Course specification

University/Academy: Damanhour University

Faculty/Institute: Faculty of Science

Department: Chemistry

1. course Data:

Course code:	**Course title:**	Academic year/level:
Chem.423	**Inorganic and Analytical Chemistry**	2010-2011 Fourth year – first term
Specialization: **Chemistry/Physics -** **Chemistry/Botany -** **Chemistry/Zoology -** **Chemistry/Microbiology** **Chemistry/Biochemistry**	**No. of instructional units:** **lecture** 3 hrs/week **Tutorial** 1hrs/week **practical** -	

2. course Aim	By the end of this course, students should be able to: • Understand the basic concepts of Nuclear and actinide chemistry Recall the principles Binding energy and the mass defect Realize types, Thermonuclear reactions and nuclear fusion. The dangers of atomic radiations. Understand the Organometallic Chemistry: Definition. Classification. Methods of preparation. Realize types and mention the Spectral methods of analysis

3. Intended learning outcome	
a) Knowledge and understanding	By the end of this course, students should be able to: A1: describe nuclear reactions A2: write on the principles of Nuclear fission. Thermonuclear reactions and nuclear fusion and the dangers of atomic radiations. A3: Characterize the Occurrence and preparation of the Actinides A4: draw of spectroscopic techniques in the identification of compounds. A4: list different organometallic compounds A5: Mention different reactions of organometallic reactions.
b) Intellectual skills	By the end of this course, students should be able to: B1: analyze different types of chemical calculations. B2: discuss the application of nuclear reactions. B3: use spectroscopic techniques in the identification compounds
c) Professional skills	By the end of the course, student will be able to: C1: examine differences between nucleal reactions and other chemical reactions.

	C2: elicit the application of nuclear reactions. C3: conduct the different spectrophotometric techniques 9idea and applications). C4: examine the preparation and applications of actinides.
d) General skills	D1: Use IT and web search engines for collecting information. D2: Work effectively in a team, and independently on solving chemistry problems. D3: explain ideas, principles and information by oral, written and visual means. D4: Communicate effectively with his lecturer and colleagues
4. course content	**Nuclear and actinide chemistry:** • Natural radioactivity. Radioactive series. Structure of the nucleus. Binding energy and the mass defect. Nuclear fission. Thermonuclear reactions and nuclear fusion. The dangers of atomic radiations. **Actinides:** • Occurrence and preparation of the elements. Electronic structure and position in the periodic table. Oxidation states. General properties. **Organometallic Chemistry:** • Definition. Classification. Methods of preparation. Cyanides, isothiocyanates, cyclopentadienyl and carbonyl compounds. Catalytic reactions of alkenes. Acid-base properties. Acceptor properties. Oxidative-addition reaction. Intermolecular transfer

	mechanism. Application. **Spectral methods of analysis** • visible and ultraviolet Spectrophtometry • Infrared spectrophotomtry. Raman spectroscopy. Emission spectroscopy - Flame photometry. Atomic absorption and fluorescence spectroscopy, Nuclear magnetic and elctron spin resonance. X-rays analysis.
5. Teaching and learning methods	4.1. Lectures and seminars using data show and board. 4.2. Home work assignment. 4.3. Problem classes and group tutorial. 4.4. Reports and discussion groups
teaching and learning methods for students with special needs	----------
6. Student Assessment	5.1. Mid term exam. 5.2. Practical exam. 5.3. Problems. 5.4. Assignments. 5.5 Written exam.
a) Procedures used:	• Computer hall to be used in visual labs and simulation experiments. • Data show, overhead projector, Molecular models and chemistry computer programs.
Schedule:	Assessment 1: Mid term Assessment 2: Final practical

	Assessment 3: Final written
Weighing of Assessment:	Total 150
7. List of Textbooks and References:	Skoog, D.A.; West, D.M.; Holler, F.J. **Fundamentals of Analytical Chemistry** New York: Saunders College Publishing, 5th Edition, **1988**. **1. ^ Robert H. Crabtree (2005). *The Organometallic Chemistry of the Transition Metals*. Wiley. pp. 560. ISBN 978-0-471-66256-3. http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471662569.html.** **2. ^ Toreki, R. (2003-11-20). "Organometallics Defined". Interactive Learning Paradigms Incorporated. http://www.ilpi.com/organomet/organometallics.html.** **3. ^ For a historical perspective, cf. Pierre Teissier, *L'émergence de la chimie du solide en France (1950-2000). De la formation d'une communauté à sa dispersion* (Paris X: Ph.D. dissertation, 2007, 651 p.). Electronic version available: http://bdr.u-paris10.fr/sid/** **4. ^ Chapter 2 of *Solid state chemistry and its applications*. Anthony R. West. John Wiley & Sons 2003 ISBN 9812-53-003-7** **5. ^ cf. Chapter 12 of Elements of X-ray diffraction, B.D. Cullity, Addison-Wesley, 2nd ed. 1977 ISBN 0-201-01174-3** **6. ^ cf. Chapter 2 of *New directions in Solid State Chemistry*. C.N.R. Rao and J. Gopalakrishnan. Cambridge U. Press 1997 ISBN 0-521-49559-8**
Course Notes	6.1. Course Notes
a) Required Books (Textbooks)	Skoog, D.A.; West, D.M.; Holler, F.J. **Fundamentals of Analytical Chemistry** New York: Saunders College

	Publishing, 5th Edition, **1988**.
b) Recommended Books	• Skoog, D.A.; West, D.M.; Holler, F.J. **Fundamentals of Analytical Chemistry** New York: Saunders College Publishing, 5th Edition, **1988**. • **^ Robert H. Crabtree (2005). *The Organometallic Chemistry of the Transition Metals*. Wiley. pp. 560. ISBN 978-0-471-66256-3.** Fundamentals of spectroscopic methods,2 th Edition ,1985.
c) Periodicals, web sites,…,etc	**6. ^ Robert H. Crabtree (2005). *The Organometallic Chemistry of the Transition Metals*. Wiley. pp. 560. ISBN 978-0-471-66256-3. http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471662569.html.** **7. ^ Toreki, R. (2003-11-20). "Organometallics Defined". Interactive Learning Paradigms Incorporated. http://www.ilpi.com/organomet/organometallics.html.** **8. ^ For a historical perspective, cf. Pierre Teissier, *L'émergence de la chimie du solide en France (1950-2000). De la formation d'une communauté à sa dispersion* (Paris X: Ph.D. dissertation, 2007, 651 p.). Electronic version available: http://bdr.u-paris10.fr/sid/** **9. ^ Chapter 2 of *Solid state chemistry and its applications.* Anthony R. West. John Wiley & Sons 2003 ISBN 9812-53-003-7** **10. ^ cf. Chapter 12 of Elements of X-ray diffraction, B.D. Cullity, Addison-Wesley, 2nd ed. 1977 ISBN 0-201-01174-3** **^ cf. Chapter 2 of *New directions in Solid State Chemistry*. C.N.R. Rao and J. Gopalakrishnan.**

	Cambridge U. Press 1997 ISBN 0-521-49559-8

Course Instructor:

Head of Department: Dr. Medhat A. Shaker

1-.Dr Ismail Abed

2- Dr.Alaa El Deen Ali

Date: -----/-----/----