Course specification

University/Academy: **Damanhour**

Faculty/Institute: Science

Department: Physics

1. course Data:		
Course code: PHY (411)	Course title: Laser, Computational physics	Academic year/level:2010\2011 4th year (first term)
Specialization: Math. & physics Chem. & physics	No. of instructional units: lecture 3hrs/ week practical 3hrs/ week	

2. course Aim	• The course introduces the fundamentals, operation and applications of laser. • The course introduces the concept of microwaves and its applications.
3. Intended learning outcome	
a) Knowledge and understanding	**A1**: Define the propagation of electromagnetic waves. **A2**: Define the radiation protection. **A3**: Recognize the role of external and internal hazards of radiation sources. A4: Define the fundamentals of quantum transitions in atomic systems. **A5:** Define the minimization and vibrational techniques.

b) Intellectual skills	B1: Analyse the Laser production and properties. B2: Discuss Monte Carlo method.
c) Professional skills	C1: Dissect the microwaves active devices. C2: Show the difference between laser beam and ordinary light beam. C3: Dissect the physical knowledge to analyze a suitable technique to solve problems. C4: Dissect some physical problems helping in understanding the course parts.
d) General skills	D1: Use of technology tools: - use the 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: Write reports 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	- Propagation of electromagnetic waves. - Properties of laser light. - Interaction of radiation with matter. - Microwaves active device.

	- Basic laser principles. - X and γ rays. - Types of laser and its applications - Minimization and vibrational techniques- Eigenvalue problem . - Computational plasma physics - Boundary value problem- Few-body problems.
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- Atoms, Radiation and Radiation protection, James E.Turner. 1985, Interscience publication, John Wiley & Sons, Inc 2- "Principles of Optics", M.Born and E.Wolf, Cambridge Univ.Press, England. 3- "Fundamentals of Photonics", B.E.A. Saleh, John Wiley & Sons, Inc. 4- "Laser Fundamentals", W.T.Silfvast, Cambridge Univ.Press, NewYork. 5- "Optical Holography", P.Hariharam, Cambridge Univ.Press, NewYork
c) Recommended Books	---
d) Periodicals, web sites,…,etc	---

Course Instructor: Dr. El Maghrby Mohamed El Maghrby

Head of Department

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

Prof. Dr. El. M. Elmaghrby