

National Commission for Academic Accreditation & Assessment

Course Specification

Institution: King Khalid University
College/Department: Faculty of Science – Chemistry Department

A Course Identification and General Information

1. Course title and code: General Chemistry (Chem. 101)
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 Chemistry (BSc)
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: Faculty of Science – Chemistry Dept.

B. Objectives

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

Chemistry 101 is a general introduction to chemistry course that incorporates both lectures and laboratory experiments in developing and understanding chemical concepts and practices.

After teaching of that course the students must have the following skills:

- 1- Identification the basic statistical methods such as significant figures and uncertainty in measurements.
- 2- Identification the atomic structure and electronic configuration.
- 3- Differentiate between different types of matter (Gas, Liquid and Solid).
- 4- Identify the properties of gases, liquids and solids, intermolecular forces in liquids and solids.
- 5- Identify the properties of solutions and chemical equilibrium.
- 6- Identify a brief introduction to organic chemistry and natural molecules.

Weekly laboratory experiments emphasize quantitative techniques and complement the lecture material.

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)

- 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 to be used for the Bulletin or Handbook should be attached)

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.	1	3
• Chemical Compounds: Atoms and Isotopes, Atomic Mass, The Mole and The Avogadro's constant, Molecular Mass, Empirical Formula, Chemical Equations and Stoichiometry.	3	9
• Atoms and the Atomic Theory: Properties of Light, Quantum Theory, Bohr's Model, Wave-Particle Duality, Uncertainty Principle, Quantum Numbers, Electronic Configuration.	3	9
• 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
• Liquids, Solids and Intermolecular Forces: Properties of Liquids, Vaporization of Liquids, Vapor Pressure, Some Properties of Solids, Phase Diagrams, Van der Waals Forces, Hydrogen Bonding, Chemical Bonds as Intermolecular Forces.	2	6
• Solutions and Their Physical Properties: Types of Solutions, Solution Concentration, Ideal Solutions and Non-ideal Solutions, Vapor Pressure of Solutions, Rault's Law, Osmotic Pressure.	2	6
• Principles of Chemical Equilibrium: The Equilibrium Constant Expressions, Predicting the Direction of Net Change, Le Chatellier's Principle, Equilibrium Calculations Examples.	1	3
• Organic Chemistry: Organic Compounds and Structures, Functional Groups. Types of organic reactions.	1	3

2- Topics to be Covered		
List of topics (Practical)	No of Weeks	Contact hours
• Identification the safety rules in laboratory	1	2
• Determination the density of liquid and solid substances	1	2

• Determination the viscosity of organic liquid	1	2
• Identification the acidic radicals of the salts	2	4
• Identification the basic radicals of the salts	2	4
• Scheme for identification the acidic and basic radicals of the salts	2	4
• Preparation of sodium carbonate (Na₂CO₃) and sodium bicarbonate (NaHCO₃) solutions	1	2
• Separation of a mixture containing NaCl, SiO₂, and (NH₄)₂CO₃	1	2
• Determination the value of general gas constant (R)	1	2
• Determination the molecular weight of volatile liquid	1	2
• Revision	1	2
• Exam.	1	2

3- Course components (total contact hours per semester):

Lecture: 45	Tutorial: 0	Laboratory: 30	Practical/Field work/Internship	Other:
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4- Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week): **None**

5- Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods for student assessment including evaluation of learning outcomes in the domain concerned

a. Knowledge

(i) Description of the knowledge to be acquired

- 1- Identification the basic statistical methods such as significant figures and uncertainty in measurements.
- 2- Identification the atomic structure and electronic configuration.
- 3- Differentiate between different types of matter (Gas, Liquid and Solid).
- 4- Identify the properties of gases, liquids and solids, intermolecular forces in liquids and solids.
- 5- Identify the properties of solutions and chemical equilibrium.
- 6- Identify a brief introduction to organic chemistry and natural molecules.

(ii) Teaching strategies to be used to develop that knowledge

- 1- Each lecture emphasis the concept to be covered and the details of this concept
- 2- Homework (from Internet and Library) was given to students

(iii) Methods of assessment of knowledge acquired

Mid-term exams, Homework, Discussions

b. Cognitive Skills

(i) Description of cognitive skills to be developed

Identification the matter, types of matter, atomic structure, and organic compounds.

(ii) Teaching strategies to be used to develop these cognitive skills

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

(iii) Methods of assessment of students cognitive skills

Mid-term exams and final exam including some questions such as (Explain, discuss, comment, compare,etc)

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1- Self teaching for the students 2- Research on the internet
(ii) Teaching strategies to be used to develop these skills and abilities Homework depending on search in the internet
(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility Evaluation of this homework
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain. 1- Using the computer 2- Practical skills
(ii) Teaching strategies to be used to develop these skills Homework
(iii) Methods of assessment of students numerical and communication skills Evaluation of this homework through black board
e. Psychomotor Skills (if applicable): None
(i) Description of the psychomotor skills to be developed and the level of performance required: Practical
(ii) Teaching strategies to be used to develop these skills:
(iii) Methods of assessment of student's psychomotor skills:

6- Schedule of Assessment Tasks for Students During the Semester			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	First Mid-term exam	6	10 %

2	Second Mid-term exam	11	10 %
3	Homework on black board	Continuous	5 %
4	Practical tests		25 %
4	Final Exam.	End of semester	50%

D. Student Support

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

Office hours (10 hours per week)

E. Learning Resources

1. Required Text(s)

Ralph H. Petrucci, William S. Harwood, and F. Geoffrey Herring, "General Chemistry, Principles and Modern Applications", 10th Edition, Prentice Hall, 2009.

2. Essential References

- 1- Catherine E. Housecroft, Edwin C. Constable, "Chemistry: An Introduction to Organic, Inorganic and Physical Chemistry", 3rd Ed., Pearson Education Limited, 2006.
- 2- Theodore L. Brown, H. Eugene LeMay, Jr, Bruce E. Bursten, "Chemistry: The Central Science", 10th Ed., Pearson Education, Inc., 2006.

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4-.Electronic Materials, Web Sites etc

Electronic references – web sites

5- Other learning material such as computer-based programs/CD, professional standards/regulations

Power point – Projector

F. Facilities Required

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

Accommodation (Lecture rooms, laboratories, etc.)

Class room

2. Computing resources

Data Show

3. Other resources (specify --eg. 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)

2- Other Strategies for Evaluation of Teaching by the Instructor or by the Department

Report from Chairman of Chemistry Department

3- Processes for Improvement of Teaching

- 1- Meeting of different levels of students under supervision of teaching stuff.
- 2- Search on internet

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)

Verifying standards of student achievement by selection of different grads of students (High, medium, and low grads)

5- Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

1- Recent publications from internet

2- Web sites