توصيف برنامج دراسي
(عام 2022/2021)

أ - معلومات أساسية :

1- اسم البرنامج : البتروكيماويات و تطبيقاتها

2- طبيعة البرنامج : أحادى

القسم المسئول عن البرنامج : الكيمياء

تاريخ إقرار البرنامج : 2022/8/15

ب – معلومات متخصصة :

1- الأهداف العامة للبرنامج :

1. To generate in students an appreciation of the importance of Chemistry, with concentration on petroleuim and petrochemicals' Chemistry, in an industrial, economic, environmental and social context.
2. To provide students with a broad and balanced foundation of knowledge and practical skills in Chemistry, with concentration on petroleuim and petrochemicals' Chemistry, and related basic sciences.
3. To develop the students ability to apply their chemical and petrochemical knowledge and skills to the solution of theoretical and practical problems in Chemistry and Petrochemistry.
4. To encourage originality of thought.
5. To provide students with experience in computing and information technology.
6. To develop in students a range of general and transferable skills, of value in Chemical, Petrochemical and non-chemical employment.
7. To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of Chemistry and Petrochemistry or multi-disciplinary areas involving Chemistry and Petrochemistry.

2 –المخرجات التعليمية المستهدفة من البرنامج :

1/2 المعرفة و الفهم :

By the end of this progrmme, students will be able to:

a1 identify the major aspects of chemical and petrochemical terminology, nomenclature rules, conventions and units.

a2 explain the related basic science facts, concepts, theories, principles and techniques.

a3 list the major types of chemical and petrochemical reactions and the main characteristics associated with them.

a4 define the characteristics of the different states of matter and the theories used to describe them.

a5 discuss the principles of molecular spectroscopy and their application to the description of the structure and properties of molecules.

a6 illustrate the principles of thermodynamics and their applications to Chemistry and Petrochemistry.

a7 explain the kinetics of a chemical change, including catalysis.

a8 discuss the principles and basics of Petrochemicals exploration methods and manual and computerized interpretations of petrochemical data.

a9 discuss the principal techniques of chemical analysis, structural investigations, including spectroscopy.

a10 recognize the basis and principles of synthesizing of different petrochemicals.

a11 state the characteristic properties of elements and their compounds, including stereochemistry, group relationships and trends within the Periodic Table.

a12 define the nature and behavior of functional groups in organic molecules, with considerable attention to reaction mechanisms.

a13 discuss the principles, classes, biosynthesis, isolation, structure-elucidation and chemistry of natural products.

a14 illustrate the major issues currently at the frontiers of chemistry and industrial applications of plastics, polymers, petroleum products and petrochemicals.

a15 define the basic science terminology, nomenclature and classification systems.
a16 indicate the processes, mechanisms, theories and methods applied for interpreting and analyzing chemical and petrochemical data and solving environmental problems.

2/2 القدرات الذهنية :

By the end of this program, students will be able to:

b1 apply the mathematical expressions in evaluating and understanding of essential facts, concepts, principles and theories of Chemistry and Petrochemistry.
b2 analyze chemical data that they gather from information technology.
b3 apply knowledge and understanding of Chemistry and Petrochemistry to solve problems either qualitatively or quantitatively.
b4 predict petrochemical problems, and analyze the data to solve these problems by suitable ways.
b5 suggest mechanisms to explain physical and chemical processes.
b6 identify chemical structure and composition using available data.
b7 integrate information and data from a variety of sources in order to gain a coherent understanding of theory and practice.
b8 analyze petrochemical data using suitable computer softwares.
b9 evaluate subject-related theories and their concepts and principles.
b10 select the appropriate judgments in accordance with scientific theories and concepts.
b11 postulate mechanisms and procedures to handle scientific problems.

3/2 المهارات :

1/3/2- مهارات مهنية وعملية :

By the end of this program, students will be able to:

c1 follow safty rules in handling chemical and performing techniques.
c2 perform standard laboratory procedures in synthesizing chemical and petrochemical organic compounds.
c3 conduct analytical work, in organic and inorganic chemistry.
c4 estimate changes in properties and chemical raections.
c5 use tools of petroleum in the filed surveys, choose and classify the investigation targeted and select the reliable methods.
c6 use scientific literature effectively and prepare technical reports.
c7 plan, design and process appropriate techniques.
c8 apply ethical standards in scientific reasearch.
c9 use experimental and computer software in interpretation of the petrochemical data.
c10 interpret petroleum data derived from field survey and laboratory techniques in terms of their significance and the theory underlying them.

2/3/2- مهارات عامة :

By the end of this program, students will be able to:

d1 use information and communication technology effectively.
d2 identify roles and responsibilities.
d3 think independently, set tasks and manage time.
d4 solve problems on scientific basis.
d5 work in groups effectively.
d6 collaborate and communicate with others positively.
d7 consider community linked problems, ethics and traditions.
d8 acquire self- and long life–learning.
d9 apply scientific models, systems, and tools effectively.
d10 deal with scientific patents considering property right.
d11 exhibit the sense of beauty and neatness.

3- المعايير الأكاديمية للبرنامج : تم تبني المعايير الأكاديمية القياسية ARS بمجلس الكلية بتاريخ 13-12-2015

مصفوفة توافق المعايير الأكاديمية للبرنامج مع نواتج التعلم المستهدفة، وطرق التدريس والتعلم، وطرق التقييم:

ARS	Corresponding program ILO's	Teaching & learning method	Assessment method
Knowledge & Understanding			
1. The related basic scientific facts, concepts, principles and techniques.	a2	lecture, Discussions, group tutorial	written exams, oral exam
2. The relevant theories and their applications.	a2		
3. The processes and mechanisms supporting the structure and function of the specific topics.	a2,a1,a9		
4. The related terminology, nomenclature and classification systems.	a1		
5. The theories and methods applied for interpreting and analyzing data related to discipline.	*a15*		
6. The developmental progress of the program-related knowledge.	a13		
7. The relation between the studied topics and the environment.	a16		
8. Chemical concepts, nomenclature, formula and units.	a1		
9. Characteristics of the different states of the matter and elements including trends within the periodic table and the related theories.	a4, a9		
10. The principles, procedures and techniques used in chemical analysis, characterization and structural investigations of different chemical compounds.	a8		
11. The major types of chemical reactions, their characteristics and mechanisms as well as their kinetics including catalysis.	a3,a7, a9		
12. The principles of thermodynamics and molecular spectroscopy including their applications in chemistry.	a5,a6, a7		
13. The constitution and properties of the different chemical compounds, including the main synthetic pathways and the relation between the properties of individual atoms and molecules.	a9,a11		
14. The current issues of chemical research and technological development.	a13		
15. The principles and basics of Petrochemicals exploration methods and manual and computerized	a8, a14		

interpretations of Petrochemicals data.			
16. The theory, principles and techniques in Petrochemicals field and the use of the related data in solving the problems in this field	a10		
Intellectual Skills			
1. Differentiate between subject-related theories and assess their concepts and principles.	b6,b1	lecture, discussions, brain storm, assignments, group tutorial	written exams, oral exam
2. Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.	b3,b6,b8		
3. Develop lines of argument and appropriate judgments in accordance with scientific theories and concepts.	b8,b9		
4. Postulate and deduce mechanisms and procedures to handle scientific problems.	b3,b10		
5. Construct several related and integrated information to confirm, make evidence and test hypotheses.	b11		
6. Differentiate between the different states of the matter, elements and compounds based on the recognition and quantification of the properties.	b7		
7. Employ computational software's and data processing skills in handling of chemical information and analysis of chemical data.	b2		
8. Explain concepts and determine the efficiency of chemical systems by applying mathematical expressions.	b1		
9. Analyze chemical data to identify and confirm chemical structures as well as determine chemical composition.	b5		
10. Propose and conclude mechanisms for physical and chemical processes.	b5, b11		
11. Predict Petrochemical problems, and analyze the data to solve these problems by suitable ways.	b4, b8		
12. Analyze the Petrochemical data using different computer software, integrate and evaluate information and data from different sources in order to gain a coherent understanding of theory and practice.	b4, b8		
Professional Practical Skills			

1. Plan, design, process and report on the investigated data, using appropriate techniques and considering scientific guidance.	c7,c9	lab work, discussions, brain storm	ospe, lab exams
2. Apply techniques and tools considering scientific ethics.	c8		
3. Solve problems using a range of formats and approaches.	c9, c10		
4. Identify and criticize the different methods used in addressing subject related issues.	c		
5. Assess risk in laboratory work taking into consideration the specific hazards associated with the use of chemical materials as well as the safe and proper operation of the laboratory techniques.	c1,c2,c3		
6. Conduct standard laboratory procedures involved in analytical and synthetic work.	c2,c3		
7. Monitor by observation and measurements the chemical properties or changes, including systematic recording and technical reporting.	c4,c6		
8. Use computational packages and tools in chemical investigations.	c5, c9		
Transferable Skills			
1. Use information and communication technology effectively.	d1	short reports	inspecting short reports
2. Identify roles and responsibilities and their performing manner.	d2	lab work	observation in lab work, ospe
3. Think independently, set tasks and solve problems on scientific basis.	d3,d4	class assignments, lab work	observation in class assignments, lab work, ospe
4. Work in groups effectively; manage time, collaborate and communicate with others positively.	d3,d5,d6		
5. Consider community linked problems, ethics and traditions.	d7	lectures of Humanities & Social courses, summer training	exams of Humanities & Social courses, summer training report, ospe
6. Acquire self- and long life–learning.	d8	self directed learning methods like short reports	inspecting short reports
7. Apply scientific models, systems, and tools effectively.	d9	lab work	observation in lab work, ospe
8. Deal with scientific patents considering property right.	d10	meetings of Chem 400	Chem 400 exam
9. Exhibit the sense of beauty and neatness.	d11	lab work	observation in lab work, ospe

مصفوفة توافق اهداف البرامج مع مواصفات الخريج بالمعايير ومع نواتج التعلم المستهدفة:

Petrochemicals and their Applications program aims	Graduate attributes	Corresponding program ILO's
1. To generate in students an appreciation of the importance of Chemistry, with concentration on petroleuim and petrochemicals' Chemistry, in an industrial, economic, environmental and social context.	1	a13, a16, c1, d7
2. To provide students with a broad and balanced foundation of knowledge and practical skills in Chemistry, with concentration on petroleuim and petrochemicals' Chemistry, and related basic sciences.	3	a1 – a16, c1 – c10
3. To develop the students ability to apply their chemical and petrochemical knowledge and skills to the solution of theoretical and practical problems in Chemistry and Petrochemistry.	1, 2	b1 – b10
4. To encourage originality of thought.	5	b1 – b10, d3, d4, d8, d9
5. To provide students with experience in computing and information technology.	5	b2, c9, d1, d4, d9
6. To develop in students a range of general and transferable skills, of value in Chemical, Petrochemical and non-chemical employment.	4, 5, 6	d1 – d11
7. To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of Chemistry and Petrochemistry or multi-disciplinary areas involving Chemistry and Petrochemistry.	2, 3	b1 – b10, c1 – c10, d2, d3, d7 – d10

The Attributes of a Petrochemist

The ability to:

1. Recognize the role of Basic Sciences in the development of society.
2. Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
3. Utilize scientific facts and theories to analyze and interpret practical data.
4. Collect, analyze, and present data using appropriate formats and techniques.
5. Postulate concepts and choose appropriate solutions to solve problems on scientific basis.
6. Apply effectively information technology relevant to the field.
7. Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting the sense of beauty and neatness.
8. Adopt self and long life-learning and participate effectively in research activities.
9. Deal with scientific data in Arabic, English or other languages.

4- العلامات المرجعية: تم الإكتفاء بالمعايير الأكاديمية القياسية ARS

5 –هيكل ومكونات البرنامج:

أ- مدة البرنامج: لا تقل عن أربع سنوات

ب –هيكل البرنامج:

نظري	**122**	**عملي**	**18**	**إجمالي**	**140**

إلزامي	98
إنتقائي	--
اختياري	24

نوع المقررات	عدد الساعات	النسبة المئوية %
□ مقررات العلوم الأساسية:	57	40.7
□ مقررات العلوم الاجتماعية و الإنسانية:	6	4.3
□ مقررات علوم التخصص:	73	53.6
□ مقررات من علوم أخرى (حاسب آلي و ..):	2	1.4
بحث ومقال	2	1.4
إجمالي	140	100

□ *التدريب الميداني*: **8 أسابيع بعد إجتياز المستوى الثالث**

ج- مستويات البرنامج (في نظام الساعات المعتمدة): 4 مستويات
المستوى الأول / السنة الأولى : يلزم اجتياز 35 وحدة موزعة كالتالي :
إلزامي 35 انتقائي ..... اختياري 0
المستوى الثاني / السنة الثانية : يلزم اجتياز 35 وحدة موزعة كالتالي :
إلزامي 27 انتقائي ..... اختياري 8
المستوى الثالث / السنة الثالثة : يلزم اجتياز 35 وحدة موزعة كالتالي :
إلزامي 27 انتقائي ..... اختياري 8
المستوى الرابع / السنة الرابعة : يلزم اجتياز 35 وحدة موزعة كالتالي :
إلزامي 27 انتقائي ..... اختياري 8