

**39. Optics and Photonics (PH031IU)**

Module designation	<i>This course will cover the basics of physical optics and photonics, the applications of photonics such as fiber optic communication and photon detectors.</i>
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Dr. Trịnh Xuân Thắng
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, assignment, homework
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 25 Private study including examination preparation, specified in hours: 60
Credit points/ECTS	2 credits/3.08 ECTS
Required and recommended prerequisites for joining the module	Previous Course: General Physics 3 (PH023IU) (or Physics 4 (PH012IU)), or Analytical Physics IIB (IS014IU)



<p>Course learning outcomes</p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1" data-bbox="579 353 1329 1086"> <thead> <tr> <th data-bbox="579 353 831 472">Competency level</th> <th data-bbox="831 353 1329 472">Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td data-bbox="579 472 831 719">Knowledge</td> <td data-bbox="831 472 1329 719">CLO1. Apply knowledge of optics and photonics into photonics applications such as fiber optic communication and photon detectors</td> </tr> <tr> <td data-bbox="579 719 831 925">Skill</td> <td data-bbox="831 719 1329 925">CLO2. Express ideas using the appropriate means of graphical communications or oral presentations</td> </tr> <tr> <td data-bbox="579 925 831 1086">Attitude</td> <td data-bbox="831 925 1329 1086">CLO3. Recognize the need of further self-learning in optics and photonics.</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Apply knowledge of optics and photonics into photonics applications such as fiber optic communication and photon detectors	Skill	CLO2. Express ideas using the appropriate means of graphical communications or oral presentations	Attitude	CLO3. Recognize the need of further self-learning in optics and photonics.																			
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<p>Content</p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (2 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1" data-bbox="563 1328 1401 1776"> <thead> <tr> <th data-bbox="563 1328 1123 1368">Topic</th> <th data-bbox="1123 1328 1281 1368">Weight</th> <th data-bbox="1281 1328 1401 1368">Level</th> </tr> </thead> <tbody> <tr> <td data-bbox="563 1368 1123 1413">Chapter 1: Nature of light</td> <td data-bbox="1123 1368 1281 1413">2</td> <td data-bbox="1281 1368 1401 1413">I, T</td> </tr> <tr> <td data-bbox="563 1413 1123 1458">Chapter 2: Light propagation I</td> <td data-bbox="1123 1413 1281 1458">2</td> <td data-bbox="1281 1413 1401 1458">T</td> </tr> <tr> <td data-bbox="563 1458 1123 1503">Chapter 3: Light propagation II</td> <td data-bbox="1123 1458 1281 1503">2</td> <td data-bbox="1281 1458 1401 1503">T, U</td> </tr> <tr> <td data-bbox="563 1503 1123 1547">Chapter 4: Fourier optics</td> <td data-bbox="1123 1503 1281 1547">2</td> <td data-bbox="1281 1503 1401 1547">T, U</td> </tr> <tr> <td data-bbox="563 1547 1123 1592">Chapter 5: Optical fibre</td> <td data-bbox="1123 1547 1281 1592">2</td> <td data-bbox="1281 1547 1401 1592">T, U</td> </tr> <tr> <td data-bbox="563 1592 1123 1637">Chapter 6: Physics of lasers</td> <td data-bbox="1123 1592 1281 1637">1</td> <td data-bbox="1281 1592 1401 1637">T, U</td> </tr> <tr> <td data-bbox="563 1637 1123 1727">Chapter 7: Semiconductor photon sources</td> <td data-bbox="1123 1637 1281 1727">2</td> <td data-bbox="1281 1637 1401 1727">T, U</td> </tr> <tr> <td data-bbox="563 1727 1123 1776">Chapter 8: Photon detectors</td> <td data-bbox="1123 1727 1281 1776">2</td> <td data-bbox="1281 1727 1401 1776">T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Chapter 1: Nature of light	2	I, T	Chapter 2: Light propagation I	2	T	Chapter 3: Light propagation II	2	T, U	Chapter 4: Fourier optics	2	T, U	Chapter 5: Optical fibre	2	T, U	Chapter 6: Physics of lasers	1	T, U	Chapter 7: Semiconductor photon sources	2	T, U	Chapter 8: Photon detectors	2	T, U
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<p>Examination forms</p>	<p>Exam</p>																											



<p>Study and examination requirements</p>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>
<p>Reading list</p>	<p>Textbook:</p> <p>[1] Lecture notes</p> <p>[1] Saleh, B.E.A., <i>Fundamentals of photonics</i>, New Jersey : Wiley, 2007.</p> <p>Reference:</p> <p>[3] <i>Laser Electronics</i>, J.T. Verdeyen, 3rd edition</p> <p>[4] <i>Fundamentals of Physics</i>, Halliday, Resnick, Walker, 9th edition</p>