

## A. Course Identification and General Information

1. Course title and code: **General Chemistry, 402101-4**
2. Credit hours: **Four (3 theoretical + 1 practical) hrs.**

## B. Objectives

This course is an introductory chemistry course designed to prepare students for college level chemistry courses. The course introduces some basic principles of chemical problems solving.

## C. Course Description:

<b>1. Topics to be Covered</b>		
Topic	No of Weeks	Contact hours
States of matter and measurement, molecules and molecular compounds.	1	3
Units of measurements; SI- units, intensive and extensive properties, uncertainty in measurements (precision and accuracy).	1	3
Significant figures: Rounding significant figures, Using significant figures in addition, subtraction, multiplication and divisions.	1	3
The periodic table, nomenclature, electronic structure of atoms, simple periodic properties of the elements.	2	3
Chemical bonding, molecular geometry, and properties of various states of matter.	2	6
Ions and ionic compounds, chemical reaction types.	1	3
Stoichiometry, atomic and molecular weights.	1	3
The mole, simple quantitative calculations with chemical reactions.	1	3
Basics of chemical equilibrium.	1	3
Acids and bases.	1	3
Thermochemistry.	1	3
Hydrocarbons, nomenclature and simple reactions.	1	3

## Laboratory Experiments Outline

Topics to be Covered		
List of Experiments	No of Weeks	Contact hours
The practical part includes the following experiments:		

Introduction	<b>1</b>	<b>3</b>
Density and viscosity of liquids.	<b>1</b>	<b>3</b>
Compound type (polar – nonpolar – ionic).	<b>1</b>	<b>3</b>
Chemical reactions.	<b>1</b>	<b>3</b>
Acids and bases and pH measurements and calculations.	<b>1</b>	<b>3</b>
Titration of vinegar.	<b>1</b>	<b>3</b>
Oxidation-reduction reactions.	<b>1</b>	<b>3</b>
Molar mass of acid.	<b>1</b>	<b>3</b>
Qualitative analysis (acidic and basic radicals).	<b>1</b>	<b>3</b>
Collegative properties (determination of molecular weight).	<b>1</b>	<b>3</b>
Determination of the heat capacity of the calorimeter.	<b>1</b>	<b>3</b>
Determination of the critical solution temperature of phenol - water system	<b>1</b>	<b>3</b>
Review	<b>1</b>	<b>3</b>
Final Exam.	<b>1</b>	<b>3</b>

<b>2. Course components</b> (total contact hours per semester):			
Lecture:	Tutorial:	Practical/Fieldwork/Internship:	Other:
<b>42</b>	---	<b>42</b>	

**3. 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)  
**- 26 hours (2 hrs per week office hrs).**

#### **4. Development of Learning Outcomes in Domains of Learning**

##### **a. Knowledge**

##### **Description of the knowledge to be acquired.**

After finishing this course students will be able to:

- investigate the different states of matter and measurement.
- calculate the mole, simple quantitative calculations with chemical reactions to understand the nature and significance molecules and compounds.
- distinguish between molecules and molecular compounds.
- interpret experimental results.
- handle the periodic table.

- to relate structure and properties
- understand the nomenclature, electronic structure of atoms, simple periodic properties of the elements.
- distinguish the different types of chemical bonding.
- understand orientation and molecular geometry, and properties of various states of matter.
- investigate the acids and bases.
- calculate the pH values in acids and bases.
- understand viscous and elastic elements of a polymer
- investigate the factors affecting the thermal characteristics of a reaction.
- calculate the chemical equilibrium constants and factors affecting them.

### **Cognitive Skills**

#### **Description of cognitive skills to be developed**

By the completion of this course, students will be able to :-

- Analyse the data related to different topics in chemistry.
- Solve problems related to different chemical subjects.
- Select and apply the appropriate technique of work at the laboratory.
- Interpret experimental results.

#### **c. Interpersonal Skills and Responsibility**

##### **Description of the interpersonal skills and capacity to carry responsibility to be developed**

- Develop the necessary skills of writing and English conversation as a good for the connection of sciences.
- Act responsibly in personal and professional relationships.
- Act in responsible ethical manner.
- Ability of self-learning using learning resources and websites.
- Improve and develop analytical capabilities for solving the problems and ideas.
- The ability to work effectively individually and in team.

#### **d. Communication, Information Technology and Numerical Skills**

##### **Description of the skills to be developed in this domain.**

On completion of this course, students will be able to :-

- Communicate link between the science of kinetic chemistry and other sciences related.
- Develop the skills to deal with the problems of numerical calculations and laws.
- Research on the Internet for various topics related to the course.
- Solve exercises and questions related to increase their numerical and statistical skills.
- Work in a group to discuss issues of domestic duties and their meanings and objectives.
- Make good and clear discussion on the basic concepts of chemistry.

<b>5. Schedule of Assessment Tasks for Students During the Semester:</b>			
<b>Assessment</b>	<b>Assessment task (eg. essay, test, group project, examination etc.)</b>	<b>Week due</b>	<b>Proportion of Final Assessment</b>
<b>1</b>	Class activities, Attendances and Duties	Throughout the Term	<b>10%</b>
<b>2</b>	Mid-Term Exam (s)	5-14	<b>20%</b>
<b>3</b>	Lab Activity and Final Exam on Lab	Throughout the Term	<b>30%</b>
<b>4</b>	Final Exam	End of the Term	<b>40%</b>
<b>5</b>	<b>Total</b>		<b>100%</b>

#### **D. Student Support**

##### **1. Arrangements for availability of faculty for individual student** consultations and academic advice.

(include amount of time faculty are available each week)

- Presence of faculty members to provide counselling and advice.
- Office Hours: weekly during working hours, and to create appropriate means.
- Academic Advising for students to those who need it, and taking into account the appropriate test for that Member.

#### **E Learning Resources**

##### **1. Required Text(s)**

- Lecture notes prepared by the lecturer.

##### **2. Essential References**

- General Chemistry, E. B. Gallogly, 4<sup>th</sup> edition, D. A. Mcquarrie, P. A. Rock, University Science books, Mill Vally, 2011.
- General, Organic and Biochemistry, 4<sup>th</sup> Edition, K. Denniston, J. Topping and R. Caret, R.; General, Organic and, McGraw Hill, 2004.

##### **3. Recommended Books and Reference Material** (Journals, Reports, etc) (Attach List)

- Chemistry, R. Chang, 10<sup>th</sup> Edition, McGraw-Hill Higher Education, 2011.

##### **4. Electronic Materials, Web Sites etc**

- Power point lectures.

##### **5. Other learning material** such as computer-based programs/CD, professional standards

- Microsoft PowerPoint, Microsoft Word