SCHOOL OF PHARMACY AND HEALTH SCIENCES

SEMESTER:	Fall 2015
COURSE:	CHE 1306: Structure and Chemical Bonding
LECTURER :	Dr Naumih Noah
CLASS DAYS/TIME:	F 1.30 – 4.50 PM
CLASS VENUE:	SC 7
CREDIT UNIT:	3
OFFICE HOURS :	T 12.30 – 1.20 PM
CONTACT :	mnoah@usiu.ac.ke

COURSE DESCRIPTION:

The objective of this course is to study the atomic structure and chemical bonding in details and study their application in pharmaceutical sciences. It includes the study and application of transition metal and coordination chemistry.

Link to University Mission and Program Learning Outcomes:

1. Higher Order Thinking

- Collect, analyze and evaluate environmental data/information to formulate valid conclusions.
- Demonstrate the ability to reason critically and creatively in an inter-disciplinary context.

2. Literacy

- Apply basic scientific, quantitative and technological skills in a changing environment.

3. Preparedness for Career

- Apply intellectual knowledge to practical tasks.

Course Learning Outcomes:

Upon completion of this course, students should be able to:

1. State the properties and application of elements in the IUPAC periodic table and their compounds
2. Discuss ionic and covalent bonds of several elements in the IUPAC periodic table
3. Explain the molecular orbital theory and its application to pharmaceutical sciences
4. Discuss the properties of transition elements and their application to pharmaceutical sciences
5. Discuss complex ions and coordination compounds and their application to pharmaceutical sciences.

COURSE CONTENT

WEEK	TOPIC	Activity	Learning outcomes	READING
Week 1	• **Revision of Exam and Recap of the basic inorganic chemistry**	**Lecture and Class Discussion**		
Week 2	• **Ionic and Covalent bonds**	Lecture, Discussion	1,2	Course text page 329-359
Week 3	**Molecular Geometry and Bonding Theories** • Valence Bond Theory (VBT) • Molecular Geometry and Hybrid Orbitals • Hybridization Involving d Orbitals Multiple, Bonds and Orbital Overlaps, Resonance Structures and Hybrid Orbitals **Molecular Orbital Theory** • Principles of molecular Orbital Theory	Lectures, Class Discussion	3	Course text page 400-408

	• Electron Configurations of Diatomic Molecules of the Second-Period Elements • Molecular Orbitals and Delocalized Bonding			
Week 4	• **Chemistry of the Main Block elements** • **The Alkali and alkaline earth metals**	Lectures, Class Discussion	1	Course text page 867 - 883
Week 5	• **Chemistry of the Main Block elements** • **Chemistry of the group 13 and 14 elements**	Lecturers, Class Discussion and Practical 3 Quiz 1	1	Course text page 892 -895
Week 6	• **Chemistry of the Main Block elements** • **Chemistry of the group 15 and 16 elements**	Lectures, Class Discussion	1	Course text page 900-908
Week 7	**Mid Semester Exam**			
Week 8	• **Chemistry of the Main Block elements** • **The group 17 and 18 elements**	Lectures, Class Discussion	1	Course text page 914 -918
Week 9	• **Transition elements** • Periodic Trends in the Transition Elements • The Chemistry of Two Transition Elements •	Lectures, Class Discussion	4	Course text page 931-934
Week 10	• **Transition elements** • Periodic Trends in the Transition Elements • The Chemistry of Two Transition Elements •	Lectures, Class Discussion	4	Course text page 934-935
Week 11	• **Coordination Chemistry** • Formation and Structure of Complexes	Lectures, Class Discussi	5	Course text page 938 -942

	• Naming Coordination Compounds • Structure and Isomerism in Coordination Compounds •	on, and Quiz 2		
Week 12	• **Coordination Chemistry** • **Valence Bond Theory of Complexes** • **Crystal Field Theory**	Lectures, Class Discussion	5	Course text page 942 -948
Week 13	• **Revision of assignments and group discussions**	Lectures, Class Discussion and **Practical Exam**	1,2,3,4,5	
Week 14	**Final Semester Exam**			

TEACHING METHODOLOGY:

1. Lectures, using power point presentations and class discussions.
2. Lectures will be given in class to explain to students various topics in basic inorganic chemistry.
3. Lectures will take a participatory approach where the instructor will involve students by frequently asking them questions that are meant to keep them alert and trigger class discussions.
4. **Video demonstrations and/or CD-Roms** on Inorganic Chemistry when available, after the relevant topic has been covered.
5. **Assignment criteria:** Students will be given several individual or group research assignments on topics relevant to the course. These could include lectures, discovery learning, problem-based learning, experimental learning, group-based learning, independent studies and e-learning.
6. The instructor will also be free to answer questions from students in the course of the lectures.

COURSE EVALUATION

Class attendance	10%
Individual assignments	15%
Group Assignment	10%
Quizzes	10%
Mid-Semester Exam	25%
Final Exam	30%
Total	**100%**

Note: **seven absences** from class will result to an automatic **grade F.**
Assignments must be handed in on the due dates shown.

REFERENCE BOOKS

Course Text
General Chemistry by Darell Ebbing and Steven Gammon, 9th or 10th Edition. **(ebook)**

Other Reference Texts

1. Guha, S. (2013). J.D. Lee Concise Inorganic Chemistry for JEE (Main & Advanced). 2nd Edition. Wiley India Pvt Ltd., Daryaganj, New Delhi, DL
2. Housecroft, C. E., Sharpe, A. G. (2012). Inorganic Chemistry. 4th Edition. Prentice Hall, Upper Saddle River, New Jersey, USA
3. Vogel, A. I., Svehla, G. (2012). Vogel's Qualitative Inorganic Analysis. 7th Edition. Prentice Hall, Upper Saddle River, New Jersey, US

GRADING

A	90-100
A-	87-89
B+	84-86
B	80-83
B-	77-79
C+	74-76
C	70-73
C-	67-69
D+	64-66
D	62-63
D-	60-61
F	0-59