

Formula Student Europe
Formula Student Class II Rules 2024

Version 1.0

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Contents

- G Administrative Regulations 4**
- 1 Competition Overview 4
- 2 Rules of Conduct 5
- 3 General Requirements for Teams & Participants 7
- 4 Documentation & Deadlines 8
- 5 General Rules 10

- B Business Plan Presentation 11**
- 1 Business Plan Presentation Objective 11
- 2 Business Plan Presentation Procedure 11
- 3 Additional Data to Submit 12
- 4 Business Plan Presentation Scoring 12

- C Cost and Manufacturing Event 14**
- 1 Cost and Manufacturing Objective 14
- 2 Submission files 14
- 3 Cost and Manufacturing Procedure 15
- 4 Additional Support Material 15
- 5 Cost and Manufacturing Event Scoring 16

- D Engineering Design Event 17**
- 1 Engineering Design Objective 17
- 2 Submission of files 17
- 3 Engineering Design Event Procedure 18
- 4 Additional Support Material 18
- 5 Engineering Design Event Scoring 18

Changelog

Version 1.0 Initial version

G Administrative Regulations

G1 Competition Overview

G1.1 Competition Objective

G1.1.1 The competition challenges teams of university students to conceive, design and develop small, formula style, race cars.

G1.1.2 The competition aims to prepare students to fabricate a car in the following year to compete in the Formula Student.

G1.2 Competition Procedure

G1.2.1 Concepts for cars of the following classes are allowed for the competition:

- Internal Combustion Engine Vehicle (CV) including Combustion Hybrid Vehicle (HY)
- Electric Vehicle (EV)
- Alternative drivetrain technologies, while deviations to the FS Rules must be kept to a minimum

The concepts must aim to comply to the requirements defined in chapters T and either EV or CV of the Formula Student Rules, depending on their drivetrain type.

G1.2.2 The competition consists of a series of static events described in the following chapters.

G1.2.3 The achievable points in each discipline are listed below.

Discipline	Points
Business Plan Presentation	100
Cost and Manufacturing	100
Engineering Design	150
Overall	350

G1.2.4 The team with the most overall points will win the competition.

G1.3 Competition Information

- G1.3.1 The competition specific rules and information are defined in the competition handbook.
- G1.3.2 The official language of the competition is English.
- G1.3.3 Every organizer of a competition based on this document bares the sole responsibility.

G1.4 Student Competition

- G1.4.1 The concepts entered into the competition must be conceived, designed and elaborated by the student team members without direct involvement from external professional engineers.
- G1.4.2 The student team may use any information from professionals or from academics as long as the information is given as a discussion of alternatives with their pros and cons.
- G1.4.3 Professionals must not make design decisions or drawings.

G2 Rules of Conduct

G2.1 General Officials Authority

- G2.1.1 The officials reserve the right to revise the schedule of the competition and/or interpret or modify the competition rules at any time and in any manner that is, in their sole judgement, required for safe and efficient operation.
- G2.1.2 All team members are required to cooperate with, and follow all instructions from the officials.
- G2.1.3 Official announcements shall be considered part of these rules.
- G2.1.4 All guidelines and clarifications posted on the respective competition website for the current season including the competition handbook are considered part of these rules.

G2.2 Team member behaviour

G2.2.1 Failure of a team member to follow an instruction or command directed specifically to that team or team member results in 25 penalty points being deducted from the team's overall score.

G2.2.2 Argument with, or disobedience to, any official results in the team being eliminated from the competition.

G2.2.3 In the event of unsportsmanlike conduct, 25 penalty points will be deducted from the team's overall score. A second violation results in expulsion of the team from the competition.

G2.3 Violations of Intent

G2.3.1 Violation of the intent of a rule will be considered a violation of the rule itself.

G2.4 Questions about the Rules

G2.4.1 Questions about the rules may be asked to the officials.

G2.4.2 The frequently asked questions (FAQ) section on the competition website must be checked before submitting a question.

G2.4.3 The officials will only answer questions that are not already answered in the rules or FAQs or that require new or novel interpretation.

G2.4.4 Refer to the competition website for specific directions how to submit a rules question.

G2.5 Protests

G2.5.1 A team may protest any rule interpretation, score or official action which they feel has caused some actual, non-trivial, harm to their team, or has had a substantive effect on their score.

G2.5.2 All protests must be submitted in writing as defined in the competition handbook by the team captain within the announced protest period. In order to have a protest considered, a team must post a 25 point protest bond which will be forfeited if their protest is rejected.

G2.5.3 The decision of the officials regarding any protest will be in a written form and is final.

G3 General Requirements for Teams & Participants

G3.1 Teams per University

G3.1.1 A university can register one team for Formula Student Class II.

G3.1.2 Teams can register for either the Formula Student and the Formula Student Class II Competition of the same event. However, they may not participate in both competitions with the same concept.

G3.1.3 For the purposes of registering and competing, a university's Formula Student and Formula Student Class II teams are considered to be separate and independent entities.

G3.1.4 Teams which are formed with members from two or more universities are treated as a single team.

G3.2 Team Members and Participants

G3.2.1 Each participant must provide proof of valid private liability & individual health insurance for the competition.

G3.2.2 All onsite participants must sign a liability waiver upon registering on-site which can be found on the competition website.

G3.2.3 A team member may only be part of one team, work on one vehicle and take part in static and dynamic events for only one team regarding Formula Student and Formula Student Class II Competitions.

- G3.2.4 Each team must have one team member identified as the team captain. The team captain is the main contact person for the officials during the registration process and the competition.
- G3.2.5 Persons who have previously attended any official event as a judge are not allowed to participate as team members.
- G3.2.6 Team members must be enrolled as degree seeking undergraduate or graduate students in any university. Team members who have graduated within the seven month period prior to the competition remain eligible to participate.
- G3.2.7 Students seeking a PhD degree/PhD students or equivalent are not allowed to participate.
- G3.2.8 Team members must be at least 18 years of age.

G4 Documentation & Deadlines

G4.1 Required Documents and Forms

- G4.1.1 Several documents and forms must be submitted by the action deadlines defined in the competition handbook.

G4.2 Submission

- G4.2.1 Submitted documents may only be viewed by members of the submitting team, authorized judges and officials.
- G4.2.2 By submitting documents via the competition website, the team agrees that they may be reproduced and distributed by the officials, in both complete and edited versions, for educational purpose.
- G4.2.3 Documents or videos that are largely incomplete or not readable/viewable will be considered as not submitted.

G4.3 Correction Requests

- G4.3.1 If the officials request a correction for a document, the corrected version has to be submitted within 168 hours (7 days) following the request.
- G4.3.2 Separate requests for different parts within one document or form will be treated independently.
- G4.3.3 If the corrected version of the document does not completely contain all requested corrections, the team will not be allowed to compete in the respective discipline.

G4.4 Late Submission or Non-Submission

- G4.4.1 For each submission later than the respective deadline, 5 penalty points are deducted from the respective discipline's overall score for each commenced 24 hours after the deadline, up to a maximum of 30 points.
- G4.4.2 Teams that fail to submit documents within 240 hours (10 days) after the respective deadline will not be allowed to participate in the corresponding discipline.
- G4.4.3 Teams that are not allowed to participate in two disciplines due to non-submission will be de-registered from the competition.

G4.5 De-registration

- G4.5.1 A team which is de-registered from the competition has a single chance to apply for a place on the waiting list.
- G4.5.2 To apply, the team must complete the following within 24 hours after the de-registration notification:
- Submit an informal application to the officials
 - Correct the reason for de-registration (e.g. submission of a document)
- G4.5.3 If the application is positively confirmed by the officials, the team will:
- Be placed at the end of the waiting list.
 - Receive 20 penalty points.

G4.5.4 Applications will be declined if the rework is inadequate or de-registration was caused by misbehaviour of the team.

G5 General Rules

G5.1 Forfeit for Non-Appearance

G5.1.1 It is the responsibility of each team to be in the right place at the right time.

G5.1.2 If a team is not present and ready to present at the scheduled time, they forfeit their attempt at that event and will receive zero points for that event.

G5.2 Alcohol and Illegal Material

G5.2.1 Alcohol, illegal drugs, weapons or other illegal material are prohibited on the competition site during the competition.

G5.2.2 If any team member is tested with an alcohol level higher than 0.0 ‰, he or she will be immediately disqualified for the rest of the competition. A second team member being found to have an alcohol level higher than 0.0 ‰ results in the entire team being disqualified immediately.

B Business Plan Presentation

B1 Business Plan Presentation Objective

- B1.1 The objective of the BPP is to assess the team's ability to develop and to present a comprehensive business model. This business model must relate to the team's specific prototype vehicle or a specific component of it. In doing so, the business must offer the vehicle or component as a product, or sell a service based on it, providing a rewarding business opportunity that creates a monetary profit.

- B1.2 The judges should be treated as if they were potential investors or partners for the presented business model.

- B1.3 The quality of the actual prototype will not be considered as part of the BPP judging.

B2 Business Plan Presentation Procedure

- B2.1 Presentations are limited to a maximum of 10 min. The judges may stop any presentation exceeding 10 min.

- B2.2 The presentation will not be interrupted by questions. Immediately following the presentation there will be a question and answer session.

- B2.3 One or more team members may present the business plan.

- B2.4 All team members presenting the BPP must be in the podium area and must be introduced to the judges at the beginning of the presentation. The team members who have been introduced may answer the judges' questions even if they were not actually presenting.

- B2.5 Teams that fail to make their presentation within their assigned time period will receive zero points for the BPP.

- B2.6 Prior to the competition a specific deep dive topic, which has to be part of the 10 min presentation, will be published on the competition website.

B3 Additional Data to Submit

- B3.1 To convince the potential investors or partners that the team’s presentation is worthy of their time, it is required that a Business Plan Pitch Video (BPPV) is submitted before the competition. The pitch video should be considered as the first impression of the business idea and has to contain the relevant investment figures.
- B3.2 The BPPV must be submitted online via the competition website, not later than the deadline specified in the competition handbook.
- B3.3 The BPPV must not exceed a length of 30 s and must be in a common video format, e.g. avi, mpg, mp4, wmv.

B4 Business Plan Presentation Scoring

- B4.1 The BPP will be evaluated on the categories specified in the table below.

Category	Points
Pitch Video	10
Content	20
Finances	10
Deep Dive Topic	10
Demonstration and Structure	15
Delivery	10
Questions	10
General Impression	15
Total	100

- B4.2 If the business model presented does not relate to one of the areas mentioned within B1.1, 15 penalty points will be deducted from the team’s BPP scoring.
- B4.3 The judging at the competition will start with an initial judging, where all teams are judged by different judging groups.
- B4.4 Some teams may be chosen to participate in the BPP finals to determine the BPP winner. The BPP finals will be held separately from the initial judging and teams will be informed about their participation during the event.
- B4.5 The scoring of the BPP is based on the average of the scores given by each of the judges.

B4.6 The scoring for the non-finalists is calculated as follows:

$$SCORE = 95 \left(\frac{P_{team}}{P_{max}} \right)$$

whereas

P_{team} is the score awarded to the team,

P_{max} is the highest score awarded to any team not participating in the finals.

B4.7 The scoring of the BPP finalists will vary between 96 to 100 points and is scored after the BPP finals by all judges.

C Cost and Manufacturing Event

C1 Cost and Manufacturing Objective

C1.1 In the Cost and Manufacturing Event teams are tasked with showcasing their understanding of manufacturing processes and the cost associated with construction of a single seater formula student car. This includes all the trade-off decisions between content and cost, make or buy, and the differences between prototyping and mass production.

C1.2 The teams are not required to present a functional Formula Student car.

C2 Submission files

C2.1 Teams are required to submit the following documents to participate in the Cost and Manufacturing event:

- Costed Bill of Materials (CBOM) of the engine & drivetrain and Detailed Bill of Materials (DBOM) of the suspension
- Supporting Material File (SMF)
- Cost Report Explanation File (CREF)
- Manufacturing Plan (MP)

C2.2 The DBOM and CBOM must be created using the FSG Cost Report tool.

C2.3 The template for the Manufacturing Plan will be provided at the competition website.

C2.4 The Support Material File shall contain technical drawings and renders of the assemblies listed in the CBOM and DBOM.

C2.5 The Cost Explanation File shall be a comprehensive explanation of the assumptions and calculations that were used to derive for example the material costs or labour costs used in the CBOM. It should also contain which specific cost figures were used, e.g. the cost of one machine operation hour.

- C2.6 All documents should be submitted as pdf files with the following file names:
- DBOM and CBOM: "DBOM_CBOM_CLASS_2_#(CARNUMBER).pdf"
 - Support Material File: "SMF_CLASS_2_#(CARNUMBER).pdf"
 - Cost Explanation File: "CREF_CLASS_2_#(CARNUMBER).pdf"
 - Manufacturing Plan: "MP_CLASS_2_#(CARNUMBER).pdf"

C3 Cost and Manufacturing Procedure

C3.1 The Cost and Manufacturing starts with a brief presentation (no longer than 3 min) of the team. The team's presentation is followed by a 30 min Q&A session where the judges will query the team on the topics described in section C1.1.

C3.2 The session will be divided into 3 parts:

1. BOM discussion - Evaluates the team ability in the preparation of the CBOM and the DBOM in completeness, correctness and feasibility.
2. Cost Understanding - Evaluates the general knowledge of cost and manufacturing processes.
3. Manufacturing Plan - Evaluates the overall readiness of the team to manufacture a Formula Student Car over the next year.

C4 Additional Support Material

C4.1 There are no restrictions on the type of support material that the team can bring.

C4.2 The team must come to the Cost and Manufacturing event prepared to show all submission documents to at least two judges. This means at least 2 copies of the support documents.

C4.3 The team can present the submission documents on a tablet or laptop.

C5 Cost and Manufacturing Event Scoring

C5.1 Teams will be evaluated on content of the presentation, visual aids, performance on the Q&A session and overall delivery.

C5.2 The breakdown of points awarded for Cost and Manufacturing Event is as follows:

Category	Points
BOM discussion	30
Cost Understanding	30
Manufacturing Plan	30
Support Material Content and Quality	10
Total	100

C5.3 An unlimited number of teams may be selected to participate in the cost and manufacturing finals to determine the cost and manufacturing event winner. The cost and manufacturing finals will be held separately from the initial judging and teams will be informed about their participation during the event.

C5.4 The Cost finals procedure is similar to the regular Q&A session.

C5.5 In case of finals the scoring for the non-finalist is calculated as followed:

$$COST_SCORE = 95 \left(\frac{P_{team}}{P_{max}} \right)$$

P_{team} is the score awarded to the team

P_{max} is the highest score awarded to any team not participating in the finals

C5.6 The scoring of the cost and manufacturing finalists will vary from 96 to 100 points.

C5.7 In case of no cost finals the scoring is calculated as followed:

$$COST_SCORE = 100 \left(\frac{P_{team}}{P_{max}} \right)$$

D Engineering Design Event

D1 Engineering Design Objective

- D1.1 The Engineering Design Event aims to evaluate the team's engineering process, understanding and effort to design a formula student car that can participate in the next year Formula Student Events.
- D1.2 The teams are not required to present a functional Formula Student car but are nonetheless encouraged to bring already manufactured components of the car (e.g. a fully or partially welded chassis) as well as any other relevant components.

D2 Submission of files

D2.1 Engineering Design Report (EDR)

- D2.1.1 Teams must submit an 8 page report that details the overall concept and goals for the car combined with a summary of each subsystem design and its relation to the overall concept.
- D2.1.2 The EDR must not exceed 5 pages of written text and must contain 3 pages of technical drawings.
- D2.1.3 The drawings must show the vehicle from the front, the top and the side. One drawing per page.
- D2.1.4 The EDR should be submitted as a pdf file with the following file name "EDR_CLASS_2-#(CARNUMBER).pdf"

D2.2 Design Specification Sheet (DSS)

- D2.2.1 Teams must submit a DSS according to a predefined template which will be provided by the competition.
- D2.2.2 The DSS should be submitted as a pdf file with the following file name "DSS_CLASS_2-#(CARNUMBER).pdf"

D3 Engineering Design Event Procedure

- D3.1 The engineering design starts with a brief presentation (no longer than 3 min) of the team. The team's presentation is followed by a 30 min Q&A session where the judges will query the team on the topics described in D5.2.
- D3.2 The team will receive both written and verbal feedback from all the judges involved in the design session but not necessarily at the very end of the session.

D4 Additional Support Material

- D4.1 There are no restrictions on the type of support material that the team can bring.
- D4.2 The combination of support material plus components that the team brings to the Engineering Design Event must be so that both team members and judges can comfortably move in a designated area of 5 by 5 metres.
- D4.3 The officials can request the team to remove components/materials so that D4.2 is complied.
- D4.4 If a TSAC with actual cells is presented, it must first be approved by the electrical Head Scrutineer. The team is responsible to present the TSAC at the technical inspection area. The TSAC must not be opened.
- D4.5 Only discharged, below 5 % State of Charge, accumulator cells each having all terminals electrically isolated may be presented.

D5 Engineering Design Event Scoring

- D5.1 Teams will be evaluated on content of the presentation, visual aids, performance on the Q&A session and overall delivery.

D5.2 The breakdown of points awarded for Engineering Design Event is as follows:

Category	Points
Aerodynamics	25
Vehicle Dynamics and Suspension	25
Powertrain	25
Electronics	20
Structural	25
Technical Management	20
Engineering Design Report	10
Total	150

D5.3 An unlimited number of teams may be selected to participate in the Engineering Design Event finals to determine the Engineering Design Event winner.

D5.4 The Engineering Design Event finals procedure is similar to the regular Q&A session.