المركز الوطني للتقويم والاعتماد الاكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS
(CHEM 107)

هيئة تقويم التعليم
Education Evaluation Commission

Course Specifications

Institution: **King Khalid University**	Date: September 2019
College/Department : **Faculty of Science – Chemistry Department**	

A. Course Identification and General Information

1. Course title and code: **General Chemistry (Chem. 107)**
2. Credit hours: **Theoretical + Practical (3 + 1)**
3. Program(s) in which the course is offered:
(If general elective available in many programs indicate this rather than list programs): **Bachelor Degree in Engineering**
4. Name of faculty member responsible for the course: **Group of staff**
5. Level/year at which this course is offered: **Level 1 / First year**
6. Pre-requisites for this course (if any): **None**
7. Co-requisites for this course (if any): **None**
8. Location if not on main campus: **Academic Campus in Mahala**
9. Mode of Instruction (mark all that apply):

a. traditional classroom	✓	What percentage?	100
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?

Chemistry 107 course aims to study the structure and states of matter and the changes that matter undergoes. It aims also to understand the relationship between the structure of matter and its properties.
Weekly laboratory experiments emphasize quantitative techniques and complement the lecture material.

At the end of this course the students would be able to:

- ✓ Distinguish between the different types of matter and recognize the properties of substances
- ✓ Recognize the different method of measurements, the significant figures and uncertainty in measurements.
- ✓ determine the atomic structure and the electronic configuration of atoms.
- ✓ interpret the mass relations in chemistry and the different types of chemical formula
- ✓ Identify the types of Gases and the different laws that control the gas behavior
- ✓ Recognize the relationship between the intermolecular forces and the properties of matter
- ✓ Identify the covalent bonding, Lewis structures, octet rule, molecular geometry.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)
1- Using different strategic teaching (white board and power point presentation)
2-Updating the contents of the syllabus
3- Activation the blackboard

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

Course Description: Chemistry 107 is a general introduction to chemistry course that incorporates both lectures and laboratory experiments in developing and understanding chemical concepts and practices.

1. Topics to be Covered

List of Topics (Theoretical)	No. of Weeks	Contact hours
• Matter – Its Properties and Measurements: Types of Matter, Quantities and SI-units, Uncertainty and Significant Figures.	3	9
• Atoms and the atomic theory, Dalton's theory, Modern view of atomic structure, Isotopes, Introduction to the periodic table, Molecular Formula, Empirical or Simplest Formula**,** Structural Formula**,** Formula of ionic compounds.	1	3

• **Mass Relations in Chemistry:** Mole, Atomic mass, Molecular mass, Molar mass, Simplest Formula from Chemical analysis, Molecular Formula from Simplest Formula and Mass Relations in Reactions.	3	9
• **Electronic Structure of Atoms:** Electromagnetic Radiation, The Quantum Theory, Bohr's Theory, De-Broglie Principal, The Modern Theory of Atomic Structure, Pauli Exclusion Principle, Hund's Rule, Electronic Configuration**,** Isoelectronic**,** Trends in the Properties of Atoms in Periodic Table, Atomic Radius, Ionic Radius of ions**,** Ionization Energy, Electronegativity.	3	9
• **Intermolecular Forces and properties of Liquids and Solids:** Chemical Bonds, Intermolecular Forces, Van der Waals Forces, Dipole-dipole forces, Hydrogen Bonding, Thermodynamic equilibrium, Vaporization of Liquids, Vapor Pressure, Some Properties of Liquids and Solids, Phase Diagrams.	2	6
• **Gases:** Properties of Gases, The Simple Gas Laws, The Ideal Gas Equation and The General Gas Equation, Mixtures of Gases, Dalton's Law of Partial Pressure, Graham's Law, Real Gas and van der Waals Equation.	2	6
• **molecular geometry:** Covalent bonding, Lewis structures, octet rule,.	1	3

List of Topics (Practical)	No. of Weeks	Contact hours
Laboratory safety rules Safety rules, Demonstration of using chemical equipment and basic glass wares, Tools used in chemical analysis	1	2
Acid base titration Standardization of HCl solution by Na_2CO_3, Titration of NaOH solution by HCl solution	2	4
Analysis of mixtures Analysis of a mixture of Na_2CO_3 and NaOH, Analysis of a mixture of H_2SO_4 and H_3PO_4,	2	4
Oxidation reduction (Redox) reactions Standardization of $KMNO_4$ by 0.1N oxalic acid, determination of Fe^{2+} and H_2O_2 by $KMNO_4$, Standardization of sodium thiosulphate $Na_2S_2O_3$ by 0.1N $K_2Cr_2O_7$, Titration of I_2 and Cu^{2+} by $Na_2S_2O_3$,	6	12
Precipitation reactions Titration of NaCl by 0.1N silver nitrate using Mohr's method and Vajan's method	1	2
Complexation titration Determination of total hardness of water by EDTA	1	2
Training tests	1	2
Final practical exam	1	2

2. Course components (total contact hours and credits per semester): 45

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	45	0		30		75
	Actual	45	0		30		75
Credit	Planed	3			1		4
	Actual	3			1		4

3. Additional private study/learning hours expected for students per week. None

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

- ✓ Explain different examples of matter
- ✓ Different web sites on the internet explain the atomic structure
- ✓ Many text books in library demonstrate the importance of inorganic and organic compounds

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Identify types of matter, properties of substances, measurements, significant figures and uncertainty in measurements.	Lectures	MCQ
1.2	Identification of atoms and atomic structure	Lectures	MCQ
1.3	Recognize the mass relationships in chemistry, molecular mass, simplest formula, molecular formula, structural formula, mass relation in reactions	Lectures	MCQ and problem-solving
1.4	Acquiring knowledge about Electronic Structure of Atoms, Electromagnetic Radiation, The Bohr's Theory, The Quantum	Lectures	MCQ

	Theory, The Modern Theory of Atomic Structure, Electronic Configuration, Properties of atoms (Effective charge, Ionization Energy, Electronegativity, Atomic size)		
1.5	Differentiate between the properties of liquids, gases and solids and interpret the relationships between the Intermolecular Forces and the properties of matter and equilibria between phases and Properties of Liquids	Lectures	MCQ
1.6	Identify types of Gases, Ideal gases, Gas law, Avogadro's law, Dalton's Law of Partial Pressure, Kinetic Theory of Gases,	Lectures	MCQ and problem-solving
1.7	Recognize the covalent bonding, Lewis structures, octet rule, molecular geometry.	Lectures	MCQ
2.0	**Cognitive Skills**		
2.1	Recognize the types of matter	Lectures	MCQ
2.2	Define the atomic structure	Lectures	MCQ
2.3	Interpret the result of various calculations about matter	Lectures	MCQ and problem-solving
3.0	**Interpersonal Skills & Responsibility**		
3.1	Self teaching for the students	Books, journals, Web sites	MCQ
3.2	Research on the internet	Web sites	MCQ
	Demonstrate punctuality in attending classes	Lectures	Electronic monitoring of the attendance
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate the skill of using the computer, software, black board	Lectures	MCQ and problem-solving
4.2			
5.0	**Psychomotor**		
5.1	**None**		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	homework	continuous	2.5 %
2	quiz	continuous	2.5 %

3	Mid-term exam	11	20 %
5	Practical exam	14-15	25 %
6	Final exam	End of semester	50 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

The teaching staff is available 10h per week for individual student consultations (office hours)

E Learning Resources

1. List Required Textbooks
   - ✓ Ralph H. Petrucci, William S. Harwood, and F. Geoffrey Herring, "General Chemistry, Principles and Modern Applications", 10th Edition, Prentice Hall, 2009.
   - ✓ Catherine E. Housecroft, Edwin C. Constable, "Chemistry: An Introduction to Organic, Inorganic and Physical Chemistry", 3rd Ed., Pearson Education Limited, 2006.

2. List Essential References Materials (Journals, Reports, etc.)
   - ✓ Journal of Materials Science

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

https://2012books.lardbucket.org/books/introduction-to-chemistry-general-organic-and-biological/s04-chemistry-matter-and-measureme.html

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

   - ✓ Data show, Power point, blackboard

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Classrooms, laboratories

Lecture Room , Wide enough to accommodate at least 60 students per class.

2. Technology resources (AV, data show, Smart Board, software, etc.)
Data show, black board

Equipped e-learning computer labs (computer ,multimedia ,internet access and peripherals) with an accommodating and seating capacity in the university campus
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching Evaluation sheet from the students including (Contents – Teaching Stuff – Teaching process) ✓ Direct communication between the course coordinator and student and also via the Blackboard . ✓ Centralized electronic confidential feedback forms have been designed for eliciting feedback from students every semester for the course and the instructors. ✓ Confidential electronic feedback forms and the experience and the university as a whole . ✓ All these strategies are expected to provide confidential ,specified and continuous analyses for obtained responses .
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department Report from Chairman of Chemistry Department ✓ Results of Problem –Solving and MCQ exams. ✓ Peer-review of teaching to be regularly conducted by course instructors. ✓ Periodic rotation of topics among different course instructors.
3. Processes for Improvement of Teaching Meeting of different levels of students under supervision of teaching stuff. Search on internet ✓ Continuous feedback is being received from students both personally by hand and also electronically ✓ Arranging workshops covering relevant topics(e.g., assessment methodology, ✓ curriculum designing ,construction of MCQs ,etc.). ✓ Encouraging faculty staff to attend regional and international conferences. ✓ Encouraging faculty staff to attend e-learning programs.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ✓ Automated double –scanning for verification of students score. ✓ The course coordinator and other colleagues manually revise students answer ✓ sheets so to verify the validity of the computer –based evaluation tools . ✓ Automated assessment of marks at the official university web portal (blackboard).
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. ✓ Consult recent publications in international journals and reports ✓ Considering the feedback elicited from the students , the department will periodically convene meetings with the faculty members to considers the suggestions and /or remarks .

- ✓ External reviewers shall be invited to review the course modules and meet with students or their representatives.

Name of Course Instructor: Dr Atef Korchef and Dr Saifeldin Siddeeg
Signature: _____ Date Specification Completed: October 10, 2019
Program Coordinator: Dr. Mohamed H.A. Suleiman
Signature: _____ Date Received: _____