

# **Syllabus of General Chemistry (I) for Geology Students**

**Lecturer: S. Mohammad Sajadi**

**2014-2015**



## Soran University

### Module Specification Template

- 1. Module Title:** General Chemistry Course Work
- 2. Module Code:** CHEM101
- 3. Module Level:** first level class of chemistry at Soran University
- 4. Module Leader:** S.Mohammad Sajadi
- 5. Teaching Semester:** Fall Semester/2014

#### **6. Credit Rating for the module:**

Final Exams - written tests designed to measure knowledge of presented course material (60%)

Quizzes- two quizzes will be held which cover 30% of final grade

Exercises - Post chapter questions and problems to support chapter learning objectives (5% of final grade)

Continues attendance - participation in classes (5% of final grade)

**7. Prerequisites and co-requisites:** possessing a good level of high school chemistry including the principal of chemistry

#### **8. Module Summary**

The basic qualitative models and principles in chemistry will be introduced in this course. The areas covered in this course include basic nuclear and atomic structure, molecular structure, the periodic table, chemical bonding such as covalent and ionic bonding , states of matter, intermolecular forces, properties of the elements, the periodic table, stoichiometry, energy changes, acid-base chemistry, chemical kinetics, chemical equilibrium.

**Although high school level of chemistry is highly recommended.** All contents for lectures, exams and homework in this course will be delivered in English.

Furthermore, the level of the students in chemistry will be checked by executing the FinalExams, Quizzes, and Exercises from Post chapter questions and problems to support chapter learning objectives and focus on Continues attendance.

## 9. Module Aims

The goal of this course is to provide a strong understanding of chemistry and its concepts to realize the concepts of Geochemistry.

## 10. Learning Outcomes

At the end of this course, the course is designed to help students to understand:

- Fundamental concepts of chemistry.
- The structure and the properties of the periodic table.
- Electronic structures of atoms and molecules for their relationship with the physical and chemical properties.
- Principles of the chemical reactions including the investigation of stoichiometry, energy changes, acid-base chemistry, chemical kinetics and chemical equilibrium.

## 11. Syllabus

### Week 1

#### Periodic Table of Elements I

1. Alkali metals, Alkali earth metals, Transition metals, Post transition metals, Metalloids, Non metals, Halogens, Noble gas
2. Oxidation numbers, Primary valence, Secondary valence, Hyper valence
3. Acid and Base, Ampholites
4. Electron configuration, Molecules and Ions

### Week 2

#### Concentration units

1. Mole, Molarity, Molality, Normality, part per million, Equivalent
2. Acid and Base Constant, Equilibrium Constant, Density (Specific gravity), Analytical percent (W/W%, W/ V%, V/V %)

### **Week 3**

#### **Equilibrium Chemistry (I)**

1. Reversible Reactions and Chemical Equilibrium
2. Thermodynamics and Equilibrium Chemistry
3. Manipulating Equilibrium Constants
4. Equilibrium Constants for Chemical Reactions

### **Week 4**

#### **Equilibrium Chemistry (II)**

1. Precipitation Reactions
2. Acid–Base Reactions
3. Complex formation Reactions
4. Oxidation/Reduction Reactions

### **Week 5**

#### **5. Gravimetric Methods of Analysis (I)**

1. Precipitation Gravimetry
2. Theory and Practice
3. Quantitative Applications
  - 3.1. Evaluating Precipitation Gravimetry
  - 3.2. Volatilization Gravimetry
  - 3.3. Quantitative Applications

### **Week 6**

#### **4. Gravimetric Methods of Analysis (II)**

- 1.1. Evaluating Volatilization Gravimetry
- 1.2. Particulate Gravimetry
- 1.3. Theory and Practice
- 1.4. Quantitative Applications
- 1.5. Evaluating Precipitation Gravimetry

## 2. Laboratory of General Chemistry (I)

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### Week 1:

Preparation of Chemical solutions (I)

### Week 2:

Preparation of Chemical solutions (II)

### Week 3:

Alkalimetric and Acidimetric titration

### Week 4:

Manganometry

### Week 5:

Ox/ Red titrations

### Week 6:

Complexometric titrations

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## 12. Assessment Strategy

Briefly, the level of the students in chemistry will be checked by executing the semifinal exams, quizzes, and exercises from post chapter questions and problems to support chapter learning objectives with focus on Continues attendance.

## 13. Summary description of assessment items

Assessment Type	Description of Item	W%*	Grading*	Tariff*	Week due*
EXM*	to support the learning objectives of chapters 1 to 3	10	Out of 20	3 hrs	Week four
EXM	to support the learning objectives of chapters 4 to 6	10	Out of 20	3 hrs	Week seven
GWK*	Solving the post chapter problems 1 to 3	2	Out of 5	-	Week 4
GWK	Solving the post chapter problems 4 to 6	2	Out of 5	-	Week 7
Class attendance	Evaluating the effective and ordered attendance of the students in the lectures	1	Out of 5	-	-
Lab Quiz	<b>Preparation of Chemical solutions (I)</b>	3	Out of 15	3 hrs	Week 2
Lab Quiz	<b>Preparation of Chemical solutions (II)</b>	3	Out of 15	3 hrs	Week 3
Lab Quiz	pH-metric (Acidimetric and Alkalimetric)	3	Out of 15	3 hrs	Week 4
Lab Quiz	Redox titration	3	Out of 15	3 hrs	Week 5
Lab Quiz	Complex formation titration	3	Out of 15	3 hrs	Week 6
EXM	Practical exam from the studied experiments	15	Out of 15	3 hrs	Week 7

\*EXM: exam, GWK; group work, W% – the percentage of the module's total assessment, Grading; the grading structure, Tariff: the amount of work required from the student for that assessment, Week due; the week in the semester the course work is to be handed in or the exam or test takes place.

#### **14. Learning Session Structure**

The structure of each weekly learning session will be 1 hour and 30 minute lecture followed by 30 minute quiz, and 2:30 hour practical in the lab followed by 30 minute quiz.

#### **15. Learning and Teaching Methods**

General chemistry for geology students is included 12 weeks in which each week is 2 hrs theory and 6 hrs practical for two sections of lab experiments. In general, it will be 24 hrs theory and 72 hrs experimental (each section 36hrs) for whole of the first semester.

#### **16. Bibliography**

General Chemistry; Charles Mortimer, 12th edition, John Wiley & Sons, Inc., New York, 2010.

#### **17. Authored by**

S. Mohammad Sajadi, 1/9/2013

#### **18. Validated and Verified by**

[Another member of staff who has checked the module specification to ensure that it meets the requirements of the course of which it a part and has checked the specification for any errors. This will include the date it was approved.]

