Khushal Khan Khattak University, Karak Pakistan

SELF ASSESSMENT REPORT

BS- Physics & BS-Applied Physics (Nanotechnology)

4 Years Degree Program

Submitted to

Directorate of Quality Assurance (DQA)

Khushal Khan Khattak University, Karak

Department of Physics & Applied Physics (Nanotechnology)

Khushal Khan Khattak University, Karak

Program Team Members

Dr. Atta ur Rahman (Focal Person)
Dr. Junaid Khan (Member)
Mr. Insar Ullah (Member)

Executive Summary

Since its establishment in 2012, Khushal Khan Khattak University Karak has become one of the prestigious institutions of the country and is well regarded internationally also. The department of Physics is one of the newer department focused on contributing committed and knowledgeable Scholar to the public and private sectors.

This document includes a report of self-assessment of the Bachelor of Science (BS) in Physics and Applied Physics (Nanotechnology) Programs. The report has been developed by the program team (PT) under the supervision of Directorate of quality Assurance (DQA) of this institution. Hopefully, this report will contribute in pointing out the department's strength and weaknesses so that actions may be taken to improve the set up.

The Program Team (PTs) consists of the following members:

Dr. Atta Ur Rahman (Focal Person)
Dr. Abdul Hakim Shah (Member)
Mr. Junaid Khan (Member)

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Introduction

The department of Physics was established in 2016. It offers two academic programs including BS-Physics and BS-Applied Physics (Nanotechnology) on undergraduate levels. The department has competent faculty and advanced research facilities. Studying Physics at Khushal Khan Khattak University Karak offers an access to outstanding academic and research exposure. A broad range curriculum is designed to train the next generation of physicists. The department is intended to educate its graduates and create research opportunities to meet the community needs. It aims to produce physics graduates with strong basic and applied concepts. The goals are set to make the curriculum in accordance with the modern-day need, which exemplifies connections with daily life and the existing industry. It also rewards the students for initiative, commitment and skills, compulsory to line up with present state of knowledge in the subject on basic and applied levels.

Presently, the department has a limited infrastructure and it can fulfil the present needs of the students. The department has two classrooms and one laboratory. All the class rooms are spacious and of standard size as per HEC guidlines and have the capacity to accommodate around 50 students. The department' laboratory is equipped with more than 90 experiments. There is also a Nanotechnology Research lab, established under HEC sponsorship. Besides this, it has one computer laboratory. All these laboratories are designed to meet the needs of students at undergraduate and post graduate levels. Department of Physics has a strong participation in sports at national level.

The department offers admissions once in year. It accommodates 50 students at maximum in each undergraduate program. At the moment, there are more than 150 students, enrolled in both programmes whereas three batches (2016-20, 2017-21 and 2018-22) have been graduated successfully till now. At the post graduate level, MPhil and PhD in Physics have also been launched this year.

The department has competent faculty, comprised of three Assistant Professor and four Lecturers. All these faculty members contribute sufficiently to acadmeics and research. They have published their research articles in reputed international journals. Department has now focused to solve issues being faced by industries. Three research projects have been won by the department from HEC and other funding agencies. Major achievement is to establish the Nanotechnology laboratory funded by HEC.

Criterion 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Standard 1-1: Mission Statement and Program Objectives

About the Program

BS - Physics is a four years' degree program having semester system of examination. The admission to BS - Physics is advertised after the declaration of F.Sc result every year.

Mission Statement

The mission of BS - Physics program is to produce high quality graduates for teaching, and local R&D organizations and hence lead the community in the subject of Physics and related fields. The program also set the basis and train graduates for further Higher Education programs like MPhil and PhD. The curricula are constantly updated via introducing new and novel courses to keep the syllabi as per the national and international standards.

Program Objectives

1. To prepare the basic level students for research in Physics
2. To become the most preferred choice of students, faculty and industry
3. To enhance the ranking of the department at national and global level
4. To train youth global leadership in human development, excellence in education, in accordance with the vision 2025.

Silient Feature of the Program

- Total numbers of credit hours 135
- Duration 04 years: max 06 years
- Semester duration 14-16 weeks
- Semesters 08
- Course Load per Semester 15-18 Cr hr
- Number of Courses per Semester 5-6

COURSE STRUCTURE

Sr.No	Categories	No. of courses	Credit Hours
1	General Courses (Group A + B)	16	48
2	Core Courses, labs and projects	26	76
3	Elective Courses	04	12
	Total	46	135

Standard 1-2:

The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support of the program objectives and that graduating students are capable of performing these outcomes.

BS-Physics

Program Objectives	Outcomes
To prepare the students to understand the basic level of Physics	To recognize how observations, experiments and theory work together to expand the frontiers of knowledge of the physical universe.
To Identify, analysis, and solve practical problem in Physics	To apply the basic mathematical tools commonly used in physics related areas.
To demonstrate in depth knowledge from traditional and emerging area of Physics.	To use the basic laboratory data analysis techniques, including distinguishing statistical and systematic errors, propagating errors, and representing data graphically.
To develop the value and attitudes in them that lead to professionalism.	To exercise the use of physical insight, including the ability to guess an approximate or conceptual answers to physical problems and recognize whether or not the result of calculations makes physical sense
To train the youth globally towards leadership in terms of in human development, excellence in science education(with emphasis on Physics) , in accordance with the vision 2025.	To convert physical situations articulated in English to mathematical formulations, and then analyze it quantitatively on the basis of Physics laws and theories.

Learning Outcomes BS-Applied Physics (Nanotechnology):

Upon completion of BS degree in Applied Physics, graduates will be able:

Program Objective	Outcome
To introduce fundamental theory and practice of Physics with specialization in nanotechnology through core and specialized courses.	To apply mathematical techniques to represent, model, and solve physical problems, including real world problems related to nanotechnology.
To impart hands on skills through well designed Labs.	To carry out the process of scientific investigation,using appropriate lab

	techniques and safety procedures in the field of Nanotechnology
To encourage and foster a culture of creative problem solving	Ability to comprehend and analyze a computational solution taking all involved constraints & tradeoffs into consideration to acquire optimal results as an output
To groom the students with the objective to enhance their subject grasp by conducting substantial interactive discussions and seminars.	i. Ability to display good technical writing skills. **ii.** Ability to market themselves and their knowledge out in the professional world.
To inculcate professional confidence and to improve their presentation.	i. Ability to effectively communicate and present their ideas of nanotechnology to all level of technical and non technical audiences ii. Ability to recognize the need and remain involved in professional development through continued knowledge in industries

Criterion 2: CURRICULUM DESIGN AND ORGANIZATION

Definition of Credit Hour

Courses are defined into credit hours. In theory, a credit hour is an academic unit that represents one hour of lecture per week for one term. However for the laboratory work, one credit hour is equivalent to three contact hours of lab working in a week. Therefore courses represented as (2-1) consist of 2 hours of lectures in addition to three hours of lab-work during a week.

Course	Duration of Class
Theory Course of 03 Credit Hours	03 classes, each of 01 hour each per week Or 02 classes of 1.5 hour each per week Or 01 class of 03 hours per week
Practical (Lab) Work of 01 Credit Hour	03 contact hours per week

A course counted in calculation of GPA/CGPA is called **'Credit Course'**, while a course mandatory to pass but not counted in calculating GPA/CGPA is called **'Non-Credit Course**

(1) BS - Physics

Scheme of Studies

1st Year			
Semester I			
Course Code	Course Title	Credit Hours	Remarks
PHY-111	Mechanics-I	3 (3-0)	Foundation-1
PHY-112	Electricity and Magnetism-I	3 (3-0)	Foundation-2
ENG-101	English-I (Functional English)	3 (3-0)	Comp-1
MATH-101	Calculus-I	3 (3-0)	Comp-2
HUM-101	Pakistan studies	2 (2-0)	Comp-3
PHY-116L	Lab-I	1 (0-1)	Foundation-3
	Total Credit Hours	15	
Semester II			
PHY-121	Mechanics-II	3 (3-0)	Foundation-4
PHY-122	Electricity and Magnetism-II	3 (3-0)	Foundation-5
ENG-102	English-II (Communication Skills)	3 (3-0)	Comp-4
MATH-102	Calculus-II	3 (3-0)	Comp-5
HUM-201	Islamic Studies/ Ethics	2 (2-0)	Comp-6
CHEM-201	Chemistry-I (Physical Chemistry)	3 (2-1)	Gen-1
PHY-127L	Lab-II	1 (0-1)	Foundation-6
	Total Credit Hours	18	
2nd Year			
Semester-III			
PHY-231	Waves and Oscillations	3 (3-0)	Foundation-7
PHY-232	Modern Physics	3 (3-0)	Foundation-8
CS-101	Introduction to Computing	3 (3-0)	Gen-2
ENG-201	English-III (Technical and Business Writing)	2 (2-0)	Comp-8
MATH-202	Differential Equations	3 (3-0)	Comp-9
CHEM-202	Chemistry-II (Organic & Inorganic Chemistry)	3 (2-1)	Gen-3
PHY-237L	Lab-III	1 (0-1)	Foundation-9
	Total Credit Hours	18	
Semester IV			
PHY-241	Heat and Thermodynamics	3 (3-0)	Foundation-10
PHY-242	Optics	3 (3-0)	Foundation-11
PHY-243	Special Theory of Relativity	3 (3-0)	Foundation-12
MATH-201	Linear Algebra	3 (3-0)	Gen-4
MATH-203	Probability & Statistics	3 (3-0)	Gen-5
PHY-246L	Lab-IV	2 (0-2)	Foundation-13
	Total Credit Hours	17	
3rd Year			
Semester V			
PHY-351	Mathematical Methods of Physics-I	3 (3-0)	Maj-1
PHY-352	Electrodynamics-I	3 (3-0)	Maj-2
PHY-353	Classical Mechanics	3 (3-0)	Maj-3

BBA-113/ECO-301	Principles of Management/ Principles of Economics	3 (3-0)	Gen-6
PHY-355	Basic Electronics	4 (4-0)	Maj-4
PHY-356L	Lab-V	2 (0-2)	Maj-5
	Total Credit Hours	18	
Semester VI			
PHY-361	Mathematical Methods of Physics-II	3 (3-0)	Maj-6
PHY-362	Electrodynamics-II	3 (3-0)	Maj-7
PHY-363	Quantum Mechanics-I	3 (3-0)	Maj-8
PHY-364	Thermal & Statistical Physics	3 (3-0)	Maj-9
PHY-365	Research Ethics	3 (3-0)	Comp-10
PHY-366L	Lab-VI	2 (0-2)	Maj-10
	Total Credit Hours	17	
4th Year			
Semester VII			
PHY-471	Quantum Mechanics-II	3 (3-0)	Maj-11
PHY-472	Solid State Physics-I	3 (3-0)	Maj-12
PHY-473	Atomic and Molecular physics	3 (3-0)	Maj-13
PHY-XXX	Elective-I	3 (3-0)	Elective
PHY-480/ PHY-XXX	Research Project-I/Elective Course	3 (0-3)/3(3-0)	Maj-14
PHY-477L	Lab-VII	2 (0-2)	Maj-15
	Total Credit Hours	17	
Semester VIII			
PHY-481	Nuclear Physics	3 (3-0)	Maj-16
PHY-482	Solid State Physics-II	3 (3-0)	Maj-17
PHY-XXX	Elective-II	3 (3-0)	Elective
PHY-XXX	Elective-III	3 (3-0)	Elective
PHY-490/ PHY-XXX	Research Project-II (Continued from Research Project-I)/Elective Course	3 (0-3)/3(3-0)	Maj-18
	Total Credit Hours	15	

Total Credit Hours: 135

Optional (Elective) Courses

Sr.	Title of the Course	Course Code	Credit Hours
1	Experimental methods in Physics	PHY-475	3 (3-0)
2	Introduction to Plasma Physics	PHY-476	3 (3-0)
3	Introduction to Semiconductor Physics	PHY-477	3 (3-0)
4	Particle Physics-I	PHY-478	3 (3-0)
5	Programming Fundamentals	CS-202	3 (3-0)
6	Introduction to Materials Science	PHY-483	3 (3-0)
7	Environmental Physics	PHY-484	3(3-0)
17	Renewable Energy Resources	PHY-485	3(3-0)
8	Laser Physics	PHY-486	3 (3-0)
9	Introduction to Condensed Matter Physics	PHY-487	3 (3-0)
10	Digital Electronics	PHY-488	3 (3-0)
11	Computational Physics	PHY-489	3 (3-0)
12	Laser-Plasma Interaction	PHY-491	3 (3-0)
13	Particle Physics-II	PHY-492	3 (3-0)
14	Introduction to Group Theory	PHY-493	3 (3-0)
15	Density Functional theory	PHY-494	3 (3-0)
16	Solid State Electronic Devices	PHY-495	3(3-0)

Scheme of Studies for BS - Applied Physics (Nanotechnology)

1st Year			
Semester I			
Course Code	Course Title	Credit Hours	Remarks
PHY-111	Mechanics-I	3 (3-0)	Foundation-1
PHY-112	Electricity and Magnetism-I	3 (3-0)	Foundation-2
ENG-101	English-I (Functional English)	3 (3-0)	Comp-1
MATH-101	Calculus-I	3 (3-0)	Comp-2
HUM-101	Pakistan studies	2 (2-0)	Comp-3
PHY-116L	Lab-I	1 (0-1)	Foundation-3
	Total Credit Hours	15	
Semester II			
PHY-121	Mechanics-II	3 (3-0)	Foundation-4
PHY-122	Electricity and Magnetism-II	3 (3-0)	Foundation-5
ENG-102	English-II (Communication Skills)	3 (3-0)	Comp-4
MATH-102	Calculus-II	3 (3-0)	Comp-5
HUM-201	Islamic Studies/ Ethics	2 (2-0)	Comp-6
CHEM-201	Chemistry-I	3 (2-1)	Gen-1
PHY-127L	Lab-II	1 (0-1)	Foundation-6
	Total Credit Hours	18	
2nd Year			
Semester-III			
PHY-231	Waves and Oscillations	3 (3-0)	Foundation-7
PHY-232	Modern Physics	3 (3-0)	Foundation-8
CS-101	Introduction to Computing	3 (3-0)	Gen-2
ENG-201	English-III (Technical and Business Writing)	2 (2-0)	Comp-8
MATH-202	Differential Equations	3 (3-0)	Comp-9
CHEM-202	Chemistry-II	3 (2-1)	Gen-3
PHY-237L	Lab-III	1 (0-1)	Foundation-9
	Total Credit Hours	18	
Semester IV			
PHY-241	Heat and Thermodynamics	3 (3-0)	Foundation-10
PHY-242	Optics	3 (3-0)	Foundation-11
PHY-243	Special Theory of Relativity	3 (3-0)	Foundation-12
MATH-201	Linear Algebra	3 (3-0)	Gen-4
MATH-203	Probability & Statistics	3 (3-0)	Gen-5
PHY-246L	Lab-IV	2 (0-2)	Foundation-13
	Total Credit Hours	17	
3rd Year			
Semester V			
PHY-351	Mathematical Methods of Physics-I	3 (3-0)	Maj-1
PHY-352	Electrodynamics-I	3 (3-0)	Maj-2
PHY-353	Classical Mechanics	3 (3-0)	Maj-3

BBA-113/ ECO-301	Principles of Management/ Principles of Economics	3 (3-0)	Gen-6
PHY-355	Basic Electronics	4 (4-0)	Maj-4
PHY-356L	Lab-V	2 (0-2)	Maj-5
	Total Credit Hours	18	
Semester VI			
PHY-361	Mathematical Methods of Physics-II	3 (3-0)	Maj-6
PHY-362	Electrodynamics-II	3 (3-0)	Maj-7
PHY-363	Quantum Mechanics-I	3 (3-0)	Maj-8
PHY-364	Thermal & Statistical Physics	3 (3-0)	Maj-9
PHY-365	Research Ethics	3 (3-0)	Comp-10
PHY-366L	Lab-VI	2 (0-2)	Maj-10
	Total Credit Hours	17	
4th Year			
Semester VII			
PHY-471	Quantum Mechanics-II	3 (3-0)	Maj-11
PHY-472	Solid State Physics-I	3 (3-0)	Maj-12
PHY-473	Atomic and Molecular physics	3 (3-0)	Maj-13
NANO-479	Synthesis and Characterization of Nanomaterials	3 (2-1)	Elective-I
PHY-480/ NANO-485	Research Project-I/ Introduction to Nanotechnology	3 (0-3)/3 (3-0)	Maj-14/Elective-II
PHY-477L	Lab-VII	2 (0-2)	Maj-15
	Total Credit Hours	17	
Semester VIII			
PHY-481	Nuclear Physics	3 (3-0)	Maj-16
PHY-482	Solid State Physics-II	3 (3-0)	Maj-17
NANO-483	Nanocomposite Materials	3 (3-0)	Elective-III
NANO-484	Thin Film Technology	3 (3-0)	Elective-IV
PHY-490/ NANO-486	Research Project-II (Continued from Research Project-I)/ Electronic Nano-devices	3 (0-3)/3 (3-0)	Maj-18/ Elective-V
	Total Credit Hours	15	

Total Credit Hours: 135

Elective Courses

S.No	Course Code	Title of the Course	Credit Hours
1	NANO-479	Synthesis and Characterization of Nanomaterials	3 (3-0)
2	NANO-483	Nanocomposite Materials	3 (3-0)
3	NANO-484	Thin Film Technology	3 (3-0)
4.	NANO-485	Introduction to Nanotechnology	3 (3-0)
5.	NANO-486	Electronic Nano devices	3 (3-0)

Standard 2-1:

The curriculum must be consistent and supports the program's documented objectives.

Each program at Department of Physics is designed in order to support its objectives and is consistent. Department follows a standardized course syllabus in order to ensure the consistency in knowledge delivered to the students. Following matrices show the relevance of the individual courses to the program objectives.

Course versus program objectives – BS Physics

Semester and Courses		BS Program Objectives				
		To prepare the students to understand the basic level of Physics	To Identify, analysis, and solve practical problem in Physics	To demonstrate in depth knowledge from traditional and emerging area of Physics.	To develop the value and attitudes in them that lead to professionalism	To train the youth globally towards leadership in terms of in human development, excellence in science education(with emphasis on Physics)
Sem 1	ENG-101				X	X
	MATH-101		X			
	HUM-101			X	X	
	PHY-111	X	X		X	
	PHY-112	X	X		X	X
	PHY-116L	X	X		X	
Sem 2	ENG-102				X	X
	HUM-201				X	X
	MATH-102	X	X		X	X
	CHEM-201			X	X	
	PHY-121	X	X		X	X
	PHY-122	X			X	X
	PHY-127L	X	X		X	X
Sem3	PHY-231	X	X	X		
	PHY-232	X	X	X		
	MATH-202	X				
	ENG-201				X	X

	CHEM-202			X		
	PHY-237L	X	X	X	X	X
Sem4	PHY-241	X	X	X	X	
	PHY-242			X	X	X
	PHY-243	X	X	X	X	X
	MATH-201	X	X			
	MATH-203	X	X			X
	PHY-246L	X			X	
Sem5	BBA-113/ECO-301				X	X
	PHY-351	X	X	X	X	
	PHY-352	X			X	X
	PHY-353	X	X	X		
	PHY-355	X	X	X		
	PHY-356L	X	X		X	X
Sem 6	PHY-361	X	X	X	X	X
	PHY-362	X			X	X
	PHY-363	X	X		X	X
	PHY-364	X			X	X
	PHY-365	X		X	X	
	PHY-366L	X	X			X
Sem 7	PHY-471	X			X	X
	PHY-472	X			X	X
	PHY-473	X			X	X
	ELECTIVE	X			X	X
	PHY-480	X		X	X	X
	PHY-477L	X				X
Sem 8	PHY-481	X			X	X
	PHY-482	X			X	X
	PHY-490	X		X	X	X
	Elective Course	X			X	X
	Elective Course	X			X	X

Table: BS Physics Courses versus program outcomes

Theoretical background, problems analysis and solution design must be stressed within the program's core material.

Problem solution

All course are designed in a way to provide students with a solid background for further study or work in any area of experimental or theoretical Physics. It will enable them to solve all the problems related to the subject. It includes the mentioned subjects.

Quantum Mechanics, Classical Mechanics, Electrodynamics, Nuclear Physics, Solid State Physics, Plasma Physics, Semiconductor devices and Nano-Synthesis.

Theoretical background.

Subjects are designed on the basis of pure Physics background. It will develop the theoretical skills and expertise in students. The program emphasizes the theoretical side of Physics but minor experimental aspects are also included.

Statistical Physics
Mathematical Methods of Physics
Computational Physics
Calculus-I
Probability & Statistics
Linear Algebra

Solution Design.

Laboratories are designed to focus on a particular solution through experiments.

Labs
Research Projects

Nanotechnology?

Standard 2-3:

The Curriculum must satisfy the core requirements for the program as specified by the respective accreditation body.

The curriculum for BS Physics is divided into the following groups regarding credit hours.

Program	Arts & Humanities Cr. Hrs	Physics Cr.hrs	Maths & Basic Sciences Cr.Hrs	Elective courses Cr.Hrs	Others	Total
BS Physics	16	80	27	12	Nil	135
BS-Applied Physics (Nanotechnology)	16	80	27	12	Nil	135

Table: Minimum Requirements for BS Physics

Standard 2-4:

The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.

This standard is closely similar to that of above standard 2-3. Both have same requirements and credit hour distribution. For this purpose, we must be concerned about the above standard.

Standard 2-5:

The curriculum must satisfy the general education, arts, professional and other discipline requirements for the program as specified by the respective accreditation body.

Table 2.1: Detail the curriculum satisfies the general education, arts, and professional and other discipline requirements for the program, as specified by HEC

S.No	Subjects	
1	Arts and humanities	Good
2	Basic sciences	Very Good
3	Tutorial	Good
4	Seminars	Good

Standard 2-6:

Information technology component of the curriculum must be integrated throughout the program

Information technology is very important for improving the standard of education nowadays. Latest technology made the education updated and distance learning too. Technology is an emerging tool in education. That is why HEC stressed the universities to make information technology as an important part of syllabus. Department of Physics and BS-Applied Physics (Nanotechnology) has included following computer/IT oriented subjects in its curriculum for both the programs.

S.No	IT Courses	Credit hours
1	Introduction to Computer	03
2	Programming Fundamentals (elective)	03
3	Computational Physics (Elective)	03

Standard 2.7:

Oral and written communication skills of the student must be developed and applied in the program.

Oral and written communication is very important in Physics. In order to improve these, weekly seminars are arranged in the department of Physics. However, following English subjects have also been included in the scheme of studies for this purpose which are modified from time to time.

S.No	Subjects for oral written communication skills	Credit hour
1	English I (Functional English)	03
2	English II (Communication Skills)	03
3	English III (Technical writing and research writing)	03

Criteria 3. LABORATORIES AND COMPUTING FACILITIES

The standard and need based facilities are a vital need for creating quality learning opportunities at the university. Such facilities create favorable learning conditions and facilitate the attainment of set objectives. These are important for strengthening effective teaching-learning that provide quality education. These facilities include not only class rooms, library and laboratory but financial aids in form of different scholarships as well.

3.1. Classroom Facilities

Classroom are well equipped with modern teaching aids. There are two classrooms in the department of Physics, Khushal Khan Khattak University, Karak, which are equipped with the white board, teacher's table and chair, computer and multimedia projectors.

1.2 Laboratory Faculties

1.2.1 Undergraduate Laboratory

Laboratories are well equipped, easily accessible and useful according to the student's academic needs. The department of Physics has following seven labs (two lab rooms) on undergraduate levels. All laboratories have laboratory manuals/ instructions required for performing experiments. One laboratory in-charge (Dr Fida Rehman) has been appointed to take care of troubleshooting, repairing, and maintenance of the undergraduate departmental laboratory equipments.

3.2.2 Location and Area

The location of Physics teaching laboratories is in Science Block I, Department of Physics, New Campus, Khushal Khan Khattak University, Karak. These laboratories also provide experimental facilities to the both Male and female students

3.2.3 Objectives

To provide experimental facilities to the students so that they can observe the implementation of theoretical concepts of physics

3.2.4 Courses Taught

Following courses are taught to meet the experimental requirements at the BS level

S.No	Laboratories	Course Conducted
i.	Lab (I)	Mechanics
ii.	Lab (II)	Electricity and Magnetism
iii.	Lab (III)	Wave and Oscillations
iv.	Lab (IV)	Optics
v.	Lab (V)	Modern Physics
vi.	Lab (VI)	Electronics
vii.	Lab (VII)	Solid State Physics

Semester-I

Lab-I (Mechincs)

Code: PHY-116L

S.No	Name of Experiments	Components
01.	Work Energy Theorem	Model : EX-5513A Brand : PASCO Scientific USA
02.	Measurement of Physical Quantities	Vernier calipers Micrometer Screw gauge Digital stop watches Compound pendulums Sextants Bar pendulums
03.	Experiments with Pendulum on Dimensional Motion	Model : ME-8091 Brand : PASCO Scientific USA
04.	Hook's Law	Model:8979 Brand : PASCO Scientific USA Stand with heavy base Transparent scale with mm resolution Horizontal support for spring Brightly colored stretch indicator Three springs with identical diameter and length, but different spring constants Three of each spring included, for a total of nine springs: spring constants are 5 N/m, 8N/m, 70 N/m

05.	Experiments Demonstrating Bernoulli Principle	Model : ME-9481 Brand : PASCO Scientific USA Supplied Components only Components: Venturi tube (ME-2220) General Flow Sensor (ME-2222), Pitot tube (ME-2221)
06.	Atwood's Machine Experiment & Newton's Law	Model : SN-7970A Brand : PASCO Scientific USA

Semester-II

Lab-II (Electricity & Magnitism)
Code: PHY-127L

07.	Resistivity Experiments	Model : EX-5534 Brand : PASCO Scientific USA Resistivity Apparatus (EM-8812) Voltage Sensor (unshrouded) (UI-5100) Banana Plug Cord-Red (5 Pack) (SE-9750)
08.	Thermoelectric Effect	Model : ET-8782 Brand : PASCO Scientific USA Energy Transfer – Thermoelectric Circuit Board Heat Sink Foam Insulation (2) Thermistor Temperature Cables (2) Short Patch Cords (8)
09.	Lenz's Law Experiment	Model :MG-8600 Brand : PASCO Scientific USA 1.5 m Tube Non-magnetic mass Magnetic mass Spring scale
11.	Coulombs Law Experiment	Model : EX-9930B Brand : PASCO Scientific USA Coulomb's Law Apparatus (ES-9070) Basic Electrometer (ES-9078A) Faraday Ice Pail (ES-9042A) Charge Producers and Proof Plane (ES-9057C) Kilovolt Power Supply (SF-9586B)

12.	Basic Electricity Lab	Model : EM-8622 Brand : PASCO Scientific USA Battery holders (2) Resistor: (1) 3.3 Ω, 2 W Light sockets with bulbs (#14) (3) Potentiometer 25 Ω, 2 W Spring connectors (32) Transistor socket Storage tube for holding Components (components stay with the kit longer
13.	RLC Resonance & Voltage/Current Phase Relationships	Model : CI-6512 Brand : PASCO Scientific USA Resistors Capacitors Lamp LED Inductor

Semester-III

Lab-III (Wave & Oscillation)
Code: PHY-237L

14.	Standing Waves on a Rope and Helical Spring	Model : EX-9952 Brand : PASCO Scientific USA String Vibrator (WA-9857A) Sine Wave Generator (WA-9867) Open Speaker (WA-9900) Economy Resonance Tube (WA-9495) Elastic Wave Cord (SE-9409) Braided Physics String (SE-8050) Yellow Braided Cord (699-067) Mass and Hanger Set (ME-8979) Universal Table Clamp (ME-9376B) (2) Adjustable Angle Clamp (ME-8744) Super Pulley (ME-9450A) Pulley Mounting Rod (SA-9242) 45 cm Stainless Steel Rod (ME-8736) (2) Banana Plug Cord-Red (5 Pack) (SE-9750)

15.	Experiments with Pendulums one dimensional motion/ME-8091	Model : ME-8091 Brand : PASCO Scientific USA Super Pulley with clamp (Not Available) Mass and Hanger Set((Not Available) Large rod base (Not Available 90 cm stainless steel rod(Not Available)

Semester-IV

Lab-IV (Modern Physics)

Code: PHY-246L

16	Magnetic Fields of Coils Experiment	Model : EX-5540 Brand : PASCO Scientific USA Helmholtz Coil Base (EM-6715) 500 Turn Field Coil (EM-6723) (2) Dynamics Track Mount (CI-6692) Small Round Base (2 pack) (ME-8974A) Stainless Steel Rod, 25 cm Threaded (ME-8988) (2) Optics Benches (60 cm) (OS-8541) Optics Bench Rod Clamp (set of 2) (OS-8479) PASPORT Rotary Motion Sensor (PS-2120A) PASPORT 2-Axis Magnetic Field Sensor (PS-2162) Banana Plug Cord-Red (5 Pack) (SE-9750) Banana Plug Cord-Black (5 Pack) (SE-9751)
17.	Photo Electric Effect/SE-6609	Model : SE-6609 Brand : PASCO Scientific USA Mercury Light Source (SE-6608) Mercury Light Source (SE-6608) DC Current Amplifier (SE-6621) DC Power Supply I (SE-6615) Mercury Light Source (BEM-5005) Mercury Lamp (BEM-5007) DC Current Amplifier (BEM-5004) DC Power Supply I (BEM-5001)
18.	Zeeman Effect/SE-9654	Electromagnet (SE-9655) Tunable DC Power Supply 6A (SE-9656) Collimating Lens Camera Lens

		CMOS Camera Electromagnet (BEM-5010) Tunable DC Power Supply 6A (BEM-5012) Camera Lens CMOS Camera
20.	Student Spectrometer/SP-9268A	Spectral Tube Power and Mount Spectral Tube (Hydrogen) (SE-9461 Spectral Tube (Helium) SE-9462 Spectral Tube (Argon) SE-9463 Spectral Tube (Corbon dioxide) SE-9464 Spectral Tube (Krypton) SE-9465 Spectral Tube (Mercury) SE-9466 Spectral Tube (Neon) SE-9467 Spectral Tube (Water Vapour) SE-9468

Semester-V

Lab-V (Optics)
Code: PHY-356L

21.	Law of Lenses & Optical Instruments	Model : EX-9988 Brand : PASCO Scientific USA Basic Optics Light Source (OS-8470) Adjustable Lens Holder (OS-8474) Basic Optics Geometric Lens Set (OS-8456) Basic Optics Viewing Screen (OS-8460) 1.2 m Optics Track -- Basic Optics (Model No not mentioned)

Semester-VI

Lab-VI (Basic Electronic)
Code: PHY-366L

22.	AC/DC Electronics Laboratory	Model : EM-8656 Brand : PASCO Scientific USA Student Power Supply (Not Available) Electronic Components (EM-8668) PASPORT Voltage Current Sensor (PS-2115)
23.	Electronic Components-AC/DC Lab/	Model : EM-8668 Brand : PASCO Scientific USA Repeated and Double Paid

Semester-VI

Lab-VII (Solid State Physics)
Code: PHY-477L

24.	Thermoelectric Effect	Model : ET-8782 Brand : PASCO Scientific USA Energy Transfer – Thermoelectric Circuit Board Heat Sink Foam Insulation (2) Thermistor Temperature Cables (2) Short Patch Cords (8)

3.3 Research Laboratries

3.3.1 Location and Area

The location of all of the Physics Graduate labs is Department of Physics, Science Block, New Campus, Khushal Khan Khattak University, Karak.

3.3.2 Objectives

i. To provide facility to the Final semester students of BS to work on their projects under the supervision of their supervisors.
ii. To meet the above mentioned objective, the preparation of laboratory according to the need of the students undertaking the project

3.3.3 Adequacy for Instruction

Research Laboratory is the basic need of every good educational institution or department where both the students and teachers (researchers) can feel and practice the science in its real sense. The role of research laboratories can't be ignored in the higher learning departments/institutions. The standard of any department of higher studies is determined by the quality of research being conducted there along with the quality of graduates produced.

The department of Physics has one modern research laboratory "Advanced Functional Nanomaterials Laboratory", sponsored by HEC under NRPU and other research projects awarded to Dr Abdul Hakim Shah (Assistant Professor/ Head of the Deparmtent) and is equipped with following facilities.

i. Horizental programmable tube furnace
ii. Programmable Muffle furnace
iii. Conventional oven
iv. Magnetic stirrer
v. Ultrasonic bath
vi. Centrifuge machine
vii. Double beam UV-Vis Spectrophotometer

viii. BET Surface area and pore size analyzer (supply order issued)
ix. TG/DTA (Supply order issued)

3.4 Computer Laboratory

Department of Physics has been issued 30x computers for establishement of Computer lab. However, due to limited space, the same has not yet been finalized. The proposed location of Physics Computer Laboratory is Department of Physics, Science Block, New Campus, Khushal khan Khattak University, Karak. Computer lab course has following objectives.

3.4.2 Objectives

i. To provide access to the digital on-line library.
ii. To provide printing facilities
iii. To provide facility to undergraduate students to work on their assignments & research students to work on their projects and thesis.
iv. To meet the above mentioned objective each system is prepared according to the need of the students undertaking the project
v. To install the custom software and to upgrade the hardware on the instructions of the project supervisor (Keeping in mind the complexity of the project)

3.4.3 Computers specifications

i. 25 Branded Dell Computers
ii. Dell (P-IV Systems with RAM 3GB , 256GB, Hard Disk and basic Operating System (Windows XP and/or Red Hat Linux))
iii. DSL Connection
iv. Digital Library access

3.4.4 Adequacy for Instruction

This lab will be used for teaching purposes.

3.4.5 Relevent Courses Taught

Following courses are offered to meet the computational requirements at the BS and MS/MPhil level

i. Programming Fundamentals
ii. Computer Programming
iii. Comptational Physics

3.5 Library Facility

Library facilities with quality text books, reference books, research journals and access to digital library facilities and e-learning materials are mandatory for academic and research purpose and the department has already provided such facilities for its students. At the central library at the campus, Physics has its own section; which has a stock of about 2,500 books and research journals related to various field of Physics. Faculty members and students of the department use resources available at the central library.

Standard 3.5:

Laboratory manuals/ documentation/ instructions for experiments are available and readily accessible to faculty and students.

The Khushal Khan Khattak University, Karak Student has access to KKKUK portal which provides the interaction between various stakeholders such as faculty, students, administrative departments (examination, accounts and etc.), and parents.

In addition to this a special web space is available where faculty can upload their lectures, slides and other resource material they want to provide to the students. Handouts are also provided (if deemed necessary) by the instructor. In addition to, all instructors can create a course website through yahoo groups for sharing all the relevant materials.

In house photocopy machines are available which student can utilize to obtain the photocopies of lecture slides and other lab work details.

Standard 3.6:

There are adequate support personnel for instruction and maintaining the laboratories.

As the department is newly established, therefore the department has been looking for smart and young support personnel for their undergraduate laboratory. However for computer labs, a proper cell known as IT-support section exists. The IT-support section has the necessary skilled/technical workforce and tools available to carry out routine as well as any urgent maintenance/repair. There is a system administrator supported by assistant system administrators. However, as far as the lectures and tutorials are concerned that is the sole responsibility of the concerned instructor and its associated teaching assistants.

Standard 3.7:

The University computing infrastructure and facilities are adequate to support program objectives.

Khushal Khan Khattak University, Karak has provided sufficient funds for the maintenance/upgrading of the existing facilities as well as for building the latest state of the art computational facilities.

Criteria 4. STUDENT SUPPORT AND GUIDANCE

Standard 4-1:

Courses offered with sufficient frequency and number for students to complete the program in a timely manner

Courses are offered in a semester of 15-16 weeks duration. As far as course offerings in the department are concerned, courses are given to those teachers who have tremendous experience in respective fields.

Standard 4-2:

Courses in the major must be structured to ensure effective interaction between students, faculty and teaching assistants

The courses taught by different faculty members have to follow standardized course outlines which are designed at departmental level after mutual consultation of faculty members and are approved by board of studies. During semester, teachers consult each other to improve quality of subject. Different teachers are detailed to teach distinct semester, to have an effective interaction with students.

Standard 4-3:

Guidance on how to complete the program are available to all students and access to qualified advising must be available to make course decisions and career choices

Students are informed about their course objectives and requirements through course outlines provided to them. For all academic programs faculty members are assigned as student counselor to take care of their problems regarding academics and administrative affairs. The Department remains in touch with various professionals who frequently share job opportunities with the students.

Criterion 5: PROCESS CONTROL

Standard 5-1:

The process by which students are admitted to the program must be based on quantities criteria and clearly documented. This process must be periodically evaluated to ensure that meets its objectives.

The admission advertisements are announced in Daily leading newspapers and uploaded on the university official website by web admin as well. The admission process is carried out under the supervision of departmental admission committee, formed by Head of Department to ensure merit and to follow university rules and regulations.

5.1.1 Criteria for admission:

BS-Physics
BS-Applied Physics (Nanotechnology)

Student who have passed the Intermediate examination in Pre Engineering, Pre Medical, Computer Science or Diploma of Associate Engineering (equivalent to F.Sc) with Physics as one subject minimum second division (45% marks) are eligible for admission into BS Physics and BS Applied Physics program.

5.1.2 Seat distribution:

The seat distribution which is approved by university academic council.

Open merit	40
Fata	2
Baluchistan	01
Others	01 Seat for each Province
Disable	01
Hafiz e Qur'an	01
Sports	02
Gilgit Balitistan Student	02
Total	50

5.1.3 Migration Policy;

A student from other educational institution, who intends to migrate to University, shall meet the following requirements:

A genuine and plausible reason for migration.

i. Production of a certificate of good character from his/her parent institution.
ii. Production of detailed marks certificate and syllabi of courses he/she studied for equivalence purposes.
iii. Migration certificate from the institution/University last attended.

Students desiring to transfer their credits, earned at other institutions, will be accepted under the following conditions:

The applicants can apply after completion of first year of study. They should apply for transfer of credit before the start date of a semester.

i. Applicants desiring to transfer their credits, earned at other institutions, will be accepted under the following conditions:
ii. Credits have been earned from institutions recognized / accredited by HEC.
iii. Enrollment of applicants in their parent Universities/Degree Awarding Institutes (DAIs) at the time of applying for transfer of credit hours.
iv. Production of character certificate, from the last attended institution, stating that the student has not been penalized on misconduct, indiscipline or undesirable activities.
v. Possession of SSC & HSSC/equivalent certificates of relevant groups with minimum 70% marks. All Non FSc stream candidates have to provide equivalence certificates duly obtained from Inter Boards Committee of Chairmen (IBCC), Pakistan.
vi. Original transcripts duly verified by the concerned University/DAI are produced along with photocopies.
vii. Course outlines, duly signed by the institutes, are produced for evaluation.

viii. No credit hour of a course will be transferred if the grade is less than C.
ix. Credits from other institutions will be evaluated by the equivalence/evaluation committee on a course-to-course basis with the courses offered by the University.
x. Courses must correspond to courses offered by KKKUK or equivalent in depth and intensity.
xi. Candidate must complete at least 60% credit hours of his degree programme at KKKUK.
xii. The transferred courses will appear on the full transcript of the University. However, they will not be counted towards CGPA of courses of the University.
xiii. Students should not assume that their academic qualifications will allow them transfer of credits till written confirmation has been given.
xiv. In case of acceptance and willingness of the student for admission, he will have to produce migration certificate from the last attended institution within one-month time, failing which the acceptance shall stand withdrawn.

Standard 5-2:

The process by which students are registered in the program and monitoring of students' progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that meets its objectives.

Students are required to register for the courses they take each semester prior to the commencement of a semester. For new students of first semester, the Department of Physics conducts 'Orientation' before the start of the semester. for each program where the students are formally welcomed, and are registered to their relevant programs, details of which are then updated on the IIUI portal. Students in the rest of the semesters register for the courses online at the Admission office. For each course being taken by a student during a semester in BS. It is required that the student undertakes one 'Midterm' examination, at least 3 assignments / 3 quizzes and a final examination. The assessment criterion for each course is as follows:

i. Midterm Examination (30%)
ii. Assignments, quizzes, projects (20%)
iii. Final Examination (50%)

A Student must achieve 60% marks in order to be successful in a subject. The final marks for each course are then graded according to the following scheme (BS).

Marks	Grade	GPA
90-100	A+	4.00
80-89	A	3.76
75-79	B+	3.50
70-74	B	3.0
65-69	C+	2.50
60-64	C	2.00
55-59	D+	1.50

50-54-	D	1.00
Below 50	F	0.00

The program of study is verified through the Cumulative Grade Point Average (CGPA) system and students are awarded scholastic status based on the GPA and CGPA in that particular semester. Each student's performance is measured at the end of each semester. A student must first clear the pre-requisite courses before they can register for any specialization course. If the CGPA of a student goes below 2.00 during a semester, a warning is issued and the student is put on probation. and, if there is still no progress the students are dropped from the program.
(New semester regulations 2022 must be included)

Standard 5-3:

The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that meets with its objectives.

The University follows the following procedure in recruitment of faculty members.

i. First of all, posts are advertised in three leading daily newspapers of the region and also uploaded on university website. After the closing date of advertisement, the establishment section of the university scrutinizes the application form and if there is any deficiency in the application form, the applicant is properly informed to overcome the deficiency in the given time.
ii. After the proper scrutiny by the scrutiny committee, the university has the proper selection board.
iii. After the selection board the case is forwarded to the syndicate for approval.
iv. The candidates selected are informed by office orders, and they have to join in specific time.

Standard 5-4:

The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and to meet the course learning outcomes. The process must be periodically evaluated to ensure that meets its objectives.

- Recently, the department of Physics has conducted its 6rd board of studies meeting on 30 March, 2022 in the meeting it approved its curriculum in which the courses for BS-Physics and BS-Applied Physics (Nanotechnology) programs have been finalized as per HEC criteria.
- Beside the available reference books and course materials, some reference books and course materials have been suggested which will be purchased / arranged for department library.

Standard 5-5:

The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

The requirements are ensured through checking each student's CGPA and whether they have submitted the final project or not. The degree is awarded on completion of a minimum 136 credits with a CGPA of at least 2.0/4.0; the defense of final year project is completed along with report and presentation. The process is evaluated when the course is designed and implemented and is used for improvement.

The examination section has divided the examination and evaluation into the following categories.

- Quizzes
- Assignments
- Mid and Final examinations
- Oral presentations
- Practical viva/voce

The exam scheduled by the controller of examination and marks of the subject are distributed in the following pattern.

S.N0	Component	Marks
1	attendance	05
2.	Test, Quiz, Time Constraint Assignments, Group Assignments, Class Participation	15
3.	Mid Term Examination	30
4.	Final Term Examination	50
Total		100

Grading standard:

A. Equivalence between letter grading and numerical marks shall be as follows;

Grade	Grade Points	Percentage
A	3.67 - 4.00	85 and above
A-	3.34 - 3.66	80 – 84
B+	3.01 - 3.33	75 – 79
B	2.67 - 3.00	71 – 74
B-	2.34 - 2.66	68 – 70
C+	2.01 - 2.33	64 – 67

C	1.67 - 2.00	61 – 63
C-	1.31 - 1.66	58 – 60
D+	1.01 - 1.30	54 – 57
D	0.10 - 1.00	50 – 53
F	0.00	Below 50

B. The range of marks defined above for a particular grade is split below further to reflectincremental grade points.

N.B: In case numerical grades are not feasible (e.g. Field Work, Thesis/Dissertation) ornot required (e.g. related course(s)), letter grade 'P' (Pass) or 'F' (Fail) shall instead be used, and not counted towards the CGPA.

Grade	Marks(%)	Grade Points	Grade	Marks(%)	Grade Points	Grade	Marks(%)	Grade Points
A	100	4	B+	79	3.33	D+	57	1.30
	99	3.98		78	3.26		56	1.21
	98	3.96		77	3.18		55	1.11
	97	3.93		76	3.1		54	1.01
	96	3.91		75	3.01	D	53	1.00
	95	3.89	B	74	3		52	0.77
	94	3.87		73	2.9		51	0.44
	93	3.85		72	2.79		50	0.10
	92	3.83		71	2.67	F	<50	0.00
	91	3.81	B-	70	2.66	P	-----	Pass
	90	3.78		69	2.51	I	-----	Incomplete
	89	3.76		68	2.34			
	88	3.74	C+	67	2.33			
	87	3.72		66	2.24			
	86	3.7		65	2.13			
	85	3.67		64	2.01			
A-	84	3.66	C	63	2			
	83	3.59		62	1.84			
	82	3.51		61	1.67			
	81	3.43	C-	60	1.66			
	80	3.34		59	1.51			
				58	1.31			

Criterion 6: FACULTY

Standard 6-1:

There must be enough full time faculties who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.

There are three full time and three visting faculty members who are committed to the program to provide adequate coverage of the program areas / courses with continuity and stability. The interests and qualifications of all faculty members are sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty has a PhD in the discipline

Program Area of Specialization	Courses in the area	Number of faculty members in each area	Number of faculty with PhD degree
Theoretical/ Computational Physics	Theoretical particle Physics, Neutronics and Thermal Hydraulic Analysis of PWR core and Simulation	**01**	
Laser & Optics	Optoelectronic devices	**01**	
Material Sciences & Semiconductor Devices	(i) Material Science I & II (ii)Solid state electronic devices(undergrad) (iii) Material Science(iv) Solid state electronic devices(grad)	**02**	**02**
Nanoscience & Technology	(i) Nanobased Materials and Applications (ii) Experimental methods of nanophysics (iii) Electronic properties of nano materials (iv) Nanoscale surfaces and interfaces (v)Nanostructural characterization techniques (vi) Nano	**01**	**01**

	safety(vii)Nano magnetism (viii) Experimental Techniques in nanotechnology (ix) Nanomaterials and applications (x) Growth of nanostructured materials (xi) Magnetic and spintronic materials and devices		
Total		**06**	

S.No.	Name	Designation	Qualification
1	Dr. Abdul Hakim Shah	Assistant Professor/ HoD	PhD
2	Dr. Atta Ur Rahman	Assistant Professor	PhD
3	Dr. Fida Rahman	Assistant Professor	PhD
4	Mr. Insaar Ullah	Visiting Lecturer	M.Phil.
5	Mr. Muhammad Ilyas	Visiting Lecturer	M.Phil.
6.	Mr. Junaud Khan	Visting Lecturer	M.Phil.

The faculty Resumes are available in Annexure A.

Standard 6-2:

***All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place*.**

In the Physics department we have different research groups for different sub fields of Physics like Nanoscience and technology, Computational Physics, Laser & Optics, Material Sciences, Semiconductor Devices, All these research groups are headed by highly qualified and senior faculty members. As a result of this, faculty is able to participate in research activities and

publications are being made periodically to verify this effort of the faculty members. Faculty members have been given resources which they utilize optimally for this purpose and remain current in their respective fields.

Faculty is also encouraged to get funding for their projects. In this regard, following projects have been awarded by HEC, Pakistan.

S.No	Title of the project	Funding Agency	Project amount (M)	PI/Co-PI	Project ID/No.	Project status
1.	Start Up Research Grant "Synthesis of metal oxides nanostructures for gas sensors and photocatalytic applications"	HEC	0.4	Dr Abdul Hakim Shah (PI)	731	Completed
2.	Strengthening of Synthesis Lab of the Advanced Functional Nanomaterials Laboratory	HEC	2.3	Dr Abdul Hakim Shah (PI)	HEC/ACAD/ISULL/2017/208	Completed
3.	NRPU "Development of highly selective gas sensors based on vanadium pentoxide nanohybrid materials for sensing of VOCs pollutants at oil and gas industries"	HEC	4.1	Dr Abdul Hakim Shah (PI)	17387	In process
4.	Start Up Research Grant "Covalent organic framework (COFs) coupled with 2D (MoS2, WS2 and MoSe2) material for visible light-driven hydrogen evolution and pollutant degradation"	HEC	1.0	Dr Abdul Hakim Shah (Co-PI)	36/IPFP-II(Batch-I)/NAHE/HEC/2020/373 (PI: Dr. Sher Ali)	In progress
5.	Start Up Research Grant "Electrochemical sensing/ detection of selected heavy metal ions from food and water samples of Khyber Pakhtunkhwa and Sindh by nanocomposites"	HEC	1.0	Dr Abdul Hakim Shah (Co-PI)	484/IPFP-II(Batch-I)/NAHE/HEC/2020/372 (PI: Dr. Afrasiab)	Competed
6.	Start Up Research Grant "Pre & post seasonal (spatial/temporal) variation gauging of water quality in natural & man-made water reservoirs using	HEC	1.0	Dr Abdul Hakim Shah (CoPI)	11080/IPFP-II(Batch-I)/NAHE/HEC/2020/374 (PI: Dr. Atta ur Rehman)	Completed

	multivariate statistical analysis in context of international & local regulatory frameworks: a case study for health risk assessment from Karak"					

There are various faculty development programs that include workshop and seminars which are being run under the banner of Khushal Khan Khattak University, Karak. The main aim of these faculty development programs is to develop better teaching and counseling techniques to the faculty members so that they can adopt more effective teaching methodology in class rooms.

Standard 6-3:

Results of the faculty survey:

Name of Instructor:	Mean
Dr. Abdul Hakeem shah	5
Dr. Fida urhman	4.94
Mr Umiar uddin	3.45
Dr.Attu urhman	5
Mr. junaid khan	5

Alumini

Groups	Mean
1. Knowledge [Humanities and professional discipline, (if applicable)]	4.3
1. Knowledge [Problem formulation and solving skills]	4.06
1. Knowledge [Collecting and analyzing appropriate data]	3.73
1. Knowledge [Ability to link theory to practice.]	3.8
1. Knowledge [Ability to design a system component of process]	3.67
1. Knowledge [IT Knowledge]	3.2
2. Communications Skills [Oral communication]	4.13
2. Communications Skills [Report writing]	3.73
2. Communications Skills [Presentation]	3.8
3. Interpersonal Skills [Ability to work in teams.]	4.2
3. Interpersonal Skills [Ability to work in arduous / Challenging situation]	3.8
3. Interpersonal Skills [Independent thinking]	4.1
3. Interpersonal Skills [Appreciation of ethical Values]	4.3
4. Department Status [Infrastructure]	3.46
4. Department Status [Faculty]	4.4

4. Department Status [Repute at National level]	3.46
4. Department Status [Repute at international level]	2.7

1. Course Content and Organization

The course objectives were clear	
Courses	Mean Valu
1	4.56
2	4.45
3	3.84
4	4.52
5	4.87
6	4.56

The Course workload was manageable	
Courses	Mean Value
1	4.11
2	4.40
3	4.04
4	4.52
5	4.79
6	4.56

The Course was well organized	
Courses	Mean Value
1	4.59
2	4.80
3	4.84
4	4.57
5	4.50
6	4.69

2. Student Contribution

I participated actively in the Course	
Courses	Mean Value
1	4.33
2	4.45
3	4.08
4	4.00
5	4.53
6	4.44

I think I have made progress in this Course	
Courses	Mean Value
1	3.59
2	4.55
3	3.80
4	4.52
5	4.50
6	4.56

2. Learning Environment and Teaching Methods

I think the Course was well structured to achieve the learning outcome	
Courses	Mean Value
1	3.74
2	4.65
3	3.80
4	4.29
5	4.24
6	3.94

The learning and teaching methods encouraged participation	
Courses	Mean Value
1	3.63
2	4.55
3	4.00
4	4.29
5	4.58
6	4.38

The overall environment in the class was conducive to learning	
Courses	Mean Value
1	3.63
2	4.35
3	3.76
4	4.43
5	4.16
6	4.13

Classrooms were satisfactory	
Courses	Mean Value
1	4.48
2	4.80
3	4.36
4	4.71
5	4.61
6	4.63

4. Learning Resources

Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful	
Courses	Mean Value
1	4.26
2	4.45
3	4.32
4	4.38
5	4.58
6	4.38

Recommended reading Books etc. were relevant and appropriate	
Courses	Mean Value
1	4.07
2	4.45
3	4.44
4	4.24
5	4.61
6	4.06

The provision of learning resources in the library was adequate and appropriate	
Courses	Mean Value
1	4.26
2	4.55
3	4.64
4	4.24
5	4.13
6	4.00

The provision of learning resources on the Web was adequate and appropriate (if relevant)	
Courses	Mean Value
1	4.19
2	4.60
3	4.24
4	4.52
5	4.39
6	4.13

5. Quality of Delivery

The Course stimulated my interest and thought on the subject area	
Courses	Mean Value
1	3.96
2	4.70
3	4.20
4	4.62
5	4.37
6	3.81

The pace of the Course was appropriate	
Courses	Mean Value
1	3.48
2	4.60
3	3.76
4	4.57
5	4.74
6	3.88

Ideas and concepts were presented clearly	
Courses	Mean Value
1	4.19
2	4.85
3	4.36
4	4.62
5	4.55
6	4.81

6. Assessment

The method of assessment were reasonable	
Courses	Mean Value
1	4.33
2	4.55
3	3.88
4	4.71
5	4.50
6	4.63

Feedback on assessment was timely	
Courses	Mean Value
1	4.15
2	4.70
3	4.04
4	4.62
5	4.53
6	4.63

Criterion 7: INSTITUTIONAL FACILITIES

Regarding this Criterion, University should have updated system for students' learning like newspapers, libraries like digital library, departmental and central library, online books and publication. Photocopy, scanner, printer and plotter will be available very soon.

Standard 7-1:

The institution must have the infrastructure to support new trends in learning such as E-learning, Supportive Infrastructure and Facilities in learning.

Khushal Khan Khattak University, Karak, is newly established university but in very short time the University achieved most targets regarding education standard.

a. Khushal Khan Khattak University has updated laboratories for the students. Two labs are well developed and well updated, computer lab and media lab. Pakistan Education Research Network facilities also now available for students and faculty for the research purpose. It will make the research work very accessible for students.
b. Five labs for department of Physics and Applied Physics have been approved and tendered.

Standard- 7-2:

The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

Khushal Khan Khattak University, Karak, has the central library of latest books and journal. The university has arranged the book fair events in 2015 and 2016. A qualified librarian with a well-trained supporting staff is responsible to manage the library in an efficient manner. Approximately 14200 books, subscription to adequate number of international journals, periodicals and magazines have been stocked in library.

As per the requirement of the Physics and Applied Physics department the university shall purchase more books for the department in near future.

Standard- 7-3:

Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

Khushal Khan Khattak University, Karak, has proper classrooms for each department. Practical classes' labs are available for students. For presentations projectors are available. There are combine offices for lecturers in each department. These offices are having basic facilities. Faculty members needs latest laptop for

- Research work.
- Presentations

Criterion 8: INSTITUTIONAL SUPPORT

Khushal Khan Khattak University, Karak, has supporting Administration team. This team facilitates the faculty in different way. They also help and support the students in different activities and provide many services.

Administration team is very important partner in achieving Khushal Khan Khattak university vision, mission, and goals by providing standard financial and administrative support services to faculty. This team is also important for students to facilitate them in scholarships etc.

The university budget office is a supporter for the effective and capable use of Khushal Khan Khattak university resources through planning, analysis, liability and arrangement of resources to significances.

The Registrar is responsible for support to the academic as well as administrative purposes of the University. At Khushal Khan Khattak University, registrar provides services in the recruitment, placement and development of University's teaching and administrative staff as well as admission of students.

Khushal Khan Khattak university is having permanent security guards. They are very experienced retired persons of the defence force of Pakistan. This team of the university facilitate the students and employees in security point of view.

Khushal Khan Khattak University's Transportation Services provides management in developing and implementing complete, reasonable, flexible, well-organized, and supportable programs to facilitate the faculty and students in pick and drop.

This section of the university provides all necessary things to the employees and students. This section of our university is very cooperative and active and provides all accessories to the departments without delay.

Technical staff members of the Khushal Khan Khattak University are very supporting for the employees and students too. They properly deliver the technical services to the departments and other administrative offices.

Standard 8-1:

There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.

Khushal Khan Khattak University provides best financial resources to facilitate its employees. The university is situated in the remote area and due to this reason; the University has attractive salary packages as compared to other universities. The financial resources are managed by the finance section of the university.

University gets funds for the research projects from HEC and other organizations to the faculty members through ORIC department.

The university provides transport facility to the students and employees.

Standard 8-2:

There must be an adequate number of high quality graduate students, research assistants and Ph.D. students.

Khushal Khan Khattak University is newly established and is striving to promote the research capabilities of the students, scholars and faculty. BS students are engaged in different projects and scientific events under the supervision of faculty members. M.Phil. and Ph.D. scholars are being provided better resources to meet their research needs.

Standard- 8-3:

Financial resources must be provided to acquire and maintain Library Holdings, laboratories and computing facilities.

Khushal Khan Khattak University, Karak IT department have substantial resources available to develop and maintain library. Faculty is directed to contact library for new book, cases, videos etc of all kinds. There is no restriction on quantity and price of material.

Khushal Khan Khattak University, Karak – IT department have substantial resources available to develop and maintain computer facilities. Every faculty member as well as supporting staff has a personal computer and access to printer on network. Systems are frequently updated as per requirement of faculty and new technology available in market

Each year there are number of co-curricular and extra-curricular activities at the university. Such initiatives help them to utilize their out of class time provocatively and make it more useful. Broadly known as co-curricular activities are the opportunities for involve students in creative and healthy activities, and all such things are an integral part of university life. It offers students additional avenues in which to explore their talents, passions and interests. Participating in co-curricular activities, the students continue to apply what they learn in the classroom to enhance their knowledge and performance.

SUMMARY AND CONCLUSIONS

The Department of Physics, Khushal Khan Khattak University, Karak, is a department of higher learning and research.

It was established in May 2016 with the aim to explore specific approaches to solve problems and to apply knowledge from different areas of Physics to independent research projects. The department is going to launch a strong experimental research program in a number of areas of physics in the near future. The main focus of the Department is to establish well equipped labs. The department is in initial stages and offering only BS Physics program in two disciplines i.e. Physics and Nanotechnology. The Department offers admissions in fall semester. The department has recently 154 students in BS Physics and 19 students in BS Applied Physics.

It should be a matter of satisfaction to all concerned that the Department has been successful in the pursuit of the aims and objectives for which it was established. The curriculum is designed by the faculty members of the department and has been approved by the Board of Studies, comprising of renowned Physics and Nanotechnologists across the country.

The department of Physics is in the phase of development and currently has planned to establish BS level labs and MPhil/ Ph.D. level labs of research which is in pipeline. However, Students are currently not involved in the research projects due to initial stage of the department. Although, the faculty members are getting some research projects from HEC. Head of department Dr. Abdul Hakim Shah has recently completed his SRGP project of HEC and has established a preliminary synthesis lab of Nanotechnology research.

Curriculum design updating is based upon approved criteria. The university Examinations and academic are scheduled semester-wise. Tutorial classes are also weekly arranged.

Institutional facilities are measured through labs, library, administration, infrastructure, class rooms and faculty offices. There are some minor short comings and limitation.

The Physics department of the university can be advanced if the following suggestions are fulfilled the classroom department need effective techniques of learning use of multimedia.

Classrooms are the platform of open discussion and presentations.

- The department of Physics need laboratory and computer laboratory for students.
- Students of the department need high speed internet facility.
- Sufficient space is needed for the research activates