

Learning Content

EP-M.4

EN30101 Foundation English 1

Study foundation English about recommendations, explanation, directions, descriptions, news, announcements, poems, skits, diagrams, graphs, initials, non-fictions, fictions, personal information, various local, social, and global situations and events, languages, voices, social manners and cultures, custom, traditions, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs, and cultures of native speakers, information related to other learning content groups. Conduct listening, speaking, reading, and writing using process of establishing knowledge and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative knowledge and understanding to create knowledge and understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30102 Foundation English 2

Study foundation English about recommendations, explanation, directions, descriptions, news, announcements, poems, skits, diagrams, graphs, initials, non-fictions, fictions, personal information, various local, social, and global situations and events, languages, voices, social manners and cultures, custom, traditions, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs, and cultures of native speakers, information related to other learning content groups. Conduct listening, speaking, reading, and writing using process of establishing knowledge and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative knowledge and understanding to create knowledge and

understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30201 English Reading -Writing 1

Study English on the topics of news, announcements, poems, skits, and pictures, different non-text information styles such as maps, graphs, and initiatives. Study non-fictions, fictions, personal information, languages, voices, social manners and cultures, traditions and customs, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs and cultures of native speakers, and information related to other learning content groups. Use process of establishing knowledge and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative knowledge and understanding to create knowledge and understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30202 English Reading -Writing 2

Study English on the topics of news, announcements, poems, skits, and pictures, different non-text information styles such as maps, graphs, and initiatives. Study non-fictions, fictions, personal information, languages, voices, social manners and cultures, traditions and customs, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs and cultures of native speakers, and information related to other learning content groups. Use process of establishing knowledge and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative

knowledge and understanding to create knowledge and understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30207 English for Academic Achievement 1

Study English on the topics of news, announcements, poems, skits, and pictures, different non-text information styles such as maps, graphs, and initiatives. Study non-fictions, fictions, personal information, various experiences, incidents, themes from analyzed stories, languages, voices, social manners and cultures, traditions and customs, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs and cultures of native speakers, and information related to other learning content groups. Use process of establishing knowledge and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative knowledge and understanding to create knowledge and understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30208 English for Academic Achievement 2

Study English on the topics of news, announcements, poems, skits, and pictures, different non-text information styles such as maps, graphs, and initiatives. Study non-fictions, fictions, personal information, various experiences, incidents, themes from analyzed stories, languages, voices, social manners and cultures, traditions and customs, festivals, language structures, idioms, proverbs, poems, ways of life, beliefs and cultures of native speakers, and information related to other learning content groups. Use process of establishing knowledge

and understanding, reading process, process of establishing practical skills, working process, process of language skills, process of establishing attitudes, process of conceptualization, process of analysis, process of establishing realization, and process of establishing communicative knowledge and understanding to create knowledge and understanding, communicative ability, thinking ability, problem-solving ability, life skills, and ability to use technology. At the same time, students will have the following intended characteristics which are nationalism, religiosity, loyalty, disciplines, diligence, self-sufficiency, endeavor, love of being Thai, and public mind.

EN30241 English for Life Skills 1

The Students will study and listen to a range of English texts. They will use learning skills in the 21st century, which encourages the students to be able to have listening, critical thinking and problem solving skills. The learning skills will be used to make students possess learners' key competencies, which are thinking capability, problem solving capability, capability in applying life skills and capability in technological application. This will be done through the teaching and learning focusing on promoting Thai wisdom with respect to the language and literature and religion and tradition. Teaching and learning also promotes students to live under the Sufficiency Economy Philosophy. Students will be provided with desirable characteristics such as love of nation, religion and king, honesty and integrity and self-discipline. Additional important characteristics are avidity for learning, observance of principles of Sufficiency Economy Philosophy in one's way of life, dedication and commitment to work, cherishing Thai-ness, public-mindedness and gentlemen of Assumption College

EN30242 English for Life Skills 2

The Students will study and listen to a range of English texts. They will use learning skills in the 21st century, which encourages the students to be able to have listening, critical thinking and problem solving skills. The learning skills will be used to make students possess learners' key competencies, which are thinking capability, problem solving capability, capability in applying life

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skills and capability in technological application. This will be done through the teaching and learning focusing on promoting Thai wisdom with respect to the language and literature and religion and tradition. Teaching and learning also promotes students to live under the Sufficiency Economy Philosophy. Students will be provided with desirable characteristics such as love of nation, religion and king, honesty and integrity and self-discipline. Additional important characteristics are avidity for learning, observance of principles of Sufficiency Economy Philosophy in one's way of life, dedication and commitment to work, cherishing Thai-ness, public-mindedness and gentlemen of Assumption College.

Learning Content

EP-M.4

HP30101 Foundation Health Studies and Physical Education 1

Students will study the following topics: promoting and maintaining efficient functions of organ systems in human, strengthening functions of skin, bone and muscle system; planning health care in accord with conditions of students' growth and those of their family members; influences of family, peers, society and culture on sexual behavior and lifestyle, nature of moods, sexuality, proper expression in different situations, managing sexual desires, avoiding and preventing sexually transmitted diseases, and ways to prevent illness and early death among Thai people. In the lesson, they will learn to think critically and exercise their problem-solving ability. Additionally, students should be able to demonstrate mercy, discipline, morals and ethics. They will also use skills in a variety of aspects: information communication skill, media literacy, and computer skill.

Different learning processes are embedded in the lessons for students to apply-- knowledge and understanding construction process, practical skill development process, problem-solving skill process, decision-making process, and value building process. Students are, then, expected to gain knowledge, understanding and are able to apply them in real life. Students should also have morals, ethics, honesty, discipline, responsibility, democratic mind, and social justice. They will learn to avoid themselves from addictive substances and all vices. Consequently, the following abilities are expected to be formed: thinking ability, communication ability, and life skill ability.

Students will additionally be supported to have the following desired characteristics: love of nation, religion and king; honesty and integrity; self-discipline; avidity for learning; observance of self-sufficiency; dedication and commitment to work; cherishing Thai-ness; public-mindedness; and attributes of an AC gentleman.

HP30102 Foundation Health Studies and Physical Education 2

Students will study the following topics: promoting and maintaining efficient functions of organ systems in human, strengthening functions of skin, bone and muscle system; planning health care in accord with conditions of students' growth and those of their family members; influences of family, peers, society and culture on sexual behavior and lifestyle, nature of moods, sexuality, proper expression in different situations, managing sexual desires, avoiding and preventing sexually transmitted diseases, and ways to prevent illness and early death among Thai people. In the lesson, they will learn to think critically and exercise their problem-solving ability. Additionally, students should be able to demonstrate mercy, discipline, morals and ethics. They will also use skills in a variety of aspects: collaboration, teamwork, leadership, careers and learning. Lessons will also be about application of modern technology in processing products in order to increase time before sending them into the market. Students will learn how to solve problems in consumption and to help the community to rely on themselves economically bearing in mind the aspects of safety, finance, and fairness. The learning topics will also include Thai traditional medicine, disease prevention, and health promotion for people in the community with the emphasis on empowering a community for self-reliance in terms of health.

Different learning processes are embedded in the lessons for students to apply--practical skill development process, problem-solving skill process, and decision-making process, value building process, communication ability and knowledge and understanding construction process.

Consequently, the following abilities are expected to be developed: thinking ability, communication ability, and life skill ability.

Students will also be supported to have the following desired characteristics: love of nation, religion and king; honesty and integrity; self-discipline; avidity for learning; observance of self-sufficiency; dedication and commitment to work; cherishing Thai-ness; public-mindedness; and attributes of an AC gentleman.

Learning Content

EP-M.4

MA30101 Foundation Mathematics 1

Study the fundamental knowledge of mathematics on the following topics: sets--sets and operations of sets, Venn diagrams – Euler diagrams and solving problems; the basics of logic-- proposition, finding the truth value of a proposition, constructing truth tables for propositions, real numbers--real numbers and properties of real numbers, solving quadratic equation in one variable, properties of inequalities, interval and solving inequalities, absolute value of real numbers and properties of absolute value of real numbers; rational exponents-- real numbers in the form of rational exponents and real numbers in the form of roots, addition, subtraction, multiplication and division of real numbers in the form of rational exponents, and radicals, the approximate value of real numbers in radicals and of real number in rational exponents. To gain knowledge, students will use mathematical process skills. The course is aimed for students to be able to solve problems, communicate and convey the mathematical meaning, connect, give reasons and think creatively. Students will then have the following competencies: communicative ability, thinking ability, problem solving ability, ability to use life skills and technological ability. The students will also be equipped with the following desired characteristics: love of nation, religion and the king, honesty and integrity, self-discipline, avidity for learning, self-sufficiency, dedication and commitment to work, cherishing Thai-ness and public-mindedness. Students will, in addition, develop the 21st century learning skill in arithmetic, critical thinking and problem solving.

MA30102 Foundation Mathematics 2

Study fundamental knowledge of mathematics about functions; relations and functions; domains and range of relations and functions; graph of relations and functions by using mathematical process skills. The course is aimed for students to have the abilities in problem solving, communication in mathematics and mathematical meaning, making connection, reasoning, and creative thinking. Students will accordingly be capable to communicate, think, solve problem, use life skills and use technology. They will also be equipped with desired

characteristics: having love for the nation, religion and the king, being honest, having avidity for learning, having value for self-sufficiency, demonstrating dedication to work, being proud to be Thai, and having social responsibility. The course will, in addition, increase the 21st century learning skill in arithmetic, critical thinking and problem solving.

MA30213 Universal Mathematics 1

Study foundation mathematics on the topics of sets and operation of sets, Venn-Euler diagram and problem solving, equations, addition, subtraction, multiplication, and division of real, solution of polynomial equations with one variable, properties of inequalities, intervals and solutions of equations, absolute value, property of completeness, foundation logic, equivalence and negative of sentences with a quantifier of one variable, argumentation, number theory, and division without remainders. Use the process of knowledge and understanding establishment, problem solving, and conceptualization to create knowledge, understanding, communicative ability, thinking ability, and problem-solving ability. At the same time, students will have the following intended qualities which are nationalism, religiosity, loyalty, honesty, disciplines, studiousness, self-sufficiency, endeavor, love of being Thai, and public mind.

MA30214 Universal Mathematics 2

Study foundation mathematics on the topics of domain and range of relations, graphs of relations, inverse of relations, function values, composite functions, inverse functions, algebra of functions, use of graph knowledge to solve problems, symbols of matrix, property of matrix, determinant, use of matrix to solve system of linear equations, solution of systems of equations using determinants, solution of systems of equations using basic of linear operation, linear, distance between two points, midpoint between two points, slope of linear, parallel, and perpendicular, linear relation graphs, distance between linear and point, conic section, circle, parabola, ellipse, hyperbola. Use the process of knowledge and understanding establishment, problem solving, and conceptualization to create knowledge, understanding, communicative ability, thinking ability, and problem-solving ability. At the same time, students will have the

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following intended qualities which are nationalism, religiosity, loyalty, honesty, disciplines, studiousness, self-sufficiency, endeavor, love of being Thai, and public mind.

Learning Content

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OC30104 Foundation Occupational Works 1

Students will study about methods of working for a living and work collaboratively to create work and solve problem with creativity. Students will have a chance to practice managerial skills, and knowledge seeking skill for the basics of a quality living. Morality and desirable characteristics for work will also be cultivated. In the course, students will learn the following contents: designing craft products in a variety of forms; different types of craft work; Thai identity and local wisdom related to craft work; use of crafts in daily life; technology and craft work, and packages used for craft work. In terms of careers, students are expected to have understanding, necessary skills, experience and proper perception towards future careers. They will be able to use technology to aid their work in future career and have morality and positive attitude towards professions.

Students will apply different learning processes: critical thinking process, problem-solving process, practice process, group work process and attitude development process. They will acquire abilities to communicate, think, solve problem, use life skill and apply technological skills. In addition, students will gain learning and innovative skills: think creatively, show interest in innovation, have critical thinking, be able to solve problem, communicate effectively and be collaborative. Students should also have information and technological media skill: stay up-to-date with the news, have media literacy, have information technology-related knowledge and skills and communicate wisely. They are expected to gain life and careers skills which include the following: stay flexible and adaptive, be initiative, take a good care of oneself, and have social skills. Other than all the learning skills, students will be equipped with a set of characteristics – honesty, self-discipline, avidity for learning, dedication to work, and public-mindedness.

ST30274 Computer for Graphic Works

Study knowledge of programs for developing graphic works, types of software and hardware used for developing basic photo editing, photo adjustment for works on webpage, and use of graphic programs to create works. Use information technology skills and processes to create communicative skills, thinking ability, ability to use technology with honesty, disciplines, and endeavor.

ST30275 Multimedia Creation

Study of basic concepts, elements and technologies related to multimedia, creating a slide animation, recording and editing including development of multimedia project by using understanding process, thinking process, technological process, and group dynamics to gain knowledge and understanding and to be able to apply knowledge to apply in everyday life, as well as disciplined pursuit learning and commitment to work.

OC30221 Introduction to Business

Students will **study** the following topics: the basics of different kinds of business, different forms of business registration, environment and components necessary for running a business including organizational management, human resource management, and accounting, finance, marketing, and office administration. Different types of business documents are to be introduced in the contents. The aims of study are to pave the way for students to run a business, to analyze business-related problems, and to develop essential ethics for entrepreneurs. **Students are expected to subsequently develop the ability to communicate, to think, and to solve problems. Life skills and the use of technology are also to be enhanced. Students will additionally be developed learning skills and skills to create innovation – think creatively, demonstrate innovation, use critical thinking, solve problems wisely, communicate effectively, and be willing to work with others.** Information-related skills will also be included in this course. Students are expected to learn about technological media, to keep themselves updated with news and information, to have good judgement on media, to be a well-rounded individual in the field of information technology and to communicate wisely. Another skill that will be fostered is

life and career skills which cover flexibility, adaptability, creativity, self-responsibility and social skills. As for the students' desired characteristics, the course will focus on honesty, discipline, avidity for learning, dedication for work and public-mindedness.

ST30105 Design and Technology

Students will study the following topics: main concepts of technology, relationships of technology with other fields of study especially science or mathematics; evaluating its impact on humans, society, economy and environment so as to use the information as a guideline for developing technology; identifying problems or needs that have impacts on society; gathering and analyzing information and concepts related to the complicated problems in order to synthesize methods or techniques for problem solving by taking into account legality on the intellectual property; designing a solution by analyzing, comparing and selecting essential information under the conditions and existing resources; proposing an understandable solution by using a range of techniques or methods that apply computer software to assist in designing, planning, working and solving problem; testing, evaluating, analyzing and giving reasons of problems or defects found within conditions scope; generating improvement alternatives; presenting results of problem solving with recommendations for further development; applying knowledge and skills about materials, equipment, tools, mechanics, electricity, electronics and complex technology to solve problems or develop work correctly, properly and safely; applying computational thinking creatively to develop a project work which is integrated with other disciplines and is connected with real life taking into account awareness and responsibility.

Students will apply many learning processes: attitude development process, knowledge and understanding development process, critical thinking process, practicing process and problem-solving process. With these processes, students are expected to develop the 21st century learning skills including the following: **critical thinking; problem solving; acceptance and understanding in change; computer, information technology and communication; collaboration, teamwork, and leadership; creativity and innovation; data and information communication, and media literacy.** In addition, the course is aimed at forming the following set of characteristics in students: honesty and integrity, discipline, avidity for learning and dedication to work.

Learning Content

EP-M.4

ST30101 Foundation Physics

Students will study the following topics: calculating a resultant force, acceleration of the object, action force and reaction force, linear motion, projectile motion, circular motion, simple harmonic motion; the magnetic field, production of EMF and its application, strong force and weak force; reflection, refraction, diffraction, superposition of waves; natural frequency, resonance, results of resonance, sound intensity, levels sound affecting people's hearing, formation of echo, beats, Doppler effect, resonance, uses of knowledge about sound in everyday life; the perception of color and deficiency of color vision, the process of color filters, mixing of colors of light, pigment mixing and its application in everyday life; electromagnetic waves, components of electromagnetic waves, working functions of some equipment that use electromagnetic waves; analog communication and digital communication.

In learning, students will use the scientific process and the scientific process skills which consists of observation, investigation, experiment, making an informed judgement, data presentation, data classification, data interpretation, making a conclusion, analysis, explanation, discussion, collaboration with other people, and evaluation. The course is aimed for students to gain knowledge, understanding and abilities to think, to solve problems, to use technology and to apply knowledge learned in everyday situations. In addition, the following characteristics will be formed: honesty and integrity, self-discipline, avidity for learning, dedication and commitment to work, and the characters of an AC gentleman.

ST30102 Foundation Chemistry

Students will study science in the following topics: elements and compounds; atomic models; the number of protons, neutrons and electrons in atoms and ions; the nuclear symbols of the elements and isotopes; the evolution of the Periodic Table of Elements; identifying group of representative elements; properties of elements; uses of representative and transition elements; ionic bonds, structure of ionic compounds, writing formula, naming of ionic compounds; covalent bonds and naming; relationship of intermolecular forces, metallic bond, different properties of ionic compounds, covalent compounds and metallic compounds;

chemicals and products used in daily life; electrolyte solution; hydrocarbon compounds; structure and properties of polymer; impacts from the use of polymer products on environment and prevention or solutions to such impacts; chemical reactions, substrates; products, meaning of chemical formula of chemical reactions; factors affecting chemical reaction, redox reaction; and properties of radioactive substances.

Students will apply skills in critical thinking, information research, observation, communication, collaboration and application of knowledge. The following competencies will subsequently be formed: ability to use technology to appropriately search for information, ability to think critically, creatively and carefully, ability to apply knowledge learned in everyday life situations, ability to communicate effectively and ability to work collaboratively with others. Students will, in addition, have the desired characteristics: love of nation, religion, and the king; honesty and integrity; self-discipline; avidity for learning; dedication to work; self-sufficiency; pride of Thai-ness; public-mindedness; qualifications of AC gentleman.

ST30103 Foundation Biology

Students will study science in the following topics: a relationship between geography on Earth and diversity in biomes; ecological succession; changes of the population size of organisms in the ecosystem and its impact on natural resources and environment; conservation of natural resources and solving environmental problems; structure and properties of plasma membrane that are involved with substance transportation; substance transportation through plasma membrane; the control of water balance and substances in blood by the function of kidneys; the control of acid-base balance of blood by the function of kidney and lung; the control of temperature balance in the body in blood circulation system, skin, and skeleton muscle; specific and nonspecific body defense against foreign matter; the diseases or symptoms caused by the immune system disorders; the acquired immunodeficiency syndrome caused by HIV infection; nutrients that plants can synthesize; the use of substances that some plants create; external factors that influence growth of plants; manmade substances used to control growth in plant, and examples of their use in plant agriculture; response of plants to many types of stimuli that affect their growth; protein synthesis and genotypes; trait inheritance controlled by gene located on sex chromosomes and multiple alleles; nucleotide sequence

changes in DNA on organisms' traits; uses of mutation; effects of DNA technology on humans; diversity in organisms which results from evolution.

Students will apply the following skills in the course: critical thinking and solving problem, creativity and innovation, collaboration teamwork and leadership, cross cultural understanding, communication, information, computing and media literacy, career and learning self-reliance and compassion. The aims are for students to gain knowledge and understanding in the subject area. Students will also be enhanced to develop the following competencies: to apply knowledge learned to solve problems and manage obstacles in future career appropriately, to have creativity and innovation skills, to communicate effectively, to avoid showing inappropriate behavior that can affect positive interpersonal relationship, and to use technology to search effectively accurate information. Students are, in addition, expected to show desired characteristics as follows: love of nation, religion, and the king, self-discipline, avidity for learning, dedication to work, honesty and integrity, self-sufficiency, following Thai ways of life and wisdom, public-mindedness and social responsibility, qualifications of an AC gentleman.

ST30104 Foundation Earth, Stars and Universe

Students will study the foundations of science in the following topics: structure of the Earth, plate tectonics theory, patterns of plate movements, volcanic eruptions, earthquakes, tsunami, changes of earth conditions, process of climate change of the earth, weather symbols, the origin of the universe, galaxies, stars, evolution of the stars, the solar system, the origin of the solar system, the origin and evolution of the sun, luminosity and absolute magnitudes of stars, distance between stars, nebulae, the origin of stars, star system, mass of stars, boundaries of natural satellites of the sun, space technology, transportation and orbits of satellites, space transportation system, and use of space technology.

Students are expected to use the 21st century learning skills, scientific process and scientific process skills including observing, searching for information, performing experiments, giving informed opinion, presenting information, classifying information, interpreting information, making a conclusion, analyzing, explaining, and discussing. Students are also expected to acquire the ability to solve problems, to think, and to use technology. The aim is for students

to gain knowledge and understanding and to be able to apply acquired knowledge in everyday situation. The course is additionally aimed for students to demonstrate the following characteristics: being honest, having discipline, being avid for learning, being dedicated for work, and having characters of an AC gentleman.

ST30211 Universal Physics 1

Study the definitions of force, work, and power, equations of relationship between force and work, equations of relationship between work and kinetic energy, potential energy, and laws of conservation of energy, impulse, impulsive force, change in momentum, one-dimensional collision, laws of conservation of momentum, two-dimensional collisions, explosion of objects, circular motion, centripetal force, simple harmonic motion, rotational motion, angular momentum, laws of conservation of angular momentum, laws of conservation of rotational kinetic energy, rotational motion relating to quantities of angular velocity, angular acceleration, torque, and linear motion equations. Use the process of establishing knowledge and understanding, scientific skills and process which are observation, data exploration, experiment, making judgments from data, data implication, data interpretation and drawing conclusion, analysis, explanation, and discussion to create knowledge, understanding, and ability to apply the knowledge to real-life situations with honesty, diligence, endeavor, and disciplines.

ST30231 Universal Chemistry 1

Study ionic bond, occurrence of change, formula writing, naming, energy changes and formation of ionic compounds, properties and reactions of ionic compounds including writing ionic equations, covalent bond, formation of bond, types of bonds, covalent molecules that violate octet rule, formula writing and naming, bond length and bond energy, resonance structures, molecular shapes, polarity and polarity direction of covalent bond, and explain relationship of bond stress between molecules and melting and boiling points of covalent substances, different properties of polar and nonpolar covalent bonds and some covalent bonds with lattice structure, metallic bond and some properties of metal, properties of elements and compounds according to Periodic Table which will be started from studying the

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properties of compounds of elements about melting point, boiling point, acidity and alkalinity of oxide and chloride compounds of period 2 and 3 elements, and learning properties of elements group IA IIA and VIA which are the representatives of metallic elements and metalloids respectively, positions of hydrogen in Periodic Table, properties of transition elements, formation of compounds of some transition elements, and preparation of complex compounds of transition elements, radioactive elements along with the use of Periodic Table to predict positions or properties of elements in Periodic Table, properties of elements in solid, liquid, and gas phases, properties of solid, particle configuration and formation of solid crystals, phase change of solid which are surface tension, vapor pressure, relationship between vapor pressure and boiling point of liquid, properties of gas, change of gas volume when temperature or pressure changes including studying various laws relating to gas such as Boyle's law, Charles' Law, Combined Gas Law, Ideal Gas Law, and Diffusion of gases. Apply knowledge about properties of solid, liquid, and gas to use in the process of dry ice industry, liquid nitrogen industry, and extraction using CO₂ fluid. Use the process of establishing knowledge and understanding, scientific skills and process which are observation, data exploration, experiment, making judgments from data, data implication, classification, data interpretation and drawing conclusion, analysis, explanation, and discussion to create knowledge, understanding, problem-solving ability, thinking ability, ability to apply the knowledge to real-life situations along with honesty, studiousness, endeavor, and proper disciplines.

ST30256 Universal Biology 1

Study fundamental science on the topics of biodiversity consisting of genetic diversity, species diversity, and ecosystem diversity, diversity of today organisms divided into 5 kingdoms which are Kingdom Monera, Kingdom Protista, Kingdom Fungi, Kingdom Plantae, and Kingdom Animalia, importance of biodiversity and methods of conserving and maintaining biodiversity, problems and causes of environmental and natural resource problems in local, national, and global levels. Study chemicals which are the basis of organisms both organic and inorganic compounds including chemical reactions in organisms and functions of enzymes, digestive reactions in organisms and structure of Gastrointestinal tract, conditions affecting digestive system and diseases. Use the process of establishing knowledge and understanding, analytical

skills, and scientific skills and process which are observation, data investigation, experiment, making judgments from data, classification, data interpretation and drawing conclusion, explanation, discussion, and group process to create knowledge, understanding, and ability to apply the knowledge to real-life situations with honesty, studiousness, endeavor, public mind, nationalism, religiosity, love of being Thai, self-sufficiency, and disciplines.

ST30201 Mechanics Physics

Study the definitions of force, work, and power, equations of relationship between force and work, equations of relationship between work and kinetic energy, potential energy, and laws of conservation of energy, impulse, impulsive force, change in momentum, one-dimensional collision, laws of conservation of momentum, two-dimensional collisions, explosion of objects, circular motion, centripetal force, simple harmonic motion, rotational motion, angular momentum, laws of conservation of angular momentum, laws of conservation of rotational kinetic energy, rotational motion relating to quantities of angular velocity, angular acceleration, torque, and linear motion equations. Use the process of establishing knowledge and understanding, scientific skills and process which are observation, data exploration, experiment, making judgments from data, data implication, data interpretation and drawing conclusion, analysis, explanation, and discussion to create knowledge, understanding, and ability to apply the knowledge to real-life situations with honesty, diligence, endeavor, and disciplines.

ST30261 Earth, Stars and Universe

Students will study the following topics: relative age, absolute age, the formation process of fossils, types of fossils, stratification, the chemical structure of minerals, physical properties of minerals, examination of minerals using the chemical composition, rock forming mineral, cycle of rock, igneous rock, sedimentary rock, metamorphic rock, coal resources, petroleum resource, atmospheric layers map divided by variations in temperature, atmospheric layers based on height, formation of clouds, types of clouds, formation of storm, types of storm, formation of monsoon, celestial sphere, horizontal coordinates, equatorial coordinates, ecliptic coordinates, world time setting, solar system model, apparent motion of the planets,

elongation and orbital path of the planets, Kepler's laws, gravitational force between the Sun and planetary orbits.

Students are expected to use the scientific process skills including observing, searching for information, performing experiments, giving informed opinion, presenting information, interpreting information, making a conclusion, analyzing, explaining, and discussing. Students are also expected to acquire the ability to solve problems, to think, and to use technology. The course is additionally aimed for students to demonstrate the following characteristics: being honest, having discipline, being dedicated for work, and having learning skills and skills to create innovation.

ST30246 Biochemistry and Biodiversity

Students will study the followings: important properties of living organisms, and relationship of the system organization within organisms that helps sustain life, importance of problem identification, relationship between problems, hypothesis and methods used to test hypothesis, the design of experiment to prove hypothesis, properties of water, importance of water to living things, examples of various types of elements that are vital to the bodies of organisms, structure of carbohydrate, groups of carbohydrate, importance of carbohydrate to living things, structure of protein and its importance to living things, structure of lipid and its importance to living things, structure of nucleic acid, types of nucleic acid, importance of nucleic to living things, chemical reactions taking place in organisms, functions of enzyme on the chemical catalysis in the living things and factors affecting functions of enzyme.

Additionally, students will study the following contents: Mendel's experiments, Law of Segregation and Law of Independent Assortment, application of these Mendel's laws to explain the genetic inheritance and to calculate probability of creating various phenotypes and genotypes of F1 & F2 series, the genetic inheritance in the part of "Extensions of Mendelian Inheritance", the genetic characteristics that show discontinuous variation and continuous variation, the genetic transmission within chromosomes and examples of the hereditary characteristics that are controlled by autosomes and sex chromosomes, the relationship between the genetic materials, alleles, proteins, the genetic traits and link of knowledge with

the Mendelian Inheritance, the genetic and chromosome mutations, causes of mutation, and examples of diseases and disorders resulting from such mutations.

The course will also contain the following contents: biodiversity and the connection between the genetic diversity, species diversity and ecological diversity, forming of the protocell of living organisms and the evolution of the single-celled organisms, bacterial organisms, protist, plants, fungus and animals, organism classification from large scale to smaller ones and the methods of creating scientific names in sequence of species, creation of Dichotomous Key to identify the organism or the selected samples that have been categorized into groups, application of knowledge about biotechnology, energy from the agricultural raw materials: biomass gas and ethanol to explain about alternative energy for future use.

Students are expected to use the scientific process, knowledge exploration process, information search, observation, analysis, experiment, discussion, explanation and skills to make a conclusion. The aim is for students to gain knowledge and understanding and to be able to communicate, make informed decision, solve problems, use technology to study for knowledge and appropriately apply acquired knowledge in everyday situation. Students' competencies are to be enhanced in regard to the ability to communicate, think and use technology. The course is additionally aimed for students to demonstrate the following characteristics: love for the country, religion and the King, honesty and integrity, discipline, avidity for learning, self-sufficiency, dedication for work, cherishing Thai-ness, public-mind, and characters of AC gentleman.

ST30291 Health Science 1

Study the origin of medicine, health care fields, how the medical field evolved in Thailand and how experiments benefit the promotion of medicine. Investigate all the different fields of medicine. Students design career path in medicine, level of education attained, and any additional training this person pursued in the course of successfully reaching his/her occupational goals. Conduct laboratory experiments to explore some medicine benefits and health care breakthroughs.

(This content is the outline, they may have some change.)

Use the process of establishing knowledge and understanding, analytical process, and scientific skills and process which are observation, data exploration, experimentation, making judgments from data, data interpretation, and drawing conclusion to create knowledge, ideas, understanding, ability of knowledge communication, decision-making ability, and ability to apply knowledge to real-life situations along with having honesty, diligence, endeavor, public mind, proper values, and self-sufficiency.