Engineering Tripos Part IIA Project, SC2: Bicycle Design, 2019-20

Leader

Prof M P F Sutcliffe [1]

Timing and Structure

Please see moodle page for 2020 revised details

Prerequisites

Part I Mechanics, Materials and Structures

Aims

The aims of the course are to:

- To define the specification of various types of bicycle in current use
- To choose suitable materials for a number of components, using the Cambridge Engineering Selector as the principal tool, but also drawing on other sources.
- To investigate in detail one aspect of bicycle design, as listed below.

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. Students choose a mini-project for section 3.

2. Specification, Conceptual Design and Use of the Cambridge Engineering Selector (students work alone in week 1).

All students will receive two handouts. The first will guide the writing of a report on the specification and conceptual design of selected parts of the bicycle and an introduction to their mini-project.

The second handout will lead students through the use of the Cambridge Engineering Selector (CES) to identify suitable materials and help them establish performance indices for a number of key components.

3. Mini-projects (students in pairs).

Students will undertake a mini-project on one aspect of bicycle design. Mini-projects will be directed through the use of handouts and timetabled supervision. Each student will write a report on their mini-project.

The subjects covered are:

- Optimisation on cost or performance
- Tyre rolling resistance

- Bearing and chain performance
- Fork and frame loading
- Fatigue failure of frames and spokes
- Power matching.

4. Presentation and Assessment: Each student will make a short presentation of their findings.

Coursework

Coursework	Due date	Marks
First report	Wed 13 May 2020	10
CES report	Fri 15 May 2020	10
Presentation	Wed 3 June 2020 (TBC)	10
Mini-project report	Fri 5 June 2020	50

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