Subject:	Physics
Subject Outline	The Physics subject aims to develop and assess students' understanding of the key areas of classical and modern physics and prepares them for further studies at the tertiary level. Physics provides the experimental and theoretical basis for understanding the nature and properties of matter and energy. The Foundation Year for the University of Queensland Physics Program aims to develop and assess students' understanding of the key areas of classical and modern physics. This subject covers modern fundamental theoretical principles and basic experimental techniques of physics. Students gain an understanding of the role of physical science in society. The subject is designed for students intending to study science or engineering subjects that require knowledge of physics, particularly the various engineering disciplines, physiotherapy, veterinary science, and medicine. A laboratory component instructs students in the proficient and safe use of laboratory equipment.
Online Subject Delivery	Students studying Physics will complete blocks of learning, which consist of four interactive lessons and checkpoint tasks. These are completed on Moodle. Students will be supported in completing these blocks of learning by live classes and live question and answer sessions via Zoom web-conferencing. Teachers monitor student's progress and provide individualised feedback on checkpoint tasks. Students access the Physics forum regularly to post questions and review discussions.
Face to Face Subject Delivery	Physics students participate in a blended learning approach that includes class time supported by activities online via Moodle. Classes are student-focused and communicative with learners being expected to contribute to group discussion. Participation in online learning before class prepares students for in-class activities and maximises the value of face to face learning. Students can prepare for class, review content and skills learned as well as complete checkpoints online.
Graduate Attributes (GA)	On completion of the Foundation Program, students will be able to: 1. Communicate effectively in English in a variety of contexts, circumstances and modes 2. Demonstrate relevant, practical and theoretical knowledge in a subject area 3. Apply relevant academic literacy skills in a subject area 4. Apply relevant numeric literacy skills in a subject area 5. Apply critical, analytical thinking, and problem solving skills for academic contexts 6. Work independently and collaboratively in a cross-cultural context 7. Demonstrate academic integrity

Objectives	On successful completion of this subject, students will be able to: 1. Apply knowledge of physics theories and principles to solve problems (GA2, 5); 2. Analyse, evaluate and present information from a range of sources on physics topics (GA 1, 2, 7); 3. Solve problems of physics using complex reasoning (GA 2, 5); 4. Deliver a presentation on a physics topic and contribute to group discussion (GA 1, 2, 6); 5. Evaluate the strengths and limitations of scientific work in relation to physics (GA 2, 5, 7); 6. Operate safely and proficiently while conducting physics activities (GA 2, 6).
Content	**Term One** • Introduction to Physics: Vectors and Forces • Motion with Constant Acceleration • Newton's Laws and Gravity • Projectile and Circular Motion • Energy • Momentum • Simple Harmonic Motion • Static Electricity, Charges • Current Electricity **Term Two** • Magnetism and the magnetic effect of current • Electromagnetic Induction • Thermodynamics **Term Three** • Wave properties • Wave reflection, Refraction, Interference • Diffraction • Einstein's theory of Special Relativity • Particle nature of light • Spectra, the Hydrogenatom, Energy levels in atoms • Radioactivity and its applications **Term Four** • Nuclear Fission and Fusion, Mass defect, Decay Series • Standard Model, Quarks
Attendance	Attendance is a visa requirement. Attendance contributes directly to the academic success of the student. Attendance is monitored as described in the Attendance Policy. • Face to face: Students are expected to attend all classes and complete all Moodle checkpoints. • Online: Students are expected to attend all live online classes and complete all Moodle checkpoints. Engagement with question and answer sessions and Moodle lessons is highly recommended.

Learning Resources	• IES Subject Moodle site • Online Research Databases: Informit • Language of Physics • Physics Notes • OpenStax Physics

Students are assessed through the following assessment activities:

Assessment Activity	Description	Weighting
TERM 1		
Project 1: Seminar (Vlogs) (Part 1)	Students will have a unique opportunity to develop core research skills relevant to a wide spectrum of Physics research, including written and oral communication, by participating in an individual research project associated with a discipline of interest to them. The project is divided into two parts. Students may select the same topic for Parts 1 and 2. In Part 1, students will need to conduct research and record a 3-minute video blog (Vlog) of their presentation and upload it on Moodle as outlined in the submission method section of this task sheet. In summary, students will be required to deliver a presentation on a Physical science topic and contribute to group discussion.	10%
Homework	This assessment activity is worth 10% and runs over four Terms (each term is worth 2.5%). Students are required to complete each problem set of questions for each of the topics in the Physics work program. Each activity is designed to provide an opportunity for students to check their understanding for each topic. Students have unlimited attempts and must achieve a satisfactory grade in Weeks 2 and 5 of each term to be able to proceed to the next lesson.	10%
TERM 2		
Mid-Course Exam	The content of the examination is based on the following topics: Introduction to physics: Vectors and Force (Chapter 1), Motion with constant Acceleration (Chapter 2), Newton's Laws and Gravity (Chapter 3), Projectiles and Circular Motion (Chapter 4), Energy (Chapter 5), Momentum (Chapter 6), Simple Harmonic Motion (Chapter 7), Static Electricity, Charges (Chapter 8), Current Electricity (Chapter 9), Magnetism and the magnetic effect of current (Chapter 10), Electromagnetic Induction (Chapter 11), and Thermodynamics (Chapter 12). The examination will consist of 3 sections: • Section A - Concept questions • Section B - Problems. Students will be required to provide short responses, based on problems or diagrams, either using sentences or equations and calculations. • Section C - Complex reasoning. Students are required to link ideas to solve more complex problems.	20%

TERM 3		
Project 1: Essay (Part 2)	In Part 2, students will need to conduct research and write an essay of approximately 1000 words, using a variety of primary and secondary sources to identify a contemporary issue in Physical sciences relating to a topic of interest (similar to Part 1 or may select a new topic). Students will be required to: • Analyse, evaluate and present information on Physical science topics. • Evaluate the strengths and limitations of scientific work in relation to Physical science.	15%
TERM 4		
UQ Labs	<u>Face to Face Subject delivery</u> Students will complete a prelab homework task before attending UQ (St Lucia Campus) and completing two (2) out of the three (3) experiments in the UQ Physics Laboratory: • Complete relevant OHS declarations. • Experiment 1: DC Measurements - In this experiment the fundamental laws of DC circuit theory, namely Ohm's Law and Kirchhoff's First and Second Laws, are investigated and then applied to the use of ammeters and voltmeters. • Experiment 2: Diffraction - This experiment explores the wave nature of light. The geometrical pattern of diffraction common to all waves is used to find the wavelength of various colours of visible light. • Experiment 3: Optical Instruments - The optical instruments to be studied in this experiment are the: Camera, Eye, Magnifying glass, Microscope. <u>Online Subject delivery</u> Online students will be completing the Online UQ Lab assessment designed by the University of Queensland (UQ). The assessment will contain the same information and practicals as those delivered face to face.	15%
Final Exam	The final exam is based on the following topics: Wave properties (Chapter 13), Wave reflection, Refraction, Interference (Chapter 14), Diffraction (Chapter 15), Einstein's theory of Special Relativity (Chapter 16), Particle nature of light (Chapter 17), Spectra, the Hydrogenatom, Energy levels in atoms (Chapter 18), Radioactivity and its applications (Chapter 19), Nuclear Fission and Fusion, Mass defect, Decay Series (Chapter 20), Standard Model, Quarks (Chapter 21). The examination will consist of 3 sections: • Section A - Concept questions • Section B - Problems. Students will be required to provide short responses, based on problems or diagrams, either using sentences or equations and calculations. • Section C - Complex reasoning. Students are required to link ideas to solve more complex problems.	30%