191	Physics Laboratory I	1(0-3-0)	105101 Physics I, or study concurrently, or based on faculty decision	This course is intended to expose student to hand-on basic physics experiments supporting contents described in Physics I course. The student must perform at least 8 experiments covering mechanics, wave and fluids.	1. to use various analog and digital devices to make corresponding measurement consistent with the content covered in class, 2. to estimate associated uncertainties of measuring devices, 3. to record and organize their observations in a laboratory notebook, 4. to perform data analysis.
105192	Physics Laboratory II	1(0-3-0)	105191 Physics Laboratory I and 105102 Physics II, or 105191 Physics Laboratory I and concurrently study 105102 Physics, or based on faculty decision	In a similar manner to Physics Laboratory I, this course is supporting contents described in Physics II course. The student must perform at least 8 experiments covering electrostatics, circuits, physical optics and photoelectric effect.	1. to use various analog and digital devices to make corresponding measurement consistent with the content covered in class, 2. to estimate associated uncertainties of measuring devices, 3. to record and organize their observations in a laboratory notebook, 4. to perform data analysis.
Basic Engineering Courses					
523102	Computer Programming	2(1-3-5)	None	Computer concepts, Computer components, Hardware and software interaction, Current programming language, Programming practices.	Students are able to explain correctly the function of each computer component, and be able to comprehend the logical steps in the computer algorithms and flow charts. The students gain programming skill through the current language for data processing.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
523202	Computer Programming for Engineers	2(1-3-5)	523102 Computer Programming	Array data structure, Programming with array, Program design for engineering problems, Programming practices with high-level language.	Students are able to explain the characteristics of array data structure and its handling technique. The students can manage the storage and manipulation of array and other basic data structures through the high-level programming language. Students have programming ability to design and develop computer programs for solving various engineering problems
531100	Engineering Materials I	2(2-0-4)	None	General properties of engineering materials: metals, ceramics, polymers and composite; classification of metallic materials; crystal structures of metals; macro and microstructure of metals; mechanical properties and mechanical testing; phase equilibrium diagrams and their interpretations; metal processing; heat treatment of metals; structure-property-processing-application relationships in engineering materials; materials degradation	Students are able to categorize the engineering materials, define the mechanical properties, explain the test methods, and their interpretations. Students are able to read and interpret the equilibrium phase diagram, perform basic calculations using the lever's rule. Students are able to describe structure-property-application relations of engineering materials. Students are able to describe materials processing, materials degradation and gain the concept of materials innovation.
533261	Manufacturing Processes	4(4-0-8)	None	Theories and concepts of manufacturing processes including machining, welding, foundry and heat treatment; manufacturing processes for various types of materials; basic principles of manufacturing cost; use of handtools; automated machines such as CNC machines, EDM, wire cutter; product analysis and design	This course enables a comprehensive understanding of manufacturing process. Students will be able to describe manufacturing processes including welding, foundry and heat treatment. Students will be able to select appropriate manufacturing process for various types of materials and product.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
533262	Manufacturing Processes laboratory	1(0-3-3)	533261 Manufacturing Processes or study concurrently	Practices of machining, welding, foundry, and heat treatment; making basic product; practices of automated machining such as CNC machines, EDM, wire cutter	The students can select machines and tools, and identify process of making product correctly.
535100	Engineering Workshop Skills	1(0-3-3)	None	Learn to use hand and power tools and practice engineering workshop skills.Student will learn practice in using: 1. Simple engineering drawings: Reading and interpretation; 2. Centre latch and processes: Plain turning, facing, chamfering, centre drilling; 3. Milling machine and processes: Slotting, facing; 4. Fitting and welding processes: Clamping, single-weld bead, tack welding, files, saws, threading; 5. Measuring tools: Callipers, micrometres, height gauges, dial gauges.	1. Follow a drawing or sketch for a specified engineering workshop task 2. Use a centre lathe to perform basic turning processes 3. Use a milling machine to perform basic milling processes 4. Manufacture an item incorporating fitting and welding techniques 5. Use an equipment for measuring thickness, length, height, and diameter of an object 6. Apply appropriate personal health and safety procedures when performing engineering workshop tasks
582201	Engineering Statics	4(4-0-8)	105101 Physics I	Force systems, resultant forces and moments, equilibrium, friction, virtual work, stability. Introduction to dynamics.	1. Transfer knowledge of basic physics and mathematics in applying on equilibrium of bodies. 2. Able to separate particle or rigid body away from their environment in order to draw a free body diagram and then it can be solved by equilibrium equations. 3. Able to apply the equilibrium condition to analysis internal force of structure member. 4. Develop self-learning, recording, researching and together with self-experiences for self-independent learning.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
582211	Mechanics of Materials I	4(4-0-8)	582201 Engineering Statics	Forces and stresses, stress-strain relations, stresses in beams, shear diagram and moment diagram, deflection of beams, torsion, buckling of columns, Mohr's circle and combined stresses, failure criteria.	1. Be able to interpret and apply the stress-strain relationship and other relevant properties of materials, and the concept of factor of safety. 2. Be able to determine and understand various type of stresses cause by loads, and perform stress analysis of the combined stresses. 3. Be able to determine and understand the deformations cause by loads, and use concept of stress and strength to design simple member.
583100	Engineering Materials II	2(2-0-4)	None	Structure and propertiesof ceramic materials; Conventional and advanced ceramic; Ceramic processing and engineering applications of ceramics; Polymer as an engineering material, Polymer blends, Polymer composites, Chain structure of polymers, Mechanical and thermal properties of polymers, Polymerization,Polymer processing, Polymer degradations; Polymeric and Ceramic Materials for engineering application.	Students are able to describe basic properties of polymeric and ceramic materials. Students are able to relate structureand properties of polymeric and ceramic materials. Students are able to explain the materials processing techniques. Students are capable of select appropriate materials for the desired basic engineering applications.
585101	Engineering Graphics I	2(1-3-5)	None	Practice to lettering, line and plane, geometric applications. Reading and drawing on orthographic projection, fundamental of dimensioning and tolerance, section view, standards and symbols. Practice to sketch by free-hand.	1. Lettering with standard and symbols and sketching with free-hand 2. Reading and drawing of orthographic, isometric, pictorial, descriptive geometry and auxiliary projection, and section view. 3. Specify the geometric dimensioning integration with basic tolerancing. 4. Drawing the assembly.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585203 Engineering Dynamics	4(4-0-8)	582201 Engineering Statics	Basic concept of engineering dynamics, Newton's law of motion, kinematics of particles, kinetics of particles: equation of motion, work and energy, impulse and momentum, kinematics of rigid bodies in plane motion, kinetics of rigid body in plane motion.	1. Solve the motion problem of rigid bodies. 2. Analyze and solve the problem of mechanism motion. 3. Analyze and solve the basic problems in mechanical vibration.
585204 Thermodynamics I	4(4-0-8)	105101 Physics I	Basic concepts. Thermodynamic properties, temperature, work and heat. First law. Second law, irreversibilities and entropy. Availability. Tables and charts of properties. Analyses of thermodynamic processes and cycles. Vapor and gas power cycles.	This course provides basic concepts of Thermodynamics. Student will be able to describe the basic concepts of Thermodynamics. Student will be able to determine properties of pure substances at different states from property tables. Student will be able to apply the first law of thermodynamics to analyze energy conversion in closed and open systems. Student will be able to apply the second law of thermodynamics and the Carnot cycle to evaluate the thermal efficiency and coefficients of performance for heat engines, refrigerators, and heat pumps. Student will be able to calculate the entropy changes that takes place during processes.
585205 Electrical Engineering I	3(2-3-7)	105102 Physics II	Electrical circuit components; electrical resistance, inductance and capacitance; analysis of DC circuit; transient response; AC circuit; phasor and complex power analysis; three-phase power circuit; principle of semi-conductor; diode and transistor; amplifier circuit and Op-Amp.	Student will be able to recall electrical circuit components. Student will be able to explain principle of electrical devices. Student will be able to analyze various types of electrical circuit.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585207 Fluid Mechanics	4(4-0-8)	103105 Calculus III	Properties of fluids, fluid statics, buoyancy and stability, integral and differential governing equations, Bernoulli's equation, analysis of various steady incompressible flows, dimensional analysis and similitude, flows in ducts, flows in open channels, flow measurements, pumps and turbines.	1. Solve problems involving fluid properties. 2. Calculate the magnitude and location of hydrostatic forces on surfaces. 3. Analyze fluid systems using the governing equation, and formulate an appropriate fluid system model using the equations. 4. Perform dimensional analysis for problems in fluid mechanics. 5. Analyze various steady incompressible flows, and explain the physical relationship between the various parameters of the flows 6. Undertake basic design calculations of fluid engineering systems.
585311 Electrical Engineering II	3(2-3-7)	585205 Electrical Engineering I	Magnetic, magnetic circuit, and power transformer; electrical-mechanical energy conversion and DC machine; electrical synchronous machine; induction machine; power semi-conductor switching device; power rectifier circuit, power switching circuit; power converter and inverter circuit; embedded systems and microcontroller architecture; embedded system programming; external hardware interface of microcontroller.	Students will be able to explain the principle of electromechanical energy conversion as well as devices in power circuit. Student will be able to use programming to control external hardware interface of microcontroller.
Major Engineering Courses				

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
581346	Product Design for Engineers	3(3-0-6)	None	Product Design Process, Sketching Drawing and Prototyping, Reverse Engineering, Materials and Processes for Product Design, Design Team, Cost Analysis and Design Workshop.	Enrolled students from this course will have the understanding on the product design process and how to do the sketch drawing and prototyping. They also can apply the process of reversed engineering for the product design. They will able to choose the best material and processes candidates for product design. They must understand the composition and the advantages of team design. Able to do the cost analysis for the designed product is a must. Finally, the hand on experiences must be implemented.
581352	Entrepreneurship for Engineers	3(2-3-7)	None	Marketing Planning, Production Process Planning, Organization Planning, Financial Planning, Accounting Planning, Entrepreneurial Workshop	After finishing the course, the students should be able to perform the evaluation process for their new start-up business. They also can evaluate the possibility of the new business in the real situations.
585200	Mechanical Engineering Fundamentals	1(0-3-3)	None	Basic requirements in study ME, overview of ME curriculum and studying strategy, equipments and tools to be used in studying ME subjects, writing engineering reports and engineering presentation, basics of computer software for aiding ME study, overview of ME professions.	Students describe the structure of ME curriculum and are able to write a engineering report and make an engineering presentation. Moreover students can use the basic computer programs as engineering tool for preparing the engineering report and presentation. Students understand careers related to mechanical engineers.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585201	Mechanical Engineering Mathematics I	2(1-3-5)	103105 Calculus III	Complex numbers, linear algebra and matrices, vector calculus, differential equations, and integral transforms.	1. Apply standard techniques of complex numbers, linear algebra, matrices, vector calculus, and integral transforms for simple applications related to mechanical engineering. 2. Demonstrate an ability to solve differential equations for related mechanical engineering problems. 3. Demonstrate self-learning skills for the use of mathematical techniques in engineering contexts.
585202	Mechanical Engineering Mathematics II	2(1-3-5)	585201 Mechanical Engineering Mathematics I	Introduction to numerical methods; solutions of nonlinear equations and systems of equations, ordinary differential equations, eigenvalues and eigenvectors, and linear least-squares, Engineering statistics; random sampling, data description, statistical inference techniques, including hypotheses testing and analysis of variance.	1. Solve and find the solutions for nonlinear equations and systems of equations using numerical techniques. 2. Find eigenvalues and eigenvectors of a matrix. 3. Find a function for data analysis using the least-squares method. 4. Estimate the solutions of systems of order ordinary differential equations using various numerical techniques. 5. Construct graphical displays of science and engineering data and reasonably interpret the displays for data analysis. 6. Apply basic statistical inference techniques, including hypothesis testing and analysis of variance, to engineering problems.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585206	Thermodynamics II	3(3-0-6)	585204 Thermodynamics I	Exergy analysis efficiency analysis of the thermodynamic cycles, e.g., gas power cycle, vapor power cycle, combined gas-vapor power cycle, refrigeration cycle theory of gas mixtures; air- conditioning processes; introduction to combustion; introduction to heat transfer.	Student will be able to define exergy of systems, and describe thermodynamic cycles,air-conditioning processes, and combustion processes. Student will be able to analyze exergy for closed systems and open systems. Student will be able to analyze refrigeration processes and air-conditioning processes. Student will be able to calculate the efficiency of thermodynamic cycles which are gas power cycle, vapor power cycle, combined gas-vapor power cycle, and refrigeration cycle. Student will be able to use the psychrometric chart to determine the properties of atmospheric air in air-conditioning processes. Student will be able to solve engineering problems related to thermodynamic cycles.
585208	Engineering Graphics II	2(1-3-5)	585101 Engineering Graphics I	Principle of engineering drawing, descriptive geometry and auxiliary view, development, detail drawing, assembly drawing, welding drawing, fasteners drawing, piping drawing, electrical drawing, structural drawing, computer aided drawing in 2D and 3D.	1. Use the computer to draw the descriptive geometry, auxiliary view, welding, and fasteners. 2. Use the computer to draw the electrical and structural systems 3. Use the computer to generate the detail drawing and assembly drawing.
585301	Mechanics of Machinery	4(4-0-8)	585203 Engineering Dynamics	Introduction to various mechanisms; Analysis of displacement, velocity and acceleration; linkage synthesis, static and dynamic forces analyses in mechanism, mass balancing of reciprocating mechanism; gear and gear trains.	1. Calculate the displacement, velocity and acceleration of the mechanism. 2. Calculate the statics and dynamic forces in the mechanism. 3. Balance the stationary and motion mass. 4. Design the cams, gears and gear trains.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585302 Heat Transfer	4(4-0-8)	585204 Thermodynamics I and 585207 Fluid Mechanics	Modes of heat transfer, conduction, convection, radiation and applications of heat transfer, heat exchangers and heat transfer enhancement, boiling and condensation.	1. Identify and compute problems involving heat transfer, via conduction, convection, radiation, boiling and condensation. 2. Analyze and quantify the heat transfer processes in applications typically found in engineering practice. 3. Design heat exchangers of different types.
595303 Machine Design I	4(4-0-8)	582211 Mechanics of Materials	Philosophy of design, material properties, design of simplification machine components, stress - strain and deflection in machine components under loading, failure theories, design of machine elements under loading, design of machine elements: shaft and shaft components, screws and fasteners, case study of machine design	1. Describe the concept of mechanical design and properties of materials. 2. Describe and apply the failure theories. 3. Design the simple machine elements. 4. Calculate for designing the rivets, welding, screw fasteners, keys and pins, shafts, spring, gear, power screws, couplings, bearings, brakes, clutches, belts, chains. 5. Analyze and design the machine systems.
585304 Mechanical Vibration	4(4-0-8)	585203 Engineering Dynamics	Single degree of freedom, torsional vibration,free vibration, general force vibration, damped vibration, resonance vibration, multi-degree of freedom, continuous system, determation of natural frequency, mode shape, methods and techniques to reduce and control vibration	This course provides the students to be able to model both one degree of freedom and multiple degree of freedom dynamics systems to ordinary differential equation. Students can analyze the torsional system, solve for the response of free vibration and force vibration. Create the math model for equivalent system. They are able to design the vibration isolation and vibration absorber for reducing and controlling the vibration.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585305	Refrigeration and Air Conditioning	4(4-0-8)	585302 Heat Transfer	History of refrigeration and air conditioning, principle of refrigeration, vapor compression refrigeration, absorption refrigeration, evaporative cooling, refrigeration system components, refrigerants, cooling load calculations, refrigerant piping design, psychrometry and air conditioning process, thermal comfort and indoor air quality, design of air distribution system, chilled water duct design, industrial applications of refrigeration, control of refrigeration system, Fire safety in air conditioning system.	This course introduces the basic refrigeration process used in mechanical refrigeration, air conditioning systems and all of their components. In addition, the topics also include the principal design of the refrigeration system, air conditioning system, and fire safety standard of the system. Consequently the students will be able to analyze and design all types of the cooling system and air conditioning system.
585306	Machine Design II	3(2-3-7)	585303 Machine Design I	Practical study in machinery and machine design, knowledge and theoretical skill enhancement in topics of mechanical system design subject	This course provides a knowledge and practical skill in machinery and machine design. Student will be able to design machine elements under the requirements of the industrial standard.
585307	Industrial Automations	3(2-3-7)	None	Study of automation system in industrial application, study of sensor using in automation system, study of controller using in automation system such as PLC, micro controller, study actuator using in automation system such as motor, cylinder. Study of pneumatic, hydraulic and electrical automation systems. Practice on sensors actuators and control automation machine by using PLC and Microcontroller.	1. Know and able to use the components of automation system and to use the controller for example PLC microcontroller etc. 2. Able to control the actuators such as motor cylinder etc. 3. Able to integrate knowledge and skill from this course to design and fabricate automation machine.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585308	Power Plant Engineering	4(4-0-8)	585302 Heat Transfer	Energy conversion principles and availability concept; basic cycle analyses and efficiency enhancements fuels and combustion component studies of steam, gas turbine and internal combustion engine power plants combined cycle and cogeneration nuclear power plant hydro power plant wind power plant control system and instrumentation power plant economics and environmental impacts.	1. Discuss and compare the energy resources and energy conversion methods available for the production of electric power. 2. Determine the efficiency and output of steam, gas turbine, internal combustion engine, combined-cycle, and cogeneration power plants. 3. Explain the major types of nuclear, hydro, wind, biomass power plants and estimate their power generation potentials. 4. Discuss the control methods of major pollutants emitted from power plants. 5. Discuss the economics and environmental impacts of electric power production.
585309	Automatic Control Systems	4(4-0-8)	585304 Mechanical Vibration	Automatic control principles, analysis and modeling of linear control elements, stability of feedback systems, design and compensation of control system in time and frequency domain.	This course provides the students to be able to model the physical systems to mathematics equations Students can analyze the response and stability of the feedback system. Students are able to design the controllers or compensators in time and frequency domain
585310	Computer Aided Engineering I	2(1-3-5)	585202 Mechanical Engineering Mathematics II and 585303 Machine Design I	Use of computer for design and analysis of mechanical engineering problems. Physical modeling and simulations of mechanical engineering problems and related applications. Specifications of boundary conditions and initial conditions, verification of simulated results.	Student will be able to create physical models which correspond to engineering problems. Student will be able to identify errors that may occur in simulations. Student will be able to use computer to design and analyze engineering problems correctly.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585340	Mechanical Engineering Laboratory I	1(0-3-3)	582211 Mechanics of Materials, 585204 Thermodynamics I and 585207 Fluid Mechanics	Experiments in instrumentation and measurement for mechanical engineers such as pressure, fluid flow, temperature, displacement, force, and strain; experiments in material testing, fluid mechanics, and thermodynamics, interpretation of experimental data, technical report writing.	1. Select and use appropriate measuring devices and techniquescommonly used in mechanical engineering systems. 2. Conduct experiments in material testing, fluid mechanics, and thermodynamics, as well as analyze and interpret data. 3. Demonstrate technical writing skills. 4. Develop work habits those are necessary for effective collaboration with other students.
585341	Mechanical Engineering Laboratory II	1(0-3-3)	585302 Heat Transfer	Experiments in heat transfer and fluid mechanics such as wind tunnel lift and drag experiments, power plants, internal combustion engines, refrigeration, air conditioning, heat exchangers, solar energy, and other topics related to thermal/fluid systems, data analysis, presentation of results.	1. Apply theoretical concepts developed in thermal/fluid courses to hands-on experiments. 2. Conduct thermal/fluid experiments and analyze experimental data. 3. Examine experimental results critically and demonstrate technical presentation skills. 4. Communicate effectively in group settings.
585401	Computer Aided Engineering II	2(1-3-5)	585310 Computer Aided Engineering I	Use of computer for design and analysis of mechanical engineering problems. Physical modeling and simulations of mechanical engineering problems and related applications, project based on using computer for design and analysis of related mechanical engineering problems.	Student will be able to create specific physical model for mechanical engineering problems. Student will be able to simulate and analyze mechanical engineering problems using commercial software. Student will be able to analyze accuracy of simulation applied for solving problems. Student will be able to apply computer aided engineering to conduct related mechanical engineering projects.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585402	Mechanical Engineering Project	4(4-0-8)	585340 Mechanical Engineering Laboratory I	Interesting projects or issues of practical important in various fields of mechanical engineering are assigned by instructors. Reports must be submitted to keep at the school of mechanical engineering, oral examination is required.	1. Develop team-working, researching and self-learning skills. 2. Apply their knowledge to solve practical engineering problems and/or create new engineering invention. 3. Develop analytical thinking and problem solving skills. 4. Appropriately select engineering tools and techniques to analyze and/or solve engineering problem. 5. Write an academic paper describing the research.
585440	Mechanical Engineering Laboratory III	1(0-3-3)	585309 Automatic Control Systems	Hydraulic system, pneumatic system, programmable logic controller (PLC), free vibration, forced vibration, shaft balancing, vibration suppression and control, feedback control system, PID controller, speed control system.	This course provides the students to be able to use hydraulic system and pneumatic system. Students can analyze free vibration and forces vibration. Students can also use controllers in control systems related to mechanical engineering applications.
Engineering Elective Courses					
581342	Innovation and Design for Engineers	2(1-2-4)	None	Innovation and Design, Differentiation between Innovation and Re-engineering, Innovation and Intellectual Properties, Think out the box, Engineering Design Fundamental, Prototyping, Material and Manufacturing selection and Workshops.	After finishing this course, student should have fundamental engineering aspect on innovation and design. They also can differentiate between the original design and re-engineering. They will also value the innovation and intellectual properties right. Moreover, they should have the encouragement to have “think-out-the box” mind. Engineering design, prototyping and right choice for material and manufacturing processes are the obvious outcome for graduated students.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
581343	Material Selection for Design Engineering	4(3-3-9)	None	Engineering Design Process, Engineering Materials and Properties, Materials Selection Chart and Constrain, Shape Factors, Processing and Design, Multiple Constrain and Compound Objectives, Industrial Design, Cost Criterion, Case Studies and Workshop on material selection and design engineering.	Succeed student from this course will have the understanding the whole process on material selection and design principles including; engineering design process, relationship between engineering materials and properties and product shape, understanding processing and design, specifying multiple constrain and compound objectives for product design, understanding on the industrial process design and unit cost and test yourself by case study throughout the learning process.
585451	Measurement and Instrumentation	3(2-3-7)	None	Study of measurement and instrumentations, characteristic of instruments, type of errors, calibration technique, statistic for measurements process, signal conditioning, display device, various type of mechanical Instruments such as displacement, acceleration, force, pressure, flow and velocity, temperature. Practice on measurement techniques and using computer for data collecting.	1. Choose and use proper instrument and method. 2. Use statistic for measurement process. 3. Know the calibration technique of the instruments.
585452	AutoCAD for Engineering	1(0-3-3)	585101 Engineering Graphics I	Philosophy of computer based design, the function and command of AutoCAD, basics of drawing in 2D and 3D, multi-layer drawing; structural drawing, mechanical drawing, electrical drawing.	Students will be able to use computer for design, the function and command of AutoCAD, basics of drawing in 2D and 3D.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585453	Electronics Controlled Unit for Automotive	4(3-3-9)	585309 Automatic Control Systems	Structure of microcontroller architecture and digital signal processing for electrical control unit in automotive; memory unit management; software for controlling and connecting with external devices; electrical measurement; feedback control system development; sensors and transducer in automotive; engine control; data communication and CAN system; programming using CoDeSys according to IEC 61131-3 standard.	Student will be able to explain operating mechanism of electrical control unit as well as basic of measurement and control system in automotive. Student will be able to develop programs for controlling engine and other devices in automotive.
585454	Electric Vehicle Technology	4(4-0-8)	585311 Electrical Engineering II	Review of electrical motors, power electronics, and powertrain systems; battery technology; Supercapacitor; fuel cell technology; battery charger; modelling and performance calculation of electric vehicle; electrical hybrid vehicle; EV enhancement system design; efficiency and carbon emission of electric vehicle.	Student will be able to recall various technologies in modern automotive engineering. Students will be able to explain basic concepts of various systems in modern automotive.
585455	Introduction to Railway System Engineering	4(4-0-8)	None	Fundamental of railway engineering; geomechanics for rail track; material science in railway engineering; railway system design; rolling stock engineering; brake system; locomotive dynamics; traction system and motor drive; electric power supply system; railway signaling.	Student will be able to explain basic concepts in railway engineering as well as other relevant disciplines.
585456	Electric Traction and Rolling stock Technology	4(4-0-8)	None	Railway energy use; passenger and freight rail transportation; traction motor and drive technology; locomotive diesel engine; diesel-electric locomotive; electric locomotive; diesel multiple unit; electric multiple unit; hybrid locomotive; high speed train technology; maglev train.	This course provides a comprehensive understanding of rail transportation basics. Students will be able to understand the operation of traction motor, locomotive including diesel, diesel-electric and electric locomotives, high-speed railway and maglev.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585457	Internet of Things	2(1-3-5)	None	Practice in devices and equipment used in Industrial 4.0 era, for examples, intelligence system, adaptive control, communication and networking, real-time embedded cyber-physical systems architecture.	1. Ability to memorize methods of using and controlling intelligence system as well as repeat using and controlling processes. 2. Ability to be responsible for engineering practice.
585458	Introduction to Robotics	2(1-3-5)	523102 Computer Programming and 585301 Mechanics of Machinery	Kinematics of robot; direct and inverse kinematics; robot motion path generation control technology; simulation off-line programming.	1. Ability to identify the principles of basic equipment operations using in automated manufacturing system. 2. Ability to design and select appropriate automated equipment related to complex engineering problems in order to control the automation systems. 3. Ability to be responsible for engineering team working.
585459	Robotics Technology	4(4-0-8)	585458 Introduction to Robotics	History, type and component of robotics; coordinate system and coordinate transformation; kinematics of robot; direct and inverse kinematics; robot motion path generation control technology; simulation off-line programming.	1. Explain differences between 2-dimensional and 3-dimensional robot. 2. Build mathematical model for co-ordinate transformation and robot movement. 3. Practice on computer programming for calculation of co-ordinate transformation and robot movement.
585460	Machine Vision Technology	2(1-3-5)	None	Introduction to image processing and machine vision, digital image type and format, boundary description, technique on shape recognition, camera and lighting adjusting technique, computer program for machine vision, interface machine vision with controller, design project.	1. Describe principles of image processing and machine vision control. 2. Write computer program for connecting controller and machine vision system. 3. Be responsible for team work.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585461	Microcontroller	4(4-0-8)	585307 Industrial Automations	Introduction to embedded system; microcontroller; programming for microcontroller; applying microcontroller in basic automation system; term project.	1. Explain the significances of embedded system and microcontroller. 2. Build computer programs for controlling of microcontroller. 3. Be responsible for work as team and safety at work.
585462	Jig and Fixture Design	2(1-3-5)	585208 Engineering Graphics II	Introduction to jig and fixture design; Type, function and material of jig and fixture; Principles of locating, positioning and clamping; Design with consideration of economic, appropriated for manufacturing and assembling processes by machine and human; Applications of jig and fixture design; Practice by design and manufacturing of assigned work piece.	1. Ability to gather and apply knowledge in order to design jig and fixture. 2. Ability to be responsible for engineering team working. 3. Ability to organize data and present design concepts and details. 4. Ability to be responsible for teams and engineering safety in practice to societal and environmental.
585463	Geometric Dimensioning and Tolerancing	2(1-3-5)	585208 Engineering Graphics II and 585303 Machine Design I	Principles and standard of determination of geometry control; surface properties control, size control, dimensioning of parts and tolerancing for assembly; the interpretation of symbols for engineering drawing standard.	1. Ability to understand symbols of geometric dimensioning and tolerance for controlling size and dimensions of parts in engineering drawing. 2. Ability to appropriately draw a drawing consists of symbols of geometric dimensioning and tolerance for controlling size and dimensions of mechanical parts.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585464	Maintenance Engineering	4(4-0-8)	None	Maintenance concepts, breakdown maintenance, preventive maintenance, time-based and condition-based maintenances, maintenance prevention; Theory and causes of depreciation; Establishment concept of inspection plan, lubrication plan and changing plan; Planning and control of maintenance activities; Safety in maintenance works; Materials and spare parts management; Analysis of reliability and failure statistics. Measurement and evaluation of maintenance KPIs; Modern concept and technology in maintenance engineering.	1. Ability to give definition and differentiate various types of maintenance method and describe principles of root cause analysis and maintenance planning and controlling. 2. Show the positive attitude toward maintenance for safety.
585465	Internal Combustion Engines	4(4-0-8)	585204 Thermodynamics I and 585207 Fluid Mechanics	Internal combustion engine fundamentals, spark-ignition and compression-ignition engines, fuels and combustion, ignition systems, ideal fuel air cycle, supercharging, turbochargers and scavenging, engine performance and engine testing, friction and lubrication	Students can understand the principles of internal combustion engine including spark-ignition and compression-ignition engines. In addition, the operation systems are related to engine.
Cooperative Education					

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585495 Pre-cooperative Education	1(1-0-2)	None	Principals and concepts relating to Cooperative Education; Process and steps of undertaking Cooperative Education;Protocols relating to Cooperative Education; Basic knowledge on and techniques for job application such as workplace selection, job application letter writing, job interviews and communication skills;Basic knowledge necessary for undertaking Cooperative Education at workplace; Building up self-confidence;Entrepreneurial potential development; Occupational health and safety in workplace;Organizational culture, Quality management systems at workplace such as5S,ISO 9000 andISO 14000; Report writing and presentation techniques;Personality development.	1. Students have a deep understanding of the concepts, principles, processes and procedures as well as relevant regulations of cooperative education. 2. Students have knowledge and basic skills to work in the enterprises. 3. Students have knowledge and skills in presentation and academic report writing. 4. Students have the basic skills in personality development to adapt themselves to work environment.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585496 Cooperative Education I	8 Credits	Courses specified by the School and 585495 Pre-cooperative Education	The student has to perform full-time academic or professional work as a temporary staff member at a workplace for 1 entire Cooperative Education trimester according to the School's specifications. Once completed the work, the student has to submit an operational report and present his/her performance results to the School faculties for the assessment, Evaluation by the supervising faculties and job supervisor(s) based on the student's performance on the assigned work and the operational reports as well as his/her performance at the post-placement interview and seminar activities will determine the assessment result of the student to be either pass or fail.	1. Apply relevant engineering knowledge, skills, techniques, and tools in a work context. 2. Identify and analyse issues, and suggest practical solutions in engineering problems. 3. Design a system, component, or process to meet desired needs. 4. Effectively communicate verbally and in writing. 5. Schedule a work plan and have the flexibility to respond to changing circumstances. 6. Establish good working relationships in a multi-disciplinary team. 7. Understand and apply professional and ethical responsibility. 8. Recognize the need for, and engage in lifelong learning.

Courses	Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585497 Cooperative Education II	8 Credits	585496 Cooperative Education I	The student has to perform full-time academic or professional work as a temporary staff member at a workplace for 1 entire Cooperative Education trimester according to the School's specifications. Once completed the work, the student has to submit an operational report and present his/her performance results to the School faculties for the assessment, Evaluation by the supervising faculties and job supervisor(s) based on the student's performance on the assigned work and the operational reports as well as his/her performance at the post-placement interview and seminar activities will determine the assessment result of the student to be either pass or fail.	1. Apply relevant engineering knowledge, skills, techniques, and tools in a work context. 2. Identify and analyse issues, and suggest practical solutions in engineering problems. 3. Design a system, component, or process to meet desired needs. 4. Effectively communicate verbally and in writing. 5. Schedule a work plan and have the flexibility to respond to changing circumstances. 6. Establish good working relationships in a multi-disciplinary team. 7. Understand and apply professional and ethical responsibility. 8. Recognize the need for, and engage in lifelong learning. 9. Develop professional contacts. 10. Take initiative in a professional setting.

Courses		Credit (Lect.-Lab-Self stud.)	Prerequisite	Course Description	Expected Learning Outcomes
585498	Cooperative Education III	8 Credits	585497 Cooperative Education II	The student has to perform full-time academic or professional work as a temporary staff member at a workplace for 1 entire Cooperative Education trimester according to the School's specifications. Once completed the work, the student has to submit an operational report and present his/her performance results to the School faculties for the assessment, Evaluation by the supervising faculties and job supervisor(s) based on the student's performance on the assigned work and the operational reports as well as his/her performance at the post-placement interview and seminar activities will determine the assessment result of the student to be either pass or fail.	1. Adaptively apply relevant engineering knowledge, skills, techniques, and tools in a work context. 2. Identify and analyse issues, and suggest practical and economical solutions in engineering problems. 3. Design a system, component, or process to meet desired needs. 4. Effectively communicate verbally and in writing. 5. Schedule a work plan and have the flexibility to respond to changing circumstances. 6. Establish good working relationships in a multi-disciplinary team. 7. Understand and apply professional and ethical responsibility. 8. Recognize the need for, and engage in lifelong learning. 9. Develop professional contacts. 10. Take initiative in a professional setting.
585499	Mechanical Engineering Professional Project	9 Credits	None	Practical and interesting projects or problems for non-coop students assigned by the advisor with consent of the head of the school to be completed within two consecutive trimesters.	This course provides a continuously operating mechanical engineering project. Student will be able to synthesize the engineering project. Students will be able to demonstrate the possible methods to solve the engineering project. Student can evaluate the results of operating engineering project in order to response to the objectives of project. Student can present the project defense including a report and a presentation to others.