



FORMAN CHRISTIAN COLLEGE UNIVERSITY
DEPARTMENT OF CHEMISTRY

SYLLABUS / COURSE OUTLINES CHEM 100A

Course Name: Introduction to Chemistry		
Course Code: CHEM 100	Course Type: Elective	Course Credits: 4
Class/Lab Timings: TR 11:00-12:15 (S212) Lab: M 11:00-12:50 Hrs (S148)	Section: A	Student Meeting Hours/ Office Hours: TR 09:30-11:00 Hrs
Instructor Name: Prof. Dr. Muhmmad Nadeem Asghar		
A Note from the Instructor: This is an introductory course in chemistry for non-science majors, encompassing classification of matter, physical methods of separation of mixtures, atomic structure, periodic table, chemical bonding, stoichiometry, solutions, acids and bases, and organic chemistry with emphasis on real-world applications. CHEM 100 has a required laboratory component that forms an important portion of this study. Experiment results will be compiled and reported on pattern given in the lab manual. The goal is to achieve the following general objectives: a) Understand and be able to explain the general principles, laws, and theories of chemistry that are discussed and presented throughout the semester b) Use critical thinking and logic in the solution of problems c) Apply learned chemistry skills to new situations d) Demonstrate an understanding of chemistry through technological advancement e) Apply chemical principles in the laboratory setting f) Recognize and acquire attitudes that are characteristic of the successful worker regardless of the major field of study g) Develop an awareness of the value of chemistry in our daily living		
Instructor Contact Details Email: nadeemasghar@fccollege.edu.pk WhatsApp Mobile #: 0332-4522509 (only during office hours) Face to Face Office Hours: TR 09:30-11:00 Hrs Zoom Meeting: On request, students need to inform at least two days prior to holding such meeting		
Course Description: Pre-requisite: This course is open for those students who have not taken Chemistry at Intermediate or A level This is an introductory course for non-science majors with no or limited background in Chemistry. The goal of the course is to give the understanding of the basic principles/laws of chemistry and to appreciate their applications in everyday life. Topics include chemistry as central science, matter and its composition, states of matter, elements and periodicity, atomic structure, concept of mole and elementary stoichiometric calculations, acids and bases, elementary redox reactions and electrochemical cells,		

organic functional groups and major classes of organic compounds and their importance, and environmental aspects of Chemistry

Mode of Instruction: Mode of instructions will be physical and lecture/presentation-based. A WhatsApp group will also be formed to facilitate discussions and sending alerts and dates/timings of important events.

Technology Requirements:

In case any online or blended mode of instructions is applied it will duly be notified. In that situation students are expected to have installed Zoom.us software (free software) on their laptops/mobiles with an adequately fast internet facility.

Lab Resources: A lab manual detailing all important experiments will be shared through Moodle.

Students Learning Objectives (SLOs)

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

1. understand the general concepts of Chemistry, especially elements, compounds, states of matter, acids and bases, simple redox reactions and organic compounds and their properties and importance.
2. develop interest to understand the life processes and natural phenomenon
3. think critically and apply the concepts to simple daily phenomenon
4. develop an awareness of the value of chemistry in our daily living and correlate the subject knowledge to interpret the routine physical and chemical processes/phenomenon

Course Content, Learning Material & Activities Schedule

The schedule is tentative because it is not possible to anticipate exactly how much time each topic will require. A time-wise split of course topic along with assessment rubrics is detailed in the following table.

Wk	Topic/ Title	Teaching-Learning Activities			Assessment & Rubrics (with the due date)
		Synchronous (Simultaneously conducted)		Asynchronous	
		In-Person Lecture	Online (Zoom Lecture)	Off-campus and offline	

1 (13 th Feb)	Chemistry and its branches, matter and its classification, states of matter, Solid, Liquid, Gas, inter-conversion of different states of matter, symbol, atomic number, atomic mass, physical and chemical properties	Yes	No	No	Worksheet 1-3 1. Use of electronic/Lib. resources etc. 2. To distinguish, element, mixture and compound 3. Properties and inter-conversion of different states of matter
2 (20 th Feb)	Physical methods of separation of components of a mixture	Yes	No	No	Quiz 1: Physical methods of separation of a mixture Worksheet 4: Relative atomic mass
3 (27 th Feb)	Isotope, molecular mass, relative atomic mass, Formula, Naming of chemicals	Yes	No	No	
	Solutions, type of solutions, making of solutions in molarity, percentage (w/v) and parts per million (ppm) concentration units,	Yes	No	No	
4 (6 th Mar)	Concept of Mole, problems relating to calculations of moles, types of reactions and solution stoichiometry	Yes	No	No	Moles Worksheet 6 & 7: Moles calculations; Stoichiometry
5 (13 th Mar)	General concept of atomic structure, Rutherford's atomic model, Bohr's atomic model, subshell and orbital concepts, electronic configuration of elements	Yes	No	No	Worksheet 8: Electronic configuration of first 20 elements
6 (20 th Mar)	Classification of elements, modern periodic table and its features, periodicity of properties	Yes	No	No	Worksheet 9: Periodic Table, groups, periods, periodic trends
7 (27 th Mar)	Units of measurements, mass, length, temperature, density, specific gravity. Thermometer, construction, different scales of temperature and their inter-conversion	Yes	No	No	Worksheet 10: Conversion of temperatures into different scales
8 (3 rd Apr)	Atoms, ions and molecules, chemical bonding, ionic bond, Lewis' structures, Criteria of nature of bonding	Yes	No	No	
9 (10 th Apr)	Representations for covalent and ionic bonds making in some simple chemical species	Yes	No	Yes No	
M I D T E R M E X A M					
10 (17 th Apr)	Acids, bases, Arrhenius and Lewis concepts, Neutralization, properties of acids and bases, common acids and bases and their applications/occurrences	Yes	No	No	Quiz 2: acids, bases, salts and neutralization
11 (24 th Apr)	Neutralization, weak and strong acids/bases, neutralization reaction, types	Yes	No	No	

	of salts, Applications of neutralization reactions				
12 (1 st May)	pH scale, pH of commonly used substances, acid-base titrations	Yes	No	No	
13 (8 th May)	Some elementary redox reactions	Yes	No	No	
14 (15 th May)	Organic compounds, Organic versus inorganic compounds	Yes	No	No	Worksheet 11 Organic Vs inorganic compounds
15 (22 nd May)	Functional groups, hydrocarbons and fuels, Homologous series, General formulae	Yes	No	No	Worksheet 12. Molecular and structural formulae of first 10 members of alkane, alkene and alkyne families
16 (29 th May)	Structural and molecular formulae of first ten members of alkanes, alkenes and alkynes, Fractional distillation of petroleum, quality of fuels, Anti-knocking agents,	Yes	No	No	Quiz 3: Organic Chemistry
17 (5 th Feb)	Green House Effect, Acid Rain, Lab Safety	Yes	No	No	
12 th June onwards	FINAL EXAM SPRING 2023				

'Out-of-class' Study and Good Practices

Here are some good practices for all the students:

- Create a weekly schedule that you follow, designating certain hours each week to reading, watching lectures, completing assignments, studying, and participating in forums
- Always be in touch with WhatsApp group and Moodle as any announcement/alert regarding zoom meetings, quiz syllabus etc. will be shared through these platforms.
- Ensure that your online tools/gadgets are in order i.e., you have a laptop (preferably)/mobile and relevant Zoom.us software is installed, you have a proper and adequately fast networking facility etc.
- All students are expected to study at least study 5 hours per week, regularly attend all online zoom sessions and video lectures uploaded on Moodle.
- Go through the course outlines very carefully and mark the important deadlines for assignments, quizzes etc.

Textbooks, Materials, Supplies, and other Resources

- The following is the list of the required textbooks which are quite useful for this course. These books will be shared through Google Drive in the very first week of the course.
- Chemistry, The Central Science by Theodore L. Brown, H. Eugene LeMay, Jr., Bruce E. Bursten, Catherine J. Murphy, Patrick M. Woodward, Matthew W. Stoltzfus, 14th Ed., 2018, Pearson Education Limited, UK.
 - Chemistry and Chemical Reactivity by John C. Kotz, Paul M. Treichel and John R. Townsend, 7th Ed, 2010, Brooks/Cole, Cengage Learning, USA.
 - Chemistry: An Introduction to General, Organic and Biological Chemistry by Karen C. Timberlake, 12th Ed., 2015, Pearson Education, Inc. USA.

- Chemistry, An Atoms First Approach by Steven S. Zumdahl and Susan A. Zumdahl, 2nd Edition, 2016, Cengage Learning, USA.
 - Principles of General Chemistry by Martin S. Silberberg, McGraw-Hill Higher Education.
- The students are required to follow all the social distancing SOPs recommended by the university inside the class and campus.
- For the practical/lab component, students will maintain a (duly filled) lab manual shared through Moodle. All the students are expected to have gone through the relevant experimental contents from the lab manual before the start of a particular lab.
- The students are supposed to bring their lab notebook (lab manual in a proper folder), scientific calculators, lab coat during all labs.

Following is the topic-wise split up of course objectives. For each objective mentioned there are some resources given. Students are expected to go through the relevant pages of the textbooks for preparation of each quiz/worksheet announced after the completion of each topic.

Learning Objective	Resources
<p><i>Matter and its classification, states of matter and their interconversion, elements, compounds and mixtures; separation of Components of mixtures</i></p> <ul style="list-style-type: none"> • To understand the nature, constitution and classification of matter in terms of Physical (states) and chemical (pure and impure substances) classification of matter. • To appreciate the differences between pure and impure substance; atom and molecule, compound and mixture; homogenous and heterogenous mixture, and true solutions, colloids and suspension. • To understand the basic principles, processes involved, and the glassware/apparatus used in separation of binary and ternary mixtures using physical methods • To understand the concept of mole and applying it in solving different conversions, i.e., moles to amounts in grams to number of particles 	<ul style="list-style-type: none"> • Class notes shared through Moodle • Chemistry and Chemical Reactivity by John C. Kotz, Paul M. Treichel and John R. Townsend, 7th Ed., pg. 7-13 (shared through Moodle)
<p><i>Elements, classification, atomic models, periodic table and periodicity of properties</i></p> <ul style="list-style-type: none"> • To learn writing electronic configuration of first 20 elements • To appreciate classification of elements as metals, non-metals, metalloids and the periodic trends ((Atomic size, Ionization Potential, Electron Affinity) with reasoning 	<p>Power point slides shared through Moodle</p> <p><i>Chemistry and Chemical Reactivity</i> by John C. Kotz, Paul M. Treichel and John R. Townsend, 7th Ed., pg. 60-62, 319-326 (shared through Moodle)</p>
<p><i>Acids, bases, neutralization and their applications in daily life</i></p> <ul style="list-style-type: none"> • To understand difference between Acids and bases, their properties • To appreciate the process of neutralization and its uses (ant's and wasp's stings; treatment of acid-affected agri-land; treatment of acidic/basic industrial effluents, tooth paste) 	<p>Power point slides shared through Moodle</p> <p><i>Chemistry and Chemical Reactivity</i> by John C. Kotz, Paul M. Treichel and John R. Townsend, 7th Ed., pg. 60-62, 319-326 (shared through Moodle)</p>
<p><i>Chemical reactions and stoichiometry</i></p> <ul style="list-style-type: none"> • To be able to differentiate between reversible and irreversible reactions, and apply stoichiometric calculations to simple conversions: 	<p>Power point slides shared through Moodle</p> <p><i>Chemistry and Chemical Reactivity</i> by John C. Kotz, Paul M. Treichel and John R.</p>

	Townsend, 7 th Ed., pg. 159-162, (shared through Moodle)
Chemical bonding, types and formation of bond <ul style="list-style-type: none"> To draw pictorial or structural representations showing covalent and ionic bonding in some simple molecules 	Power point slides shared through Moodle
Organic compounds, classes of organic compounds, structures of simple hydrocarbons <ul style="list-style-type: none"> To be able to differentiate organic and Inorganic compounds To appreciate the structural formulae of alkanes, alkenes and alkynes To be able to differentiate different classes of organic compounds on the basis of functional groups present 	Power point slides shared through Moodle

Course Requirements:

- Course assessment/evaluations will be made through different quizzes, theoretical and performance-based exams.
- Apart from 10 worksheets which will be taken over the whole semester (as per schedule mentioned above), there will be 3 quizzes, a mid-term exam and a final term exam.
- Five quizzes and other exams are designed to evaluate theory component of the course. Though each theory-based quiz will partly cover practical component, yet a dedicated lab exam will also be taken to assess lab skills/activities.
- Final letter grade will be cumulative of the score earned in all the worksheets, assignments, quizzes and exams, as per the grading system described above.
- The distribution of marks of quizzes, worksheets and midterm/final term exams is as follows:

Sr. No.	Topic	Evaluation Criteria	Points Allocated	Wk of Quiz/ Worksheet
1	Chemistry and its branches, matter and its classification, states of matter and their inter-conversion, elements, compounds and mixtures; physical methods of separation of components of mixtures	Quiz 1	7.5	Week 3
3		Mid-Term Exam	15	Week 10
4	Chemical bonding and their types, ionic and covalent bonds	Quiz 2	7.5	Week 10
6	Organic chemistry	Quiz 3	05	Week 16
7	Lab activities	Final Lab Exam	25	Week 17
8		Worksheets 1-10	10	As detailed above
9		Final Term Exam	30	TBD
Total			100	

OTHER RULES

- a) This course is open for those students who have not taken Chemistry at Intermediate or A level.
- b) All assignments should be submitted through Moodle (LMS) and will be graded manually.
- c) Retake of quiz/assignment etc. would be possible only under special circumstances. In case of retake/make-ups the student has to produce credible evidence for his/her being absent from the quiz/exam.
- d) Keeping in view the overall performance of the students and difficulty level of quiz, assignment etc. instructor has the right to lower or improve the weightage of any activity.
- e) Retake of missed assignments and make-ups of any quizzes assignment is discouraged. However, under special circumstances (for which the reasons have already been communicated to the instructor), retake/make-ups are possible.
- f) The grading criteria/system will be purely ABSOLUTE and there will not be any change in it at any stage of the course.

Attendance Policy:

The minimum attendance requirement is 85% in the lecture and 90% in lab. Any students failing to achieve this standard would likely to get 'F' grade without giving any consideration to his performance in quizzes, assignments and exams.

Classroom Participation:

Apart from speaking up, asking questions etc during lectures or initiating/participating discussion in WhatsApp group, the timely submission of all the worksheets will be taking as good participation in the class.

Grading Legend

Below is the grading legend of FCCU (published in all catalogues and available on the FCCU website) as approved by the Academic Council and applies for Fall 2021 as well

Grade	Point Value	Numerical Value	Meaning
A+	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	
B	3.00	83-86	Good
B-	2.70	80-82	
C+	2.30	77-79	
C	2.00	73-76	Average
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

Student Conduct & Other Issues:

The students are expected to come to class regularly and prepared. Students should conduct and express themselves in a way that is respectful to all individuals. This includes respecting the rights of others to comment and participate fully in class. Classroom misconduct is any behavior which disrupts or interferes with the learning environment.

- a) Private conversation, chatting/texting on mobile phones and all other activities which disturb the learning environment are strongly discouraged. The student's behavior should such that classroom interactions remain civil, respectful, and supportive to all.
- b) Students are required to keep their mobile phones in silent modes during class and labs.
- c) Mobile calculators are strongly discouraged for scientific calculations during class, exams and labs.
- d) Students not observing the social distancing SOPs, dress code and displaying their University ID cards would not be allowed to sit in the class.
- e) Any sort of plagiarism in assignments etc. or cheating during exam would result in F grade in that assignment/activity/exam.
- f) If any student faces any issues or has any concerns regarding the classroom climate and interactions, please feel free to contact VR office glorialib@fccollege.edu.pk

Changes to the Syllabus:

This syllabus is designed to convey course information and requirements as accurately as possible. It is important to note, however, that it **may** be subjected to change during the course depending on the needs of the class and other situational factors. Such changes would be for your benefit and you will be notified of them as soon as possible.

Student Support Services

[Student Counseling Services](#)

[Writing Center](#)

[Mercy Health Center](#)

Other Useful Policy Documents:

[Sexual Harassment Policy](#)

[Anti-Corruption Policy](#)

[Academic integrity](#)

[Plagiarism Policy](#)

[Academic Calendar](#)

I expect that you will strictly follow the core values of FCCU and put your entire efforts to learn as per the course requirements, attend classes, read the textbook(s)/other assigned reading material and do the assignments in the stipulated time period.