



## **Benha University** **Faculty of Science**



Physics programs

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## **Benha University** **Faculty of** **Science**



BSc. Physics programs





## Benha University Faculty of Science



### Physics programs

Chm 100	General Chemistry (1)	2	2/-	3	-	
Com 101	Introduction to Computer Science	1	-/2	2	-	
Mat 101	Algebra and Geometry	1	2/-	2	-	
Phy 101	Heat and Properties of Matter	2	2/-	3	-	
Bio 102	Biology (2)	1	-/2	2	-	
Chm 105	General Chemistry (2)	2	2/-	3	-	
Com 102	Introduction to Computer Programming	1	-/2	2	-	
Mat 102	Statistics	1	2/-	2	-	
Phy 102	Optics, Electricity and Magnetism	2	2/-	3	-	
Mat 103	Differentiation and Integration	1	2/-	2	-	
Mat 104	Dynamics	1	2/-	2	-	
<b>Faculty Compulsory Courses: 60 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
Mat 201	Ordinary Differential Equations (1)	1	2/-	2	Mat 102	Physics



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Physics programs

Phy 221	Classical Physics	2	-/-	2	Phy 102
Phy 222	Atomic and Principles of Modern Physics	2	-/-	2	Phy 102
BPh 223	Introduction to Biophysics	2	-/-	2	Phy 102
Phy 224	Thermodynamics	2	-/-	2	Phy 101
Phy 225	Alternating Current and Electromagnetism	2	-/-	2	Phy 102
Phy 226	Mathematical Physics (1)	2	-/-	2	Phy 102
Phy 227	Vibrations and Waves	2	-/-	2	Phy 103
Phy 228	Physical Optics	2	-/-	2	Phy 102
Phy 230	Electromagnetism Theory	2	-/-	2	Phy 102
Phy 231	Physics Lab (1)	-	-/3	1	Phy 102
Phy 232	Physics Lab (2)	-	-/3	1	Phy 102
Phy 341	Solid State (1)	2	-/-	2	Phy 222
Phy 342	Semiconductors	2	-/-	2	Phy 222



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Physics programs

Phy 343	Quantum Mechanics (1)	2	-/-	2	Phy 226
Phy 344	Nuclear Physics (1)	2	-/-	2	Phy 222
Phy 345	Statistical Physics	2	-/-	2	Phy 224
Phy 346	Fluid Mechanics (1)	2	-/-	2	Phy 345
Phy 347	Laser Physics (1)	2	-/-	2	Phy 222
Phy 348	Plasma Physics (1)	2	-/-	2	Phy 230
Phy 349	Modern Physics Lab	-	-/3	1	Phy 230
Phy 350	Semiconductors Lab	-	-/3	1	-
Phy 351	Solid State Lab (1)	-	-/3	1	-
Phy 364	Laser Physics Lab	-	-/3	1	-
Phy 461	Quantum Mechanics (2)	2	-/-	2	Phy 343
Phy 462	Elementary Particles	2	-/-	2	-
Phy 463	Nuclear Physics (2)	2	-/-	2	Phy 344



Physics programs

Phy 464	Nanomaterials Physics	2	-/-	2	Phy 341	
Phy 465	Solid State (2)	2	-/-	2	Phy 341	
Phy 466	Computational Physics and Programming	2	-/-	2	Phy 226	
Phy 467	Electronics	2	-/-	2	Phy 342	
Phy 469	Nuclear Physics Lab (1)	-	-/3	1	Phy 344	
Phy 470	Solid State Lab (2)	-	-/3	1	Phy 351	
Phy 471	Electronics Lab (1)	-	-/3	1	Phy 342	
Phy 472	Electronics Lab (2)	-	-/3	1	Phy 342	
<b>Faculty Elective Courses: 28 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
Mat 204	Numerical Analysis (1)	1	2/-	2	Mat 101	
BPh 231	Vision and Hearing Biophysics	2	-/-	2	Phy101	
Phy 233	Theory of Relativity	2	-/-	2	-	



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### Physics programs

Phy 234	Radiation Physics and Its Applications	2	-/-	2	-
Phy 235	Renewable Energy	2	-/-	2	-
Phy 237	Physics of Metals	2	-/-	2	-
Phy 353	Mathematical Physics (2)	2	-/-	2	Phy226
Phy 354	Thin Film Technology	2	-/-	2	-
Phy 355	Atomic and Molecular Spectra	2	-/-	2	Phy222
Phy 356	Electrodynamics	2	-/-	2	Phy230
Phy 357	Accelerators and Ionization Sources	2	-/-	2	Phy 222
Phy 358	Cosmology	2	-/-	2	-
Phy 366	Methods of Experimental Physics	2	-/-	2	-
Phy 473	Plasma Physics (2)	2	-/-	2	Phy 348
Phy 474	Digital Electronics	2	-/-	2	Phy 467
Phy 475	Fluid Mechanics (2)	2	-/-	2	Phy 346

Physics programs

Phy 476	Reactors	2	-/-	2	Phy 344	
Phy 477	Superconductors	2	-/-	2	Phy 341	
Phy 478	Laser Physics (2)	2	-/-	2	Phy 347	
Phy 479	Non-Linear Optics	2	-/-	2	-	
Phy 480	Theory of Quantum Solid State and Its Applications	2	-/-	2	Phy 341	
<b>Faculty Free Elective Courses: 6 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	<b>Physics</b>
Mat 203	Linear Algebra	2	2/-	3	-	
Com 221	Object- oriented Programming	2	2/-	3	-	
Geo 233	Crystallography and Mineralogy	2	-/2	3	-	
Geo 239	Crystallography and Optical Mineralogy (1)	2	-/2	3	-	
<b>Faculty Graduation requirements: 6 Credit Hours</b>						
Phy362	Applied and Field Training	-	-/-	3	--	
Phy468	Research and Essay	3	-/-	3	--	





Physics programs

Faculty Compulsory Courses: 60 Credit Hours						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
Sta 200	Probability Theory (1)	2	1/-	2	Mat 102	Biophysics
Mat 201	Ordinary Differential Equations (1)	1	2/-	2	Mat 102	
Zoo 214	Human Physiology and Anatomy	2	-/3	3	Zoo 102	
Phy 222	Atomic and Principles of Modern Physics	2	-/-	2	-	
BPh 223	Introduction to Biophysics	2	-/-	2	Phy 102	
Phy 225	Alternating Current and Electromagnetism	2	-/-	2	Phy 102	
Phy 231	Physics Lab (1)	-	-/3	1	-	
Phy 232	Physics Lab. (2)	-	-/3	1	-	
Chm 241	Analytical Chemistry (1)	2	-/3	3	Chm 105	
Phy 246	Principles of Physical Optics	1	-/-	1	Phy 102	
Phy 301	Fundamental of Solid-state Physics	2	-/-	2	Phy 222	
Phy 302	Fundamental of Nuclear Physics	2	-/-	2	Phy 222	
BPh 303	Laser Physics and Application Biophysics	2	-/-	2	Phy 102	
Phy 304	Plasma Physics and Its Application.	2	-/-	2	Phy 222	



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### Physics programs

Phy 306	Fundamental of Fluid Mechanics	2	-/-	2	Phy 101
BCh 341	Advanced Biochemistry	2	-/3	3	Chm 105
BPh 341	Ultrasound in Biological and Medicine	2	-/-	2	Bph 223
Zoo 342	Tumor and Immunity	2	-/-	2	Zoo 214
BPh 351	Biophysics Lab (1)	-	-/3	1	-
BPh 352	Biophysics Lab. (2)	-	-/3	1	-
Zoo 355	Principles of Genetic Engineering	1	-/-	1	Zoo 102
Mic359	General Microbiology	2	-/3	3	Bot 105
BPh 461	Quantum Mechanics and Its Biological Applications.	2	-/-	2	Phy 222
BPh 462	Control and Communication Biophysics .	2	-/-	2	BPh 223
BPh 463	Polymer Physics and Its Applications in Medicine	2	-/-	2	Phy 301
BPh 464	Medical Bioelectronic Devices	2	-/-	2	Phy 102
BPh 465	Isotopes and its Applications in Medicine	1	-/3	2	Phy 302
BPh 466	Radiotherapy	1	-/3	2	Phy 102
BPh 467	Molecular Biophysics	2	-/-	2	BCh 341
BPh 468	Principals of Nano-medical and Application	2	-/-	2	BPh 463



Physics programs

BPh 471	Biophysis Lab. (3)		-/3	1	-	
BPh 472	Biophysics Lab. (4)		-/3	1	-	
<b>Faculty Elective Courses: 28 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
BPh 224	Thermodynamics for Biological Systems	2	-/-	2	Mat 201	<b>Biophysics</b>
Phy 226	Mathematical Physics (1)	2	-/-	2	-	
Phy 227	Vibrations and Waves	2	-/-	2	Phy 103	
BPh 231	Vision and Hearing Biophysics	2	-/-	2	Phy 101	
Phy 235	Renewable Energy	2	-/-	2	-	
BPh 236	Cell and Membranes Biophysics	2	-/-	2	BPh 223	
Geo 261	Petroleum Biosafety	1	-/2	2	-	
Phy 303	Crystal Structure and X-ray Diffraction.	2	-/-	2	Phy 222	
Phy 305	Electronic and Electricity Circuit.	2	-/-	2	Phy 102	
Zoo 314	Nutrients Metabolism	2	-/-	2	Zoo 102	
BPh 353	Biomaterials Substitutions	2	-/-	2	BPh 223	
BPh 354	Health Physics	2	-/-	2	-	
BPh 356	Physics of Digenesis Devices	2	-/-	2	Phy 301	



Physics programs

Bph 358	Radiation Dosimetry	2	-/-	2	Phy 102	
Phy 401	Advanced Physical Optics	2	-/-	2	Phy 102	
BPh 434	Radiation Physics and Its Bio-application.	2	-/-	2	Phy 302	
BPh 445	Principles of Physical Therapy	2	-/-	2	-	
BPh 473	Biophysical Techniques in Medicine.	2	-/-	2	-	
BPh 474	Magnetic Resonance Imaging	2	-/-	2	BPh 464	
BPh 475	Electric Simulation in Biosystems.	2	-/-	2	BPh 223	
BPh 476	Biomodelling	2	-/-	2	BPh 223	
BPh 488	Biomedical Accelerators	2	-/-	2	Phy 222	
<b>Faculty Free Elective Courses: 6 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	<b>Biophysics</b>
Mat 205	Real Analysis (1)	1	2/-	2	-	
Geo 231	Crystallography and Optical Mineralogy (2)	1	-/3	2	-	
Ent 258	Medical Entomology	1	-/2	2	-	
Mat 311	Number Theory	1	2/-	2	-	
Zoo 410	Neurophysiology	2	-/-	2		



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Com 427	Introduction to Bioinformatics	2	-/-	2	-	
<b>Faculty Graduation requirements: 6 Credit Hours</b>						
Phy 362	Applied and Field Training	-	-/-	3	-	
Bph 470	Research and Essay	3	-/-	3	-	
<b>Faculty Compulsory Courses: 60 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
Phy 222	Atomic Physics and Principles of Modern Physics	2	-/-	2	Phy 227	<b>Physics and Chemistry</b>
Phy 224	Thermodynamics	2	-/-	2	Phy 101	
Phy 225	Alternating Current and Electromagnetism	2	-/-	2	Phy 102	
Phy 227	Vibrations and Waves	2	-/-	2	Phy 103	
Phy 231	Physics Lab (1)	-	-/3	1	Phy102	
Phy 232	Physics Lab (2)	-	-/3	1	Phy 231	
Phy 341	Solid State I	2	-/-	2	-	
Phy 342	Semiconductors	2	-/-	2	Phy 341	



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Phy 344	Nuclear Physics (1)	2	-/-	2	Phy 359
Phy 352	Physics Lab	-	-/3	1	-
Phy 359	Introduction to Quantum Mechanics	2	-/-	2	Phy 222
Phy 360	Optics and Introduction to Laser Physics	2	-/-	2	Phy 222
Phy 464	Nanomaterials Physics	2	-/-	2	Phy 341
Phy 466	Computational Physics and Programming	2	-/-	2	-
Phy 467	Electronics	2	-/-	2	Phy 342
Phy 471	Physics Lab (1)	-	-/3	1	-
Phy 481	Introduction to Plasma Physics	2	-/-	2	-
Chm 212	Aromatic and Polynuclear Chemistry	2	-/-	2	Chm 105
Chm 213	Petroleum and Petrochemicals	2	-/-	2	Chm 105
Chm 222	Chemistry of Representative Elements	2	-/3	3	Chm 100
Chm 241	Analytical Chemistry (1)	2	-/3	3	Chm 100



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Chm 304	Photochemistry	3	-/-	3	Chm 385	
Chm 323	Chemistry of Transition Metals	2	-/-	2	Chm 222	
Chm 332	Surface Chemistry	2	-/-	2	Chm 222	
Chm 385	Kinetic Chemistry	2	-/-	2	Chm 105	
Chm 400	Nanochemistry and Applications	2	-/-	2	Chm 222	
Chm 405	Laser Spectroscopy (2)	2	-/-	2	Chm 385	
Chm 411	Polymer Chemistry and Applications (1)	2	-/3	3	Chm 212	
Chm 432	Computational Chemistry and Chemical Applications	2	-/-	2	Chm 439	
Chm 442	Analytical Chemistry (3) [selected topics]	2	-/-	2	Chm 241	
<b>Faculty Elective Courses: 28 Credit Hours</b>						
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite	
Phy 223	Introduction to Biophysics	2	-/-	2	-	<b>Physics and Chemistry</b>
Phy 228	Physical Optics	2	-/-	2	Phy 102	



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Phy 234	Radiation Physics and Its Applications	2	-/-	2	Phy 102
Phy 235	Renewable Energy	2	-/-	2	-
Phy 346	Introduction to Fluid Mechanics	2	-/-	2	-
Phy 354	Thin Film Technology	2	-	2	Phy 341
Phy 355	Atomic and Molecular Spectra	2	-	2	Phy 222
Phy 357	Accelerators and Ionization Sources	2	-/-	2	Phy 222
Phy 366	Methods of Experimental Physics	2	-/-	2	-
Phy 465	Solid State (2)	2	-/-	2	Phy 341
Phy 467	Reactors	2	-/-	2	Phy 344
Phy 477	Superconductors	2	-/-	2	-
Phy 482	Laser's Applications	2	-/-	2	-
Chm 216	Organic Environmental Green Chemistry (1)	2	-/-	2	Chm 105
Chm 217	Industrial Chemistry and Economic studies	2	-/-	2	Chm 105



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Chm 221	Industrial Inorganic Chemistry (1)	2	-/-	2	Chm 100		
Chm 232	Electrochemistry (1)	2	-/-	2	Chm 105		
Chm 310	Advanced Organic Chemistry	2	-/-	2	Chm 212		
Chm 333	Chemistry of Molecular Spectroscopy	2	-/-	2	Chm 222		
Chm 383	Irreversible Electrochemistry	2	-/-	2	Chm 222		
Chm 418	Technology of Paints and Detergents	2	-/-	2	Chm 313		
Chm 439	Basic of Quantim and Statistical Dynamics Chemistry	2	-/-	2	Chm 222		
Chm 470	Chemistry of Ceramics and Glass	2	-/-	2	Chm 405		
Chm 475	Principles of Chemistry of Dyes and Textiles	1	-/3	2	Chm 212		
Chm 487	Principles of Corrosion and Metal Protecting Chemistry	2	-/-	2	Chm 332		
<b>Faculty Free Elective Courses: 6 Credit Hours</b>							
Course Code	Course Title	Theoretical	T / P	Credit Hours	Prerequisite		Physics and Chemistry
Mic 200	Principles of General Microbiology	2	-/3	3	-		



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Mat 203	Linear Algebra	2	2/-	3	-
Com 221	Object-oriented Programming	2	2/-	3	-
Geo 233	Crystallography and Mineralogy	2	-/3	3	-
<b>Faculty Graduation requirements: 6 Credit Hours</b>					
Phy 362	Applied and Field Training	-	-/-	3	--
Phy 468	Research and Essay	3	-/-	3	--