Engineering Tripos Part IIA Project, SC2: Bicycle Design, 2022-23

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 15 May 2023	3+5
Finalised project plan	Mon 22 May 2023	10
Literature review	Mon 29 May 2023	12
Presentation	Wed 7 June 2023	10
Mini-project final report	Thur 8 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://teaching24-25.eng.cam.ac.uk/content/form-conduct-examinations