PhD in Physics

Program Overview:

PhD Physics program enables the students to scientifically understand and analyze the behaviour of nature by studies and experiments supported by theories and data. As a result of PhD research training, some innovation is contributed to the world in form of publications and patents. Also, this process orientates them with many interdisciplinary subjects such as Physics with Design Studies, Electro Technology, Systems and Control Engineering, Energy and Environmental Studies, the Physics of Life, Material Science and Nanotechnology.

Main Areas of Research:

- Material science
- Nanotechnology
- Plasma physics
- Quantum Optics
- Soil Physics
- Magnetic materials
- Radiation Physics
- Environmental Physics
- Renewable energy
- Applied nuclear physics

For more information, please refer to the list of faculty members for their research field on the departmental website.

Admission Requirement:

MS/MPhil in Physics (16 years of Education) from HEC recognized university with a minimum of 30 credit hours (24 credit hour graduate-level courses + 6 credit hours thesis) with CGPA 3 out of 4.

GRE (International) subject test with 60 percentile score or GAT subject test with 60 % marks.

For more information on application deadlines, tests and other admission requirements, please visit the admissions section of the Graduate Studies Office.

Program Requirement:

PhD (Physics)

The minimum and maximum duration of PhD programs are 3 to 8 years. Students must meet the following requirements for graduation:

- Confirmation of PhD candidature
- Positive examiners, reports / addressal of reviewers comments
- Successful public defense and viva

  Publication of at least one paper in a journal as per HEC policy before the award of the PhD degree.

Program Structure:

Semester wise courses scheme for PhD Physics

There are six optional courses for PhD Physics.

#	Course Codes	Course Title	Credit Hours
FIRST SEMESTER			
1		Elective Course -I	3 + 0
2		Elective Course -II	3 + 0
3		Elective Course -III	3+0
SECOND SEMESTER			
1		Elective Course -IV	3 + 0
2		Elective Course -V	3 + 0
3		Elective Course -VIII	3 + 0

	THIRD SEMESTER		
1		Doctoral Dissertation	
		Total Courses	**18**
		Total Credit Hours	**18**

List of elective courses

S#	**Code**	**Title of the Course**	**Credit hours**
1	PHY-638	Electrodynamics II	3+0
2	PHY-654	Optical Properties of Solid	3+0
3	PHY-639	Magnetism in Condensed Matter	3+0
4	PHY-679	Quantum Optics-I	3+0
5	PHY-653	Condensed Matter Theory-I	3+0
6	PHY-676	Quantum Information Theory-I	3+0
7	PHY-658	Plasma Physics	3+0
8	PHY-651	Particle Physics	3+0
9	PHY-649	Plasma Physics-II	3+0
10	PHY-681	General Relativity and Cosmology	3+0
11	PHY-659	Accelerator Techniques for Materials	3+0
12	PHY-680	Solid State Theory	3+0
13	PHY-655	Atomics and Electron Physics II	3+0
14	PHY-656	Advanced Nuclear Theory-II	3+0
15	PHY-647	Quantum Field Theory – II	3+0
16	PHY-648	Laser Physics – II	3+0
17	PHY-617	Computational Physics – II	3+0

18	PHY-622	Advanced Techniques of Experimental	3+0
19	PHY-650	Micro-Electronics and Semi-Conductor Devices	3+0
20	PHY-681	Optoelectronics	3+0
21	PHY-660	Advanced Medical Physics	3+0
22	PHY-668	Ferrite Technology	3+0
23	PHY-682	Quantum Optomechanics	3+0
24	PHY-693	Photovoltaics Materials	3+0
25	PHY-694	Dielectric Properties of Materials	3+0
26	PHY-641	Permanent Magnetic Materials	3+0
27	PHY-631	Physics of Solar Cells	3+0
28	PHY-632	Solar Energy	3+0
29	PHY-633	Wind Energy	3+0
30	PHY-642	Hard Magnetic Alloys	3+0
31	PHY-634	Refining and Recycling of Silicon	3+0
32	PHY-623	Methods and Techniques of Experimental Physics	3+0
33	PHY-677	Quantum Mechanics-I	3+0
34	PHY-678	Quantum Mechanics II	3+0
35	PHY-669	Nanophysics and Nanotechnology I	3+0
36	PHY-692	Materials Science	3+0
37	PHY-657	Applied Nuclear Physics	3+0
38	PHY-637	Magnetic Materials	3+0
39	PHY-623	Methods and Techniques of Experimental Physics	3+0
40	PHY-695	Spintronics	3+0

41	PHY-671	Theory of Nanomaterials	3+0
42	PHY-672	Thin Films Technology	3+0
43	PHY-670	Applications of Nanostructures	3+0
44	PHY-697	Crystallography and Structural Analysis	3+0
45	PHY-624	Radiation Physics	3+0
46	PHY-625	Radiation Protection and Health Physics	3+0
47	PHY-626	Radiation Detection and Measurements	3+0
48	PHY-627	Method and Applications of Nuclear Tracks	3+0
49	PHY-611	Advanced Environmental Physics	3+0
50	PHY-766	Nanophysics and Nanotechnology II	3+0
51	PHY-746	Advanced Quantum Mechanics	3+0
52	PHY-736	Superconductivity	3+0
53	PHY-747	Condensed Matter Theory-II	3+0
54	PHY-721	Experimental Plasma Physics	3+0
55	PHY-749	Quantum Optics-II	3+0
56	PHY-748	Quantum Information Theory-II	3+0
57	PHY-767	Dissertation Writing	3+0
58	PHY-756	Radiotherapy	3+0
59	PHY-757	Magnetic Resonance Imaging	3+0
60	PHY-731	Energy Storage Technologies	3+0
61	PHY-737	Electronic Theory of Alloys	3+0
62	PHY-750	Semiconductor Nanostructures &Optoelectronic Devices	3+0
63	PHY-723	Physical and Chemical Fabrication of Nanostructures	3+0
64	PHY- 751	Phase Transformation in materials	3+0

Contact Information:

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