COURSE SPECIFICATIONS

Form

Course Title: Spectroscopy and Magnetism of Inorganic Compounds

Course Code: 4026842-3

Date: 24-10-2018	**Institution:** **Umm Al-Qura University**.
College: **Faculty of Applied Science**	**Department:** **Department of Chemistry**

A. Course Identification and General Information

1. Course title and code: **Spectroscopy and magnetism of inorganic compounds / 4026842-3**
2. Credit hours: **3 (theoretical)**
3. Program(s) in which the course is offered: **M. Sc.in Chemistry**

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: **Dr. Hoda Abou El-Fetouh El-Ghamry**
5. Level/year at which this course is offered:**3rd / 2nd**
6. Pre-requisites for this course (if any): **None**
7. Co-requisites for this course (if any): **None**
8. Location if not on main campus:**El-Abedyah, El-Azizya, and El-Zaher**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom		percentage?	
b. Blended (traditional and online)	■	percentage?	80%
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other	■	percentage?	20%

Comments:

B Objectives

1. The main objective of this course

- The students will learn the basic theories related to coordination chemistry such as: valance bond theory and crystal field theory, electronic spectroscopy will be also discussed.
- Let the students to be familiar with magnetism of compounds especially inorganic compounds.
- Special emphasis will be on electronic spin resonance including its techniques and the meaning of relaxation time and line width of and ESR spectra.
- Nuclear spin and hyperfine splitting will also be discussed.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Link the theoretical and practical sides of the course to give the students to understand and interpret the properties of the complexes.
- Variation of learning sources for the course, so that students benefit from more than one reference.
- The use of teaching intelligent classes for lectures.
- Encourage students to prepare reports include the preparation and chemical properties of coordination and organometallic compounds.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
• Valence theories: valence bond theory, crystal field theory, ligand field theory.	2	6
• Electronic spectra: crystal field strength, electronic transition selection rules and d-d transitions on complexes.	2	6
• Para magnetism: the Curle law and zero-field.	1	3
• Long term order: molecular field theory of ferromagnetism and antiferromagnetism.	1	3

• Short term order: one-dimensional or linear chain systems, two-dimensional or planar systems.	**1**	**3**
• Some single ion and transition metal compounds properties.	**2**	**6**
• Electron spin resonance: interaction between electron spin resonance and magnetic field.	**2**	**6**
• Techniques of ESR spectroscopy.	**1**	**3**
• Relaxation time and line width of ESR Absorption.	**1**	**3**
• Nuclear spin and hyperfine splitting.	**1**	**3**

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	42	---	---	---	---	42
	Actual	42	---	---	---	---	42
Credit	Planned	3	---	---	---	---	3
	Actual	3	---	---	---	---	3

3. Individualstudy/learning hours expected for students per week. **2**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Explain the valence theories: valence bond theory, crystal field theory, ligand field theory.	• Lectures • Scientific discussion • Library visits	• Written mid-term and final exams. • Long and short
1.2	Describe the electronic spectra: crystal field		

	strength, electronic transition selection rules and d-d transitions on complexes.	• Web-based study	essays. • web-based student performance systems
1.3	Identify the para magnetism, ferromagnetism and antiferromagnetism		
1.4	Explain the electron spin resonance: interaction between electron spin resonance and magnetic field		
1.5	Describe the techniques of ESR spectroscopy.		
2.0	**Cognitive Skills**		
2.1	Compare between para magnetism, ferromagnetism and antiferromagnetism	• Lectures • Scientific discussion • Library visits • Web-based study	• Mid-term and final exams. • Measuring the response to the assignments.
2.2	Interpret the valence theories: valence bond theory, crystal field theory, ligand field theory		
2.3	Interpret the electronic spectra: crystal field strength, electronic transition selection rules and d-d transitions on complexes.		
2.4	Interpret the techniques of ESR spectroscopy		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Take the personality and responsibility for their own learning.	• Encourage the solving problems in groups during lecture. • Making open discussion about certain recent topic related to the course.	• Homeworks • Group reports.
3.2	Working effectively in groups and exercise leadership when appropriate		
3.3	Act ethically and consistently with high molar standards in personal and public forums		
3.4	Community linked thinking		
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written forms.	• The use of computers in the training room of the department. • Organizing group visits to the Central Library. • The use of the	• Ask questions that test the student's ability to interpret simple statistical information. • Assess the duties associated with the proper use of
4.2	Use information and communication technologies.		
4.3	Use basic mathematical and statistical techniques.		

		international information network (internet).	communication skills and numerical process
5.0	**Psychomotor(if any)**		
5.1	Not applicable.		
5.2			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	**Assignments and activities.**	**--**	**10 %**
2	**Midterm Exam.**	**8**	**30 %**
3	**Final Exam.**	**15-16**	**60 %**
4	**Total**	**100 %**	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- Academic advisingforstudents.
- Office hours: During the working hoursweekly.
- Availability of Staff members to provide counselling and advice.

E Learning Resources

1. List Required Textbooks

- Edward Maslowsky, "Vibrational Spectra of Organometallic Compounds", 1st ed., Wiley, 2018.
- Chandran Karunakaran, "Spin Resonance Spectroscopy, Principles and applications", 1st ed., Elsevier, 2018.

2. List Essential References Materials (Journals, Reports, etc.)

- Journal of magnetism and magnetic materials.
- Journal of magnetic resonance.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- https://www.abebooks.co.uk/book-search/title/magnetochemistry/author/carlin/
- http://link.springer.com/book/10.1007%2F978-1-349-18198-8

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- None.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

• Equipped lecture hall.
2. Technology resources (AV, data show, Smart Board, software, etc.) • Roomequippedwithcomputers, data show andTV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • No other requirements.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Questionnaires can be used to collect student feedback. • Student representation on staff-student committees and institutional bodies. • Structured group discussions and/or focus groups.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Visits by other faculty can provide information about the process of teaching. • Colleagues have the expertise to evaluate the quality of a course as evidenced by its content and format (peer reviewers). • The instructor's statement of his/her goals for the course, teaching methods and philosophy, student outcomes, and plans for improvement are a critical source of information. • A systematic self-review has the potential for contributing significantly to the instructor's teaching improvement by focusing on the strengths and weaknesses of the course in light of his/her original course objectives.
3. Procedures for Teaching Development • The application of e-learning. • Exchange of experiences internal and external. • Training programs and workshops for Staff member. • Providing new tools for learning.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Check marking by an independent member teaching staff of a sample of student work. • Periodic exchange and remarking of tests or a sample of assignments with staff at another institution.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- Periodic review of the contents of the syllabus and modify the negatives.
- Consult other staff of the course.
- Hosting a visiting staff to evaluate of the course.
- Workshops for teachers of the course.

Name of Course Instructor: Dr. Hoda Abou El-Fetouh El-Ghamry

Signature:  **Date Completed: 24/10/2018**

Program Coordinator: Dr. Ismail Ibrahim Althagafi

Signature:  **Date Received: 25/10/2018**