ZPHY H1101: Physics

Module Title:	Physics
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	6 programme(s)

Teaching & Learning Strategies:	This subject will be taught in three theory classes of one hour duration per week and one two hour practical class each week.

Module Aim:	The aim of this module is to provide the student with an introduction to the principles of physics and to develop practical laboratory skills in physics.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Demonstrate a theoretical knowledge and understanding of physics as applied to chemistry and biology.
LO2	Apply scientific procedures, including recording and analysing experimental data.
LO3	Describe the principles behind basic laboratory instruments which will be studied in detail in the instrumentation course in year 2 of the programme.
LO4	Explain the theory behind practical experiments carried out in the laboratory.
LO5	Identify and quantify basic sources of error in laboratory experiments.
LO6	Demonstrate an ability to work independently in a laboratory or as part of a team.
LO7	Apply the appropriate safety procedures in the laboratory.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Measurement Physical standards, SI units, basic measurements, length, time, errors measurement of errors.
Mechanics Vectors and scalars. Displacement, velocity, acceleration, force, gravity, angular motion, friction, gravitation, work energy, power. Equivalence of heat and work.
Fluids Pressure in liquid, density, atmospheric pressure, pressure gauges, viscosity, blood flow and pressure.
Heat Temperature scales, thermometers, expansion of solids, liquids, gases. Gas laws, kinetic theory of gases and its relationship with the gas laws. Specific heat capacity, latent heat. Conduction, convection, radiation, thermal conductivity. Vapour pressure, humidity. Refrigeration.
Light Reflection, refraction, critical angle and total internal reflection. Fibre optics in telecommunications and medicine. Lenses, the microscope, the telescope. The eye, accommodation, vision defects. Deviation and dispersion of light.
Waves Basic properties of transverse and longitudinal waves, energy propagation by waves. Reflection, refraction, interference, diffraction of waves. Diffraction gratings, polarisation and optical activity.
Electricity Positive and negative charges. Electrical potential. Conductors, insulators, conduction in metal, semi-conductors, pn junctions. Current electricity, current, resistance, resistivity, energy, power, simple electric circuits. Ohm's law, temperature coefficient of resistance, electrical safety, meters.
Atomic and nuclear physics Structure of atom. Alpha, beta and gamma radiation, isotopes, stability of nuclei, natural radioactivity and decay, radioactive series. Production and use of radioisotopes. Detection of ionising radiation. Nuclear fission and fusion. Renewable sources of energy. Biological effects of radiation. X-rays. Energy level transitions in atoms. Introduction to spectroscopy.
Practicals At the start of each practical there will be a talk about any relevant safety issues. The practical component will allow students to develop the required technical competencies, attitudes and behaviours develop problem solving abilities and group skills

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	50.00%
End of Module Formal Examination	40.00%

Special Regulation
Students must achieve a minimum grade (35%) in both the practical/CA and final examination.

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	a number of one hour exams throughout the year	1,2,3,4	10.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	a two hour practical each week	2,3,4,5,6,7	50.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	three hour end of year exam	1,2,3,4	40.00	End-of-Semester

ITCarlow reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	30 Weeks per Stage	3.00
Laboratory	30 Weeks per Stage	2.00
Estimated Learner Hours	30 Weeks per Stage	2.00
	Total Hours	210.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_SABTP_B	Bachelor of Science (Honours) in Biosciences with Biopharmaceuticals	1	Mandatory
CW_SABRE_B	Bachelor of Science (Honours) in Brewing and Distilling	1	Mandatory
CW_SASES_B	Bachelor of Science (Honours) in Environmental Science	1	Mandatory
CW_SAASC_D	Bachelor of Science in Analytical Science	1	Mandatory
CW_SABFQ_D	Bachelor of Science in Biosciences	1	Mandatory
CW_SASCI_C	Higher Certificate in Science in Applied Biology or Applied Chemistry	1	Mandatory