

## **Engineering Tripos Part IIA Project, GB1: Optical Fibre Link, 2023-24**

### **Leader**

[Prof T D Wilkinson](#) [1]

### **Timing and Structure**

Thursday 9-11, and afternoons and Monday 11-1

### **Prerequisites**

3B1 & 3B2 essential

### **Aims**

The aims of the course are to:

- To provide practical experience of electronic circuit design and construction
- To provide experience of using optoelectronic devices and their applications.
- To build a communications system including testing and characterisation

### **Content**

The aim of the project is to design and build a complete communications link based on a plastic optical fibre and resonant cavity light emitting diode that is capable of delivering up to 10 Mbit/s data rates. The challenge is to build a working transmitter, receiver and full testing scenario using a limited set of components within the EITL. Each element of the link has to be fully tested and characterised before putting them together as an overall system capable of transmitting digital data from a compact disk player. Students work in groups of three to design, construct and test an optical communications system. Each student within a group will be expected to manage the different sections of the design and construction individually and then combine them as a group into an overall communications system. All reports are submitted individually and will contain both individual and group elements as the project design ideas develop.

#### **Week 1**

System outline and basic transmitter, receiver and testing scenario. First interim report.

#### **Week 2**

Receiver, transmitter and test scenario construction. Characterisation and fault finding. Second interim report.

#### **Week 3**

System test integration and general testing. Optional extension design/construction.

#### **Week 4**

Final testing and CD demonstration of overall systems along with extensions. Final report.

## MINI-LECTURES

Mini-lectures on optical communication system design and circuit design for the basic building blocks will be integrated into the first week of the project.

## Coursework

| Coursework                  | Due date                                                                           | Marks |
|-----------------------------|------------------------------------------------------------------------------------|-------|
| <u>Interim report 1</u>     | TBA                                                                                | 15    |
| <u>Interim report 2</u>     | TBA                                                                                | 15    |
| <u>Final summary report</u> | 4pm Thursday 7 June 2023                                                           | 50    |
|                             | Approximately 30% of marks are based on group work and 70% on individual elements. |       |

## Examination Guidelines

Please refer to [Form & conduct of the examinations](#) [2].

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### Links

[1] <mailto:tdw13@cam.ac.uk>

[2] <https://teaching24-25.eng.cam.ac.uk/content/form-conduct-examinations>