Photonic Subsystems (ELEC0078)

Description
This four-day course will give you an in-depth understanding of the design, fabrication, operation and performance of advanced photonic devices for a variety of applications, including optical-fibre communications and solar power generation. It covers materials and devices and examines how ingenious device design can overcome shortcomings in the materials, devices or their application. This module features several key advanced devices used in all areas of photonics such as high bit rate fibre, security imaging, waveguide and free space digital communications. The course takes place over four days, followed by a three-hour tutorial and an optional exam.

The following topics will be covered during the course:

- Crystals
- The electronic behaviour of semiconductor materials
- Principle of generation of light and its detection
- Quantum wells and quantum dots
- Semiconductor growth by molecular beam epitaxy (MBE)
- Light emitting diodes (LEDs)
- Coupling of LEDs and lasers to optical fibres
- Principle of operation of a laser
- The design of a variety of semiconductor lasers

The module aims to provide an in-depth understanding of the design, operation and performance of advanced photonic devices including light emitting diodes, LEDs, a range of semiconductor lasers, photodetectors, liquid crystal devices, photovoltaic solar cells for a variety of applications including optical communications and solar power generation.

By the end of this module students will be expected to:

- Know and understand the scientific principles and methodology of light generation, detection and modulation and to use this to understand the

Key information

<table>
<thead>
<tr>
<th>Year</th>
<th>2019/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit value</td>
<td>15 (150 study hours)</td>
</tr>
<tr>
<td>Delivery</td>
<td>PGT L7, Campus-based</td>
</tr>
<tr>
<td>Reading List</td>
<td>View on UCL website</td>
</tr>
<tr>
<td>Tutor</td>
<td>Prof Cyril Renaud</td>
</tr>
<tr>
<td>Term</td>
<td>Term 2</td>
</tr>
<tr>
<td>Timetable</td>
<td>View on UCL website</td>
</tr>
</tbody>
</table>

Assessment

- Written examination (main exam period): 100%

Find out more

For more information about the department, programmes, relevant open days and to browse other modules, visit ucl.ac.uk

Disclaimer: All information correct as of August 2019. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
operation and evolution of advanced photonic devices so that they can appreciate historical, current, and future developments and technologies.

- Have a comprehensive understanding of the scientific principles of light generation, detection and modulation and to use this to understand the operation and evolution of advanced photonic devices and their use in telecommunications and in solar power generation;

- Know and understand the mathematical principles necessary to underpin their education in advanced photonic devices and apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.

- Be aware of developing technologies related to advanced photonic devices.
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