University of the West of Scotland
Module Descriptor

Session: 2023/24

Title of Module: Properties of Matter			
Code: PHYS08004	**SCQF Level: 8** (Scottish Credit and Qualifications Framework)	**Credit Points: 20**	**ECTS: 10** (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Shigeng Song		

Summary of Module

This module is presented at SCQF Level 8. It is a core module for all IoP accredited Physics degrees but would be equally suitable for any student progressing from 1st year Physics modules. The aim of this module is help the students develop a sound scientific understanding of the properties of condensed and gaseous matter at an introductory level.
The module covers the following topics, Distinction between solids, liquids and gases; ionic, covalent and Van der waals and metallic bonds, interatomic forces/ potential energy, fluid pressure, buoyancy, Bernoulli's equation, surface tension, viscosity, elastic properties of solids, thermal expansion of solids, point defects, dislocations and grain boundaries.
The introductory thermodynamics aspects of the course covers the Kelvin temperature scale, properties of ideal gases, equation of state of ideal and real gases, zeroth and first laws of thermodynamics, kinetic theory, second law of thermodynamics, entropy, Heat Engines, Carnot Cycle, microscopic interpretation of entropy, introduction to the macrostate, microstate and the Maxwell-Boltzmann.
The course material is primarily presented in lectures with complementary small-group tutorials and problems classes. The module also includes **practical lab classes** which enable students to put into practice the principles covered in the lectures and tutorials. The laboratory investigation could cover topics ranging from surface tension in liquids to the elastic and hydrostatic properties of matter. Part of the practical element of the module is the presentation of a formal laboratory report or presentation.
The Graduate Attributes relevant to this module are given below.

- Academic: Critical thinker; analytical; inquiring; knowledgeable; digitally literate; problem solver; autonomous; incisive; innovative.
- Personal: Effective communicator; influential; motivated
- Professional: Collaborative; research-minded; enterprising; ambitious; driven

Module Delivery Method

Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
✓					

Face-To-Face
Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.
Blended
A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered "blended" if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations

Fully Online
Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.
HybridC
Online with mandatory face-to-face learning on Campus
HybridO
Online with optional face-to-face learning on Campus
Work-based Learning
Learning activities where the main location for the learning experience is in the workplace.

Campus(es) for Module Delivery						
The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓						

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1		Term 2	✓	Term 3	

Learning Outcomes: (maximum of 5 statements)
On successful completion of this module the student will be able to: L1. L1.Relate the concepts of temperature and pressure to the properties of an ideal gas L2. L2.State the laws of thermodynamics and apply them to simple physical systems L3. L3. Apply the basics of kinetic theory to problems involving gases, as well as the ability to apply statistical physics in various areas of physics. L4. L4. Describe and explain the properties and behaviour of liquids and solids. L5. L5. Conduct prescribed laboratory experiments, collect and analyse data, estimate experimental uncertainties and draw conclusions. Record experimental procedures and observations in a log book and present an experiment in a formal lab report

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	SCQF Level 8. Demonstrate and work with:· A broad knowledge of introductory aspects of the physical ideas for explaining the properties of condensed matter. Knowledge that is embedded in the main theories, concepts and principles· An awareness of the evolving nature of the knowledge and understanding· An understanding of the difference between explanations based in evidence and other forms of explanation and of the importance of this difference
Practice: Applied Knowledge and Understanding	SCQF Level 8. Use some of the basic and routine professional skills, techniques, practices andmaterials used in physics.

Generic Cognitive skills	SCQF Level 8. · Present and evaluate arguments, information and ideas in physics· Use a range of approaches to addressing problems and issues in physics	
Communication, ICT and Numeracy Skills	SCQF Level 8. · Use a wide range of routine skills and some advanced skills in physics. For example:o convey ideas in well-structured and coherent formo use a range of forms of communication effectively in both familiar and new contextso use standard applications to process and obtain a variety of information and datao use a range of numerical and graphical skills in combinationo use numerical and graphical data	
Autonomy, Accountability and Working with others	SCQF Level 8. · Exercise some initiative and independence in carrying out defined activities· Take account of own and others' roles and responsibilities in carrying out and evaluating tasks· Work with others in support of current professional practice under guidance	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: PHYS07006 PHYS07007 MATH07003 MATH07009	**Module Title:** Introductory Physics A Introductory Physics B Mathematics of Space & Change Mathematics of Space & Change 2
	Other:	or equivalent
Co-requisites	**Module Code:**	**Module Title:**

* Indicates that module descriptor is not published.

Learning and Teaching	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Tutorial/Synchronous Support Activity	12
Laboratory/Practical Demonstration/Workshop	12
Independent Study	152
	200 Hours Total

****Indicative Resources: (eg. Core text, journals, internet access)**
The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

1. Finn, C.B.P. Thermal physics, Chapman and Hall, 1993 or later edition.

2. Guenault, T. Statistical physics, Chapman and Hall, 1995 or later edition.

3. Zemansky, M.W. and Dittman, R.H., Heat and Thermodynamics, 7th edition, McGraw-Hill, New York, 1997.

4. Barber D.J. and Loudon R, An introduction to the properties of condensed matter, CUP, 1989 or later edition.

5. Young, H. and Freedman, R. University Physics with Modern Physics, Pearson; 14 edition.

(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Engagement Requirements

In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: Academic engagement procedure

Supplemental Information

Programme Board	Physical Sciences
Assessment Results (Pass/Fail)	No
Subject Panel	Physical Sciences
Moderator	Des Gibson
External Examiner	H Boston
Accreditation Details	Institute of Physics
Changes/Version Number	3.03 Evaluation details updated v3.0 The prerequisites were updated

Assessment: (also refer to Assessment Outcomes Grids below)

This course consists of three formal assessments as indicated below .The written examination takes place at the end of the semester.

The laboratory element of the course is assessed through written formal lab reports .The teaching is supported by a range of classroom exercises during the teaching sessions to help prepare the students for the two written tests and the final written examination.Category Type of assessment %
1 Examination 60%
2 Continuous assessment (coursework) 20%
3 Laboratory/practical work (including formal laboratory report) 20%

(N.B. (i) **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.
(ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Learning Outcome (5)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen closed book (standard)	✓	✓	✓	✓		60	2

Component 2

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Learning Outcome (5)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Case study	✓	✓	✓	✓		20	0
Workbook/ Laboratory notebook/ Diary/ Training log/ Learning log	✓	✓	✓	✓		20	0
Combined Total For All Components						100%	2 hours

Footnotes
A. Referred to within Assessment Section above
B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).
   This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

In order for the student to complete this module an element of laboratory work will require to be undertaken
UWS Equality and Diversity Policy

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)