Course Specifications

Course Title:	**Inorganic Chemistry II**
Course Code:	**42021220**
Program:	**Bachelor of Science in Chemistry**
Department:	**Chemistry**
College:	**Faculty of Science**
Institution:	**Albaha University**

Table of Contents

A. Course Identification

1. Credit hours: 4 credits	
2. Course type	
a. University ☐ College ☐ Department ☑ Others ☐	
b. Required ☑ Elective ☐	
3. Level/year at which this course isoffered: 4th level /2nd year	
4. Pre-requisites for this course (if any): Inorganic Chemistry I (42021219)	
5. Co-requisites for this course (if any): None	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	Total	75
Other Learning Hours*		
1	Study	60
2	Assignments	15
3	Library	15
4	Projects/Research Essays/Theses	15
5	Others(specify): web search	
	Total	105

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course includes the following topics: Introduction to the chemistry of d-block metals (transition elements), general properties of transition metals, complex formation, naming transition metal complexes, overview of bonding theories of transition metal compounds, structure and isomerism of transition metal complexes. Nanomaterials: fundamentals, characterization, bioinorganic, inorganic-organic.

A tow-hour laboratory in which basic Inorganic chemistry laboratory procedures and techniques, including some Inorganic Chemistry preparations, preparation of simple metal complexes.

2. Course MainObjective

1- Knowledge of basic concepts and principles of inorganic chemistry related to d-block elements.
2- Provide the students with the knowledge of general physical and chemical properties of d-block elements.
3- To introduce the students into coordination compounds,isomerism in metal complexes and bonding theories.
4- To introduce Students to nanomaterials and their fundamentals and characterization.
5- To provide students with laboratory work and perform qualitative analysis and preparation of metal complexes.

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	Define the periodic trends and concepts related to transition elements and metal complexes.	1-1
1.2	Recall symbols, formulas, chemical equations for reactions of d- and f-block elements and important compounds.	1-2
1.3	Explain and interpret general chemical and physical properties of transition elements.	1-3
1...		
2	**Skills :**	
2.1	Applying critical thinking in explaining the behavior and applications of transition elements and their compounds.	2-2
2.2	Conduct laboratory experiments and preparations by using different techniques and effective communication	2-4
2.3		
2...		
3	**Competence:**	
3.1	Cooperate with his colleagues in teamwork and actively collaborate within one team in solving chemical problems related to transition elements.	3-1
3.2	Bear self-learning responsibility and decision-making	3-2
3.3	Write the lab reports from results obtained from using practical techniques.	3-3

CLOs		AlignedPLOs
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to transition elements, electronic configuration and general characteristics of transition elements. Trends in chemical properties: oxidation states across a series and down a group.	6
2	Chemistry of Period 4 d-block elements and their compounds: Introductory remarks, physical properties of important halides of the elements, Important oxides of the elements.	3
3	The chemistry of Titanium and its compounds	3
4	Comparative chemistry of period 5 and 6 d-block elements and their compounds: Introduction, some physical properties of the elements, important halides and oxides of the elements.	6
5	Introduction to Transition Metal Complexes: Transition Metal complexes formation and general concepts. Tendency of transition elements to form complexes.	3
6	coordination numbers and geometries	3
7	Isomerism in transition metal complexes	3
8	Mid-term exam	
9	Role of transition elements in biological systems	3
10	Brief Comparative chemistry of Lanthanides and Actinides (period 6 &7 f-block elements) : physical properties of lanthanides and actinides. Lanthanide contraction; Oxidation states; Magnetic and spectral properties; Brief comparative chemical behavior of lanthanides and actinides.	6
11	Uses of transition elements magnetic and conductive materials, lasers and heterogeneous catalysts.	3
12	Representative compounds of d-block elements, Metal-metal bonded compounds and clusters	6
13	* Final exam	
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Define the periodic trends and concepts related to transition elements and metal complexes.	* Lectures * Discussion questions during class * Assignments	* Short quizzes * Mid-term exam * Final exam *Individual assignments
1.2	Recall symbols, formulas, chemical equations for reactions of d- and f-block elements and important compounds.		

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.3	Explain and interpret general chemical and physical properties of transition elements.		
2.0	**Skills**		
2.1	Applying critical thinking in explaining the behavior and applications of transition elements and their compounds.	* Lectures * Discussion questions during class * Assignments	* Short quizzes * Mid-term exam * Final exam *Individual and group assignments
2.2	Conduct laboratory experiments and preparations by using different techniques and effective communication		
3.0	**Competence**		
3.1	Cooperate with his colleagues in teamwork and actively collaborate within one team in solving chemical problems related to transition elements.	* Lecture preparation * Discussions * solving problems	Monitoring individual behavior during the class and group work.
3.2	Bear self-learning responsibility and decision-making		
3.3	Write the lab reports from results obtained from using practical techniques.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	5	5%
2	Mid-term Exam	9	20%
3	Quiz 2	13	5
4	Lab report	During semester	10%
5	Lab final	16	10%
6	Final exam	17	50%
7			
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Recommend faculty have 2 hours per week office hours available for student appointments.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1- Advanced Inorganic Chemistry (6th edition), Cotton, F. Albert; Wilkinson, G.; Murillo, C. A. (1999); New York: Wiley-Interscience (ISBN 978-0-471-19957-1 - John Wiley & Sons) 2- Inorganic Chemistry, Principles of structure and reactivity, 4th edition. J.E.Huheey and others.
Essential References Materials	Inorganic Chemistry (4th edition); Catherine E. Housecroft and Alan G. Sharpe. Pearson (2012).
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	* Lecture room with tables and/or movable chairs for student group work * Laboratory for experimentation
Technology Resources (AV, data show, Smart Board, software, etc.)	* Smart Board, Data Show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Glassware, chemicals and ordinary laboratory equipment for practical part

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching strategies.	Students	Direct Students feedback/ survey
Course contents and Learning resources	Students, Faculty and external reviewer.	Direct
Verifying Standards of Student Achievement	Independent member teaching staff	Direct, check marking and assessment methods. Analyzing results of students.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	

Date	

Course Specifications

Course Title:	General Physics (2)
Course Code:	42031216
Program:	BSc in chemistry
Department:	Department of Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Third level**
4. Pre-requisites for this course(if any)**:**	**General Physics (1) - (42032102)**
5. Co-requisites for this course(if any)**:**	**None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30	40%
2	**Blended**	15	20%
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other (Laboratory)**	30	40%

7. Actual Learning Hours(based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	30
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**75**
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	-
5	**Others**(Lab reports and exam preparation time)	20
	Total	**65**

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course is an introduction to electricity and magnetism at a second-year university level.

2. Course MainObjectives:

On completing this course, the students will be able to:

- Recognize the fundamental concepts in electricity, magnetism and elementary circuits theory
- Gain practical experience in the fundamental concepts of electricity and magnetism

3. Course Learning Outcomes

CLOs		AlignedPLOs
1	**Knowledge:**	
1.1	Recall the fundamental principles of the electric field,electric potential and electric flux.	K1
1.2	Describe the magnetic field, magnetic forces (Lorentz and Laplace forces)	K1
1.3	Explain the energy stored in a charged capacitor	K1
2	**Skills :**	
2.1	Combine resistances and capacitors in series and parallel	S1
2.2	Apply appropriate mathematical and physical conceptsto solve problems in the field of electricity and magnetism	S2
2.3	Conduct experiments in the fields of electricity and magnetism	S3
2.4	Analyze and interpret dataobtained from simple magnetic systems and electric circuits usingprinciples of physics.	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in atomic physics	C1
3.2	Communicate effectively orally and in writing.	C2

C. Course Content

No	List of Topics	Contact Hours
	Lectures	
1	**Electric Fields:** Coulomb's law, electric field, electric field of a discrete charge distribution, electric field lines and Electric flux.	6
2	**Electric Potential:** Electric potential, potential energy due to point charges, potential due to discrete charge distributions	6
3	**Capacitance and Dielectrics :** Capacitance, combinations of capacitors, energy stored in a charged capacitor, capacitors with dielectrics**.**	10
4	**Current and Resistance:** Electric current, resistances, relation between resistance and temperature**.**	6
5	**Direct Current Circuits:** Electromotive Force, resistors in Series and Parallel, Kirchhoff's Rules, electrical meters	7
6	**Magnetic Fields:** Magnetic field, magnetic forces, Lorentz and Laplace forces Sources of Magnetic Field: Biot-Savart law and its applications	10
	Total (Lectures)	45

No	List of Topics	Contact Hours
	Practical part	
1	Power sources and electric meters	2
2	Magnetic field of the earth	2
3	Metric bridge and Wheatstone bridge	2
4	The force of two magnets	2
5	Resistance of a wire depending on its length and cross section.	2
6	Voltage and Current dividers	2
7	Tangent Galvanometer	2
8	Charge and discharge of capacitors	2
9	Combinations of capacitors.	2
10	Ohm's Law and combinations of resistors	4
11	Capacitance of parallel plate capacitors.	2
12	Resistance of a wire depending on its temperature	2
13	Kirchhoff's laws	4
	Total (practical)	30
	Total (lecturers + practical) 45 + 30 = 75	75

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Recall the fundamental principles of the electric field, electric potential and electric flux.	Lectures, blended learning, open discussion and brainstorming	Quizzes, homeworkperiodical Exams, midterm and final exam
1.2	Describe the magnetic field, magnetic forces (Lorentz and Laplace forces)	Lectures, blended learning, open discussion and brainstorming	Quizzes, homework periodical exams, midterm and final exam.
1.3	Explain the energy stored in a charged capacitor	Lectures, blended learning, open discussion and brainstorming	Quizzes, homework periodical exams, midterm and final exam.
2.0	**Skills**		
2.1	Combine resistances and capacitances in series and parallel	Lectures, blended learning, open discussion and brainstorming, Problem based learningand lab working.	Quizzes, homework periodical Exams, midterm and final exam.Lab report, final practical exam
2.2	Apply appropriate mathematical and physical concepts to solve problems in the field of electricity and magnetism	Lectures, blended learning, open discussion and brainstorming, problem based learning,	Quizzes, homework periodical exams, midterm
2.3	Conduct experiments in the fields of electricity and magnetism	Lectures, blended learning, open discussion and brainstorming and lab working.	Quizzes, homework periodical Exams, midterm and final examand final exam. Lab report, final practical exam
2.4	Analyze and interpret data obtained from simple magnetic systems and electric circuits using principles of physics.	Lectures, cooperative learning,brainstorming, problem based learningand lab working	Quizzes, homework periodical Exams, midterm and final examLab report, final practical exam
3.0	**Competence**		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in atomic physics	Group working, cooperative learning, search activity	Observation card
3.2	Communicate effectively orally and in writing,	Group working, cooperative learning, search activity	Observation card

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	5 %
2	Mid- Term exam	9	10 %
3	Periodical exam 2	13	5 %
4	Home works	During the term	10 %
5	Practical (lab reports)	During the term	10 %
6	Final practical	16	10 %
7	Theoretical Exam	17	50%

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
   - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
   - The students are divided into groups, whereas each student has academic counseling.
2. Student Appeals
   - The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	-Physics for Scientists and Engineers, Raymond A. Serway, Thomson Brooks, 2004; 6th Edition.
Essential References Materials	- Halliday, David, Robert Resnick, Jearl Walker. Fundamentals of Physics, 7th ed. Hoboken, N.J.: John Wiley and Sons. 2005
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One classroom containing computer access, white board and laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV. - One data show. - One Smart Board.

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching. - The course content. - Satisfaction with the course - Quality of Learning Resources	Students	Questionnaire
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Faculty (staff member)	Observation of lectures, analysis of assessment data
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Program Leader	Observation of lectures, interviews with involved faculty member, analysis of assessment data
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Peer Reviewer	interviews with involved faculty member and course participants, analysis of assessment data,

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	Curriculum Committee
Reference No.	
Date	

Course Specifications

Course Title:	**General Physiology**
Course Code:	**42011210**
Program:	**Bachelor Degree of Science in Chemistry**
Department:	**Chemistry**
College:	**Faculty of Science**
Institution:	**Al-Baha University**

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A. Course Identification

1. Credit hours:	**2 hours(2 lectures)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level 4, Second Year**
4. Pre-requisites for this course (if any)**:**	General Biology (**42011103**)
5. Co-requisites for this course (if any)**:**	**None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**		80%
2	**Blended**		10%
3	**E-learning**		10%
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45
Other Learning Hours*		
1	**Study**	30
2	**Assignments**	15
3	**Library**	
4	**Projects/Research Essays/Theses**	15
5	**Others**(specify)	
	Total	60

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

After completing this course, the student must know: This course is designed to give a broad overview of general physiology.
This course encompasses: introduction to physiological principles and some other

physiological topics.

2. Course MainObjective

1. Build hypotheses physiological Statistics and evaluated using data provided by Professor
2. Provide physiological explanations for the data provided by Professor
3. discuss possible concepts of different physiological hypotheses

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	**Know the physiological principles in living organism**	
1.2	Understand **physiological principles**	
1.3	Build and design the various physiological cycles.	
2	**Skills :**	
2.1	Give concise interpretations and discussions of physiological processes	
2.2	Discuss the reasons of physiological disorders	
2.3	Give a description of the hormone action and explain importance of hormones and enzymes in physiology	
3	**Competence:**	
3.1	Developing the student's ability to deal with multimedia.	
3.2	Take the appropriate decision and take responsibility about its consequences	
3.3	Collaboration with colleagues to work more effectively and to develop the spirit of team work.	
3.4	Use math and computer software to analyze data and reports	

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to physiological principles**	3
2	**Biochemistry and cell physiology**	3
3	**Cell signaling and endocrine regulation**	3
4	**Cells: cell theory, cell organelles, structure and function**	3
5	**Neuron structure and function**	3
6	**Cell movement and muscles**	3
7	**Sensory systems**	3
8	**Organization of nervous systems**	3
9	**Circulatory systems in animals**	3
10	**Ion and water balance**	3
11	**Transport of water and nutrients in plant**	3
12	**Digestion**	3
13	**Locomotion – Thermal physiology**	3
14	**Reproduction**	3
Total		42

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Know the physiological principles in living organism	Lectures using board	Written and oral exams
1.2	Understand physiological principles	Discussion and group tutorial	Written and oral exams, regular homework assignments
1.3	Build and design the various physiological cycles.	Discussion and group tutorial	Written and oral exams, regular homework assignments
2.0	**Skills**		
2.1	Give concise interpretations and discussions of physiological processes	Cooperative learning- Brain storming	Written and oral exams. Class discussions
2.2	Discuss the reasons of physiological disorders.	Cooperative learning - Brain storming	. Written and oral exams - Class discussions.
2.3	Give a description of the hormone action andexplain importance of hormones and enzymes in physiology.	Cooperative learning - Brain storming	Explain importance of hormones and enzymes in physiology.
3.0	**Competence**		
3.1	Developing the student's ability to deal with multimedia.	- Encouraging students to participate in summer activities.	Additional privileges for outstanding students. - Periodic examinations - Practical exam - Oral discussion
3.2	Take the appropriate decision and take responsibility about its consequences	Making working groups of students cooperate in joint research - Encouraging competition between students and groups	the exams - Continuous monitoring and evaluation. -.
3.3	Collaboration with colleagues to work	Group and	Practical exam

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
	more effectively and to develop the spirit of team work.	individual discussion to develop Cognitive skills and constructive cooperation with the group to solve problems.	
3.4	Use math and computer software to analyze data and reports	cooperative learning based on training and search in web site	grading reports

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	5	10
2	Midterm Written Theoretical Exam	9	20
3	Quiz2	13	10
4	Assignments, Activities & Attendance	During Semester	10
5	Final Theoretical Exam		50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Faculty members will be available for 3 hours per week to provide academic counseling and guidance to students

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Textbook of General Physiology, 4th Edition; Hardcover Anatomy and Physiology - Lab Manual - 8th edition
Essential References Materials	Publisher: McGraw-Hill Publishing
Electronic Materials	https://jamanetwork.com/journals/jama/article-abstract/328569
Other Learning Materials	Software virtual labs for scientific terms, listening and training in correct pronunciation

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	□ Classrooms equipped with smart boards and display screens , seats and desks for all students □ Laboratories equipped with microscopes and different equipment.
Technology Resources (AV, data show, Smart Board, software, etc.)	□ Provide a computer for each student with access to the Internet. □ Provide large display screens □ Provide a smart boards
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	□ Glassware □ Immunological Kits for diagnosis □ ELISA Reader □ Spectrophotometers □ Flow cytometry devices □ Thermal cyclers

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1-Effectiveness of Teaching	students	Distribution of an assessment questionnaire Hold group discussions with the students Conducting statistical analysis for student marks
2. Other Strategies for Evaluation of Teaching	External examiner, evaluation committee	Inviting an external examiner to evaluate students' answers and conduct oral test
3- Verifying Standards of Student Achievement	Committee from staff members, coordinator, external evaluator	Indirect and direct Re-evaluation of the tests by a faculty member having same specialization from other institution.
4- Reviewing course effectiveness	visiting professor for evaluation of the course	Periodic meetings with students to evaluate the positive/ negative aspects of course and study

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Course Specifications

Course Title:	**Calculus (2)**
Course Code:	**42041230**
Program:	**Chemistry**
Department:	**Mathematics**
College:	**Faculty of Science**
Institution:	**Al Baha University**

A. Course Identification

1. Credit hours: 3 hours							
2. Course type							
a. University	Al Baha	College	Science	Department	√	Others	
b. Required				Elective			
3. Level/year at which this course is offered:							
4. Pre-requisites for this course (if any)**: Differential and Integral (1)** (42041103)							
5. Co-requisites for this course (if any)**:N/A**							

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom (√)**	3 hours	95
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**(Exercises) **(√)**		5

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45
Other Learning Hours*		
1	**Study**	3
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others**(specify)	
	Total	3

***The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description Course Description:(Note: General description in the form used in Bulletin or handbook).

2. Course MainObjective

1. **Summary of the main learning outcomes for students enrolled in the course.**

To learn the students to the basic concepts methods, theorems and results in Integral

calculus(Integration of algebraic functions, Integration of trigonometric functions - Integration of exponential functions - Integration of logarithmic functions - Substitution Rule. The definite integral and its properties and applications.Methods of Integration by parts - Integration by partial fractions -Trigonometric substitution - Numerical integration). alsoto learn partial derivatives (Functions of several variables -Limits - Continuity - Partial derivatives - The chain rule). To understand the students to the basic concepts and solution analytical and numerical methods of first ordinary differential equations and its properties and applications.

2.Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Increasing use of references and the Internet in the collection of knowledge resources that are difficult to be provided in the library of Faculty / university
- Choosing new subjects, new books and latest papers.

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1.0	**Knowledge:**	
K1	Knowthe main concepts and definition of thecalculus.	
K2	State the principles of calculus in (integration-numerical integration - partial derivatives- ordinary differential equations).	
K3	Recognize calculus theorems and problems.	
S0	**Skills :**	
S1	Determine theintegration, numerical integration,partial derivatives and ordinary differential equations and some the applications on their.	
S2	Students should be able to construct mathematical arguments and proofs.	
S3	Students should be able to solve mathematical problems by using numerical and analytical methods.	
3	**Competence:**	
C1	Students should be able to use information and communication technologies to collect, interpret and analyze information in both verbal and written forms.	
C2	Students should be able to develop their self-learning skills.	
C3	Students should be able to take responsibility for their own learning.	
C4	Students should be able to demonstrate the work either independently or being a part of a team.	

C. Course Content

No	List of Topics	Contact Hours
1	**Indefinite Integral :** Integration of algebraic functions, Integration of trigonometric functions - Integration of exponential functions -Integration of logarithmic functionsand other functions–Substitution Rule	6
2	**The Definite Integral** : Definite Integral - The fundamental theorem of calculus -Mean value theoremfor integrals (the average value of function)- Properties of definite Integral. Applications of definite integral.	9
3	**Methods of Integration:** Integration by parts - Integration by Partial fractions - Integrals involving radicals. Numerical integration(Trapezoidal rule -Simpson's rule).	9
4	**Partial Derivatives :** Functions of several variables - Limits - Continuity - Partial derivatives - The chain rule.	9
5	**Ordinary Differential Equations:**	12

	First-ordinary differential equations (Method of separation of variable –exact solution-Method ofintegrating factors). Some applications of first-ordinary differential equations. numerical solution of differential equation (Euler's method).	
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Calculate the main concepts of indefinite integraland definite integral and Methods of integration.	Developing basic communicative ability through: • Lectures • Team work • Oral discussion • Scientific discussion. • Open discussion.	• Homework. • Periodic tests • Web search • Class Participation • Midterm tests Final exams
1.2	State the principles of calculus in Integration by parts - Integration by Partial fractions - Integrals involving radicals. Numerical integration (Trapezoidal rule - Simpson's rule), Partial derivatives and Ordinary Differential Equations and its applications		
1.3	Recognize calculustheorems and Algorithms.		
2.0	**Skills**		
2.1	Determinethe integration, numerical integration, partial derivatives ordinary differential equationsand some the applications on its.	• Lectures • Exercises • Case studies • Individual • Presentations Brainstorming.	• Class Participation • Essay Question • Presentation Research
2.2	Construct arguments and proofs in calculus		
2.3	Solve problems in calculus.		
3.0	**Competence**		
3.1	Students should be able to use information and communication technologies to collect, interpret and analyze information in both verbal and written forms.	• Small groupdiscussion • Whole groupdiscussion • Brainstorming Presentation.	• Written Exam • Web search and writing reports. • Class Activities • Periodic tests
3.2	Students should be able to develop their self-learning skills.		
3.3	Students should be able to take responsibility for their own learning.		
3.4	Students should be able to demonstrate the work either independently or being a part of a team.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1 (Periodic test 1)	5	10%
2	Midterm Exam	9	20%
3	Quiz 2 (Periodic test 2)	13	10%
4	Homework & participation	During the	10%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
		term	
5	Final theoretical exam	16	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

(include amount of time faculty are available each week)

- Follow-up by the head of the department.
- Define 8 office hours per week for each member of the faculty who resides in his office.
- Define 2 hours weekly as Academic guidance for each faculty member for guiding a group of students academically.
- Give guidance so encouraging in assessing the performance of a teacher.
- Creating the means to make the teacher benefit of his time during his stay in office.

Non-scientific services to assist the teacher to attend office hours**.**

F. Learning Resources and Facilities

1.Learning Resources

1.Required Textbooks	**1. Required Text(s)** • Course notes • Chapters from different text books
2. Essential References **[1] Howard Anton, Irl C. Bivens, Stephen Davis Calculus, 11th Edition. John Wiley and Sons, 2016.**	
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) **[1] James Stewart. Calculus Early Transcendentals, 5th edition. Thomson, 2016.**	
4-.Electronic Materials, Web Sites etc *http://www.google.com*.	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Teaching classes equipped with white board and display screen for (30) students
Technology Resources (AV, data show, Smart Board, software, etc.)	**- Provision of computers for students training to be used in research on scientific topics that serve the course.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, et	Students, Faculty, Program Leaders, Peer Reviewer	

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Course Specifications

Course Title:	**Organic Chemistry(2)**
Course Code:	**42021214**
Program:	**Bachelor of Science in Chemistry**
Department:	**Chemistry**
College:	**Faculty of Science**
Institution:	**Albaha University**

Table of Contents

A. Course Identification

1. Credit hours: 4 credit hrs (3T + 1P)
2. Course type **a.** University ☐ College ☑ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 4. Second year
4. Pre-requisites for this course (if any)**:** Organic Chemistry 1 (42021217)
5. Co-requisites for this course (if any)**:** none

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**75**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	75
Other Learning Hours*		
1	**Study**	45
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	
5	**Others**(specify)	
	Total	75

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Lectures: This course is designed to give a broad overview of aromatic compounds, with respect to, nomenclature, synthesis and reactions of aldehydes, ketones, carboxylic acids, amines, dihydric alcohols, hydroxyl aldehydes, dicarbonyl compounds, Halogeno acids, hydroxyl acids, Keto acids and dicarboxylic acidsand amino acids.

Labs: The labs will provide student with an opportunity to identify and study commonly aldehydes, ketones, carboxylic acids, amines and identify unknown organic compounds.

2. Course MainObjective

The objectives of this course are to:

1- Introduce students to the basic concepts of aromatic chemistry;
2- Expose students to the knowledge of electrophilic aromatic substitution reactions, Nucleophilic Aromatic Substitution, involved methods of identification of aromatic compounds; Dienes; Peri-cyclic reactions; Aldehydes & Ketones, Carboxylic Acids, Amines andChemistry of Bifunctional compounds.
3- Give students a broad perception to define the fundamentals of Aromaticity, explain Hückel Rule, structure, ofbenzene, nomenclature of the organic compounds, study of Bifunctional compounds and their reactions. In addition to, some physical organic behavior of the organic compounds.

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	Define the concepts, terms and basic principles in dienes, aromaticity, pericyclic-, electro- and nucleophilic substitution reactions of organic compounds.	1.1
1.2	Recall symbols, formulas, chemical andphysical properties of aliphatic and aromatic aldehydes, ketones, carboxylic acid and their derivatives, amines, and bifunctional compounds	1.2
2	**Skills :**	
2.1	Use the knowledge to name and prepare the different organic compounds	2.1
2.2	Apply his chemical knowledge's to interpret the transformation between the different organic compounds in solving the chemical problems.	2.2
2.3	Conduct laboratory experiments by using different techniques and effective communication to identify the chemical compounds.	2.4
3	**Competence:**	
3.1	Bear self-learning responsibility and decision-making.	3.1
3.2	Involved in a teamwork in solving chemical problems and serving the community.	3.2
3.3	Write reports and use various techniques to collect and analyze information and presenting it to others.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the course. Dienes – conjugation, stability, molecular orbital considerations; electrophilic addition reactions & kinetic and thermodynamic control of reaction progress	3
2	Peri-cyclic reactions; The Diels-Alder reaction.	3
3	Aromaticity revisited: the Hückel Rule,benzene and heterocyclic aromatic structures. Electrophilic Aromatic Substitution (EAS):halogenation, nitration, sulfonation, Friedel-Crafts alkylation and acylation.	3
4	EAS, continued: substituent effects, reactivity and orientation. Nucleophilic Aromatic Substitution (NAS). Reactions of side chain in aromatic compounds.	3
5	Aldehydes & Ketones: nomenclature, properties and preparation.	3
	Exam 1	**1**
6	Aldehydes & Ketones: oxidation and nucleophilic addition reactions, addition/elimination reactions and condensation reaction.	6
7	Carboxylic Acids: nomenclature, properties, preparation and reactions	3
8	Carboxylic Acids derivatives: nomenclature, properties, preparation and reactions.	3
9	Amines: Nomenclature, bascity, properties, preparation and reactionsand Coupling reactions of diazonium compounds	3
	Mid Term Exam	**1**
10	dihydric alcohols: nomenclature, properties, preparation and reactions.	1.5
11	Halogeno acids: nomenclature, properties, preparation and reactions.	1.5
12	Hydroxy acids:nomenclature, preparation and reactions.	1.5
13	Hydroxy aldehyde and dicarbonyl compounds: preparation and reactions.	3
14	Keto acids and dicarboxylic acids: preparation and reactions.	3
	Exam 2	**1**
9	Amino Acids	1.5
	Final Exam	**2**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Define the concepts, terms and basic principles in dienes, aromaticity, pericyclic-, electro- and nucleophilic substitution reactions of organic compounds.	• Lectures • Debate and discussion Working in small groups • PowerPoint presentation • Individual & group assignments	• Quizzes • Midterm exam. • Final written exams. • Evaluation of assignments and homework.
1.2	Recall symbols, formulas, chemical andphysical properties of aliphatic and aromatic aldehydes, ketones, carboxylic acid and their derivatives, amines, and bifunctional compounds		

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
2.0	**Skills**		
2.1	Use the knowledge to name and prepare the different organic compounds	• Lectures • Debate and discussion. • Cooperative Learning • Working in small groups Individual & group assignments	• Continuous evaluation through interaction, and presentation of research projects. • presentation of summaries and reports during lectures. • Quiz1 & Midterm exam. • Final written theoretical exam.
2.2	Apply his chemical knowledge's to interpret the transformation between the different organic compounds in solving the chemical problems.	•	• Continuous evaluation through interaction, and presentation of research projects. • presentation of summaries and reports during lectures. • Quiz1 & Midterm exam. • Final written theoretical exam. • . •
2.3	Conduct laboratory experiments by using different techniques and effective communication to identify the chemical compounds.	• Laboratory sessions and experimental demonstration. • Cooperative Learning • Working in small groups	**Lab reports **Final practical exam.
3.0	**Competence**		
3.1	Bear self-learning responsibility and decision-making.	Individual and team work and Assignments. *student presentation and reporting. *Lab work • Working in small groups	• Evaluation of individual & group works. • Lab reports.
3.2	Involved in a teamwork in solving chemical problems and serving the community.		
	Write reports and use various techniques to collect and analyze information and presenting it to others.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	5	5
2	Midterm Written Theoretical Exam	9	10
3	Quiz2	13	5
4	Assignments and Activities	During Semester	10
5	Final Practical Exam	16	10
6	Lab Reports	During semester	10
7	Final Written Theoretical Exam	17	50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- The presence of faculty members to provide advice, academic advice and academic guidance to the student in need within the six hours a week available to all students.
- Arrange extra hours gifted students or Program for students who default in scholastic achievement.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Hornback, Joseph, ***Organic Chemistry: Student Solutions Manual [book]***, NY:Thompson Brook/Cole, 2005, 507pp, ISBN 0534397107
Essential References Materials	Klein, David R. "*Organic Chemistry as a Second Language,* 2nd ed. ISBN 978-0-470-12929-6 {English edition} Donald L. Pavia, Gary M. Lampman and George S. Kriz, Introduction to Spectroscopy, 3rd Ed., Thompson Brook/Cole, 2001
Electronic Materials	• https://www.khanacademy.org/science/organic-chemistry/aromatic-compounds. • https://www.khanacademy.org/science/organic-chemistry/aldehydes-ketones. • https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/crbacid1.htm. • https://en.wikibooks.org/wiki/Organic_Chemistry/Amines.
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms equipped with smart board and display screen for (40) students • Practical labs provided with glass wares, reagents,

Item	Resources
	melting point apparatus and different equipment for (20-25) students.
Technology Resources (AV, data show, Smart Board, software, etc.)	Provision of computers for students training to be used in research on scientific topics that serve the course.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• TLC gars. • Glass tubes. • A sensitive balance Chemicals

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching strategies.	Students	Direct Students feedback/ survey
Course contents and Learning resources	Students, Faculty and external reviewer.	Direct
Verifying Standards of Student Achievement	Independent member teaching staff	Direct, check marking and assessment methods. Analyzing results of students.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Qualityof learning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,PeerReviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	