Course specification

University/Academy: **Damanhour**

Faculty/Institute: Science

Department: Physics

1. course Data:		
Course code: PHY (404)	Course title: Nuclear physics and accelerators	Academic year/level: 2010-2011 4th year (second term)
Specialization: Mathematics and physics	No. of instructional units: lecture 3hrs/ week tutorial 1hrs/ week practical 3hrs/ week	

2. course Aim	• The course introduces the nuclear forces, reactors and accelerators.
3. Intended learning outcome	
a) Knowledge and understanding	**A1**: Define the nuclear reactors and accelerators and its applications. **A2**: Describe the structure of the nucleus in terms of nuclear forces. **A3**: Recognize the electric and magnetic properties of the nucleus.
b) Intellectual skills	B1: Show a clear understanding of the basic concepts of nuclear forces, Schrodinger's wave equation of duetron. B2: Creats Principles of reactors. B3: Apply the laws governing the reactors.

c) Professional skills	C1: Examine the Production of neutrons- Neutron reactions and detection. C2: Dissect the difference between Fission reactions and Fussion reactions C3: conduct the physical knowledge to analyze a suitable technique to solve problems. C4: Examine some physical problems helping in understanding the course parts.
d) General skills	D1: use of technology tools like the internet/electronic resources to obtain subject specific information,. - use a number of computer packages to present information. D2The 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 improving Self-learning: - study independently, set realistic targets and plan work and time to met targets within deadlines. D4: Write 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	- Electric and Magnetic properties of the nucleus. - The quantum numbers of the nucleon inside the nucleus. - The nuclear energy levels. - The Vector coupling. - The magnetic moment of the nucleus and the parity - The nuclear forces. - Schrodinger's wave equation of duetron. - Theories and mechanisms of Alpha, Beta and Gamma decay. - Nuclear structure and nuclear models - Liquid drop model and the shell model as examples. - Production of neutrons - Neutron and reactor physics - Neutron reactions and detection - Fission reactions- - Principles of reactors: (Types- Fuels- moderators- coolants). - Infinite amplification coefficients Critical volume- Examples- Fussion reactions. Accelerators: Importance- Types- Uses.
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: 150 Practical Examination: 30 Semester Work: 10 Total: 200
8. List of Textbooks and References:	----------
a) Course Notes	Lecturer private notes
b) Required Books (Textbooks)	1- Nuclear physics by I.kaplan (Adison Wesley). 2- Nuclear physics and Nuclear reactors by A.Klimov (Mir publishors). 3- α, β and ray spectroscopey (Vol I) by K.Sigban (North Holand publishing)
c) Recommended Book	----------
d) Periodicals, web sites,…,etc	----------

Course Instructor: Dr / shaker Ibrahim **Head of Department**

Date: -----/-----/---- **Prof. Dr. El. M. Elmaghrby**