

## Engineering Tripos Part IIA Project, SC2: Bicycle Design, 2023-24

### Leader

[Prof M P F Sutcliffe](#) [1]

### Timing and Structure

Tuesdays 9-11am plus afternoons, and Fridays 11-1pm

### Prerequisites

Part I Mechanics, Materials and Structures

### Aims

The aims of the course are to:

- To apply engineering principles to bicycle design
- Propose and develop an individual project on one aspect of bicycle design
- Develop project skills

### Content

The project will investigate the mechanical, structural and materials design considerations for the bicycle.

#### 1. Introduction (joint sessions).

An introductory session will put the bicycle in its historical perspective and discuss the specification of various types of bicycle.

#### 2. Mini-projects (students work individually).

Students will undertake a mini-project on one aspect of bicycle design. Mini-projects will be directed through the use of timetabled supervision. Project can be theoretical, numerical or experimental, or a mixture of all three. Discussion between students is encouraged. It is expected that students will have controlled access to laboratory facilities and technical support. Possible project ideas include:

- Optimisation on cost or performance
- Tyre rolling resistance
- Wheel design
- Aerodynamics
- Human factors
- Bearing and chain performance
- Fork and frame design
- Fatigue failure of frames and spokes
- Power matching

The project will be split into phases with corresponding reports and feedback:

- Very rough draft mini-project plan
- Literature review
- Finalised project plan
- Presentation
- Final report

### Coursework

| Coursework                | Due date         | Marks |
|---------------------------|------------------|-------|
| Draft project plan/Forum  | Mon 13 May 2024  | 3+5   |
| Finalised project plan    | Mon 20 May 2024  | 10    |
| Literature review         | Mon 27 May 2023  | 12    |
| Presentation              | Wed 5 June 2023  | 10    |
| Mini-project final report | Thur 6 June 2023 | 40    |

### Examination Guidelines

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

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### Links

[1] <mailto:mpfs1@cam.ac.uk>

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