1. **Title of the module**

PHYS3120 (PH312) – Mathematics II

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

Division of Natural Sciences

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

Level 4

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)**

Spring

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

None

1. **The course(s) of study to which the module contributes**

Compulsory for:

Physics (BSc, BSc with Foundation Year, BSc with a Year in Industry, MPhys, MPhys with a Year Abroad).

Physics with Astrophysics (BSc, BSc with a Year in Industry, MPhys, MPhys with a Year Abroad).

Astronomy Space Science and Astrophysics (BSc, BSc with a Year in Industry, MPhys, MPhys with a Year Abroad).

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

8.1 Use mathematical skills in the topics of differential equations, multivariate calculus, non-Cartesian coordinates, and vector calculus.

8.2 Analyse mathematical problems and select appropriate mathematical theorems and techniques for their solution.

8.3 Ability to correctly carry out algebraic manipulations, differentiate, and integrate, when solving mathematical problems.

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

9.1 Demonstrate problem solving skills.

9.2 Demonstrate investigative skills (including information retrieval).

9.3 Demonstrate analytical skills (including working with details and evaluating ideas).

9.4 Demonstrate personal skills working independently (e.g. to use initiative and originality, be organised and meet deadlines).

9.5 Demonstrate ICT skills (e.g. to use Moodle and internet resources).

1. **A synopsis of the curriculum**

This module builds on the Mathematics I module to develop key mathematical techniques involving multiple independent variables. These include the topics of differential equations, multivariate calculus, non-Cartesian coordinates, and vector calculus that are needed for Physics modules in Stages 2 and 3.

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

Stroud, K., and Booth, D. (2020). *Engineering Mathematics* (Eighth Edition). London: Palgrave Macmillan

1. **Learning and teaching methods**

Total Contact Hours: 36

Total Private Study Hours: 114

Total Study Hours: 150

1. **Assessment methods**
	1. Main assessment methods
* Problem Set 1 (4 hours) – 15%
* Problem Set 2 (4 hours) – 15%
* 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* | *9.1* | *9.2* | *9.3* | *9.4* | *9.5* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lecture | **x** | **x** | **x** | **x** |  | **x** |  |  |
| Problem Solving | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |
| Problem Sets | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Examination | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The Division 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**

The topics to be covered in this module were developed collaboratively by scientists in many countries over the course of centuries. Throughout the teaching of this module emphasis will be made on how contributions from scientists in different countries, each having their own science culture, interacted to create the knowledge we have today, which like all established scientific knowledge transcends national boundaries.

**DIVISION 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) |
| January 2021 | Major | September 2021 | 8-10, 12-14 | No |
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| Revised FSO Jan 2018 |