

2023-2024 Undergraduate Catalog Description Chemical Engineering

1. MAT11301 – Calculus 1

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course covers the following topics: theory and application of the differential calculus of polynomial, exponential, logarithmic and trigonometric functions, graphical, numerical, and analytical solutions to applied problems involving derivatives, introduction to the integral.

Prerequisites: None

2. ELE31201 – Foundations in Engineering 1 (+ Lab)

Credit(s): 2 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/week, Lab: 1/week)

The course covers an introduction to computer-aided drafting. Emphasis is placed on drawing setup; creating and modifying geometry; adding text and dimensions, coordinate systems, and plot/print to scale. Technical drawing skills including freehand sketching, orthographic projection, dimensioning, sectional views, and other viewing conventions will be developed. Basic CAD commands, tools, multi-view drawing and dimensioning techniques.

Prerequisites: None

3. CHE11301 – General Chemistry 1

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course provides basic knowledge of chemistry with the content includes atomic structure, electromagnetic radiation, atomic spectroscopy, atomic structure according to quantum mechanics, atomic orbitals, and energy levels; theories explaining about chemical binding (theory valence bond, hybridization theory); the molecular structures and shapes of the propulsion theory between electron pairs VSEPR and the molecular orbital theory MO; the state of substances.

Prerequisites: None

4. CHE11101LAB – General Chemistry Lab 1

Credit(s): 1 (Math & Basic Sciences); Required

Contact hours: 3 (Lab: 3/week/group)

The General Chemistry Lab 1 in addition to helping students to review the knowledge learned in the theoretical module also helps students to classify tools, chemicals, equipment, skills and basic operations, the extent of the substances impact on the experimenters, the possible risks of incidents, from which to properly recognize and use personal protective equipment when working in the laboratory.

Prerequisites: None

5. PHY21201 – General Physics 1

Credit(s): 2 (Math & Basic Sciences); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course is designed to meet the needs of student majoring in Petroleum Geology – Geophysics, Drilling and Production Technology, and Refinery and Petrochemical. It is introductory course in Newtonian mechanics with topics include Vectors, motion in one dimension, motion in a plane, Newton's laws, work and energy, potential energy, momentum, Kinematics of rotational motion, dynamics of rotational motion, elasticity, and fluid mechanics.

Prerequisites: None

6. PHY21101LAB – General Physics Lab 1

Credit(s): 1 (Math & Basic Sciences); Required

Contact hours: 3 (Lab: 3/week/group)

Through practical work students should be able to carry out experimental and investigative work in which they plan procedures, use precise and systematic ways of making measurements and observations, analyze and evaluate evidence and relate this to scientific knowledge and understanding. The syllabus is organized around the topics of General Physics 1 with 7 experiments. Each experiment has one laboratory manual with the typical structure: objects of the experiment, principles, carrying out the experiment and report form.

Prerequisites: None

7. PET21201 – Introduction to Oil and Gas Industry

Credit(s): 2 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/weeks, Discussion: 1)

The course provides students the fundamental understand related to the history of petroleum industry development and its role. In terms of upstream, students will understand the basic of petroleum geology – geophysics, the definition of reservoir rock, drilling process, well completion and petroleum production, as well as petroleum transportation. Regarding the downstream, the course will bring the descriptions of the main processes in petroleum refining, gas conditioning and processing and describe block schemes of refinery and gas plant.

Prerequisites: None

8. MAT11302 – Calculus 2

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course covers the following topics: definite and indefinite integrals of functions of a single variable. Improper integrals. Infinite series. Introduction to differential equations. Emphasis on applications of calculus and problem-solving using technology in addition to symbolic methods.

Prerequisites: MATH11301

9. PET11105 – Career Orientation Field Trip

Credit(s): 1 (Engineering topics); Required

Contact hours: 2 weeks

In the summer of first year, students participate in a 2-week training program in oil and gas companies - operating in area related to PVU's training majors from the upstream to downstream such as Vietsovpetro, PTSC, PVD, PVFCCo, Dinh Co Gas Processing Plant, Petroleum Institute... and foreign oil and gas technical service companies like Schlumberger, Baker Hughes.

Prerequisites: PET21201

10. INC31301 – Foundations in Engineering 2 (+ Lab)

Credit(s): 3 (Engineering topics); Required

Contact hours: 5 (Lecture: 3/week, Lab: 2/week)

Computer programming for engineers, syntax, use of primitive types, control structures, vectors, strings, structs, classes, functions, file I/O, exceptions, and other programming constructs, use of class libraries, practice in solving problems with computers, includes the execution of programs in C++ written by students.

Prerequisites:

11. PHY21202 – General Physics 2

Credit(s): 2 (Math & Basic Sciences); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course is designed to meet the needs of student majoring in Petroleum Geology – Geophysics, Drilling and Production Technology, Refinery and Petrochemical. It is an introduction to electricity and magnetism, light, geometrical and wave optics. Many concepts from General Physics 1 will be used in this course such as: position, velocity, acceleration, force, Newton's laws of motion, work, and energy. The course uses algebra, geometry and trigonometry, vectors and vector arithmetic, and some calculus. The course has lecture, homework, and laboratory portions.

Prerequisites: MAT11301, PHY21201

12. PHY21102LAB – General Physics Lab 2

Credit(s): 1 (Math & Basic Sciences); Required

Contact hours: 3 (Lab: 3/week/group)

Through practical work students should be able to carry out experimental and investigative work in which they plan procedures, use precise and systematic ways of making measurements and observations, analyze and evaluate evidence and relate this to scientific knowledge and understanding. The syllabus is organized around the topics of General Physics 2 with 7 experiments. Each experiment has one laboratory manual with the typical structure: objects of the experiment, principles, carrying out the experiment and report form.

Prerequisites: PHY21101LAB

13. MAT12203 – Calculus 3

Credit(s): 2 (Math & Basic Sciences); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course covers the following topics: vector geometry, algebra, and calculus. Partial and directional derivatives. Double and triple integrals. Vector fields. Line and surface integrals. Theorems of Green, Stokes, and Gauss.

Prerequisites: MAT11302

14. CHE12302 – General Chemistry 2

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

General Chemistry 2 presents the main point that the student will achieve the knowledge to solve problems in fundamental chemistry such as: Energies and Rates of Chemical Reactions, aqua solution, electro-chemistry, chemical surface.

Prerequisites:

15. CHE12102LAB – General Chemistry Lab 2

Credit(s): 1 (Math & Basic Sciences); Required

Contact hours: 3 (Lab 3/week, Discussion: 1/week)

Students will execute experiments pertinent to some facts, concepts, principles, laws, and theories of chemistry covered in CHE12103LAB – General Chemistry Lab 2.

Prerequisite:

16. MEC32301 – Thermodynamic

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course introduces the fundamental laws of thermodynamics (the first and second laws) and their application to engineering power cycles such as Carnot cycle, Rankine cycle, refrigeration cycle, Otto cycle, and Diesel cycle.

Prerequisites:

17. MEC22302 – Fluid Mechanics (+ Lab)

Credit(s): 3 (Engineering topics); Required

Contact hours: 5 (Lecture: 3/week, LAB: 2/week)

This is an introductory course in fluid mechanics. The topics covered include fluid properties, fluid statics, fluid kinematics, conservation laws, Bernoulli and energy equations, differential analysis of fluid flow, inviscid and viscous incompressible flow, and flow in confined streams and around objects.

Prerequisites: PHY21202, MAT11302

18. PPR12301 – Organic Chemistry 1

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

“ORGANIC CHEMISTRY” will provide students with basic knowledge about structure, nomenclature, basic methods for preparation of organic compounds, physical properties, chemical properties and applications of important organic compounds (the saturated hydrocarbon compounds, unsaturated hydrocarbons, aromatic hydrocarbons, halogen derivatives, alcohol, phenol, carbonyl compounds, carboxylic acids) in the life. The module also provide learners with knowledge about isomers of organic compounds, understanding and distinguish the types of chemical bonds in organic compounds, organic reactions and reaction mechanisms, understand the types of effects in organic compounds molecules to explain and compare acidity – base of organic compound, reactivity, direction of reaction and reaction mechanism of organic compound.

Prerequisite:

19. PPR12101LAB – Organic Chemistry Lab 1

Credit(s): 1 (Math & Basic Sciences); Required

Contact hours: 3 (Lab: 3/week/group)

The “Organic Chemistry Lab” will help learners revise the knowledge learned in courses “Organic Chemistry” and provide learners with some skills to conduct qualitative experiments on some chemicals. After this module, learners will be proficient in performing laboratory experiments, have good understanding about effects of different chemicals used in each experiment, use personal protective equipment (PPE) correctly when working in Organic Chemistry laboratory.

Prerequisites:

20. ELE32203 – Electric Circuit Analysis (+ Lab)

Credit(s): 2 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/week, Lab: 1/week)

Basic components and electrical circuit models. Response analysis due to DC, AC circuits (Kirchhoff’s Laws, RLC circuits, Power, Polyphase circuits). Solution of multi-node circuits using the Laplace transform and complex number method. Concepts of electrical machines.

Prerequisites: MAT11301, PHY21201

21. SOC02206 – Professional Skills for Engineers

Credit(s): 2 (Others); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

Occupational skills refer to skills that are not related to professional knowledge, including communication skills, teamwork skills, problem-solving skills, negotiating skills, etc. Occupational skills provide students with the system of knowledge, rules, and practices to help students form the soft skills needed to help students promote social behavior, self-management, and leadership. Such skills direct students to build and maintain good social interactions and solve problems at work and in life.

Prerequisites: None

22. MAT12305 – Differential Equations

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course covers the following topics: First, second, and higher order equations; Systems of differential equations; Analytic methods of solution; Applications to science and engineering.

Prerequisites: MAT11301

23. PPR12302 – Principles of chemical engineering

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

To provide a foundation in the principles of chemical engineering for persons whose first degree is otherwise. The module explains how plant is designed and operated and covers those aspects of chemical engineering which are of relevance for building quantitative process models. Its content includes stoichiometry, material and energy balances, introduction to practical engineering problems, including computer methods.

Prerequisites:

24. PPR12303 – Heat Transfer

Credit(s): 3 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

Transfer of heat by conduction, radiation, and convection. Analysis of steady-state and transient heat processes. Introduction to heat exchanger design. Introduction to numerical heat transfer using finite-element analysis.

Prerequisites: MEC32301

25. PPR12336 – Equilibrium Thermodynamics

Credit(s): 3 (Math & Basic Sciences); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course provides the major knowledge of thermodynamics and equilibrium in chemistry, including the contents of: the first law and the second law of thermodynamics and its application in determining the direction and evolution of the process; theory of phase equilibrium, phase equilibrium for a one-component system; liquid-vapor equilibrium, liquid-liquid equilibrium and liquid-solid equilibrium; the method of determining the composition of the components in the phases; the law of Nernst distribution.

Prerequisites: CHE12302

26. PPR12320 – Analytical Chemistry

Credit(s): 3 (Math & Basic Sciences); Elective

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This is a course in fundamental theories and techniques in classical methods of chemical analysis including titration, and equilibria, as well as, error analysis and an introduction of instrumental

analyse. For instance, the student could understand about the acid-base titration, EDTA titration, redox titration and how to calculate the pH, to draw the curve titration...

Prerequisites:

27. PPR12120LAB – Analytical chemistry Lab

Credit hour(s): 1 (Math & Basic Sciences); Elective

Contact hours: 3 (Lab: 3/week/group)

The "Analytical Chemistry lab" will help learners revise the knowledge learned in courses "Analytical Chemistry". After this module, learners will be proficient in performing laboratory experiments, have good understanding about effects of different chemicals used in each experiment, use personal protective equipment (PPE) correctly when working in analytical chemistry laboratory.

Prerequisite:

28. PPR12204 – Summer Internship 1

Credit(s): 2; (Engineering topics); Required

Contact hours: 4 weeks

The course is to provide learner practical working skills at a specific plant through observation and learning from technicians and operators in the factory. The course re-examine knowledge about operations, and principles of operating equipment in petrochemical refineries such as pumping systems, distillation towers, absorption, catalytic reaction and regeneration equipment, methods for handling simple incidents during transport. The learner also captures the requirements and regulations on occupational safety - environmental protection, waste treatment methods and techniques and other regulations; Since then, learners can approach and step by step formulate the thinking of mastering technology and equipment in the factory, can perform the inspection and supervision of equipment after graduation.

Prerequisites: None

29. PPR13305 – Mass Transfer

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This course will introduce you to the fundamental principles of mass transfer and separation processes. The course provides to student scientific basis and method of calculation processes and equipment diffusion (mass transfer) in a phase and between phases: solid - liquid – gas.

Prerequisites:

30. PPR13306 – Gas Processing Technology

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The module will provide the basic concepts of natural gas, the role of natural gas in the economy, the trend of developing gas processing technology in Vietnam and in the world. The first part introduces the basic knowledge of natural gas, physical and chemical properties, requirements on

raw materials and gas products, phase diagrams and applications in oil and gas processing. The next part of the module provides important insights into gas processing processes: separation of mechanical impurities, dehydration, gas sweetening, NGL recovery and fractionation, LNG production. The module also introduces some process flow diagram & configuration of existing gas processing plants in our country.

Prerequisites:

31. ELE33305 – Process Control (+ Lab)

Credit(s): 3 (Engineering topics); Required

Contact hours: 6 (Lecture: 3/week, Lab: 3/week)

To introduce the fundamental of process instrumentation, dynamics and control that includes dynamic and steady state modeling of processes, design and analysis of feedback control systems, stability analysis, tuning of feedback control systems and process instruments.

Prerequisites: MAT12305

32. PPR12317 – Physical Chemistry 1

Credit(s): 3 (Math & Basic Sciences); Elective.

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course provides the major knowledge of simple reactions kinetics and complex reactions, and the method for determining the order of reactions; theory of activation collision and activated energy. The theory of surface and adsorption. Introduction to porous materials; The methods to determine surface area and characteristics of porous. Theories of homogeneous and heterogeneous catalysis. The methods to catalytic synthesis and some important catalytic reaction systems in industrial chemical and petroleum.

Prerequisites: CHE12302

33. PPR12119LAB – Physical Chemistry Lab

Credit(s): 1 (Math & Basic Sciences); Elective

Contact hours: 3 (Lab: 3/week/group).

The course in addition to helping students to review knowledge thermodynamics, phase equilibrium and adsorption also helps students develop more complex skills and steps when doing experiments. Deeper awareness of laboratory safety rules. The coordination in experimental procedures, analytical methods and experimental data processing and the ability to write a report.

Co-requisite:

34. PPR13323 – Polymer Chemistry

Credit(s): 3 (Engineering topics); Elective

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

Introductory polymer chemistry including theory of polymer molecular weight and molecular weight measurements, step-growth and chain-growth polymerization, polymer structure and physical properties, and viscoelastic properties.

Prerequisites:

35. PPR13326 – Reaction Engineering

Credit(s): 3; (Engineering topics); Elective

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This course is to enable to develop a clear understanding of fundamental of chemical reaction engineering. The topics include: Mole balances, the characteristics of reactors, applications of mole balances into different reactors, conversion and reactor sizing, rate laws, stoichiometry for each type of reactor.

Prerequisites:

36. PPR14327 – Petroleum chemistry

Credit(s): 2 (Engineering topics); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

Petrochemistry is a branch of chemistry that studies the transformation of crude oil (petroleum) and natural gas into products or raw materials.

- General characteristics of petroleum, its origin and classification
- Hydrocarbon compounds (paraffin, naphten, aromatics) in crude oil and oil products; Non-hydrocarbon compounds (sulfur, oxygen, nitrogen, metal and other compounds in crude oil).
- Physical and chemical properties of oil and petroleum products.
- The chemical mechanism that occurs in the chemical processing processes occurring in petrochemical plants such as: thermal cracking, catalytic cracking, hydrocracking, catalytic reforming, alkylation, isomerization ...

Prerequisites: PPR12301

37. PPR13207 – Chemical reactor design

Credit(s): 2 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

Chemical reactors play a central role in all chemical processes. The control of chemical changes for practical applications is a defining concept in chemical engineering. Reaction engineering entails the manipulation of chemical reactions by adjusting the size and shape of a reactor, the flow conditions, and the operating conditions (temperature, pressure, etc.). Possible goals might be to minimize reactor size, to optimize the yield of a certain product, to avoid by product production, or to make a process safer or more environmentally friendly. In this course, you will learn to interpret chemical reaction rate data and to use those data to develop performance equations for single and multiple reactor systems.

Prerequisites: PPR13326

38. PPR13208 – Process Component Design

Credit(s): 2 (Engineering topics); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

This course allows the participants to understand the design of chemical process components. Including: capital and manufacture cost estimation; profitability analysis; project specifications, consideration given to optimizing performance, energy integration, cost effectiveness.

Prerequisites: PPR13305

39. PPR13339 – Petroleum Refining Technology

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This module content includes the concepts, classification and physicochemical properties of crude oil and refinery products, thereby providing knowledge of selection processes and preparation of raw materials and processing. Transform the oil to form the major fuel products. The module introduces physical processes such as desalting, dehydration, distillation of crude oil at atmospheric and vacuum pressure to chemical processes in oil processing such as hydrotreating, thermal cracking, catalytic cracking, reforming, etc.... In addition, the module also introduces the main knowledge in the production of lubricants and lubricants.

Prerequisites: PPR14327

40. PPR13137LAB – Chemical Engineering Lab

Credit hour(s): 1; (Engineering topics); Required

Contact hours: 2 (Lab: 2/week/group)

Students will execute experiments pertinent to some facts, concepts, principles, laws, and theories of chemistry covered in Heat Transfer, Mass Transfer, and the principle of technical chemistry.

Prerequisite: PPR13305

41. PPR13138LAB – Specialized Experiment 1

Credit(s): 1 (Engineering Topics); Required

Contact hours: 3 (Lab: 3/week/group)

The specialized experiment 1 provides students with sufficient knowledge and skills to conduct experiments to determine the composition and properties of petroleum and petroleum products according to ASTM or Vietnamese standards (TCVN). Students will apply the knowledge in the module Petroleum Chemistry and Petroleum Refining Technology to practice experiments such as determining the density of oil, determining the calorific value of fuel, determining the cloud point of a fuel, copper strip corrosion, fractional distillation of crude oil, determination of organic compounds in liquid mixtures by HPLC and GCMS methods. After this module, students will be proficient in performing laboratory experiments, training awareness and habits in the use of laboratory equipment, keeping safety in the laboratory.

Prerequisites: PPR14327

42. PSE13201 – Health, Safety and Environment

Credit(s): 2 (Others); Required

Contact hours: 3 (Lecture: 2/week; Discussion: 1/week)

This course provides a number of basic knowledge about health, safety and environmental management and techniques that are commonly used in the oil and gas industry. By the end of the

course, students can describe hazards in the workplace and hazards of flammable and combustible liquids; describe methods for preventing fire and explosion; calculate noise levels and noise exposure; identify major characteristics of US standards for process safety management and OHSAS 18001; distinguish accident causes, losses and accident causation models; describe hazard measurement, cause measurement, control measurement and consequence measurement; recognise methods and necessary requirements for risk assessment, environmental impact assessment (EIA) and environmental monitoring; apply risk assessment and EIA simply to hypothesis activities/projects; explain oil weathering processes and discuss oil spill response approaches.

Prerequisites: None

43. ECO13301 – Petroleum Economics

Credit(s): 03 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The course consists of 16 chapters to provide students with basic knowledge of microeconomics, macroeconomics, and petroleum economics. Microeconomic issues include the basic laws and concepts of economics and the economy; market mechanism of action, supply and demand rule and market balance; consumer and producer decision-making models; models of market structures and the actions of the parties involved in such market structures. In the macroeconomics section, the module will discuss National Income Accounting; total supply and demand model; Macroeconomic stability: inflation and unemployment; aggregate supply and fiscal policy, financial systems, monetary, banking, and monetary policies of the government. The Petroleum Economics section will give an overview of the world oil and gas industry, the world oil and gas market; update information on laws related to the oil and gas industry; Basic oil and gas contracts; and Vietnam's oil and gas industry.

Prerequisites: None

44. PPR13240 – Summer Internship 2

Credit(s): 2 (Engineering topics); Required

Contact hours: 4 weeks

The course is to provide learner practical working skills at a specific plant through observation and learning from technicians and operators in the factory. The course re-examine knowledge about operations, and principles of operating equipment in petrochemical refineries such as pumping systems, distillation towers, absorption, catalytic reaction and regeneration equipment, methods for handling simple incidents during transport. The learner also captures the requirements and regulations on occupational safety - environmental protection, waste treatment methods and techniques and other regulations; Since then, learners can approach and step by step formulate the thinking of mastering technology and equipment in the factory, can perform the inspection and supervision of equipment after graduation.

Prerequisites: PRP12204

45. PPR14309 – Chemical Engineering Plant Design

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The module equips students with basic knowledge about the design of an oil refinery such as

choosing a suitable construction site and layout of the premises, economically to determine investment costs and operating costs. and payback period, there is a method of selecting equipment in the factory, calculating the design of a network of thermal equipment to take advantage of the heat, gaining access to new design methods in the field of chemical technology (mass and heat integration), the basic principles for designing waste treatment systems, piping systems and detecting hazardous elements in an oil refinery...

Prerequisites: PPR13208

46. PPR14310 – Petrochemical technology

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 2/week)

The "Petrochemical Technology" module will provide learners with an overview about the production and the usage of raw materials from crude oil, natural gas, coal, shale oil ... in Oil and Gas industry. After the course, learners will get an overview of the supply/demand, and the application of important chemicals such as ethylene, propylene, butadiene, syngas, benzene, xylenes ... Besides, this module will equip learners with basic knowledge about some technologies for the production of important chemicals in the petrochemical industry; help learners understand and master some of processes applied in petrochemical industry.

Prerequisites: PPR14327

47. PPR14311 – Petroleum and Petrochemical Products (+ Lab)

Credit(s): 3 (Engineering Topics); Required

Contact hours: 5 (Lecture: 3/week, Lab: 2/week)

The module provides students with basic knowledge about petroleum and petrochemical products (gasoline, jet fuel, civil kerosene, diesel fuel, fuel oil, gas and CNG, lubricating oils, greases, bitumen, petroleum chemicals and solvents), thereby enhancing students' understanding of the properties, standards and applications of products petroleum and how to determine the quality of petroleum products. The module presents users of petroleum and petrochemical products and related issues when using refined and petrochemical products. Experimenting with petroleum products helps students to accurately determine the quality criteria of petroleum products according to ASTM or Vietnamese Standards (TCVN), training awareness and habits in the use of laboratory equipment, keeping safety in the laboratory.

48. PPR14312 – Process Simulation and Optimization

Credit(s): 3 (Engineering topics); Required

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This course is intended to introduce students to the fundamentals of computer-aided process simulation and optimization. Students use a commercial process simulator to aid in evaluating a variety of these process designs. Using a commercial solver package (Matlab trial version) students are introduced to the formulation and solution of linear and nonlinear mathematical optimization problems for chemical engineering applications.

Prerequisites:

49. PPR14113LAB – Specialized Experiment 2

Credit(s): 1 (Engineering topics); Required

Contact hours: 2 (Lab: 2/week/group)

The course provides students with the skills to operate the main unit in refineries and gas processing plants. Topics include: crude oil distillation tower operation, gas processing plant operation, fluid bed catalytic cracking (FCC). After this module, students will have the knowledge and skills to work in oil refineries and processing plants, understand the technical literature, and the nature and purposes of oil primary processes crude oil (separation of water, salt, dust) and distillation of crude oil at atmospheric pressure and vacuum pressure into oil products; Understand gas processing methods and understand the nature and purpose of catalytic cracking. In addition, the module also provides students with skills to operate, test and adjust technological parameters in oil refineries.

Prerequisites: PPR13339, PPR13306

50. PPR13241 – Senior Project 1

Credit(s): 2 (Engineering Topics); Required

Contact hours: 2 (Discussion: 2/week)

The module builds the initial foundation for students in synthesizing the basic and specialized knowledge learned in Chemical Engineering in designing a technological process to produce the required product. In this module, students can calculate and design important basic equipment in chemical engineering, majoring in petrochemical refining such as distillation column, reactor, absorber/regenerator, heat exchangers, hydrodynamic equipment such as pumps, fans, compressors, pipelines,...; After this project, students can form their own thinking and initiative in calculating and designing devices by using code/standard. Safety issues and hazards in process design are also identified.

Prerequisites: PPR13305, PPR12303

51. PPR14214 – Senior Project 2

Credit(s): 2 (Engineering Topics); Required

Contact hours: 2 (Discussion: 2/week)

This course require students to design a chemical engineering process by synthesizing learned knowledge to calculate mass and energy balance in oil and gas processing, selecting and sizing main equipment to build a complete technological process from processing input materials to finished products. In addition, the course is also built so that students can apply their knowledge of simulation software and basic knowledge of refining and petrochemical technology to optimize the designed process. Besides, students must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Prerequisites: PSE13201, ECO13301, PPR13241, PPR13307, PPR13308

52. PET14233 – Renewable Energy

Credit(s): 2 (Engineering topic); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

This course aims to introduce students to general information of energy and necessary knowledge of renewable energy. The course will mention environmental impacts related to the use, extraction and production of fossil fuels; benefits of renewable energy and the trend of energy transition in the world. The

course will take a deep look into some renewables such as solar energy, bioenergy, wind energy, hydropower, wave and tidal energy, geothermal energy and hydrogen energy. Major contents about renewable energy include: the applications, production and consumption, operating mechanism, storage and transportation, advantages and disadvantages, potential and costs, and environmental impacts. After successful participation in this course, students will be able to assess common energy policies in the world and have the foundation for research on energy transition.

Prerequisites: None

53. PPR14232 – The Production of Lubricant and Synfuel

Credit(s): 2 (Engineering topics); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The module equips learners with basic knowledge about the technologies of lubricants and synthetic liquid fuels production. After this course, students will have good understanding on the quality requirements of the lubricants, the chemistry of the lubricants production processes; distinguish liquid synthetic fuels from liquid petroleum fuels; understand technologies for the production of liquid synthetic fuels from biomass, coal and natural gas; technology and catalysis for synthetic liquid fuel production processes. On this basis, learners can apply knowledge learned in this course to their research and practical activities in the Oil and Gas industry.

Prerequisites:

54. PPR14235 – Special Topics

Credit(s): 3 (Engineering topics); Elective

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

The module provides students supplement and reinforce the knowledge learned through topics related to the field of oil and gas transportation and processing, the module has extensive or deeper content about specialized knowledge, on practical issues and the latest research and application results of the profession. Students need to grasp the basic content of the topic, link the learned knowledge and gradually form career development directions upon graduation. Major topics will change annually depending on teaching and practical conditions. Number of topics from 1 or more, selected by subject faculty and students..

Prerequisites: None

55. PPR14315 – Graduation Internship

Credit(s): 3 (Engineering topic); Required

Contact hours: 6 weeks

Pregraduate internship revise all knowledge of students and helps students to equip the necessary knowledge, skills and data for the graduation thesis in Refining - Petrochemical. The content of the intership focuses problem solving of a specific petrochemical proppcess in industry.

Prerequisites: PPR13240

56. PPR14816 – Graduation Thesis

Credit(s): 8 (Engineering topics); Required

Contact hours: 15 weeks

Final year project is to revise all knowledge of student. The content of the project focuses problem solving of a specific petrochemical process in industry.

Prerequisites: PPR14214

57. PPR13324 – Biochemistry

Credit(s): 3 (Engineering topics); Elective

Contact hours: 4 (Lecture: 3/week, Discussion: 1/week)

This course provides the structure, function, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. It also introduces the concepts in cell structure, replication and growth, and metabolic regulation.

Prerequisites:

58. PPR14228 – Equipment in Chemical Engineering

Credit(s): 2 (Engineering topics); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The subject contains general knowledge about the reactive devices used in the petroleum refining industry, such as equipment for physical separation techniques like distillation column, two-phase and three-phase separator, heater, heat exchanger, mechanical transportation equipment, and reactor.

Prerequisites:

59. PPR14230 – Heavy Oil Upgrading Technology

Credit(s): 2 (Engineering topics); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The module provides fundamental concepts in the main technological processes to upgrade heavy crude oil, the development trend of heavy crude oil processing in the world. The main content of the module is to provide important knowledge about the technological process of heavy crude oil processing: methods of transporting heavy crude oil from extraction to processing, carbon reduction technologies, hydrogenation, fractional distillation treatment.

Prerequisites: None

60. PPR14231 – Additives for petroleum products

Credit(s): 2 (Engineering topics); Elective

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course content includes knowledge of the quality of oil products and the types of additives used to enhance the performance of these products. The development trend of new multifunctional, environmentally friendly additives is also introduced in the module. In addition to traditional oil products, including motor gasoline, diesel fuel and lubricants, the module will also cover the necessary additives to improve the quality of biofuel products (gasoline mixed with ethanol and biodiesel).

Prerequisites:

61. ENG41000 – English preparation (120 hrs.)*

This is the first course of the English language training program at PetroVietnam University. It is intended for students whose current level of English proficiency is A1 (2). It primarily aims at preparing students with necessary skills and competence relevant to IELTS attributes.

62. ENG41301 – English 1

Credit(s): 3 (Others); Required

Contact hours: 6 (Lecture: 4/week, Discussion: 2/week)

This is the first course of the English language training program at PetroVietnam University. It is intended for students whose current level of English proficiency is A2 (1). It primarily aims at preparing students with necessary skills and competence relevant to IELTS attributes. This course adopts the learner-centered approach and learning-by-doing theories. Assessment is continuous, which allows for a comprehensive view of the extent to which students have met the course objectives and outcomes.

Prerequisites: None

63. ENG42302 – English 2

Credit(s): 3 (Others); Required

Contact hours: 6 (Lecture: 4/week, Discussion: 2/week)

This is the second course of the English language training program at PetroVietnam University. It is intended for students whose current level of English proficiency is A2 (2). It primarily aims at preparing students with necessary oral skills and competence relevant to IELTS attributes. This course adopts the learner-centered approach and learning-by-doing theories. Assessment is continuous, which allows for a comprehensive view of the extent to which students have met the course objectives and outcomes.

Prerequisites: ENG41301

64. ENG42303 – English 3

Credit(s): 3 (Others); Required

Contact hours: 6 (Lecture: 4/week, Discussion: 2/week)

This is the third course of the English language training program at PetroVietnam University. It is intended for students whose current level of English proficiency is B1.1. It primarily aims at preparing students with necessary oral skills and competence relevant to IELTS attributes. This course adopts the learner-centered approach and learning-by-doing theories. Assessment is continuous, which allows for a comprehensive view of the extent to which students have met the course objectives and outcomes.

Prerequisites: ENG42302

65. ENG43304 – English 4

Credit(s): 3 (Others); Required

Contact hours: 6 (Lecture: 4/week, Discussion: 2/week)

This is the second course of the English language training program at PetroVietnam University. It is intended for students whose current level of English proficiency is B1 (2). It primarily aims at

preparing students with necessary oral skills and competence relevant to IELTS attributes. This course adopts the learner-centered approach and learning-by-doing theories. Assessment is continuous, which allows for a comprehensive view of the extent to which students have met the course objectives and outcomes.

Prerequisites: ENG42303

66. SOC01204 – Ho Chi Minh's Ideology

Credit(s): 2 (Others); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The content of the course covers the basic issues of Ho Chi Minh's Ideology on the national issue and the national liberation revolution; the transition to socialism in Vietnam; Communist Party of Vietnam; great national and international solidarity; democracy and building a State of the people, by the people, for the people; culture, ethics and building new people.

Prerequisites: None

67. SOC01301 – Philosophy of Marxism and Leninism

Credit(s): 3 (Others); Required

Contact hours: 5 (Lecture: 3/week, Discussion: 2/week)

The subject consists of three main contents: studying the nature and the most general laws of movement and development of the world. From there, it will help build scientific worldview and dialectical methodology for cognitive and practical activities of learners; study the economic laws of society, especially the basic economic laws of the Capitalist mode of production; provide learners with regular problems in the process of socialist revolution.

Prerequisites: None

68. SOC01205 – History of Vietnamese communist party

Credit(s): 2 (General Education and Others); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

This subject aims to raise awareness and understanding of the Communist Party of Vietnam - which has led the Vietnamese revolution to victories and achievements of great historical significance in the development of the nation's history. Through studying and researching the Party's history to educate the Party and nation's ideals and traditions of revolutionary struggle, strengthen and cultivate faith in the Party's leadership, and be proud of the Party and the young generation join the Party, participate in building a stronger and stronger Party, continue to carry out the Party's mission of leading to firmly defend the Fatherland and successfully build socialism in Vietnam.

Prerequisites: None

69. SOC01202 – Political economics of Marxism and Leninism

Credit(s): 2 (General Education and Others); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course content includes objects, research methods and functions of Marxist-Leninist political economy; core content of Marxism-Leninism on goods, markets and the role of actors in the market

economy; Surplus value in the market economy; Competition and monopoly in the market economy; the main issues of the socialist-oriented market economy and economic interest relations in Vietnam; Vietnam's industrialization, modernization and international economic integration.

Prerequisites: None

70. SOC01203 – Scientific socialism

Credit(s): 2 (General Education and Others); Required

Contact hours: 3 (Lecture: 2/week, Discussion: 1/week)

The course includes theoretical knowledge on scientific socialism and the path to socialism in Vietnam; provide learners with: objects, purposes, requirements, learning methods, subject research; the process of formation and development of scientific socialism; historical mission of the working class; social, class, ethnic and religious issues during the transition to socialism; After completing the course, learners have the ability to have practical understanding and the ability to apply knowledge about socialism to consider and evaluate the country's socio-political issues related to socialism, society and the road to socialism in our country. Learners explain and have the right attitude towards the path to socialism in Vietnam.

Prerequisites: None

71. PED11101 – Physical education 1

Credit(s): 1 (Others); Required

Contact hours: 2/week

The course content consists of two parts: theory and practice. In theory: equip students with basic knowledge of volleyball, how to organize a volleyball tournament to develop the ability to practice self-improvement. About practice: Equip the basic techniques in Volleyball.

Prerequisites: None

72. PED11102 – Physical education 2

Credit(s): 1 (Others); Required

Contact hours: 2/week

The course content consists of two parts: theory and practice. In theory: Equip students with basic knowledge of football, how to organize a football tournament to develop the ability to practice self-improvement. About practice: Equip the basic techniques in football.

Prerequisites: None

73. PED12103 – Physical education 3

Credit(s): 1 (Others); Required

Contact hours: 2/week

The course content consists of two parts: theory and practice in theory: Equip students with basic knowledge of athletics, how to organize a movement athletics tournament to develop the ability to practice self-improvement. About practice: Equipping basic techniques in athletics.

74. MIE01101– Military Education (165 hrs.)

Credit(s): 0 (Others); Required

The course content consists of two parts: theory and practice in theory: Equip students with basic knowledge of athletics, how to organize a movement athletics tournament to develop the ability to practice self-improvement. About practice: Equipping basic techniques in athletics.

Prerequisites: None

75. MAT12206 - Probability and Statistics

Credit(s): 3 (Math & Basic Sciences), Required course

Contact hours: 4 (Lecture: 3/week ; Discussion: 1/ week)

This course provides students with knowledge about Probability definition, rules for probability calculation, random quantities, probability distributions, conditional probability distribution, statistics, hypothesis testing, variance analysis, regression analysis.

Prerequisites: None