

Forman Christian College

Physics 100 (BS Hons.): [4 – credits] SYLLABUS – ‘Fall 2021’

Mode of Instruction:

Face to face (on-campus)

This course meets the Bachelor of Studies (BS Honours) degree’s General Education requirement in the science category.

Course Prerequisites and Goals:

- *Open to all Baccalaureate students*
- *However, this course is not **recommended** for students who have passed physics in Intermediate or A-levels or equivalent.*
- *Knowledge of elementary mathematics/pre-calculus is preferable.*

Professor: Dr. Sufian Aslam **Office:** S-014 Armacost Science Block 042-9231581-88 ext:573 **Email:** sufianaslam@fccollege.edu.pk

Class meeting Time:

Sec	Lab	Lessons
A	2:00 – 3:50-S-027 W	2:00 – 3:15-S-007 (T, Th)
B	2:00 – 3:50-S-027 M	11:00 – 12:15-S-007 (T, Th)
Office Hours	By appointment only (send an e-mail)	

All instruction and Labs are on Campus.

Availability outside Class Hours (above): – By appointment only (send an e-mail)

Course content:

Introduction to physics, lays emphasis on basic concepts that can be treated with elementary mathematics. These include applications of physics in everyday life to which the student can relate with. Concepts to be taken up are - Scope of Physics, Kinematics, and bodies in motion; Communications, Basic Electricity, Medical Physics and/or Elements of Astrophysics

This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws.

Assessment:

Course assessment and evaluation is based on a blend of regular quizzes, homework sets and/or reports from the lab/activity period, midterm and final exams and other evaluative tools.

Duration:

One 16-week semester (5 - 6 weeks in summer) including examinations and preparation time.

Contact time: (Summer)

Four lessons of theory and two lesson of laboratory work per week.

Learning Outcomes:

By the end of this course, it is hoped that students will be able to:

1. Understand and appreciate that most of the natural phenomena can be explained using fundamental laws of physics.
2. Develop understanding of the material studied by solving applicable problems.
3. Become familiar with physics principles applicable in other fields of science.
4. Become familiar with the techniques used in measurement and measuring instruments.

Note:

Work in this Course is set and graded CONTINUOUSLY: Thus, to excel in this Course, you need to engage in sustained hard work. To gain maximum benefit you should **lookup material before** Classes.

Credits:		<u>At Mid</u>	<u>After Mid</u>	<u>Total</u>
Theory/ Lab	Attendance/Participation	5	5	10
Tests/Quiz/ Assignments Laboratory Work	Minimum 5 Quiz/Assignments	15	10	30
	Practical Notebook counted as 1 assignment at end of course	–	–	
Mid–Term Test/Exam		20	–	20
Final Examination	20% Lab reports	–	8	40
	80% Final Exam	–	32	
Total		40	60	100
Grades would be calculated as per the University criteria (given in the student handbook/catalogue)				

Gradable Course Work comprises:

A minimum of 5–8 pieces of Class work, which are likely to be in the form of 20–50–minute quiz of either TF/MCQ or short–questions or a combination, one being the midterm and the last being the final exam.

All examination, tests and assignments shall be **CUMULATIVE**, i.e., may or may not contain material from previous assignments and tests.

Homework:

2-3 pieces of Homework, which are likely to be in the form of papers of short questions from the text. The solutions to Homework may be reached independently or collaboratively (your choice). However, **ALL Homework MUST be written up in your OWN words** (see section below on **Academic Honesty**). As already mentioned, Homework assignments can be done in teams, but all team members **MUST turn in an individual set** of homework solutions neatly written or typed, these can also be uploaded in the relevant section on **Moodle**.

Laboratory Notebook: is in two parts Non-Electricity and Electricity worksheets. These are to be filled in from a set of Lab work, which involves your participation within and writing up of about 10 – 12 sessions of

laboratory experiments. (Filling tables, plotting graphs and extracting relevant data) and submitted in the next lab lesson.

All submissions (Assignment and Lab notebook should also be uploaded on Moodle and have their pages numbered and contain your roll number/name **on each page**.

Setting and Marking of Gradable Work:

Each piece of Gradable Work is set within ONE WEEK of time indicated on the syllabus. The rules by which marks are allocated are identified each time a piece of Gradable Work is set. You will achieve maximum marks if you:

A) Demonstrate excellence in the following Learning Outcomes:

Thorough appreciation of the Course Content

- Understanding of how to use basic concepts and fundamental laws of physics to explain natural phenomena and apply the knowledge to solve numerical problems.
- Ability to use basic measuring instruments for the purposes of experimentation.
- Utilise, AS A MATTER OF ROUTINE, correct handling practices relating to physical quantities, units and data.
- Ability to self–learn, criticise, and report.

B) Demonstrate excellence in the following aptitudes:

- Use of the medium of English
- Legible writing, neat drawing, and neat calculations and graphing.
- You **MUST** bring into each Lab or class, where appropriate, your **OWN** calculator to perform and check calculations.

Note:

- It is **NOT** permitted for you to share items during Gradable Class work.
- Since the experiments which will be performed by the class comprise the core of the course, **attendance is mandatory**, and will be recorded. Students must organize their work on **Laboratory Worksheets in a Folder** (to be graded as an assignment, (independently of other assignments)).

Required Work:

- Attend ALL classes. Arrive on time and stay the entire period.
- Perform all laboratory work and submit all homework assignments on time.
- Take the quizzes and exams.
- Explore, be attentive, interact – pose questions to me or to each other and figure things out.

Note:

1. An assignment/quiz will be posted/given to the class fortnightly (weekly in Summer semester) on the average (see syllabus below).
2. The Notebook/Lab Worksheets need to be e-mailed/submitted weekly.
3. Absences will be approved ONLY in the case of extenuating circumstances. Non-approved absences will quickly erode your course grade.
4. **Note that this Syllabus does NOT provide for makeup exams, re-sits, rescheduling and/or extensions.**
5. You can bring only a one A4 page of notes to the two examination (if held on campus) and no other references.
6. Bring your own calculators to all graded quizzes and exams – **MOBILE PHONES CANNOT SUBSTITUTE CALCULATORS**

Midterm and Final exam

The exams will be given according to the university schedule, with questions similar to the quizzes in format.

Required Text:

Physics in Context, W. J. Zealney, M. Hynoski et al, Oxford University Press (ISBN: 0 19 550776 2) [2 vol. set] 2002 or later

Optional Text:

Fundamentals of Physics Extended version, David Halliday, Robert Resnick and Walker, Jerel, John Wiley & Sons, 2002 or later

University Physics with Modern Physics, Hugh D. Young, Roger A. Freedman, (ISBN 81–297–0464–1) Pearson Education Ltd. [LPE] Addison–Wesley, 2004 or later

Syllabus / Course of Study (Chapters from the Textbook)

Fall Weeks	Chapter	
1 – 2	Introduction and Breadth of Physics	Quiz/ Assignment
3 – 5	Communication Physics	Quiz/ Assignment
6 – 8	Elements of electricity	Quiz/ Assignment
8	Mid Term Examination	
9 – 10	Elements of electricity	Quiz/ Assignment
11 – 15	Medical Physics OR Motion and kinetics / Revision	Quiz/ Assignment
	Final Examination	

Attendance and Participation:

In line with the University's expectation of % attendance, this Course rewards attendance and participation. You are to record your attendance on Moodle. Your Instructor can also maintain a full record of Class and Lab attendance. Your 10 Attendance Credits are progressively reduced towards 0 if you miss classes.

Missing Classes poses other dangers; for example, you may miss a piece of Class work, or a Homework deadline. Missed Class works and Homework, or a piece of Lab work means you get no Credits for that piece of work, but there are also penalties for attending, but NOT fully participating.

Academic dishonesty, including plagiarism:

FCC does NOT allow activities and acts of Academic dishonesty; to ensure that honest students are not disadvantaged.

I REQUIRE you to use your OWN words when answering questions in pieces of Class work. If, you HAVE committed **Academic dishonesty, including plagiarism**, you will be penalised as described in the Baccalaureate Student Handbook. But honesty is infinitely preferable to losing letter grades or failing.

I will be vigilant of offences and shall take steps to minimise opportunities of dishonesty by ensuring that during graded work only allowing you to

have at your desk, any Items provided by me (E.g., Question Paper, blank paper etc.).

Not allowing you to have at your desk all other UNNECESSARY Items. These include (but are not limited to) BAGS, NOTES and **MOBILE PHONES**. All such UNNECESSARY Items MUST be switched off and placed in your bags or left with the instructor at the front of the class.

Requiring you to sit in seats of MY choice.

Not allowing all forms of communication (verbal, written, electronic etc.) – The only exception is that you may raise your hand if you need my attention.

Requiring you to complete all washroom activities IN ADVANCE.

The penalty for breaking these rules depends on its severity. Use of a mobile phone during a quiz, for example, results in 0 (ZERO) marks for that piece of work AND you will be required to leave the room. In other cases, you may first receive a warning.

Concessions:

- You can bring only a one A4 page of notes to the **two examination** (if held on campus) and no other references.
- Days when lab is held, are also counted as Attendance days.
- Homework and Gradable written work will ONLY be accepted if EITHER sent to me (via e-mail), submitted in hardcopy at my office OR posted on Moodle by **end of the working day of the deadline**. Late homework will NOT be accepted unless it is accompanied by proof of an extenuating circumstance.
- If Gradable Work is MISSED for unplanned reasons, concessions may be given, but ONLY in EXCEPTIONAL circumstances – e.g., DOCTOR’S NOTE indicating serious illness, but other reasons may be accepted at the discretion of the instructor.

Lab PHYS 100:

Experiments (Actual ones if changed shall be notified):

0	Laboratory practices safety and other instructions	
1	Measurement of a volume of a cuboid/ prism/ sphere, using a Vernier calliper	Measure density of the objects against given mass recorded on a balance
2	Measurement of the volume of a sphere/piece of wire using a micrometre screw gauge	
3	Verify the law of mass and the law of amplitude for a simple pendulum	On-Line simulator can also be used by students for practice
4	Verify the law of lengths for a simple pendulum	
5	Verify that intensity of light and distance have an inverse square relationship	
6	Learn the essential workings of the AC/DC laboratory kit and use of a multi-meter (Voltmeter/Ampere meter)	On-Line simulator can also be used by students for practice
7	Measure current and resistance in a circuit and verifying Ohm’s Law	
8	Measure the resistance of resistors in series	
9	Measure the resistance of resistors in parallel	
10	Measure the resistance of resistors in series and parallel	

Evaluation of the Course:

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered online by the Office of Institutional Research and Quality Assurance Cell (QEC) in the two weeks before the Finals.

Additional informal formative surveys may also be administered, by me, within the course as an optional evaluation tool.

Guide to Participating in This Course

1. Structure of this Course

- The course is subdivided in Units – each lasting roughly 4 – 5 lessons – plus lessons for exams and revision.
- You will be taking this course as part of a class of up to 35 other participants. The Teacher would be the facilitator.

NOTE

- In case the course is to be required to be offered online (due to government directives) it would be in form of timed lectures and laboratory instruction, most of the communication will be synchronous, however there would be asynchronous work as well that is, participants will be communicating on the same topic at different times. This would be happening if the participants are not online at the same time. There would be meeting times on “**Big Blue Button**” (Moodle) or “Zoom meeting” or “Microsoft Teams”. (The preferred mode would be “**Big Blue Button**” (Moodle) on the FCC Moodle Platform.

2. Process

- a. All participants in a class will go through the units, doing the units one at a time.
- b. In each of the Units, you will have some textual material to read, instructional material to watch and some exercises to do, problems to solve, usually something to think about and write.
 - Some of these exercises will be documents you will be asked to post to the course website (Moodle) while others might be gradable timed quiz also on Moodle for assessment purposes. Normally quiz would be in class.
 - You and the other participants in your Class should plan to read and give feedback on each of the items that are posted on Moodle or sent to you via e-mail for this course.

3. What You Will Get Out of Completing This Course

- a. When you have completed this course, you will have accomplished the following:

You will have... Learned to

1. Understand and appreciate that most of the natural phenomena discussed can be explained using fundamental laws of physics.
2. Develop an understanding of the material studied by solving applicable problems.
3. Become familiar with physics principles applicable in other fields of science.
4. Become familiar with some of the techniques used in measurement and measuring instruments.

To Succeed in This course, What Will You Need to Do?

1. Be ready to spend 3 – 5 hours each week on this course, other than the meeting time.
2. Be on-time for class and deadlines of when you are instructed to post your work.
 - *Have a back-up plan for how to access the Internet if you have trouble with your own computer.*
 - When posting on the forum with the class and other participants, be respectful and courteous.

4. What You Can Expect from me

- a. I, as the Facilitator/Teacher, will make every effort to reply to any specific question (sent via e-mail) within 48 hours of when I receive it.
- b. If I cannot get on the Internet for an extended period, e.g., 3 or more days, I will inform all participants in my class.
- c. I will treat all participants with respect. If you feel I am not doing this, please let me know what I am doing that you find disrespectful, and I will change that if I can.
- d. I will do everything I can think of to make this learning experience, enjoyable, and enlightening

5. Technical Issues

- a. To participate in this course, you will need access to the following software and hardware:

- b. Please make sure that your computer meets the following requirements. It is important to use supported internet browsers (**Microsoft Edge, Google Chrome or Firefox**) while using “Moodle” or “Zoom” or “Microsoft Teams” to ensure a successful experience.

	Fully Supported Browsers
WINDOWS/MAC	Microsoft Edge (WINDOWS only)/Firefox /Google Chrome All on-line Quiz should be attempted through the Web Browser.
Android Mobile/ iPhone™	Moodle APP is not supported for attempting quiz on mobile platforms.

Minimum Technical Skills:

As University students are expected to demonstrate competency in Computer Technology. To be successful in this course, you will need the following technical skills: For the most part, you will only need to be able to do the following technically:

- Use electronic mail with attachments.
- Send messages and Receive documents or attach documents in your official FCC email.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics, or hyperlinks.
- Open documents in *Microsoft Word, Excel, or Adobe Acrobat Reader* (PDF).
- Use the University LMS (**Moodle™**) for course material and attempting quizzes.
- Go to other websites on the Internet.

Introduction

The primary purpose of this introduction is to help prepare you for this structured program in introductory Physics.

To do this, you need to understand both yourself and the program of study, and then relate the two together. So, let's begin by posing a question for you to ask yourself – **What do you expect to gain from studying this course?**

The Program of Study

When you take this course, here is what you will be doing.

Here is the sequence of the scheme:

Content	Online methods and resources	Assessment
Students learn about the scientific method, SI system of standard units and need for experimental verification of observed phenomenon etc.	Moodle and e-mail. Links to on-line resources	Quiz Assignment on questions from textbook supplemented with some from other textbooks
Students develop understanding about Refraction of Light Waves		
Basics of Electricity – Current, Voltage, circuits etc.		
Medical Physics or Motion and kinetics / Revision		

Lab Work – On Campus Demonstration and conduct of Experiments - link to online experiments that are opensource relating to content and questions concerning the experiments (plotting graphs and extrapolating data – even if measurement is not possible)