Concept Class UK 2020 Supplementary Rules

Introduction

Formula Student UK (FS) is an educational challenge organised by the Institution of Mechanical Engineers (IMechE) for the purpose of educating and preparing students of engineering and other disciplines for their future careers.

The competition is governed and executed in line with four key principles:

- Safety – to maintain the highest standards of safety throughout the event.
- Education – to focus on providing the best educational experience for all those involved, including competitors, volunteers and visitors.
- Openness – to be open to collaboration with other competitions and parties, to embrace new ideas and to allow different vehicle concepts to compete together within a common rule set.
- Inclusiveness – to deliver an event that allows all teams to be at their best: new or established, elite or amateur, domestic or international.

The IMechE is supported by volunteers from Industry and Academia that together form the Formula Student Organising Committee (the Committee). The Committee includes the IMechE Formula Student Project Manager and Project Executive and volunteers: Chairmen, Chief Judge, Clerk of the Course, Head Judges, Chief Scrutineer(s), Dynamic Events Captain(s) and other volunteers representing key functional areas. The Committee is supported by sub-committees for Scrutineering, Dynamic Events and FS-AI.

The base ruleset for the competition, along with the Formula Student UK supplementary rules are continuously reviewed by the Committee and are updated at least once a year with the aim of providing the best educational experience for students and volunteers whilst maintaining the highest standards for safety.

Teams with vehicles in the design process can compete in Formula Student Concept Class (formerly Class 2), competing in static events (Business Plan Presentation, Cost & Manufacturing and Engineering Design) only. Concept Class entries are assumed to be focused on ultimately providing a Formula Student (running vehicle) entry in a future competition year.

The static events are judged by a mix of experienced engineering industry professionals (from backgrounds including motorsport, automotive, aerospace and supply chain partners) as well as recent graduates and some learned academic authorities.

The Formula Student Rules consist of four documents:

2020 Formula Student Rules (FSG Rules)
Formula Student UK 2020 Supplementary Rules
Formula Student AI 2020 Rules
Formula Student Concept Class 2020 Rules (this document)

This set of regulations deals with 'Concept Class' and is written using the "2020 Formula Student Rules" as the base ruleset with the with the Formula Student UK 2020 Supplementary Rules containing amendments or new rules specific to the UK event, all of which take precedence over the equivalent regulation in "2020 Formula Student
Rules”. Teams are therefore required to consider fully all of the Formula Student rules in parallel with these Concept Class rules.

Formula Student includes internal combustion engine vehicles, electric vehicles and alternative fuelled vehicles; it is assumed that Concept Class entries pay full attention to this important FS specific fact. For the avoidance of doubt, a key design choice for which entrants must provide detailed understanding is that of powertrain conceptual choice.

However, many of the regulations remain identical to Formula Student and so you must also fully understand the Formula Student event objectives (i.e. those applicable to running vehicles) and the intended customer and manufacturing realities.

The organisers will provide a 3m x 2m display area for each Concept Class team. Teams are required to supply their own displays and supporting structure, showing their vehicle and giving details of their design and development work.

Note: Concept Class entrants must submit a Design Concept Specification (see Section 5 of this document). The template will be available on the Forms webpage. https://www.imeche.org/events/formula-student/team-information/forms-and-documents

There are a number of documents required to be submitted prior to July 2020: the documents are generally those required for Formula Student with some exceptions related to the running vehicle. Concept Class Key Dates for submissions are on the webpage, https://www.imeche.org/events/formula-student/team-information/key-dates

A summary of the required submissions prior to the event is as follows:
- Design Concept Specification
- Engineering Design Report
- Engineering Design Spec Sheet

Penalties for lateness, non-submission and poor quality submission are as per Formula Student, please see the Key Dates document.

Points will be awarded for the following:

2. Engineering Design (160 points)

Prior to the event, teams will submit an Engineering Design Report and Engineering Design Spec Sheet. These documents should reflect the current state of development of the designs and outline plans for resolution of outstanding issues/manufacture. As per the Formula Student regulations, late submission of documents will be penalised. For the Engineering Design event documents, penalties will be awarded as per Formula Student but note that Concept Class entrants are not required to submit an Impact Attenuator Report.

Understanding that the vehicle design/manufacture is incomplete, i.e. a non-running vehicle, the judges will be looking at the project planning as well as the design process and will be looking to see evidence of understanding of proposed manufacturing methods and their implications (e.g. costs, tooling requirements, etc).

Judges expect to see proof of reasoning for key design and concept choice decisions. Given that Formula Student accommodates alternative powertrain technology possibilities it is expected that teams will outline their basic conceptual choice in this regard in some detail. In recognition of the “real world” it is further expected that teams
will consider fully the costs of manufacture, service and safety of innovative design choices in addition to the usual parameters of mass and performance and customer appeal. You should note that there is an increased link between the information provided to Cost & Manufacturing, Engineering Design and Business Plan Presentation static event judges.

Please note that it is **essential** that some component parts are manufactured in order that teams may demonstrate their understanding of manufacture. This is not solely a paper design concept class: designs must have their basis in reality with specific reference to the Formula Student Rules and intents as a long-term future objective. Teams that present only the smallest or simplest parts for judging will naturally be awarded their points accordingly.

At the event, teams will be expected to give a brief informal presentation about the engineering design of their vehicle. This will be followed by a 30-40 minute discussion with the design judges about the designs, concepts and analyses presented, and to view the drawings and components etc. that have been produced.

Points will be awarded according to the specific Concept Class Engineering Design Scoring Sheet. [https://www.imeche.org/events/formula-student/team-information/forms-and-documents](https://www.imeche.org/events/formula-student/team-information/forms-and-documents) There is no Engineering Design Final for Concept Class.

**3. Business Plan Presentation (120 Points)**

The Business Plan Presentation is a combined event for both Formula Student and Concept Class teams. Please see the Formula Student UK 2020 Supplementary Rules for further information.
4. Cost & Manufacturing (150 Points)

At the event, teams will provide a hard copy of their Cost report to the judges whilst they are being judged (a posted copy prior to the event is not required). This will meet the same formatting and other requirements of the Formula Student Rules but reflecting only the costs for producing the chassis (frame and body).

Reports do not need to be submitted before the event.

At the event, teams will give a 15 minute presentation on the overall project management, followed by 30 minutes of questioning from the cost judges on the likely costs and manufacturing and management processes implied by the team’s designs and ideas (similar to the cost event described in the Formula Student Rules). The questions (and points) will be split equally between the overall cost estimates and management plans for building a complete car of the team’s design within the next year, and the costing of the chassis (frame and body) and any sustainability considerations the team wants to highlight.

Points will be awarded according to the Concept Class Cost & Manufacturing Scoring Sheet. Team should aim to cover the following areas to achieve associated points.

<table>
<thead>
<tr>
<th>Overall Management (60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teams will be judged on their proposed structure and how they plan to manage the project considering the costing of the vehicle..</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component Costing (90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teams will be judged on the accuracy and quality of the vehicle chassis costing, understanding and demonstration of manufacturing processes used and the impact on the environment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Points (150)</th>
</tr>
</thead>
</table>

No pre-event document submissions are required for the Cost & Manufacturing event therefore there are no pre-event late submission penalties.

5. Design Concept Specification

All teams must submit a Design Concept Specification (DCS) by way of application to compete in the 2020 competition. Teams will be selected for a place in the competition by the Committee based on their DCS document. Submission of the DCS is via your Team Account and is as per the Key Dates document.