1. **Title of the module**

PHYS5040 (PH504) - Electromagnetism and Optics

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

Physical Sciences

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

Level 5

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**

Prerequisite:

PHYS3210 Mechanics

PHYS3220 Electricity and Light

PHYS3230 Thermodynamics and Matter

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

BSc/BSc with Foundation Year/MPhys/MPhys with Year Abroad Physics

BSc/MPhys/MPhys with Year Abroad Physics with Astrophysics

BSc/MPhys/MPhys with Year Abroad Astronomy, Space Science and Astrophysics

This is not available as a wild module.

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

8.1 Demonstrate knowledge and understanding of physical laws and principles in Electromagnetism and Optics, and their application to diverse areas of physics.

8.2 Demonstrate an ability to identify relevant principles and laws when dealing with problems in Electromagnetism and Optics, and to make approximations necessary to obtain solutions.

8.3 Demonstrate an ability to solve problems in Electromagnetism and Optics using appropriate mathematical tools.

8.4 Demonstrate an ability to use mathematical techniques and analysis to model physical behaviour in Electromagnetism and Optics.

* 1. Demonstrate an ability to present and interpret information graphically.
  2. Demonstrate an ability to make use of appropriate texts, research-based materials or other learning resources as part of managing their own learning.

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

9.1 Demonstrate a knowledge and understanding of problem-solving skills, in the context of both problems with well-defined solutions and open-ended problems; 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. Numeracy is subsumed within this area.

9.2 Demonstrate a knowledge and understanding of 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.

1. **A synopsis of the curriculum**

This module looks to introduce a range of important laws and principles relating to the physics of electromagnetism and optics. Students will also learn mathematical techniques to enable the modelling of physical behaviour and apply important theory to a range of electromagnetism and optics scenarios.

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

* D.J. Griffiths, Introduction to Electrodynamics, 3rd Ed. (1999), Prentice Hall
* Tipler, P. A., Physics, 4th Ed., W.E. Freeman
* E Hecht, Optics, 2nd Ed. (1987), Addison-Wesley

1. **Learning and teaching methods**

Total contact hours: 36

Private study hours: 114

Total study hours: 150

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

Coursework (20 hrs) 30%, consisting of

* + Homework 1 (10 hours, 15%)
  + Homework 2 (10 hours, 15%)

Exam (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* | *8.6* | *9.1* | *9.2* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Lectures | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |
| *Assignments* | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Examination* | **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**

The topics to be covered in this module were developed collaboratively by scientists in several countries (European, USA, including the U.K.) during the first decades of the Twentieth century. Throughout the teaching of this module emphasis will be made on how contributions from different countries, each having their own approach to Physics, interacted to create the theory we have today, which like all established scientific theories transcends national boundaries.

**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.**

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 01/05/2020 | Minor | September 2020 | 10, 12, 13 |  |
|  |  |  |  |  |