1. **Title of the module**

PHYS0022 (PH022) - Graphical Methods for Physical Scientists

1. **School or partner institution which will be responsible for management of the module**

School of Physical Sciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 3

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn

1. **Prerequisite and co-requisite modules**

Co-requisite: PHYS0020 (PH020)

1. **The programmes of study to which the module contributes**

BSc (Hons) Chemistry with a Foundation Year, BSc (Hons) Forensic Science with a Foundation Year, BSc (Hons) Physics with a Foundation Year

School concerned: School of Physical Sciences

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**

8.1 Represent and analyse lines, curves (including quadratics) and circles.

8.2 Know trigonometric and related functions and solve equations involving them.

8.3 Represent, manipulate, and analyse vectors and their properties.

8.4 Apply the above graphical methods in modelling phenomena in physical sciences.

8.5 Proceed with a firm foundation in maths (in combination with similar modules) to be successful in Stage 1 (Level 4) of physical science programmes in the School of Physical Sciences.

1. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**

9.1 Problem-solving skills, an ability to formulate problems in precise terms and to identify key issues, and the confidence to try different approaches in order to make progress on challenging problems.

9.2 Analytical skills – associated with the need to pay attention to detail and to develop an ability to manipulate precise and intricate ideas, to construct logical arguments and to use technical language correctly.

9.3 Personal skills – the ability to work independently, to use initiative, to organise oneself to meet deadlines and to interact with other people.

9.4 Numeracy and computational skills, including such aspects as correct use of units and modes of data presentation.

1. **A synopsis of the curriculum**

Graphical methods are powerful, visual tools to illustrate relationships in theories, and in experimental quantities, pertaining to physical phenomena. They involve knowledge of, and visual representation of mathematical functions frequently encountered in the physical sciences. The topics covered are expected to include:

Graphs of functions including straight lines, quadratics, 1/x and 1/x2.

Parametric equations for curves, including use in modelling phenomena in physical sciences.

Coordinate geometry of lines and circles, including calculations with angles in radians.

Trigonometric functions (sine, cosine, tangent), and reciprocal and inverse trigonometric functions.

Formulae involving small angles, sums of angles, and products of trigonometric functions.

Solving trigonometric equations in the context of modelling phenomena in physical sciences.

Vectors in one, two and three dimensions, and notations for representing them.

Algebraic operations of vector addition and multiplication by scalars.

Use of vectors in modelling phenomena in physical sciences.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

• Core Maths for Advanced Level, Bostock & Chandler, (2000) ISBN 0748755098. Copies are in the library.

• Foundation Maths, Croft & Davison, 5th ed., (2010) pub. Addison-Wesley, ISBN 0273730762. Copies are in the library.

• Foundation Mathematics, Stroud & Booth, (2009) ISBN 0230579078. Copies are in the library.

1. **Learning and teaching methods**

36 contact hours

114 hours of independent study.

The total number of hours is 150.

1. **Assessment methods**
	1. Main assessment methods

Moodle assignments (6) – approximately 20 hours (5% each)

Examination - 2 hours (70%.)

13.2 Reassessment methods

Like for like.

1. ***Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 9.1 | 9.2 | 9.3 | 9.4 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| Lectures | **x** | **X** | **x** | **x** | **x** | **x** | **x** |  | **x** |
| Workshops | **x** | **X** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Private Study | **x** | **X** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Online quizzes | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Examination (2 hr) | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Physical sciences is an international subject with laws of physical sciences discovered and techniques developed and refined by physical scientists across the globe. Mastery of the subject-specific learning outcomes, will equip students to apply the theories and techniques of this module in a wide range of international contexts. The module team is drawn from the School of Physical Sciences, which includes many members of staff with international experience of teaching and research collaboration. In compiling the reading list, consideration has been given to the range of texts that are available internationally. The support SPS provides to its students is also attuned to our international student body.

**FACULTIES SUPPORT OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 10/07/2019 | Minor | September 2019 | 13, 14 |  |
|  |  |  |  |  |