Course specification

University/Academy: Damanhour

Faculty/Institute: Science

Department: Physics

1. course Data:		
Course code: PHY (401)	Course title: Quantum in sollids	Academic year/level: 2010-2011 4th year (first term)
Specialization: Special physics , chemistry& physics and Math.&physics	No. of instructional units: lecture 2hrs/ week practical 3hrs/ week	

2. course Aim	• The course introduces the principles of quantum mechanics including 3 dimensional problems as a continuation to quantum physics (1)
3. Intended learning outcome	
a) Knowledge and understanding	**A1**: Define the basic concepts of quantum mechanics by studying a real system qualitatively and quantitavely as hydrogen atom **A2**: Recognize the energy bands in metals.
b) Intellectual skills	B1: Apply wave equation for solving many physical problems. B2: Analyze the physical meaning of the wave equation of electron in a periodic potential.

c) Professional skills	C1: Use the physical knowledge to analyze a suitable technique to solve problems. C2: examine some physical problems helping in understanding the course parts.
d) General skills	D1: Use of technology tools: like internet/electronic resources to obtain subject specific information,. - use a number of computer packages to present information. D2: the ability to work in groups: work with other as a part of a team to collect data and/or to produce reports and presentations. D3: The ability to communicate to improve the self-learning: - study independently, set realistic targets and plan work and time to meet targets within deadlines. D4: rite reports and Problem solving: - Regular problem exercises and example will give students the chance to develop their theoretical understanding and problem. D5: The ability to communicate : Students will have write reports and give oral presentation.
4. course content	- Energy bands- nearly free electron model- - Bloch function- - Kronning Penny model - electron in a periodic potential. - Construction of Fermi surface- electron - orbits - Calculation of energy bands- - experimental methods in Fermi surface - Diamagnetism and paramagnetism- - Ferromagnetism.

	- Anti Ferromagnetism.
5. Teaching and learning methods	5.1. Teaching will be by lectures, exercises . 5.2. All learning outcomes are delivered through lectures. 5.3.All lectures and worked examples are given from the lecturer private notes. Instructional Methods include: • Direct Instruction: lecture, reading, in class research, problem sets, presentations, and guest speakers • Instructional Materials: textbook; primary and secondary materials, experts from the field, and electronic media • Team Teaching which will include business, university, and community based partners • Community based applied concept projects • Self-directed, cooperative, and collaborative learning projects • Student oral presentations
6. teaching and learning methods for students with special needs	1- Over head projector 2- appropriate teaching accommodation and Computers 3- Laboratory with computer terminal.
7. Student Assessment	**7-1.** Semester Work.

	7-2. Mid-Term Examination . 7-3. **Practical Examination** 7-4. **Final Term Examination**
a) Procedures used:	7.1. Reaserch and presentation to assess skills of presenting data and discussion. 7.2. Mid-Term Examination To accesses ability to **continue in course** 7.3. practical exam. To access professional and practical skills. 7.4. written exam. To accesses ability to remember &.understand scientific background. &.understand scientific background.
b) Schedule:	Assessment1:Semesterwork Week: 4-8 Assessment 2: Mid-term Week: 10 Assessment 3: Practical final Week: 12 Assessment 4: Written final Week: 14
c) Weighing of Assessment:	Mid-Term Examination: 10 Final-Term Examination: 100 Practical Examination: 30 Semester Work: 10 Total: 150
8. List of Textbooks and References:	----------
a) Course Notes	Lecturer private notes

b) Required Books (Textbooks)	1. **Quantum Mechanics in Hilbert Space: Second Edition** 2. **Quantum Field Theory: A Modern Introduction, 1993-03** 3. **Advanced Quantum Mechanics (Advanced Texts in Physics)** 4. **Quantum Dots: A Doorway to Nanoscale Physics** 5. **Feynman Lectures on Physics Volumes 1,2,3 - Feynman, Leighton and Sands**
c) Recommended Books	1. Feynman Lectures on Physics Volumes 1,2,3 - Feynman, Leighton and Sands
d) Periodicals, web sites,…,etc	**http://rugth30.phys.rug.nl/quantummechanics/** **http://phys.educ.ksu.edu/** **http://plato.stanford.edu/entries/qm/** **http://www.chemistry.ohio-state.edu/betha/qm/** **http://www-history.mcs.st-and.ac.uk/HistTopics/The_Quantum_age_begins.html** **http://www.mtnmath.com/faq/meas-qm.html** **http://www.upscale.utoronto.ca/GeneralInterest/QM.html**

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Head of Department

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

Prof. Dr. El. M. Elmaghrby