University requisite			
Course Code	Course Name	Credit points	Workload
605101	Holly Quran1	2	90
6051201	Holly Quran2	2	90
605301	Holly Quran3	2	90
605401	Holly Quran4	2	90
601101	Islamic Culture 1	2	90
601201	Islamic Culture 2	2	90
601301	Islamic Culture 3	3	135
601401	Islamic Culture 4	2	90
102101	Alsera Alnabaweia	2	90
501101	Arabic Language	2	90
705101	English Language	2	90
705102	Communication in English 1	3	135
705103	Communication in English 2	3	135
Total		29	1305
percentage		(29/142)*100 = 20.4%	

College requisite			
Course Code	Course Name	Credit points	Workload
404101-4	Differentiation and Integration 1	4	180
404102-4	Differentiation and Integration 2	4	180
404140-4	Algebra Fundamental	4	180
401101-2	General Biology Plant	2	90
401102-2	General Biology Animal	2	90
402101-4	General Chemistry 1	4	180
Total		20	900
percentage		(20/142)*100 =14.1%	

Department requisite			
Course Code	**Course Name**	**Credit points**	**Workload**
403101-4	General Physics 1	4	180
403102-4	General Physics 2	4	180
403121-4	Electricity and Magnetism	4	180
403212-3	Heat and Thermodynamic	3	135
403231-4	Optics	4	180
403240-3	Theoretical Physics 1	3	135
403241-4	Classical Mechanics 1	4	180
403285-3	Measurements	3	135
403213-3	Statistical Thermodynamic	3	135
403242-3	Theoretical Physics 2	3	135
403245-3	Classical Mechanics 2	3	135
403253-4	Atomic physics	4	180
403332-3	Electromagnetism 1	3	135
403344-4	Quantum Mechanics 1	4	180
403346-2	Theoretical Physics 3	2	90
403371-3	Solid Stat 1	3	135
403342-3	Electromagnetism 2	3	135
403345-3	Quantum Mechanics 2	3	135
403361-4	Nuclear Physics 1	4	180
403382-2	Workshop	2	90
403383-2	Computer	2	90
403423-4	Electronics	4	180
403432-3	Advanced Optics	3	135
403462-3	Radiation Physics	3	135
403471-3	Semiconductor	3	135

Department requisite			
Course Code	Course Name	Credit points	Workload
403493-5	Project	5	225
403461-3	Nuclear Physics 2	3	135
403463-2	Nuclear Technology	2	90
403372-2	Solid State 2	2	90
Total		93	4185
percentage		(93/142)*100 =65.5%	

1st year					
1th Semester			2ND Semester		
Course Code	Course Name	Prerequisite	Course Code	Course name	Prerequisite
403101-4	General Physics 1	-	403102-4	General Physics 2	404101+403101
402101-4	General Chemistry 1	-	403121-4	Electricity and Magnetism	404101+403101
404101-4	Differentiation and Integration 1	-	404102-4	Differentiation and Integration 2	404101
705101-2	English Language	-	404140-4	Algebra Fundamental	404101
601101-2	Islamic Culture 1	-	401101-2	General Biology Plant	-
605101-2	Quran 1	-	401102-2	General Biology Animal	-
Total : 18			Total : 20		

2nd year					
3th Semester			4th Semester		
Course Code	Course Name	Prerequisite	Course Code	Course name	Prerequisite
403212-3	Heat and Thermodynamic	404102+402102	403213-3	Statistical Thermodynamic	403212
403231-4	Optics	404102+402102	403242-3	Theoretical Physics 2	403240
403240-3	Theoretical Physics 1	404102	403245-3	Classical Mechanics 2	403241
403241-4	Classical Mechanics 1	404102+402102	403253-4	Atomic physics	403240+40231
403285-3	Measurements	403121	705102-3	Communication in English 1	705101
501101-2	Arabic Language	-	601201-2	Islamic Culture 2	601101
Total : 19			Total : 18		

3th year

5th Semester			6th Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
403332-3	**Electromagnetism 1**	**403242+403285**	**403342-3**	**Electromagnetism 2**	**403332**
403344-4	**Quantum Mechanics 1**	**403252+403242**	**403345-3**	**Quantum Mechanics 2**	**403344**
403346-2	**Theoretical Physics 3**	**403242**	**403361-4**	**Nuclear Physics 1**	**403344+403253**
403371-3	**Solid Stat 1**	**403253**	**403382-2**	**Workshop**	**403381**
601301-3	**Islamic Culture 3**	**601201**	**403383-2**	**Computer**	**403242**
605201-2	**Quran 2**	**605101**	**705103-3**	**Communication in English 2**	**705102**
			601401-2	Islamic Culture 4	601301
Total : 17			**Total :19**		

4th year

7th Semester			8th Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
403423-4	**Electronics**	**403371**	**403461-3**	**Nuclear Physics 2**	**403361**
403432-3	**Advanced Optics**	**403346+403231**	**403463-2**	**Nuclear Technology**	**403462**
403462-3	**Radiation Physics**	**403361**	**403372-2**	**Solid State 2**	**403471**
403471-3	**Semiconductor**	**403371**	**605401-2**	**Quran 4**	**605301**
403493-5	**Project**	**Department**	**Total :8**		
605301-2	**Quran 3**	**605201**			
102101-2	Alsera Alnabaweia				
Total : 22					

1st year			
1st Semester		2nd Semester	
Credit points	Workload	Credit points	Workload
4	180	4	180
4	180	4	180
4	180	4	180
2	90	4	180
2	90	2	90
2	90	2	90
18	810	20	900

2nd year			
1st Semester		2nd Semester	
Credit points	Workload	Credit points	Workload
3	135	3	135
4	180	3	135
3	135	3	135
4	180	4	180
3	135	3	135
2	90	2	90
19	855	18	810

3th year			
1st Semester		2nd Semester	
Credit points	Workload	Credit points	Workload
3	135	3	135
4	180	3	135
2	90	4	180
3	135	2	90
3	135	2	90
2	90	3	135
		2	90
17	765	19	855

4th year			
1st Semester		2nd Semester	
Credit points	**Workload**	**Credit points**	**Workload**
4	**180**	**3**	135
3	**135**	**2**	90
3	**135**	**2**	90
3	**135**	**2**	90
5	**225**		
2	**90**		
2	**90**		
22	**990**	**8**	**405**

1st year			
1st Semester		1st Semester	
Credit points	Workload		
4	180		
4	180		
4	180		
2	90		
2	90		
2	90		
18	810		
4	180		
4	180		
4	180		
4	180		
2	90		
2	90		
20	900		
2nd year			
3	135		

4	180		
3	135		
4	180		
3	135		
2	90		
19	855		
3	135		
3	135		
3	135		
4	180		
3	135		
2	90		
18	810		
3th year			
Credit points	Workload		
3	135		
4	180		
2	90		
3	135		
3	135		
2	90		
17	765		
3	135		
3	135		
4	180		
2	90		
2	90		
3	135		
2	90		
19	855		
4th year			

4	180		
3	135		
3	135		
3	135		
5	225		
2	90		
2	90		
22	990		
3	135		
2	90		
2	90		
2	90		
6	270		

Courses designation	**Physics 101**
Courses level, if applicable	Bachelor
Code, if applicable	403101
Semester(s) in which the module is taught	1st Semester - 1st year
Person responsible for the module.	**Dr.**Abdelmajid Ali TIMOUMI
Lecturer	Dr. Ahmed El-hadi , **Dr.**Abdelmajid Ali TIMOUMI
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	-

Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Learning fundamentals in physics theory 2. Understanding the physics low and their applications 3. Improving logical thinking. 4. To use mathematical formulation to describe the physical principle or phenomena 5. Ability to explain how things work.

Content	1-Measurement 2-Vectors 3-Properties of Matter 4-Fluid statics 5-Fluid Dynamics 6- Heat 7- Optics
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Physics by : Halliday, D and Resnick, Krane 2-Physics for student of science and Engineering by A.L.Stanford and J.M. 3- Physics, by J. Walker, fourth Ed. 4- Fundamentals of Physics, by Halliday, Resnick and Walker 5- http://www.physicsclassroom.com 6- http://www.eskimo.com

Courses designation	General Physics (2)
Courses level, if applicable	Bachelor
Code, if applicable	403102
Semester(s) in which the module is taught	2nd Semester - 1st year
Person responsible for the module.	
Lecturer	Dr..Badie Korany , Dr.El hussieny Eltaher Dr. Abdel Rahman Lashin , Dr. Adel Madani,
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-101
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. use physical laws and principles to understand the subject 2. simplify problems and analyse phenomena 3. Analyse and explain natural phenomena 4. Ability to explain the idea with the student own words 5. Represent the problems mathematically

Content	1. Electromagnetism, electric charge, conductors and insulators, Coulomb's law and conservation of charge. 2. Electric field, charge distribution, point charges and electric dipoles . 3. Electric flux, Gauss's law, charges in conductors and applications of Gauss's law. 4. Electrostatic and gravitational forces, electric potential, electric potential energy, potential due to charge distributions and equipotential surfaces 5. Capacitance, capacitors in parallel and series, energy stored in capacitors, energy stored in electric fields, dielectrics and capacitors with dielectrics . 6. Electric currents, current density, resistance and resistivity, Ohm's law and DC circuits (Kirchoff's laws and RC circuits) . 7. Magnetic field, magnetic force, magnetic force and electric currents, Ampere's law and magnetic fields due to electric loops
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Required Text(s) ; Physics, by J. Walker, fourth Ed. 2. Essential References :Fundamentals of Physics, by Halliday, Resnick and Walker 3. Essential References :Fundamentals of Physics, by Halliday, Resnick and Walker 4. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) Introduction to Electrodynamics, by Griffiths

Courses designation	Electricity and Magnetism
Courses level, if applicable	Bachelor
Code, if applicable	403121
Semester(s) in which the module is taught	2nd Semester - 1st year
Person responsible for the module.	Dr.Badie Abdel halim Korany
Lecturer	Dr.Badie Abdel halim Korany
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	PH 101 + MATH101
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Learning fundamentals in electricity and magnetism theory. 2. Understanding the physics of electricity and magnetism and their applications Improving logical thinking. 3. To use mathematical formulation to describe the physical principle or phenomena 4. Ability to explain how things work.

Content	1. Electric charge and Coulomb's law . 2. The Electric Field 3. Gauss Law 4. Electric Potential 5. Capacitors 6. Current and Resistance 7. DC Circuits 8. The Magnetic Field 9. Ampere's Law
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	Jearl Walker. (2008) .

Courses designation	Heat and Thermodynamics
Courses level, if applicable	Bachelor
Code, if applicable	403383
Semester(s) in which the module is taught	3rd Semester - 2nd year
Person responsible for the module.	Dr.Mona Refaie
Lecturer	Dr.Mona Refaie , Dr. Hanan Amer D.MEHREZ LOULOU , Dr. El hussieny Eltaher Mahdy Dr.Aida
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-102
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Students have proficiency in describing and using the basic principles underlying the study of thermodynamics, include the ideal gas model, the pure substance model, and combustion processes. 2. Students can explain at a level understandable the concepts of path dependence/independence and reversibility/irreversibility of various thermodynamics processes, represent these in terms of changes of thermodynamic state, and cite examples of how these would impact the performance of simple energy generation systems. 3. Students have an understanding and appreciation for the implications of the science of 4. thermodynamics on society as a whole (in scientific, historical and economic contexts) and 5. recognize connections between thermodynamics and other areas of study.

Courses objectives/intended learning outcomes	1. Students can explain the First Law of Thermodynamics and define heat, work, thermal 2. efficiency and the difference between various forms of energy. 3. Students can estimate the thermodynamic efficiency and power production of an arbitrary ideal cycle. 4. Students can use entropy calculations as a tool for evaluating losses and irreversibility in engineering processes. 5. Students can apply the basic principles and laws of thermodynamics to an availability 6. analysis of an energy conversion system
Content	1. Thermal properties of matter 2. Thermodynamics properties 3. First law of thermodynamics, Heat and Energy 4. Second law of thermodynamics 5. Thermodynamics potentials
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Kittel C. and Kroemer H. ,Thermal Physics, , 2nd Ed., Freeman and Co. (1994), ISBN 0-. 7167-1088-9. 2. W.Nolting, Grundkurs Theortische Physik, Statistische Physik. 3. Statistical and thermal physics: Fundamentals and applications, M.D. Sturge, , A K Peters Natick, Massachusetts (2003). 4. 2. Essential References; 5. 1. Daniel V. Shroeder, An Introduction to Thermal Physics, Addison-Wesley Publishing Company, San Francisco, CA, 1999, The ISBN is 0-201-38027-7.

Courses designation	Optics
Courses level, if applicable	Bachelor
Code, if applicable	403231
Semester(s) in which the module is taught	3rd Semester - 2nd year
Person responsible for the module.	Dr. / Ahmed El-hadi
Lecturer	Dr. Ahmed El-hadi
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	PH 101, Math 101
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Description of the knowledge to be acquired 2. Learning basic fundamentals in physical optics. 3. Understanding the physics of wave motion, superposition of waves, interference, diffraction, and polarization 4. Improving logical thinking. 5. use high mathematical formulation to describe the physical principle of different physical phenomena

Content	1. Interference 2. Fraunhofer diffraction 3. Diffraction grating 4. Fresnel diffraction 5. polarization
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Fundamentals of optics , by Jenkins \ white 2. Introduction to Classical and Modern Optics By: Jurgen R. Meyer-Arendt. 3. http://www.physicsclassroom.com 4. http://www.learnerstv.com/

Courses designation	**Mathematical methods (1)**
Courses level, if applicable	Bachelor
Code, if applicable	403240
Semester(s) in which the module is taught	3rd Semester - 2nd year
Person responsible for the module.	Dr. Khaled Abdel-Waged
Lecturer	Dr. Khaled Abdel-Waged , Dr.Mohamed Sabry , Dr. Mona b Refaie , Ms. Arwa A. Bukhari
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Math. 102
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Be familiar with the notations of each subject in the course. 2. Show ability to perform partial differentiation for a function of several variables or for a function of a function. 3. Be able to expand functions in power series or in Fourier series. 4. Show ability to decide whether a given series is convergent or divergent. 5. Be familiar with the definitions of even and odd functions and their properties. 2. Be able to recognize the type of a given differential equation and to choose the suitable method for solving it. 3. Be able to deduce the equations for a circle, ellipse, parabola and hyperbola from the general quadratic equation. 4. 8. Be able to write the equations of conic sections in parametric and polar forms.

Content	1. PARTIAL DIFFERENTIATION 2. INFINIT SERIES, POWER SERIES 3. CONIC SECTIONS 4. FOURIER SERIES 5. ORDINARY DIFFERENTIAL EQUATIONS
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points, final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Required Text(s): Mathematical methods in the physical sciences. Third edition, by Mary L. Boas 2. Mathematical Methods for Physicists by G. Arfken 3. Mathematical Methods by M.C. Potter and J. Goldberg. 4. Mathematical Physics by E. Butkov 5. Introduction to Mathematical Physics by N. Laham. 6. www.mpipks-dresden.mpg.de/~jochen/methoden/outline.html 7. People.uncw.edu/hermanr/phy311/mathphysbook/index.html

Courses designation	**Classical Mechanics (1)**
Courses level, if applicable	Bachelor
Code, if applicable	403241
Semester(s) in which the module is taught	3rd Semester - 2nd year
Person responsible for the module.	Dr. Fatma El-Sayed Mahrous
Lecturer	Dr. Abdelrahman , Dr. Fatma El-Sayed Mahrous
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 60 hours
Workload	180 h (60h contact time60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	PH 102 + 102 Math
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Ability to analyse the Vectors, divergence, Curl, Grad, Studied the different coordinate systems. 2. Ability to understand the general equation of motion for the particle in three dimensions. 3. To understand the theoretical treatments of Classical Mechanics. 4. Understand the noninertial reference systems. 2. Knowing the central forces and celestial mechanics. 3. Studying the special relativity and some transformations.

Content	1. Vector Analysis 2. Coordinate Systems 3. General Motion of A Particle in Three Dimensions 4. Non-inertial Reference Systems 5. Central Forces and Celestial Mechanics 6. Special Relativity
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. S. T. Thornton and J. B. Marion, " Classical Daynamic of Particles and System", 4th Edition, Brooks Cole (2003) 2. Ernesto Corinaldesi, "Classical Mechanics for Physics Graduate Students", World Scientific Publishing, (1999) 3. T. W. Kibble and F. H. Berkshire, "Classical Mechanics" World Scientific Publishing, (2004) 4. M. W. McCall, " Classical Mechanics; from Newton to Einstein" 2th edition Wiley (2010) 5. Thornton, Stephen T.; Marion, Jerry B.. Classical Dynamics of Particles and Systems (5th ed.). Brooks Cole. (2003) 2. Kibble, Tom W. B.; Berkshire, Frank H. Classical Mechanics (5th ed.). Imperial College Press. (2004). 3. 7- http://en.wikipedia.org/wiki/Classical_mechanics 4. 8- http://math.ucr.edu/home/baez/classical/

Courses designation	**Measuring Instruments**
Courses level, if applicable	Bachelor
Code, if applicable	403285
Semester(s) in which the module is taught	3rd Semester - 2nd year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 35 hours practical 10 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-121
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Developing important concepts of measurements such as accuracy, precision, sensitivity, response, resolution, and errors. 2. Understanding the operation of different instruments such as ammeter, voltammeter, Ohmmeter and Oscilloscope. 3. Using of the complex quantities to analyse equations of R-C and R-C-L circuits and calculating the impedance, power factor, root-mean- square values of current and voltage. 4. To use mathematical formulation to describe the physical principle or phenomena. 5. Improving logical thinking.

Content	1. Measurement 2. Direct Current Instruments: 3. Ammeters, Voltammeter and Ohmmeter: 4. Potentiometer 5. Oscilloscope 6. Faraday's Law of Inductance 7. Inductance: Inductance 8. Alternating Current
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	Fundamental of Physics by Halliday & Resnick

Courses designation	Statistical thermodynamics
Courses level, if applicable	Bachelor
Code, if applicable	403213
Semester(s) in which the module is taught	4^{th} Semester - 2^{nd} year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-121
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. the ability to understand and apply the principles of statistical mechanics on ensembles of molecules. 2. the ability to understand the association between statistical mechanics and thermodynamics. 3. deep understanding of how intermolecular interaction affects the properties of matter 4. the ability to use statistical mechanical computer programmers to calculate the properties of macroscopic systems.

Content	1. Basics of probability and statistics 2. Partition function of an ideal gas, diatomic gas 3. Micro canonical, canonical and grand canonical statistical ensembles. 4. Fermi-Dirac and Bose-Einstein statistics and applied to free electron theory and Bose-Einstein condensation. 5. Thermodynamics of radiation, blackbody spectrum, Bose-Einstein gases, Bose-Einstein condensation, liquid helium
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Walter Greiner, Ludwig Neise and Horst Stoecker, Thermodynamics and Statistical Mechanics, English edition, translated from the German by Dirk Rischke (Springer, New York, 2000) ISBN 0 387 94299 8. 2. L. D. Landau and E. M. Lifshitz, Statistical Physics, Part I, Landau and Lifshitz 2. Course of Theoretical Physics, Volume 5 (Butterworth-Heinemann, Oxford, 1980) 3rd edition ISBN 0 7506 3372 7. 3. M.D. Sturge, Statistical and Thermal Physics, Fundamentals and Applications (A.K. Peters, Natick, Massachusetts, 2003) ISBN 1-56881-196-9. 4. Herbert B. Callen, Thermodynamics and an Introduction to Thermostatistics (John Wiley & Sons, New York, 1985) ISBN 0-471-86256-8. 5. Charles Kittel and Herbert Kroemer, Thermal Physics (W.H. Freeman, New York 1980) second edition ISBN 0-7167-1088-9. 6. 9. Hill, T. L., An Introduction to Statistical Thermodynamics.

Courses designation	**Mathematical Methods (II)**
Courses level, if applicable	Bachelor
Code, if applicable	403242
Semester(s) in which the module is taught	4^{th} Semester - 2^{nd} year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework*)*
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	PH- 240
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Be familiar with the notations of each subject in the course. 2. Be able to recognize the type of a given differential equation and to choose the suitable method for solving it. 3. Be able to solve differential equation by series method and to compare the solution with other solutions obtained by other methods. 4. Be familiar with some special functions such as Besssel, Legendre. Hermite and Lageure functions. 5. Be familiar with gamma and Beta functions and solve integrals that are related to these functions. 6. Be familiar with some partial differential equations such as Laplace and wave equations 7. Show ability to decide whether a given series is convergent or divergent.

Content	1. Solution of differential equation by series method 2. Gamma and Beta functions 3. Partial differential equations 4. Function of complex variables
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Mathematical methods in the physical sciences. Third edition, by Mary L. Boas 2. Mathematical Methods for Physicists by G. Arfken 3. Mathematical Methods by M.C. Potter and J. Goldberg. 4. Mathematical Physics by E. Butkov 5. Introduction to Mathematical Physics by N. Laham. 6. www.mpipks-dresden.mpg.de/~jochen/methoden/outline.html 7. People.uncw.edu/hermanr/phy311/mathphysbook/index.html

Courses designation	**Classical Mechanics (2)**
Courses level, if applicable	Bachelor
Code, if applicable	403245
Semester(s) in which the module is taught	4^{th} Semester - 2^{nd} year
Person responsible for the module.	Dr. Doaa Abd Allah Said
Lecturer	Dr. Doaa Abd Allah Said Dr. Mongi Sassi Amor Ben Moussa
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-241
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Developing important physical concepts of classical mechanics 2. Understanding mechanics and dynamics of rigid body 3. Deriving equations of motion from the least action principle. 4. Classification of the motion of rigid bodies (Eular classification). 5. To use mathematical formulation to describe the physical principle or phenomena. 6. Improving logical thinking.

Content	1. Dynamics of Systems of Many Particles 2. Mechanics of Rigid Bodies , Planar Motion 3. -Motion of Rigid Bodies in Three Dimensions 4. Lagrange Mechanics
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Analytical Mechanics. G.R. Fowles 2. Classical Mechanics. T.W.B. Kibble and F. H. Berkshire. 3. Classical Dynamics of particle and system J, Marion and T. Thoronton 4. http://academicearth.org/lectures/modern-physics-classical-mechanics-2

Courses designation	**ATOMIC PHYSICS**
Courses level, if applicable	Bachelor
Code, if applicable	403253
Semester(s) in which the module is taught	4th Semester - 2nd year
Person responsible for the module.	**Dr.**Abdelmajid Amor Ali TIMOUMI
Lecturer	**Dr.**Abdelmajid Amor Ali TIMOUMI
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60 h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-231 , Ph-240
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1-Solve problems on the theory of relativity, quantum theory and elementary quantum mechanics. 2- Identify the recent technological advances that have allowed careful and precise experiments and have stimulated new interest in the field. 3- Summarize the experimental findings that ultimately led to broad acceptance of energy quantization. 4- Validate de Broglie hypothesis and experiments. 5- Apply the concepts of the theory of relativity and quantum theory in our life practice. 6- Introduce Schrödinger equation and the standard one-dimensional examples- infinite and finite square wells, barrier penetration, and the harmonic oscillator.

Content	1. THE SPATIAL THEORY OF THE RELATIVITY 2. BLACK BODY RADIATION 3. PARTICLE PROPERTIES OF WAVES 4. WAVE PROPERTIES OF PARTICLES 5. ATOMIC STRUCTURE 6. Energy levels and spectra
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. 1-Frank J. Blatt, Modern Physics. International Edition 1992 by McGraw –Hill Book Co. 2. 2- Arthur Beiser, Concepts of Modern Physics (5th Ed.), 2000, by McGraw-Hill, Inc

Courses designation	**Electromagnetism (1)**
Courses level, if applicable	Bachelor
Code, if applicable	403332
Semester(s) in which the module is taught	5th Semester - 3rd year
Person responsible for the module.	Dr. Roshdi Seoudi
Lecturer	Dr. Roshdi Seoudi , Dr. Mongi Sassi Dr Mohamed BOUSTIMI , Dr. Mongi Sassi
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph 221 + 246 Ph
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Learning fundamentals in electromagnetic theory 2. Understanding the physics of electromagnetism and their applications . 3. 3.Improving logical thinking. 4. To use mathematical formulation to describe the physical principle or phenomena 5. Ability to explain how things work.

Content	1. Electrostatics 2. Solution of the Electrostatic Problem 3. The Electrostatic Field in Dielectric Media 4. ELECTROSTATIC ENERGY 5. ELECTRIC CURRENT
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Electromagnetism Principles and Applications by Paul Lorrain and Dale R. CorsonPhysics for scientists and engineering by Serway 7Th edition3] Physics by : Halliday, D and Resnick, Krane 2. Physics for student of science and Engineering by A.L.Stanford and J.M. Tanner . 3. . http://www.physicsclassroom.com 4. http://www.eskimo.com 5. http://ocw.mit.edu/OcwWeb/Physics/8-02Electricity-and-Magnetism/VideoLectures/index.htm

Courses designation	Quantum Mechanics (1)
Courses level, if applicable	Bachelor
Code, if applicable	403371
Semester(s) in which the module is taught	5th Semester - 3rd year
Person responsible for the module.	Dr. Fahad Abdullah Alhashmi
Lecturer	Dr. Fahad Abdullah Alhashmi , Dr. Nuha Felemban Dr. Abdelrahman , Dr. Fatma El-Sayed Mahrous
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 60 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	242 PH+252 PH
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. are expected to come equipped with basic mathematical skills that will be crucial throughout the course, such as complex numbers and functions, simple differential equations, gaussian integrals, basic linear algebra. Some of the most important math will be refreshed during the first week of the course. 2. Be able to independently solve the Schrödinger equation for simple one-dimensional systems -- the ones explicitly taught (e.g. square well, harmonic oscillator, potential barrier), as well as similar, new ones. Use the solution to compute probabilities, expectation values, uncertainties, time evolution. 3. Give concise physical interpretations and discussions of the mathematical solutions. 4. Similarly, solve simple problems in two and three dimensions in various coordinate systems, e.g. by using separation of variables in the Schrödinger equation

Content	1. Math Review 2. The development of the quantum theory 3. The Schrodinger Wave Equation 4. Eigenfunctions and Eigenvalues 5. One Dimensional potential 6. The General Structure of Quantum 7. The Schrodinger Equation in Three Dimensions 8. Angular Momentum 9. The Hydrogen Atom
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Quantum Physics By: Gasiorowicez 2. Introduction to Quantum By: Dicke & Wittke 3. Richard L. Liboff. Introductory Quantum Mechanics 4. M. Horbatsch, Quantum Mechanics Using Maple, Springer Publishing, (NY), 1995. 5. R.P.Feynman, R. B. Leighton and M. Sands, The Feynman Lectures on Physics, California Institute of Technology, 1966, VIII. 6. R. Shankar, Principles of Quantum Mechanics, Plenum, 1994.

Courses designation	**Solid State Physics I**
Courses level, if applicable	Bachelor
Code, if applicable	403371
Semester(s) in which the module is taught	5th Semester - 3rd year
Person responsible for the module.	Dr. MEHREZ LOULOU
Lecturer	Dr. MEHREZ LOULOU
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time, 38 h private study, 37h homework)
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	PH-344
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Understanding the origin and types of binding in material. 2- Learning fundamentals of crystallography and crystal defects. 3- Improving logical thinking. 4- To use mathematical formulation to describe the physical principle or phenomena. 5- Ability to explain the structure of simple crystals. 6- Learning theory and applications of the solid state. 7- Methods of measurement and assessment of properties of solids

Content	1- The atomic Theory and Binding Forces 2- Crystalline Structure 3- Crystals Properties 4- Structural Defects in Crystals 5- X-Rays Diffraction in Crystals 6- Lattice Vibrations
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. C.Kittel / Introduction to Solid State Physics. 7th. dition 2. Walter A. Harrison/ Solid State Theory , Dover edition 1979 3.http://www.phys.lsu.edu/~jarrell/COURSES/SOLID_STATE_HTML/course_solid.html 4 http://www.encyclopedia.com/topic/solid-state_physics.aspx

Courses designation	**Theoretical Methods of Physics (3)**
Courses level, if applicable	Bachelor
Code, if applicable	403346
Semester(s) in which the module is taught	5^{th} Semester - 3^{rd} year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 30 hours
Workload	90 h (30h contact time,30 h private study,30h homework)
Credit points	2 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph 242 for Ph 346
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Learning fundamentals of Mathematical Physics 2. Understand how to use mathematics as a tool for physics 3. Ability to solve Physical problems 4. Improving the logical thinking

Content	1- PARTIAL DIFFERENTIAL EQUATIONS 2- INTEGRAL TRANSFORM 3- FUNCTION OF A COMPLEX VARIABLE
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. C.Kittel / Introduction to Solid State Physics. 7th. dition 2. Walter A. Harrison/ Solid State Theory , Dover edition 1979 3.http://www.phys.lsu.edu/~jarrell/COURSES/SOLID_STATE_HTML/course_solid.html 4 http://www.encyclopedia.com/topic/solid-state_physics.aspx

Courses designation	**Electromagnetism II**
Courses level, if applicable	Bachelor
Code, if applicable	Phys – 342
Semester(s) in which the module is taught	6th Semester - 3rd year
Person responsible for the module.	Dr. Said Mohamed Attia
Lecturer	Dr. Said Mohamed Attia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework*)*
Credit points	3 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph -332
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Ability to analyse the observed electromagnetic field intensity 3- Ability to understand the functioning of electro-magnetic devices 4- To understand the theoretical treatments of electromagnetic problems 5- Ask the student to do small research1- Learning fundamentals of Mathematical Physics 2- Understand how to use mathematics as a tool for physics 3- Ability to solve Physical problems 4- Improving the logical thinking

Content	1- The Magnetic Field of Steady Current 2- The Electromagnetic Induction 3- Magnetic Properties of Matter 4- Microscopic Theory of Magnetic Properties of Matter 5- Magnetic Energy 6- Maxwell's Equation's and Electromagnetic Waves
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1. Foundations of Electromagnetic Theory by John R. Reitz, Frederick J. Milford, Robert W. Christy, Addison Wesley 2008 2. George E. Owen, Introduction to Electromagnetic Theory, Dover Publications, Inc., Mineola, New York, 2003. 3. John David Jackson, Classical Electrodynamics, Third Edition, John Wiley & Sons, New York, 1999 4. W.N. Cottingham and D.A. Greenwood, Electricity and Magnetism, Cambridge University Press, Cambridge, 1991. 5. Journal of Electromagnetic Waves and Applications 6. http://en.wikipedia.org/wiki/Electromagnetism 7. http://www.dmoz.org/Science/Physics/Electromagnetism/

Courses designation	Nuclear Physics I
Courses level, if applicable	Bachelor
Code, if applicable	403361
Semester(s) in which the module is taught	6^{th} Semester – 3^{rd} year
Person responsible for the module.	Dr. zinab matar
Lecturer	Dr.Adel Madani , Dr. zinab matar , Dr.Fatma El-Sayed
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60 h private study, 60h homework)
Credit points	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph- 253+ Ph-344
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. use physical laws and principles to understand the subject 2. simplify problems and analyze phenomena 3. Analyse and explain natural phenomena. 4. Ability to explain the idea with the student own words. 5. Represent the problems mathematically.

Content	1- Nuclear Properties 2- Liquid Drop Model 3- Nuclear Shell Model 4- Gamma Transitions 5- Alpha Transitions 6- Beta Transitions 7- Elementary Particles
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	[1] Introductory Nuclear Physics, Krene, 1987.

Courses designation	Quantum Mechanics 2
Courses level, if applicable	Bachelor
Code, if applicable	403345
Semester(s) in which the module is taught	6^{th} Semester – 3^{rd} year
Person responsible for the module.	Dr. Fatma El-Sayed
Lecturer	Dr. Fatma El-Sayed, Dr. Abdel Rahman Lashin
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-344
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1. Learning fundamentals in quantum mechanics theory 2. Understanding the quantum physics precisely the approach methods to solve Schrodinger equation such as perturbations and JWKB 3. Understanding the notion of spin and its usefulness in matter 4. Improving logical thinking. 5. To use mathematical formulation to describe the physical principle or phenomena 6. Ability to explain how things work

Content	1- OPERATOR METHODS IN QUANTUM MECHANICS 2- INTERACTION OF ELECTRONS WITH ELECTROMAGNETIC FIELD 3- OPERATORS MATRICES & SPIN 4- THE ADDITION OF ANGULAR MOMENTA 5- TIME INDEPENDENT PERTURBATION THEORY 6- THE HELIUM ATOM 7- TIME DEPENDANT PERTURBATION THEORY 8- THE WKB APPROXIMATION
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1-Quantum Physics by Gasiorowicz; A Wiley International Edition 2-Introduction to quantum Mechanics (second edition) 3-http://www.physicsclassroom.com 4-http://www.eskimo.com

Courses designation	Workshop
Courses level, if applicable	Bachelor
Code, if applicable	403382
Semester(s) in which the module is taught	6th Semester - 3rd year
Person responsible for the module.	
Lecturer	Dr.Hanan Amer Dr. El hussieny Eltaher Mahdy Mohamed
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 20 hours practical 10 hours
Workload	90 h (30h contact time,30 h private study,30h homework)
Credit points	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph- 242
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Learning fundamentals in engineering and industrial drawing: 2- Acquire the basic engineering experience of practice in the field of engineering drawing. 3- Abel to use the engineering drawing experience in different artistic field. 4- Improving logical thinking. 5- To use mathematical formulation to describe the physical principle or phenomena 6- Ability to explain how things work.

Content	1- ENGINEERING AND INDUSTRIAL DRAWING 2- DEFINATIONSFIELD 3- OPERATORS MATRICES & SPIN 4- APPLICATIONS ON THE USE OF ENGINEERING TOOLS AND GUIDELINES 5- Applications 6- SECOND: INDUSTRIAL DRAWING 7- APPLICATIONS ON PROJECTION 8- INTERSECTIONS 9- APPLICATIONS ON INTERSECTION
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Geometric and Engineering Drawing by K . MORLING 3Th edition 2- Engineering Drawing for Manufacture, by B.Griffiths 1st Edition 3- Engineering Drawing, b y M.B.Shah and B.C.Ranas 1st Edition

Courses designation	COMPUTER
Courses level, if applicable	Bachelor
Code, if applicable	403383
Semester(s) in which the module is taught	6th Semester - 3rd year
Person responsible for the module.	Dr.Mohamed Sabry
Lecturer	Dr.Mohamed Sabry , Ms. Arwa A. Bukhari
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 20 hours practical 10 hours
Workload	90 h (30h contact time,30 h private study,30h homework)
Credit points	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph- 102 +140 Math
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Ability to think critically and analytically in computing 2- Ability to interpret of oriented problems, whether graphically or algebraically using the computer program

Content	1- Introduction to computers + computers 2- Computer languages/ 3- Operating system in personal computers (DOS) 4- Virus 5- Flow charts 6- Physical application 7- Microsoft Windows 3.1 +Microsoft Arabic Word
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Fortran 77 with scientific and engineering application. Dr. Awad Mansour, 2- Windows 3.1 and MS-DOS 6.2 by Majdi Mohammed abou alaata 3-Windows 3.1 and MS-DOS 6.2 by Majdi Mohammed abou alaata Fortran 77 with scientific and engineering application. Dr. Awad Mansour

Courses designation	**Electronics**
Courses level, if applicable	Bachelor
Code, if applicable	403423
Semester(s) in which the module is taught	7th Semester - 4th year
Person responsible for the module.	Ms. Samar Alsolamy
Lecturer	Dr. Adel Madani, Dr.Yosry Mohamad , Ms. Samar Alsolamy
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 50 hours practical 10 hours
Workload	180 h (60h contact time, 60h private study, 60h homework)
Credit points	4Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph 246 + Ph 285
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Learning fundamentals in electronics and electronic elements 2- Understanding the physics of electronics and their applications mentioned in the text. 3- Improving logical thinking. 4- Ability to understand and design simple electronic circuits 5- Ability to explain how things work. 6- Teaching strategies to be used to develop that

Content	1- CONDUCTION MECHANISM IN SEMICONDUCTORS 2- DISTRIBUTION AND FLOW OF CARRIERS IN SEMICONDUCTOR 3- JUNCTION DIODE PHYSICAL ELECTRONICS 4- BIPOLAR JUNCTION TRANSISTORS 5- FIELD-EFFECT TRANSISTORS 6- Operational amplifiers 7- DIGITAL ELECTRONICS
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), Laboratory work (20 points), final exam (40 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Physics by Experiment , by J.R.L Hartley; D.L. Misell; Pob. 2- http://www.physicsclassroom.com 3- http://www.electronicstheory.com/ 4- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

Courses designation	**Radiation physics**
Courses level, if applicable	Bachelor
Code, if applicable	403462
Semester(s) in which the module is taught	7^{th} Semester - 4^{th} year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph- 361
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Understanding the physics of radiation and their applications 2- Improving logical thinking. 3- To use mathematical formulation to describe the physical principle or phenomena 4-Ability to explain how things work.

Content	1- Fundamental Sciences 2- Interaction of radiation with matter 3- Gamma ray emission 4- Radiation quantities and units 5- Exposure
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Michael G. Stabin" Radiation Protection and Dosimetry" 2007.Ch5. p-p, 67-74 2- Herman Cember " Introduction to Health Physics" 1983, 2003, 2009.Ch6. p-p, 135-142.,Ch.10-p. 529. 3- http://www.IAEA.com 4- http://ICRP.com 5- http://NCRP..com 6- http://ICRU.com 7- http://UNSCAR.com 8- http://ANSI.com 9- http://FWO.com 10- http://WHO.com

Courses designation	**Semiconductor**
Courses level, if applicable	Bachelor
Code, if applicable	403471
Semester(s) in which the module is taught	7th Semester - 4th year
Person responsible for the module.	
Lecturer	Ms. Arwa A. Bukhari
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework*)*
Credit points	3Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph- 371
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- Learning fundamentals in different types of conduction 2- Understanding the physics of semiconductors and their applications mentioned in the text. 3- Improving logical thinking. 4- Ability to understand and design simple semiconductor-based elements 5- Ability to explain how things work.

Content	1- THE ELEMENTARY PROPERTIES OF SEMICONDUCTORS 2- ENERGY LEVELS IN CRYSTALLINE SOLIDS 3- IMPURITIES AND IMPERFECTIONS IN CRYSTALS 4-CARRIER CONCENTRATIONS IN THERMAL EQUILIBRIUM 5- ELECTRON TRANSPORT PHENOMENA 6-THERMAL EFFECTS IN SEMICONDUCTORS 7-DIFFUSION OF ELECTRONS AND POSITIVE HOLES 8-SCATTERING OF ELECTRONS AND HOLES 9-RECOMBINATION OF ELECTRONS AND HOLES
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Semiconductors by Smith 2- Physics of Semiconductors by Sze. 3- http://www.physicsclassroom.com 4- http://www.electronicstheory.com/ 5- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

Courses designation	Nuclear physics 2
Courses level, if applicable	Bachelor
Code, if applicable	403461
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	Dr.zinab matar
Lecturer	Dr.El hussieny Eltaher , Dr.zinab matar
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45h contact time,45 h private study,45 h homework)
Credit points	3Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph 361 , Ph 362
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- The fundamental knowledge of nuclear theory. 2- Understanding the physics of nuclei and forces acting between nuclear particles. 3- Improving logical thinking. 4- To use mathematical formulation to describe the physical principle or phenomena 5- Knowledge of Nuclear Magnetic Resonance phenomena and its applications. 6- Knowledge of production of nuclear energy and its uses.

Content	1- Deuteron 2- NUCLEON –NUCLEON SCATTERING 3- NUCLEAR MOMENTS 4- NUCLEAR MODELS 5- NUCLEAR REACTIONS 6- NUCLEAR ENERGY
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Introduction of Nuclear Physics by A Enge 2- Introductory Nuclear Physics by KS Krane 3- Introductory Atomic and Nuclear Physics by Harvey E White 4- http://www.physicsclassroom.com/ 5- http://www.eskimo.com/

Courses designation	Nuclear Technology
Courses level, if applicable	Bachelor
Code, if applicable	403463
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	Dr.El hussieny Eltaher
Lecturer	Dr.El hussieny Eltaher
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 30 hours
Workload	90 h (30h contact time,30 h private study,30h homework)
Credit points	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph 361, Ph 362
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- The fundamental knowledge of nuclear theory. 2- Knowledge of production of nuclear energy and its uses. 3- Understanding the physics of fission and fusion reactions. 4- Importance of controlled chain reaction. 5- Knowledge of disasters of un-controlled chain reactions. 6- To use mathematical formulation to describe the physical principle or phenomena. 7- Ability to explain how things work.

Content	1- FISSION REACTORS 2- FUSION REACTORS 3- ACCELERATORS
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Introduction of Nuclear Physics by A Enge 2- Introductory Nuclear Physics by KS Krane 3- Introductory Atomic and Nuclear Physics by Harvey E White 4- Plasma Physics by Cheu 5- Nuclear Physics by Irving 6- http://www.physicsclassroom.com 7- http://www.eskimo.com

Courses designation	Solid State Physics II
Courses level, if applicable	Bachelor
Code, if applicable	403472
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	Dr.Yosry Mohamad
Lecturer	Dr.Yosry Mohamad
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 30 hours
Workload	90 h (30h contact time,30 h private study,30h homework)
Credit points	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	Ph-471
Courses objectives/intended learning outcomes	At the end of the course, the students should: 1- knowledge that students should know and understand when they complete the course are as follow: 2- Learning fundamentals in electron gas theory 3- Understanding the physics of solid properties and their applications. 4- Improving logical thinking. 5- To use mathematical formulation to describe the physical principle or phenomena 6- Ability to explain how physical properties work in solids. 7- Learning theory and applications of the solid state. 8- Methods of measurement and assessment of properties of solids

Content	1- Superconducting Properties of Solids 2- X-Rays Diffraction in Crystals 3- Free Electron Theory in Metals 4- Thermal Properties of Crystal Lattice 5- Energy Band Theory in Solids 6- Dielectric Properties of Solids 7- Magnetic Properties of Solids 8- The Semiconductors: Theory and Application
Study and examination requirements and forms of examination	Tow Midterm exam (20 points) , In class problem solving (10 points), Homework every week (10 points), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- C.Kittel / Introduction to Solid State Physics. 7th. dition 2- Walter A. Harrison/ Solid State Theory , Dover edition 1979 3- http://www.phys.lsu.edu/~jarrell/COURSES/SOLID_STATE_HTML/course_solid.html 4- http://www.encyclopedia.com/topic/solid-state_physics.aspx 5- http://www.physics.byu.edu/research/condensed 6- http://web.utk.edu/~tbarnes/website/cm/cm.html