

UNL71 Physics

Your Teacher for Unilearn Physics is **Rowan Barber; B Sc, M Eng Sc, Grad Dip Ed**. Rowan is a husband, a father (of infants) and a Teacher. Rowan's current day job is engaging students to discover the joys in science, mathematics and technology. He works with students and teachers from Prep to Year 12. He has experience in water and sanitation in developing communities and a background in Process Engineering in a first world context. He uses this expertise to help students be successful.

Rowan will be providing support for your studies in the Unilearn Physics course. This support will be provided by means of a tutoring system, whereby you can discuss your difficulties with the course concepts by email (preferred), telephone, letter, or through the online course support classroom.

Please do not hesitate to contact him as you work through the course materials. One phone call, or quick email can make a huge difference when you are stuck. Rowan's role is to assist you in mastering these concepts so you can move on to University studies confident that you have the knowledge necessary to succeed.

About the Course

The unit is a preparatory physics unit designed to help you gain the necessary knowledge to enter into a tertiary study. This unit provides a foundation for the study of matter and its motion through space and time. Physics is needed for those who wish to move into engineering, high military applications and fields in space study. This unit covers topics equivalent to those covered in the last two years of physics at high school. The unit concentrates on the concepts and models which physics uses to enhance your understanding of the real world and the techniques for presenting and analysing the data from experimental observation.

This unit includes individual tutorial support with an experienced high school physics teacher. Tutorial support is via email, phone and an online classroom with discussion forums. There is also a Unilearn Student Support Officer available to help you throughout your study.

The unit has flexible enrolment dates to meet your needs. Start your study when you want and complete the unit any time within the 12 month enrolment window. This unit requires a minimum of 220 hours or 18 weeks to complete. The 18-week option is only available to you if you complete the unit in the online classroom.

Aim

The main aim of this course is to assist the learner to obtain skills and competence in physics suitable for commencing studies in tertiary programs with a substantial component of physical science.

At the end of this course the learner should:

- Demonstrate competence in using physical measurements and scientific notation

- Demonstrate a sound knowledge of the basic laws of force and linear and wave motion
- Demonstrate a sound knowledge of the theory of gases, energy and momentum
- Demonstrate a sound knowledge of electric circuits, magnetism and the laws of optics
- Demonstrate a sound knowledge of atomic and nuclear physics
- Demonstrate confidence and competence in applying the basic laws of physics to problem solving situations
- Have acquired a pre-requisite knowledge and confidence to undertake studies which require a higher level of competence in physical science

Be motivated to continue with lifelong learning where skills in physics are required.

Structure

UNL71 Physics consists of nine Modules with an overview of the Topics covered in that UNL71 Physics Study Guide found in the online classroom. A range of Activities is included for the learner to work through to develop experience in problem solving. Detailed solutions for all Activities are included in each Module.

Progress Tests and lab activities are also provided at appropriate points in the course. Students are required to successfully complete nine (9) of these progress tests and two (2) lab activities to be eligible to sit for the final examination.

Tutorial Support is available from the UNL71 Physics Teacher. This support, which can be accessed by the online classroom, mobile phone or email, is designed to help students clarify their understanding of concepts, to provide details of solutions to exercises, and to answer other relevant queries.

Pre-requisite knowledge

Normally, candidates for UNL71 Physics should be competent in mathematics including algebraic manipulation, solutions of linear and quadratic equations, properties including (graphs) of linear quadratic trigonometrically and exponential functions and knowledge of the theory of logarithms is also desirable. Students who feel they need to develop their mathematical skills are referred to UNL32 Senior Mathematics.

On enrolment students receive a study guide comprising the nine Modules and a user-friendly Physics textbook. When the course package is received the student is encouraged to make contact with the UNL71 Physics Teacher. The content of each Topic is studied with the Activities providing learning experiences.

Specimen Examination

The specimen exam or practice final exam is available once you have completed approximately 80% of the course. The Practice test allows students to work through similar problems under exam conditions which allow them to see if they are pacing themselves appropriately to be successful on the final exam. Most students who are successful on the practice exam find they are successful on the final exam as they are prepared for the type of questions and the exam format they will have during the final exam.

Hours of Study

In general the course should be completed in a minimum of 220 hours of study. The actual time required by an individual student to receive a successful result, however, will depend on the background, time available and needs of the learner. A majority of students take 540 hours to complete the course over the 12 months.

Assessment

The chapter questions, Study Guide questions, progress tests and the Specimen Examination are designed to help students prepare for the final examination for UNL71 Physics. Examinations are prepared and assessed by the UNL71 Physics Teacher and monitored by the Unilearn Examinations Committee.

To be eligible to sit for the final, closed book, examination students are required to achieve a mark of 60% or higher each on ALL progress tests and lab activities. The formal, supervised examination covers the content specified by the Study Guide. Candidates, who successfully complete the course, are awarded a Statement of Achievement, which lists the percentage mark gained and a grade of Pass, Credit, Distinction or High Distinction. Any candidate who fails to obtain the minimum mark required for a Pass grade in the examination will be eligible to sit for a second examination.

Examinations are not held at set times. Rather, they are arranged through the Unilearn office after the student has successfully completed the required materials with a score of 60% or higher on each.

Practical Components

UNL71 Physics consists of eight practical lab activities to meet the required 20+ hours of practical work. These lab activities account towards your final grade and can be done either in your home, office or even your backyard if required. Lab activities are hosted through our online classroom, so there is no need to go to a campus or book a room anywhere, they have been developed to be conveniently accessible online.

Physics consists of the following lab activities:

- Forces and Motion- Forces and Motion Lab Activity 1
- Energy and Momentum - Circular Motion and Gravity Lab Activity 2
- Thermal Physics - Specific Heat Lab Activity 3
- Wave Motion - Wave Unit Lab Activity 4a
- Optics – Optics Unit Lab Activity 4b
- Electricity and Magnetism - Faraday Electromagnetic Lab 5
- Electrical Circuits - Ohm's Lab Activity 6
- Atomic and Nuclear Physics - Alpha Decay Lab Activity 7 and Beta Decay Lab Activity 8

Grading Scheme

Students are required to complete all required materials (progress tests and lab activities) with a score of 60% or above on each in order to be eligible to sit the final exam. A student's final grade is an accumulation of all required content and will be weighted as follows:

Progress Tests - 10%
Lab Activities - 10%
Final Exam - 80%

The final grading scale is as follows:

Pass (P) - 50-64%
Credit (C) - 65-74%
Distinction (D) - 75-84%

High Distinction (HD) - 85% and above

Content

Module 1 - New Century Senior Physics: Concepts in context, second edition.

Unit 1 Physical quantities & measurement

- Ch 1 Measurement and quantities

Unit 2 Forces and motion

- Ch 2 Motion in a straight line
- Ch 3 Vectors and Graphing
- Ch 4 Forces in action
- Ch 5 Projectile, circular and periodic motion
- Ch 6 Astrophysics
- Ch 7 Hydrostatics: the physics of fluids

Unit 3 Energy and momentum.

- Ch 8 Momentum
- Ch 9 Work and Energy

Unit 4 Thermal physics

- Ch 10 Heat and temperature
- Ch 11 Heat and matter
- Ch 12 Heat transfer

Unit 5 Wave motion

- Ch 13 Wave motion in one dimension.
- Ch 14 Wave motion in two dimensions.
- Ch 15 Light - a wave.
- Ch 16 Sound, music and audio technology.

Unit 6 Optics

- Ch 17 Reflection of light
- Ch 18 Refraction
- Ch 19 Lenses
- Ch 20 Optical instruments

Unit 7 Electricity

- Ch 21 Electrostatics
- Ch 22 Electric circuits
- Ch 23 Electronics
- Ch 24 Electronic systems

Unit 8 Magnetism & electromagnetism

- Ch 25 Magnetism and electromagnetism
- Ch 26 Electromagnetic induction

Unit 9 Atomic and nuclear physics

- Ch 27 Atomic structure
- Ch 28 Nuclear physics
- Ch 29 Quantum physics and fundamental particles

Unit 10 Extension topics

- Ch 30 Special and General Relativity
- Ch 31 Designing practical electronic circuits
- Ch 32 Solar physics
- Ch 34 Medical physics