



**ENGINEERING DEPARTMENT
COURSE DESCRIPTION
CHEMICAL ENGINEERING PROGRAM (DIPLOMA SECOND YEAR LEVEL)**

Course Code	Course Title	Course Description	Credit Hours	Contact Hours
CHEM 2100	General Chemistry – I	This course is a theoretical formulation of basic inorganic chemistry which will serve as the chemistry foundation for the chemical engineering specialization. Detailed discussion of atomic structure, periodic properties of elements, molecular structure and bonding models, structures of metals and ionic compounds, solubilities of ionic compounds, intermolecular forces, halides, oxides and hydrides of the s-and p-block elements are covered. Introduction to properties of acids and bases, acid-base equilibrium and coordination compounds will also be covered.	3	4
CHEM 2101	Organic Chemistry	Introduction to the constitution and properties of the different classes of organic compounds. Emphasis will be placed on the relation of molecular structure to its chemical and physical behavior, functional groups and nomenclature as well as some important classes of organic reactions. The laboratory work involves an introduction to the analytical techniques of organic chemistry including preparation of representative organic compounds and isolation of compounds from natural resources.	3	4
CHEE 2101	Engineering Thermodynamics	This course covers the basic concepts of thermodynamics, PVT of pure fluids and equations of state, first and second laws of thermodynamics, thermodynamic properties of pure fluids, applications to flow processes, production of power from heat, liquefaction and refrigeration.	3	4
MATH 2100N	Calculus 2	This course enables the students to learn the various integration methods like, integration by parts, by long division, by using partial fractions, by trigonometric substitution, by reduction formula etc. Numerical integration. Definite integration and its properties. Applications of definite integrals to find areas and volumes. Concepts of even and odd functions. Concept of zeros of a function. Area between two curves. Lengths of plane curves. The functions of several variables. Partial derivatives of order one and two. Graphs of some well known functions. Multiple integrals: Double integrals. Change of order of integration.	3	3
EEPW 2150	Electrical Principles	This course provides the students with an understanding of basic electrical principles and concepts, leading to the ability to carry out calculations involving DC circuits, inductive & capacitive circuits, DC network theorems, electromagnets and AC fundamentals.	3	4
CHEM 2200	General Chemistry – II	Introduction to the theory and applications of analytical chemistry. The course includes a survey of the classical methods of chemical analysis, the underlying theoretical concepts, and a brief introduction to modern instrumental analysis techniques. Laboratory emphasis on obtaining and interpreting qualitative and quantitative data. Errors in analytical analysis, equilibrium expressions, pH, volumetric and gravimetric analysis, fundamentals of spectroscopy, fundamentals of electrochemistry, and analytical separations.	3	4



Course Code	Course Title	Course Description	Credit Hours	Contact Hours
CHEE 2200	Introduction to Chemical Engineering	A brief overview of the chemical engineering profession, the course of study, and career choices is provided. Introduction to design of industrial processes, survey of unit operations, chemical engineering calculations and material and energy balances are well covered. Examples of the processes studied include stoichiometry in combustion and other reactions, material flow with recycle streams, humidification and drying process, and the analysis of non-steady systems.	3	4
CHEE 2201	Petroleum Processing and Refining	A study of the origin and chemistry of petroleum and petrochemicals and the physical and chemical processes to convert crude oil into desired products. The course introduces the cracking process used in petroleum and petrochemical industries. The chemical reactions, products and by-products of petroleum and petrochemical processing are explained. Fractional distillation, catalytic cracking process and polymerization are also introduced. Petrochemical testing methods are also incorporated.	3	4
CHEE 2202	Fluid Mechanics	This course introduces the principles of fluid mechanics that are of fundamental importance to chemical engineers. This course covers fluid statics, Newtonian and non-Newtonian fluids, Bernoulli equation, flow of fluids, flow meters, pumps and compressors, two phase flow, fluid flow in porous media, packed and fluidized beds, and design of piping system.	3	4
PHIL 2200	Formal Logic	To develop the student's ability to think and function effectively, logically and analytically, effectively using oral and written communication.	3	3
EERE 2201	Introduction to Renewable Energy	This course develops the ability to understand the importance of renewable energy resources and its utilization for the thermal and electrical energy needs and also the environmental aspects of these resources. Understand the various forms of conventional energy resources. Learn the present energy scenario and the need for energy conservation. Explain the concept of various forms of renewable energy. Outline division aspects and utilization of renewable energy sources for both domestic and industrial application. Analyze the environmental aspects of renewable energy resources.	3	3
PHIL 3108	Business Ethics	This course is to equip the student with the highest ethical standards that will guide him/her through real life dilemmas. It also enables the student to understand the concept of value, Islamic and Omani values, appreciate and respect ethic and cultural diversity.	3	4
CHEE 2399	Diploma Project	The course is based on projects originating from industry or chemical process problems under the supervision of individual faculty members. Final written report and oral presentation will be presented to summarize his/her work.	3	6



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COURSE DESCRIPTION
CHEMICAL ENGINEERING PROGRAM (ADVANCED DIPLOMA LEVEL)**

Course Code	Course Title	Course Description	Credit Hours	Contact Hours
MATH 3120N	Engineering Mathematics	This course introduces the students to differential equations. This enable the students to learn how the physical problems are represented by means of differential equations, to recognize their types, various methods of solving them, various types of solutions and distinction between them, and to recognize the governing differential equations frequently arise in engineering situations. Laplace transformations, their uses to find solutions of initial value problems and boundary value problems. Partial differential equations and their applications in engineering.	3	3
CHEE 3100	Chemical Process Industries	A survey of the different chemical industry - agrichemical industry, food and food by-products, fragrances, flavors and food additives, fermentation industries, oils, fats, and waxes, soaps and detergents, electrochemical, glass, cement, paint, pulp and paper, fuel gases and industrial gases are discussed more broad and detailed. Course activities include guest speakers and plant trips.	3	4
CHEE 3101	Heat Transfer	This course covers the concepts and theories of heat transfer, introduction to the different modes of heat transfer, steady state and transient heat transfer, conduction, natural and forced convection, radiation, heat transfer coefficient and design of heat exchangers.	3	4
CHEE 3102	Mechanical Operations with Engineering Materials	Basic course in engineering materials and an overview of the various mechanical operations carried out in chemical industries. Topics include particle size analysis, mechanical separation of solids, liquids and gases: agitation and mixing of liquids and solids; storage and conveying of solids. Metals, polymeric, ceramic, composite, and inorganic materials used in construction materials are covered. Corrosion, coatings and selection of materials will also be discussed.	3	4
CHEM 3101	Fundamentals of Physical Chemistry	This covers properties of gases, kinetic theory and transport properties of gases, PVT relations and equations of state, thermodynamic laws, phase equilibrium, chemical kinetics, and electrochemistry.	3	4
CHEE 3201	Mass Transfer	This course covers molecular, convective and interphase mass transfer, transport properties, continuous and stage wise mass transfer, absorption/stripping operations, humidification/drying, and design of certain separation equipment.	3	4
CHEE 3202	Chemical Engineering Thermodynamics	This course covers review of basic thermodynamics, theory and application of solution thermodynamics, vapor-liquid and liquid-liquid equilibrium for ideal and non-ideal systems, and chemical reaction equilibrium.	3	4



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CHEE 3203	Chemical Reaction Engineering	This course covers stoichiometric tables, rates expressions, reaction with phase diagrams, relations between – concentration, pressure, conversion and flow rates, reactor data analysis techniques, conservation of mass in reactive systems, non-isothermal reactors, catalytic reactions, design of reactors, use of package programs and interactive learning tools.	3	4
CHEE 3204	Polymer Science and Technology	This course covers basic terminology in Polymer Science and Technology: chemical structure and physical states of polymers, application of thermodynamics to various processes including devolatilization, molecular weight and molecular weight distribution, polymerization kinetics and polymerization reactors, rheology and fluid mechanics, processing and fabrication of polymeric materials, process analysis with emphasis on extrusion and injection molding, recycling, environmental impact and legal impact on the polymer industry, and heat and mass transfer problems in polymer processing.	3	4
ENGL 3100	Public Speaking	This course provides basic principles and fundamentals of public speaking. Students come to know how to prepare their speech, address the audience, make arrangements in the room and how to effectively deliver their talk or make a presentation. They can apply this knowledge to various other fields.	3	4
PHIL 3201	Formal Arabic Communication	This course is to strength the relationships between the students and his Arabic language and to sure its academic and practical role in society. Also to gain the basic skills in oral and written communication.	3	4
CHEE 3399	Higher Diploma Project	This course covers various topics on the design of chemical engineering processes. The course is based on projects originating from industry or design problems under the supervision of individual faculty members. Final written report and oral presentation will be presented to summarize his/her work.	3	6



**ENGINEERING DEPARTMENT
 COURSE DESCRIPTION
 CHEMICAL ENGINEERING PROGRAM (BACCALAUREATE LEVEL)**

Course Code	Course Title	Course Description	Credit Hours	Contact Hours
CHEE 4101	Chemical Process Dynamics, Instrumentation, and Control	The course covers principles of automatic control for chemical processes, unsteady state modeling, Laplace open loop and closed loop systems, stability, feedback/feed forward and cascade controllers; It also covers instrumentation in chemical processes.	3	4
CHEE 4102	Separation Processes	This course covers evaporation, distillation, liquid-liquid and solvent extraction, design of industrial separation equipment and the use of flowcharting programs.	3	4
CHEE 4103	Computer Aided Design	This course covers modeling and simulation, introduction to computational tools available for the solution of chemical and process engineering problems, use of chemical process simulators, and use spreadsheets.	3	4
CHEE 4104	Introduction to Biochemical Engineering	Introduction to the fundamental concepts in biochemical engineering. Topics include the nature of biochemical engineering, batch and continuous bioreactor design, energy considerations, heat and mass transfer, biochemical kinetics, and application to biological waste treatment are covered in this course.	3	4
CHEE 4105	Engineering Statistics	This is an introductory course in probability & statistics that is designed for engineering students. Topics to be covered will include data analysis, probability, random variables, discrete and continuous probability distributions, estimation, hypothesis testing, sampling, and introductory linear regression and statistical process control.	3	3
CHEE 4298	ChE Final Project 1	This is a chemical engineering design course that will introduce the principles of process design and economic evaluation utilizing various industry computer tools, with special emphasis on process simulators. The student will develop critical design logic to evaluate a process, starting with block flow diagrams and simple material balances utilizing practical heuristics and then builds the process flow sheet through computer simulation, flow sheet optimization, and detailed equipment design. The course is based on projects originating from industry or design problems under the supervision of individual faculty members. This course is taken for two consecutive semester.	3	6
CHEE 4201	Plant Design and Economics	Process and plant design, methods used for feasibility studies and plant design, process synthesis, cost estimation, technical and economical evaluation, pricing of material and products. Use of software. Site visits. Guest lectures. Completion of practical/theoretical task, normally in collaboration with chemical and industrial companies.	3	4



Course Code	Course Title	Course Description	Credit Hours	Contact Hours
CHEE 4202	Introduction to Environmental Engineering	This is an introductory course to environmental pollution control, methods and environmental impact assessment. Topics includes pollution and the environment, environment quality systems, standards and guidelines, environmental legislation, industrial pollution control methods and practices, and the qualitative and quantitative analysis of treatment of environmental problems and industrial pollutants.	3	4
CHEE 4203	Energy Conversion	The course will begin by reviewing the history of supply and use of energy and the transition from coal to wood to oil, gas and nuclear. It will cover the existing and potential energy supplies for the future and discuss their positive and negative impacts, including environmental impacts. This will include the potential for a new generation of nuclear power, wind, solar, biomass and other renewable sources of energy.	3	4
CHEE 4204	Industrial Health and Safety	The course will provide an overview of process safety in the chemical industry. This course will focus on the nature of chemical plant accidents, their causes, and steps to eliminate them, with emphasis on inherently safe designs. The role of human error in accidents will also be examined. Discussions on flammability and toxicity issues are dealt with in great detail.	3	4
CHEE 4299	ChE Final Project 2	Continuation of ChE Final Project 1. Final written report and oral presentation will be presented to summarize and defend his/her work to a panel of selected faculty.	3	6
PHIL 4100	Oman Civilization	To acquaint the student with Omani and Islamic civilization, their development and significance during different pre- and post-Islam eras, and with the Islamic judicial system. The course enable the student to: Understand the geography of Oman, Be familiar with the significance of Omani civilization during pre- and post-Islam eras, Understand Islamic civilization, its development, and its supporting factors. Understand the Islamic judicial system during different post-Islam eras.	3	3