Preparatory Year			
Course Code	Course Name	Credit points	Workload
4800140		4	180
4800150		2	90
4800170		6	270
4800130	General Physics 1	4	180
4800141		4	180
4800104		3	135
4800153		3	135
4800171		4	180
Total :		30	1350
percentage		(30/132)*100 = 22.7%	

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
Total		21	945
percentage		(21/132)*100 = 15.91%	

College requisite			
Course Code	Course Name	Credit points	Workload
404231	مبادئ الاحصاء	3	135
402101	General Chemistry 1	4	180
Total		7	315
percentage		(7/132)*100 =5.3%	

Department requisite			
Course Code	Course Name	Credit points	Workload
403200	Traditional Physics	4	180
403220	Classical Mechanics (1)	3	135
403321	Classical Mechanics (2)	3	135
403380	Introduction to computing physics	3	135
403201	Electromagnetism(1)	3	135
403331	Electromagnetism(2)	3	135
403350	Modern physics	4	180
403460	Nuclear Physics	4	180
403232	Optics	4	180
403344	Quantum Mechanics (1	3	135
403345	Quantum Mechanics(2)	3	135
403370	Solid State Physics 1	3	135
403211	Statistical Thermodynamics	3	135
403210	Thermodynamics	2	90
403243	Methods in theoretical physics (1)	2	90
403244	Methods in theoretical physics2	3	135
403343	Methods in theoretical physics (3)	3	135

Department requisite			
Course Code	**Course Name**	**Credit points**	**Workload**
403434	Advanced Optics 1	2	90
403435	Advanced Optics 2	2	90
403473	Electronics	4	180
403471	Semiconductor Physics	2	90
403472	Solid State Physics 2	2	90
403475	Introduction to material science	2	90
403477	Physics of nano	2	90
403476	physics of polymer	2	90
403466	Introduction to elementary particle physics	2	90
403463	Nuclear Models	2	90
403464	Nuclear reactions	2	90
403465	Nuclear Technology	2	90
403446	Quantum Mechanics (3)	2	90
403462	Radiation Physics	3	135
403499	Project	2	90
Total			
percentage			

Preparatory Year

1th Semester			2ND Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
4800140-4	**General Physics 1**	-	4800141-4		**404101+403101**
4800150-2	**General Chemistry 1**	-	4800104-3		**404101+403101**
4800170-6	**English Language**	-	4800153-3		**404101**
4800130-4	**General Physics 1**	-	4800171-4		**404101**
Total : 16			**Total : 14**		

2nd year

3th Semester			4th Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
403200-4	Traditional Physics	4800130	403244-3	Methods in theoretical physics (2)	403243
403243-2	Methods in theoretical physics (1)	4800141	403220-3	Classical Mechanics (1)	403243
403210-2	Thermodynamics	4800141	403211-3	Statistical Thermodynamics	403210
605101-2	Holly Quran1	-	403232-4	Optics	4800141
601101-2	Islamic Culture 1	-	6051201-2	Holly Quran2	705101
402101-4	General Chemistry 1	-			
404231-3	احصاء	**4800141**			
Total : 19			**Total : 15**		

3th year

5th Semester			6th Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
403343-3	Methods in theoretical physics (3)	403244	403345-3	Quantum Mechanics 2	**403244**
403344-3	Quantum Mechanics 1	403244	403370-3	Solid State Physics 1	**403244**
403350-4	Modern physics	403243	403331-3	Electromagnetism(2)	**403201**
403321-3	Classical Mechanics 2	403220	403380-3	Introduction to computing physics	**403381**
403201-3	Electromagnetism(1)	403200	102101-2	Alsera Alnabaweia	-
605301-2	Quran 3	605201	403350	Modern physics	403243
501101-2	Arabic Language	-	601201-2	Islamic Culture 2	601101
Total : 20			**Total :16**		

4th year

7th Semester			8th Semester		
Course Code	**Course Name**	**Prerequisite**	**Course Code**	**Course name**	**Prerequisite**
403434-2	Advanced Optics 1	403232	403435-2	Advanced Optics 2	403434
403460-4	Nuclear Physics	403345	403472-2	Solid State Physics 2	403370
			403464-2	Nuclear reactions	403446
403473-4	Electronics	403370	403466-2	Introduction to elementary particle physics	403446
403471-2	Semiconductor Physics	403370	403477-2	Physics of nano	403472
			403476-2	physics of polymer	403472
			403475-2	Introduction to material science	403472
403446-2	Quantum Mechanics3	403345	403463-2	Nuclear Models	403446
605401-2	Holly Quran4	605301	403465-2	Nuclear Technology	403460
601301-3	Islamic Culture 3	60120	403499-2	Project	-
Total : 21			403462-3	Radiation Physics	403460
			601401-2	Islamic Culture 4	601301
			Total : 25		

1st year " Preparatory Year "			
Credit points	Workload		
4	180		
2	90		
6	180		
4	180		
16	720		
4	180		
3	135		
3	135		
4	180		
14	630		
2nd year			
4	180		
2	90		
2	90		
2	90		
2	90		
2	90		
3	135		
17	765		
3	135		
3	135		
3	135		
4	180		
2	90		
15	675		

3th year			
Credit points	**Workload**		
3	**135**		
3	**135**		
4	**180**		
3	**135**		
3	**135**		
2	**90**		
2	**90**		
20	**900**		
3	**135**		
3	**135**		
3	**135**		
3	**135**		
2	**90**		
2	**90**		
16	**720**		
4th year			
2	**90**		
4	**180**		
4	**180**		
2	**90**		
2	**90**		
2	**90**		
3	**135**		
19	**855**		
2	90		
2	90		
2	90		

2	90		
2	90		
2	90		
2	90		
2	90		
2	90		
2	90		
3	135		
25	1125		
132	5940		

Courses designation	Traditional Physics
Courses level, if applicable	Bachelor
Code, if applicable	403200
Semester(s) in which the module is taught	3rd Semester - 2nd 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	4800130
Courses objectives/intended learning outcomes	

Content	1- Linear Momentum and Collision 2- Rotational Kinematics 3- Rotational Dynamics and Static Equilibrium. 4- Oscillations about Equilibrium. 5- Elictric charges, forces, and Fields 6- Electric Potential and Electric Potential Energy 7- Electric Current and Direct Current Circuits 8- Magnetism: Magnetic Field, Magnetic force on moving charges, current – carrying wire, Amperes' law. 9- magnetic Flux and Faraday's law of Induction.
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. D. Halliday, R. Resnick and K. Krane, 4th edition, John Wiley and Sons, (1992) 2. Physics, James S. Walker,5th Edition, Addison – Wesley, 2010

Courses designation	Methods in theoretical physics (1)
Courses level, if applicable	Bachelor
Code, if applicable	403243
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 , Dr. Arwa A. Bukhari
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	4800141
Courses objectives/intended learning outcomes	

Content	1. Vector analysis 2. Curvilinear coordinates 3. Infinite series, Power series 4. Partial differentiation 5. Ordinary differential equations of the first order: 6. Second order linear 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- Mary L. Boas, Mathematical methods in the Physical sciences, second edition, John Wiley and Sons (1966) and (1983). 2- G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912. 3- Eugene Butkov, Mathematical Physics, World student series edition (1973).

Courses designation	Thermodynamics
Courses level, if applicable	Bachelor
Code, if applicable	403210
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 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	4800141
Courses objectives/intended learning outcomes	

Content	1. Thermal properties of matter 2. Thermodynamics properties 3. First law of thermodynamics, Heat and Energy 4. Second law of thermodynamics 5. Entropy and third law of thermodynamics 6. 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- Daniel V. Shroeder, An Introduction to Thermal Physics, Addison-Wesley Publishing Company, San Francisco, CA, 1999, The ISBN is 0-201-38027-7. 2- Blundell S.J / Blundell K.M., Concepts in Thermal Physics, Oxford University Press, ISBN 978-0-19-856770-7. 3- Kittel C. and Kroemer H. ,Thermal Physics, , 2nd Ed., Freeman and Co. (1994), ISBN 0-. 7167-1088-9. 4- Statistical and thermal physics: Fundamentals and applications, M.D. Sturge, , A K Peters Natick, Massachusetts (2003). 5- Sturge M.D., Statistical and Thermal Physics, Fundamentals and Applications

Courses designation	Optics
Courses level, if applicable	Bachelor
Code, if applicable	403232
Semester(s) in which the module is taught	4th 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	4800141
Courses objectives/intended learning outcomes	

Content	1. Introduction: Reflection and Refraction 2. Wave Optics: Harmonic Wave Motion 3. Interference 4. Diffraction 5. Polarization of light
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- Introduction to Classical and Modern Optics, by Jurgen R. Meyer-Arendt, Prentice –hall international, INC., 19722-Foundation of Optics, Francis A. Jenkins and Harvey E. White, 4th Edt., McGraw-Hill, 19763-Eugen Hecht, Optics, 4th edition (2002), Publisher: Addison Wesley.

Courses designation	**Mathematical methods (2)**
Courses level, if applicable	Bachelor
Code, if applicable	403244
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	403243
Courses objectives/intended learning outcomes	

Content	1. Gamma, Beta and Error functions 2. Differential equations of the special functions 3. Fourier series 4. Fourier transform 5. Dirac Delta function
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. Mary L. Boas, Mathematical methods in the Physical sciences, second edition, John Wiley and Sons (1966) and (1983). 2. George Arfken, Mathematical Methods for physicists, second edition, Academic press (1970). 3. Eugene Butkov, Mathematical Physics, World student series edition (1973). 4. G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912

Courses designation	**Classical Mechanics (1)**
Courses level, if applicable	Bachelor
Code, if applicable	403241
Semester(s) in which the module is taught	4^{th} Semester - 2^{nd} 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 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	403243
Courses objectives/intended learning outcomes	

Content	**1-** Fundamental concepts of dynamics: **2-** Newtonian Mechanics: Rectilinear motion of a particles **3-** General motion of a particle in three dimensions **4-** Noninertial reference systems **5-** Central forces and celestial 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- G. Fowels and G. L. Cassiday, Analytical Mechanics, 7th ed., Brooks Cole, (2004). ISBN-10:0534494927; ISBN-13:978-0534494926 2- K. Symon, Mechanics, 3rd ed., Addison-Wesley. (1971). ISBN 0-201-07392-7 3- W. Greiner, Classical Mechanics, Point particles and relativity, Springer (2004) or latest. ISBN 0-387-95586-0 4- W. Greiner, Classical Mechanics, System of particles and Hamiltonian dynamics, Springer (2003) or latest. ISBN 0-387-95128-8

Courses designation	Statistical Thermodynamics
Courses level, if applicable	Bachelor
Code, if applicable	403211
Semester(s) in which the module is taught	4th Semester - 2nd 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	403210
Courses objectives/intended learning outcomes	

Content	1. Fundamental concepts 2. The three statistics and its distribution functions 3. The partition function 4. Applications of statistics to gases 5. Applications of quantum statistics to other systems
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. Francis W. Sears and Gerhard L. Salinger, Thermodynamics, Kinetic theory, and statistical thermodynamics, 3rd edition, 2. Fundamentals of Statistical and Thermal Physics, by R. Reif, (2008) 3. Statistical Physics, 2nd Edition (printed 2002), by Franz Mandl.

Courses designation	Methods in theoretical physics (3)
Courses level, if applicable	Bachelor
Code, if applicable	403343
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 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	403244
Courses objectives/intended learning outcomes	

Content	1- Partial differential equations 2- Laplace transforms 3- Green's functions 4- Functions of a complex variable 5- Introduction to tensor analysis
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- Mary L. Boas, Mathematical methods in the Physical sciences, second edition, John Wiley and Sons (1966) and (1983). 2- George Arfken, Mathematical Methods for physicists, second edition, Academic press (1970). 3- Eugene Butkov, Mathematical Physics, World student series edition (1973). 4- G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912.

Courses designation	Quantum Mechanics 1
Courses level, if applicable	Bachelor
Code, if applicable	403344
Semester(s) in which the module is taught	5^{th} Semester - – 3^{rd} 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 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	403244
Courses objectives/intended learning outcomes	

Content	1. Wave-Particle Duality and Uncertainty 2. The Schrödinger Equation 3. Unbound Particles 4. Bound Particles 5. Operator Method 6. Quantum Mechanics in Three Dimensions 7. Spin
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. Griffiths, David J. Introduction to Quantum Mechanics. 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004. 2. Sakurai, J. J. Modern Quantum Mechanics. Revised Edition. Reading, MA: Addison-Wesley; 1994.

Courses designation	Classical Mechanics (2)
Courses level, if applicable	Bachelor
Code, if applicable	403321
Semester(s) in which the module is taught	5^{th} Semester - – 3^{rd} 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	403220
Courses objectives/intended learning outcomes	

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- G. Fowels and G. L. Cassiday, Analytical Mechanics, 7th ed., Brooks Cole, (2004). ISBN-10:0534494927; ISBN-13:978-0534494926 2- K. Symon, Mechanics, 3rd ed., Addison-Wesley. (1971). ISBN 0-201-07392-7 3- W. Greiner, Classical Mechanics, Point particles and relativity, Springer (2004) or latest. ISBN 0-387-95586-0 4- W. Greiner, Classical Mechanics, System of particles and Hamiltonian dynamics, Springer (2003) or latest. ISBN 0-387-95128-8

Courses designation	Modern physics
Courses level, if applicable	Bachelor
Code, if applicable	403350
Semester(s) in which the module is taught	5th Semester - – 3rd year
Person responsible for the module.	**Dr.**Abdelmajid Amor Ali TIMOUMI
Lecturer	**Dr.**Abdelmajid TIMOUMI, , Dr. Fatma El-Sayed **Dr. Afaf Maweed**
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	403243
Courses objectives/intended learning outcomes	

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- Jeremy Bernstein, Paul Fishbane and Stephen Gasiorowicz , Modern Physics, Hardback (2000). 2- Randy Harris, Modern Physics (2nd Edition), International Edition 3- A. Beiser (2003). Concepts of Modern Physics (6th ed.). McGraw-Hill.

Courses designation	**Electromagnetism (1)**
Courses level, if applicable	Bachelor
Code, if applicable	403201
Semester(s) in which the module is taught	5^{th} Semester - – 3^{rd} 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	403200
Courses objectives/intended learning outcomes	

Content	1. Electric multipoles 2. Boundary conditions at a surface of discontinuity 3. Electrostatics in the presence of matter 4. Special methods in electrostatics 5. Magnetic energy 6. Magnetic multipoles 7. Magnetism in the presence of matter
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- John David Jackson, Classical electrodynamics , 3rd edition, John Wiley and Sons, INC, ISBN 0471-30932-X. 2- David J. Griffiths, Introduction to Electrodynamics (3rd Edition) (1999), ISBN 013-805326-X

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. Abdelrahman , Dr. Fatma El-Sayed Mahrous
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (60h 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	403344
Courses objectives/intended learning outcomes	

Content	1- Review of Quantum Physics 2- Motion of charged particle in electromagnetic field 3- Time-independent perturbation theory 4- Time-dependent perturbation theory 5- Elements of scattering theory
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. 1- Griffiths, David J. Introduction to Quantum Mechanics. 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004. 2. 2- Sakurai, J. J. Modern Quantum Mechanics. Reading, MA: Addison-Wesley Pub., 1994. 3. 3- Quantum Physics, Gasiorowicz S (3rd ed. Hoboken, NJ: Wiley, 2003. 4. 4- Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles. Eisberg, Robert Martin, and Robert Resnick. New York, NY: Wiley, 1974. 5. 5- Feynman, R. P. Feynman Lectures On Physics. Vol. 3. Reading, MA: Addison Wesley Longman, 1970. 6. 6- Cohen-Tannoudji, Claude. Quantum Mechanics. 2 vols. New York, NY: Wiley, 1977.

Courses designation	Solid State Physics I
Courses level, if applicable	Bachelor
Code, if applicable	403370
Semester(s) in which the module is taught	6^{th} Semester - 3^{rd} 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	403344
Courses objectives/intended learning outcomes	

Content	1- Crystalline Structure 2- Crystals Properties 3- Crystal Diffraction 4- Defects in Crystals 5- Lattice Vibrations and Some Thermal Properties 6- Free Electrons in Metals 7- Band Theory in Solids
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-**Charles Kittel, Introduction to Solid State Physics 8th Ed , 2005, John Wiley & sons. 2-Introduction to Solid State Physics, H.P. Myers, 2nd Ed, 2009 Taylor & Francis.

Courses designation	Introduction to computing physics
Courses level, if applicable	Bachelor
Code, if applicable	403380
Semester(s) in which the module is taught	6th Semester - 3rd year
Person responsible for the module.	
Lecturer	
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture 45 hours
Workload	135 h (45 h 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	403344
Courses objectives/intended learning outcomes	

Content	1- Introduction to Fortran 90/95 2- Numerical Analysis 3- Fortran Libraries 5-Monte Carlo Simulation Methods
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- Stephen J. Chapman, Fortran 90/95 for scientists and engineering, First edition, MacGraw-Hill Companies, Inc. (1998), ISBN 0-07-011938-4 2- Harvey Gould and Jan Tobochnik, An introduction to computer simulation methods, Applications to Physical Systems, Part1 and Part2, Addison-Wesley Publishing company (1988), ISBN 1-201-16503-1 (v.1) and 1-201-16504-X (v.2).

Courses designation	**Electromagnetism 2**
Courses level, if applicable	Bachelor
Code, if applicable	403331
Semester(s) in which the module is taught	6^{th} Semester - 3^{rd} 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	403201
Courses objectives/intended learning outcomes	

Content	1- Maxwell's equations 2- Scalar and vector potentials 3- Plane waves 4- Reflection and refraction of plane waves 5- Field in bounded regions 6- Radiation
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- John David Jackson, Classical electrodynamics , 3rd edition, John Wiley and Sons, INC, ISBN 0471-30932-X. 2- David J. Griffiths, Introduction to Electrodynamics (3rd Edition) (1999), ISBN 013-805326-X/

Courses designation	Nuclear Physics
Courses level, if applicable	Bachelor
Code, if applicable	403460
Semester(s) in which the module is taught	7^{th} Semester - 4^{th} 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	403345
Courses objectives/intended learning outcomes	

Content	1. Nuclear properties (do not vary with time) of stable nuclei 2. Nuclear properties (vary with time) of unstable nuclei 3. Gamma decay 4. Alpha decay 5. Beta decay 6. Problems and solutions on Nuclear decays
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- K. Heyde, Basic ideas and concepts in nuclear Physics, An introductory approach, second edition, Institute of physics publishing, Bristol and Philadelphia (1999) ISBN 0 7503-0534 7 hbk, 07503 0535 pbk. 2- Irving Kaplan, Nuclear Physics, Second Edition, Addison-Wesley Publishing Company (1977). 3- Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X . 4- Burcham, Nuclear and Particle Physics, 2 Edition, Longman Publisher (1995),ISBN-10 : 0582 450888 , -13: 978 - 0582 4508882

Courses designation	Quantum Mechanics 3
Courses level, if applicable	Bachelor
Code, if applicable	403446
Semester(s) in which the module is taught	7^{th} Semester - 4^{th} year
Person responsible for the module.	Dr Mohamed BOUSTIMI
Lecturer	Dr Mohamed BOUSTIMI
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	403345
Courses objectives/intended learning outcomes	

Content	1- Symmetry 2- Identical particles 3- **The Adiabatic approximation** 4- Scattering theory 5- Elements of relativistic quantum 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- David J. Griffiths, Introduction to Quantum Mechanics, Prentice Hall, Inc (1995) ISBN 0-13-124405-1 2- J.J. Sakaurai, Modern Quantum Mechanics, Addison-Wesley Publishing Company (1994) ISBN 020153929-2 3- Cohen-Tannoudji, Claude. Quantum Mechanics. 2 vols. New York, NY: Wiley, 1977. ISBN: 9780471164326. 4- Albert Messiah, Quantum mechanics II, North Holland Publishing Company Amesterdam, 1962.

Courses designation	Semiconductor Physics
Courses level, if applicable	Bachelor
Code, if applicable	403471
Semester(s) in which the module is taught	7^{th} Semester - 4^{th} year
Person responsible for the module.	
Lecturer	Ms. Arwa A. Bukhari
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	403370
Courses objectives/intended learning outcomes	

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
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 R.A. Smith , Cambridge University Press, 2nd edition, December 21, 1978 **2.** Physics of Semiconductor Devices, By S. M. Sze,1981, John Wiley & sons **3.** .**3.** Semiconductor Physics and Devices – Basic Principles, Donald A. Neamen, 3rd ed. McGraw-Hill, 3rd Ed, 2003.

Courses designation	Advanced Optics 1
Courses level, if applicable	Bachelor
Code, if applicable	403434
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 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	403232
Courses objectives/intended learning outcomes	

Content	1- Optical Boundaries 2- Light Scattering 3- Fourier Transform Spectroscopy 4- Transfer Functions 5- Two- Dimensional Transforms 6- Holography
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 to Classical and Modern Optics, by Jurgen R. Meyer-Arendt,Prentice-hall International, INC., 1972. 2- Contemporary Optics for Scientists and Engineers, by Allen Nussbaum and Richard A. Phillips, Prentice –Hall, 3-Foundation of Optics, Francis A. Jenkins and Harvey E. White,4th Edt.,McGraw-Hill, 1976.

Courses designation	Electronics
Courses level, if applicable	Bachelor
Code, if applicable	403473
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	4 Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	403370
Courses objectives/intended learning outcomes	

Content	1- CONDUCTION MECHANISMS IN SEMICONDUCTORS 2- JUNCTION DIODE PHYSICAL ELECTRONICS 3- BIPOLAR JUNCTION TRANSISTORS (BJT) 4- FIELD EFFET TRANSISTORS BJT 5- OPERATIONAL AMPLIFIERS 6- 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. Electronic devices and circuits theory, ed. By Robert \L. Boylestad and Louis Nashelstky, Prentice-Hall, 1996. 2. Microelectronics, ed. By J. millman and A. Grabel, McGraw-Hill, 1987. 3. Electronic devices, Discrete and integrated, ed. By S. R. Fleeman, Prentice – Hall, 1990.

Courses designation	**Radiation physics**
Courses level, if applicable	Bachelor
Code, if applicable	403**462**
Semester(s) in which the module is taught	8th Semester - 4th 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	403460
Courses objectives/intended learning outcomes	

Content	1- Interaction of Radiation with Matter 2- Units of Radiation Dosimetry 3- Biological Effects of Radiation 4- Radiation detectors 5- Dosimeters 6- External Radiation Protection
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- "A Primer In Applied Radiation Physics", F.A.SMITH, Ed. World Scientific, 2000. 2- "Radiation Physics for Medical Physicist", E. B. Podgorsak, Ed. Springer. 2006

Courses designation	Advanced Optics 2
Courses level, if applicable	Bachelor
Code, if applicable	403435
Semester(s) in which the module is taught	8^{th} Semester - 4^{th} 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	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	403434
Courses objectives/intended learning outcomes	

Content	1- Optics of solids 2- Thermal Radiation and Light Quanta 3- Laser 4- Ray 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), final exam (60 points).
Media employed	Online materials as lecture notes, presentations, interactive learning modules and chapter checks.
Reading list	1- Introduction to modern optics, Grant R. Fowles, Holt Rinehart and Winston, INC 1972.

Courses designation	Nuclear Models
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	403446
Courses objectives/intended learning outcomes	

Content	1- Properties of the Nucleon-Nucleon force - Nuclear potential Proposed 2- Nuclear structure - Liquid drop model approach 3- Fermi - gas model (The Simplest independent particle model) 3- The single particle shell model 4- The Collective model 6- Selected problems and solutions on Nuclear Models
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- K. Heyde, Basic ideas and concepts in nuclear Physics, An introductory approach, second edition, Institute of physics publishing, Bristol and Philadelphia (1999) ISBN 0 7503-0534 7 hbk, 07503 0535 pbk. 2- Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X . 3- N.A. Jelley, Fundamental of nuclear physics , Cambridge University Press (March 30, 1990) **ISBN-10:** 0521269946 . 4- L.R.B Elton, Introductory nuclear Physics, , second edition, W.B. Saunders company- Philadelphia (1966) ISBN - B0006BO48M .

Courses designation	Nuclear Technology
Courses level, if applicable	Bachelor
Code, if applicable	403465
Semester(s) in which the module is taught	8th Semester - 4th 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	2Cr
Requirements according to the examination regulations	successful participation in HW problem - Written exam – attendance 75% from #'s of lectures
Recommended prerequisites	403460
Courses objectives/intended learning outcomes	

Content	1.accelerators 2.Mass Spectrometers (nuclear masses) 3.Fission Nuclear reactors 4.Fusion Nuclear reactors 5.Nuclear detectors
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- Klaus Wille, The Physics of particle accelerators,Oxford university press, 2000, ISBN: 19 850549 2- Helmut Wiedemann, Particle accelerator physics I, springer, 2nd edition, 1999. 3- Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X . 4- Burcham, Nuclear and Particle Physics, 2 Edition, Longman Publisher (1995),ISBN-10 : 0582 450888 , -13: 978 - 0582 4508882 5- Richard A. Dunlap , An Introduction to the physics of particles and nuclei, first Edition, Brooks Cole Publishing Company(2003), ISBN-10: 0534392946, -13: 978 – 0534392949

Courses designation	Solid State Physics 2
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	403370
Courses objectives/intended learning outcomes	

Content	1- Dielectric Properties of Insulating Materials 2- Ferroelectric Materials 3- Landau Theory of Phase Transition 4- Magnetic Properties of Solids 5- Superconducting Materials
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- Charles Kittel, Introduction to Solid State Physics (8th ed) , 2005, John Wiley & sons. 2- Omar M., Elementary Solid State Physics, Addison Wesley, Reading, 1993

Courses designation	Nuclear reactions
Courses level, if applicable	Bachelor
Code, if applicable	403464
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	
Lecturer	
Relation to curriculum	
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	403446
Courses objectives/intended learning outcomes	

Content	Nuclear Reactions (Theory of scattering and reaction processes 1- Basic Concepts and Definitions 2- Classical picture of nuclear scattering (particle view) 3- Quantum picture of nuclear scattering (wave and particle duality view) 4- Integral form of Scattering amplitude in terms of scattering potential and asymptotic wavefunction (solution of Lippmann – Schwinger equation) . 5- Theoretical models of Nuclear reactions
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- Jean-Louis Basdevant, James Rich, Michel Spiro, Fundamentals in Nuclear Physics, from Nuclear Structure to Cosmology, Springer Science+Buisiness Media, Inc (2005), ISBN 0-387-01672-4 2- M.L. Goldberger and K.M. Watson, John Wiley & Sons (1964) 3- Harald A. Enge, Introduction to nuclear Physics, Addison-Wesley Publishing Company Inc (1966). ISBN-0: 201 0187G-5 4- Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X .

Courses designation	Physics of nano
Courses level, if applicable	Bachelor
Code, if applicable	403477
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	
Lecturer	
Relation to curriculum	
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	403472
Courses objectives/intended learning outcomes	

Content	1- History of nanomaterials and Nanotechnology 2- Techniques for fabrication, characterization and modification of nanomaterials 3- Methods to produce nanofibers and nano partical 4- Structure and physical properties of nanomaterials
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. Seeram, Ramakrishna , Kazutoshi, Fujihara , Wee-Eong Teo, An Introduction to Electrospinning and Nanofibers, World Scientific Publishing Co Pte Ltd (2005), ISBN-13: 978-9812564542. 2. Anthony L. Andrady, Science and Technology of Polymer Nanofibers , Wiley-Interscience (2008), ISBN-13**:** 978-0471790594. 3. Yury, Gogotsi**,** Nanotubes and Nanofibers (Advanced Materials and Technologies), CRC Press; 1 edition (2006), ISBN-13: 978-0849393877. 4. Irwin M. M. Hutten, Handbook of Nonwoven Filter Media, Elsevier Science; 1 edition (2007), ISBN-13: 978-1856174411. 5. Synthesis, Properties and Applications Nanomaterials: S. Edelstein and R. C. Cammarata, Taylor & Francis,(1998). ISBN-13: 978-0750305785. 6. Physics and Chemistry of Nanostructured Materials : Shihe Yang and Ping Shen, World Scientific Publishing Company (2005), 13: 978-9812564542.

Courses designation	Introduction to elementary particle physics
Courses level, if applicable	Bachelor
Code, if applicable	403466
Semester(s) in which the module is taught	8^{th} Semester - 4^{th} year
Person responsible for the module.	
Lecturer	
Relation to curriculum	
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	403446
Courses objectives/intended learning outcomes	

Content	1- Relativistic kinematics 2- Elementary particles 4- The fundamental forces: 5- Life time and cross sections.
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- David Griffith, Introduction to elementary particles, John Wiley & Sons, INC (1987), ISBN 0-471-60386-4. 2- Francis Halzen and Alan D. Martin, Quarks and leptons: An introductory Course in Modern Particle Physics, John Wiley & Sons, INC (1984) ISBN 0-471-88741-2. 3- Elementary particles, I. S. Hughes, Cambridge University press, third edition (1991). 4- Intoduction to high energy physics, Donald H. Perkins, Addison-Wesley Publishing Company, Inc, third edition (1987), ISBN 0-201-12105-0.

Courses designation	physics of polymer
Courses level, if applicable	Bachelor
Code, if applicable	403476
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	
Lecturer	
Relation to curriculum	
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	**403472**
Courses objectives/intended learning outcomes	

Content	1- Introduction to polymer 2- Polymer structure 3- Characterization techniques 4- Processing
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. Gedde, U.W, Introduction to Polymer Physics, Springer; 1st Ed. edition (1995), ISBN-13: 978-0412590207. 2. P.G. de Gennes, Scaling Concepts in Polymer Physics, Cornell University Press; 1 edition (1979). ISBN-13: 978-0801412035. 3. David I, Bower, An introduction to Polymer Physics, , Cambridge University Press; 1 edition (2002), ISBN-13: 978-0521637213. 4. Joseph Powers Richard S. Stein , Topics in Polymer Physics, Imperial College Press; (2006), ISBN-13: 978-1860944123. 5. Lloyd M. Robeson, Polymer Blends: Introduction and Review, Hanser Gardner Pubns (2007), ISBN-13: 978-1569904084. 6. Wolfgang Binder, W.H. Binder, L. Bouteiller, and G. ten Brinke, Hydrogen Bonded Polymers (Advances in Polymer Science), Springer; 1 edition (2007), ISBN-13: 978-3540685876. 7. John M. Dealy, Structure and Rheology of Molten Polymers, Hanser Gardner Pubns (2006), ISBN-13: 978-1569903810. 8. Julie P. Harmon and Gerry K. Noren ,Optical Polymers: Fibers and Waveguides, An American Chemical Society Publication (September 13, 2001). ISBN-13: 978-0841237063. 9. Jan C. J. Bart, Additives in Polymers: Industrial Analysis and Applications, Wiley; 1 edition

Courses designation	Introduction to material science
Courses level, if applicable	Bachelor
Code, if applicable	403475
Semester(s) in which the module is taught	8th Semester - 4th year
Person responsible for the module.	
Lecturer	
Relation to curriculum	
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	403472
Courses objectives/intended learning outcomes	

Content	Materials science involves the preparation and characterization of materials include plastics, glass, ceramics, metals, and semiconductors. properties of materials include their mechanical behavior, electrical, magnetic optical and thermal characteristics, and other physical properties such as density and grain structure 1- Classification of Materials 2- Diffusion 3- Mechanical Behavior An elasticity 4- Thermal Behavior, 5- Physical Characteristics, Optical, Electrical and Magnetic Properties 6- Applications and Processing of Polymer, Ceramics and Composites, , Semiconductors, Nano materials.
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. William D. Callister, Introduction to Materials Science for Engineers, Wiley; 8 edition (2010) , ISBN-13: 978-0470419977. 2. Günter Gottstein, Physical Foundations of Materials Science, Springer; 1 edition (2004), ISBN-13: 978-3540401391.