

FORMULA
STUDENT EAST

RULES EXTENDED

AUG
7<>11
2021

<REGISTRATION RULES>
<GENERAL RULES>
<DOCUMENTATION RULES>
<TECH RULES>
<STATIC RULES>
<DYNAMIC RULES>

#FSEASTAUG7<>11

RELEASE

VERSION 1.1

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FURTHER DETAILS AT [FSEAST.EU](https://fseast.eu)

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FORMULA STUDENT EAST

EVERY SINGLE ONE'S GOT
A STORY TO TELL
EVERYONE KNOWS
ABOUT IT
FROM THE QUEEN OF ENGLAND
TO THE HOUNDS OF HELL

THE WHITE STRIPES
SEVEN NATION ARMY



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REGISTRATION RULES

Since 2016 the FS East Event intends to organise a simple, and clear registration procedure, keeping in mind, that overseas teams may have disadvantages caused by internet latencies. Different regions of the world will have dedicated number of slots during the first period of the registration procedure.

1. IMPORTANT DATES

MAIN DATES:	FROM:	TO:
Team Registration	29th of January 22:00 CET	5th of February 10:00 CET
Event Registration Quiz	5th of February 11:00 CET	5th of February 16:59 CET
Quiz Protest Period	5th of February 17:00 CET	5th of February 23:59 CET

PERIODS	FROM:	TO:
Event Registration Period 1	5th of February 11:00 CET	5th of February 23:59 CET
Event Registration Period 2	6th of February 00:00 CET	6th of February 23:59 CET
Event Registration Period 3	7th of February 00:00 CET	19th of February 19:59 CET
Event Registration Period 4	10th of February 20:00 CET	15th of March 23:59:59 CEST

2. TEAM REGISTRATION

THE TEAM REGISTRATION FORM WILL BE AVAILABLE AT:

<http://login.fseast.eu>

REGISTRATION PROCESS:

1. The team captain should be registered.
2. The team captain must register the team as well.
The rest of team members can join the already created team once they registered.
3. After the Team Registration a confirmation email will be sent with the data.

2.1. REGISTRATION WITH MULTIPLE TEAMS FROM THE SAME UNIVERSITY

Participation with multiple vehicles: In the case that a university takes part in FS East 2021 in two or three categories (CV, EV, DV), each participation counts as a separate team and all the teams must be registered.

Multiple team registration (i.e.: registration with the same vehicle, with the same team to the same category) is prohibited. Each team should be registered by the team captain only once.

Team Registration closes on the 5th of February at 10:00 CET. Only teams who created a valid team account until the deadline are able to participate in the quiz.

We are going to validate the registered teams after the quiz.

Those participating in the quiz under multiple accounts will be penalised or disqualified.

2.2 MULTIPLE REGISTRATIONS WITH THE SAME CAR

Teams are allowed to participate in multiple categories with the same car (eg. DV and EV, or CV and DV), with the following restrictions:

- Teams are virtually treated as two separate Team
- Teams have to register and pass the quiz in both categories
- Both registration fee have to be paid
- They have to pass the DV scrutineering process to participate in the dynamic events
 - If the DV scrutineering fails, but the EV or CV is passed, and scrutineers state that the autonomous system can be safely disabled, they can participate in the non-autonomous events. (EV or CV but not driverless).
- Configuration change in car after scrutineering is prohibited
- All static and dynamic events will be available and scored separately for the autonomous and the conventional category as well.
- The Static and Dynamic Schedule is not guaranteed to be convenient.

3. EVENT REGISTRATION QUIZ FORMS (CV, EV AND DV)

The Event Registration Order will be determined by the results of the Event Registration Quiz.

Separate Event Registration Quiz Forms will be available for Internal Combustion (CV) Electric Vehicle (EV) and Driverless (DV) Teams.

THE EVENT REGISTRATION QUIZ FORM WILL BE AVAILABLE AT:

<http://quiz.fseast.eu>

LINK TO THE DUMMY QUIZ TO TEST YOUR BROWSER AND THE QUIZ SYSTEM:

<http://dummyquiz.fseast.eu>

THE FOLLOWING TEAM DATA WILL BE REQUIRED:

- Login name & password
- answers of single choice and/or multiple choice questions

IMPORTANT:

After you finish, you must click the “Submit” button at the end of the Event Registration Quiz Form.

The system will log the timestamp, which will be used to create the registration order.

Every wrong answer will add 120 seconds to the registration timestamp.

Each team will have only one opportunity.

After the Event Registration you will get a confirmation message: “Your response has been recorded.”

NOTE: Teams who log in with more than one account to solve the same quiz form will be automatically disqualified from FS East 2021.

4. REGIONS

FS EAST DEFINES FOUR REGIONS:

DEFINITION OF REGION A:

Countries of the following list: Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom, Vatican City State.

DEFINITION OF REGION B:

Countries in standard time zones from -1 to -12 (international date line).

DEFINITION OF REGION C:

Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, North Macedonia, Georgia, Greece, Hungary, Kazakhstan, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine.

DEFINITION OF REGION D:

Countries in standard time zones from 0 to +12 (international date line), except countries of region A and C.

5. EVENT REGISTRATION SLOTS AND LISTS

FS East 2020 competition opens slots for 36 combustion 36 electric and 12 driverless teams, and the organisers will handle the documents of maximum 5 combustion 5 electric and 3 driverless waiting list teams.

FS EAST 2020 DEFINES THE FOLLOWING LISTS:

LIST A - CV	6 combustion engined slots
LIST A - EV	6 electric slots
LIST A - DV	2 driverless slots
LIST B - CV	5 combustion engined slots
LIST B - EV	5 electric slots
LIST B - DV	1 driverless slots
LIST C - CV	9 combustion engined slots
LIST C - EV	9 electric slots
LIST C - DV	2 driverless slots
LIST D - CV	4 combustion engined slots
LIST D - EV	4 electric slots
LIST D - DV	1 driverless slots
LIST ABCD - CV (A-B-C-D ADDITIONAL JOINT LIST)	12 combustion engined slots
LIST ABCD - EV (A-B-C-D ADDITIONAL JOINT LIST)	12 electric slots
LIST ABCD - DV (A-B-C-D ADDITIONAL JOINT LIST)	6 driverless slots
WAITING LIST - CV	---
WAITING LIST - EV	---
WAITING LIST - DV	---

6. INVITED TEAMS

FS EAST 2019 TOP 3 TEAMS PER CATEGORY AND THE HIGHEST RANKED HUNGARIAN TEAM ARE INVITED AS PRE-REGISTERED TEAMS AS WELL AS THE TOP 30% OF FS ONLINE 2020. WE ARE GIVING A PRE-REGISTERED SLOT TO TU DELFT TO APPRECIATE THEIR CONTRIBUTION TO FS ONLINE 2020.

LIST ABCD - CV:

- Joanneum racing graz - FS East 2019
- Zips racing - FS East 2019
- Arrabona Racing Team - FS East 2019
- HAWKS Racing - FS Online 2020
- FSUPV Team - FS Online 2020
- Rennstall Esslingen - FS Online 2020
- CTU CarTech - FS Online 2020
- Team Bath Racing - FS Online 2020
- UPBracing Team e.V. - FS Online 2020
- FaSTTUBE CV - FS Online 2020

LIST ABCD - EV:

- TUfast e-technology - FS East 2019 & FS Online 2020
- Greenteam Electric - FS East 2019
- Racetech Racing Team TU Bergakademie Freiberg - FS East 2019
- Ecurie Aix Formula Student Team RWTH - FS Online 2020
- Dynamis PRC - FS Online 2020
- Ampera racing - FS Online 2020
- DHBW Engineering Stuttgart - FS Online 2020
- FSB Racing Team - FS Online 2020
- Racetech Racing Team - FS Online 2020
- TU Delft - FS Online 2020
- FaSTTUBE EV - FS Online 2020

LIST ABCD - DV:

- AMZ Racing Driverless - FS East 2019
- Starkstrom Augsburg Driverless - FS East 2019
- e-ognition Hamburg e.V - FS East 2019 & FS Online 2020
- KA-Racing Driverless - FS Online 2020

FOR THESE TEAMS THIS OPPORTUNITY IS OPEN UNTIL 4TH OF FEBRUARY, AND THEIR REGISTRATION WILL BE ACCEPTED IF THEY PAY THE REGISTRATION FEE BEFORE 15:00 ON 5TH OF FEBRUARY.

THE REGISTRATION FEE OF THE BEST HUNGARIAN TEAM OF FS EAST 2019 IS SPONSORED BY OF ASSOCIATION OF AUTOMOTIVE ENGINEERS. THE BEST FROM THE LIST ABCD - CV, EV, DV IS ARRABONA RACING TEAM

IMPORTANT:

The invited teams have to login to the registration quiz, in order to select a start number.
This is also possible on the quiz date before the quiz starts.

7. EVENT REGISTRATION PERIOD 1

During the 1st Period teams will compete to get on their own (dedicated) lists.

For example an electric team from the **Region C** will be able to get on the **List C - ev**.

If one region's list gets full, the additional joint lists (**List ABCD - cv**, **List ABCD - ev**, **List ABCD - dv**) will be filled.

If one of the **List ABCD - cv**, **List ABCD - ev** or **List ABCD - dv** gets full, further teams will get on the waiting lists (Waiting list - cv, Waiting list - ev, Waiting list - dv).

8. EVENT REGISTRATION PERIOD 2

From the start of the 2nd period, empty slots of a region will be filled with teams from the waiting list.

9. EVENT REGISTRATION PERIOD 3

From the start of the 3rd period, the remaining free places of a vehicle category (CV, EV, DV) may be filled on the discretion of the organisers, with Waiting List applicants of the other category.

(For example: if there are any free CV places, they may be filled with EV or DV teams, and vica versa.)

10. EVENT REGISTRATION PERIOD 4

In the 4th period the **first 5 CV teams of the Waiting list - cv**, the **first 5 EV teams of the Waiting list - ev**, and the **first 3 DV teams of the Waiting list - dv** will be asked to pay a part of the registration fee.

During the season the organiser will handle the documents of the starter and the waiting list teams together. Corrections, e-mailing and documents upload deadline system will be active for all of the maximum 97 (36+36+12+5+5+3) teams.

11. REGISTRATION FEE

11.1. PAYMENT INFORMATION FOR TEAMS ON THE STARTER LIST:

Teams will have to pay the registration fee, which does not include the lodging fee if a team applies for camping. There is no limit to team size.

REGISTRATION FEE:

- CV: 1700 EUR + VAT (+27%)
- EV: 1900 EUR + VAT (+27%)
- DV: 2200 EUR + VAT (+27%)

VAT-free payment is only acceptable from teams with a valid EU VAT number.

In case your team doesn't have an EU VAT number, please transfer the full amount including the 27% VAT.

You are able to request a proforma invoice before payment at hello@fseast.eu.

11.2. REFUND POLICY:

11.2.1 REFUNDS IF FS EAST NEEDS TO BE CANCELLED

Cancelling reasons:

- If there will be any governmental restrictions applied for events above 1500 people (FS East reserves the right to limit the number of participants per team, details will be published in the Event Handbook or in the General Rules.)
- If at least 70% of the starter list teams overall are not able to travel to the event due to border crossing restrictions
- If at least 70% of the starter list teams overall have withdrawn for any reason

Cancelling until 31th March 2021 - 90% Refund

Cancelling until 31th May 2021 - 60% Refund

Cancelling until 30th June 2021 - 0% Refund

11.2.2 REFUNDS IF A TEAM CANNOT PARTICIPATE DUE TO ANY REASONS

If a team cancels the participation on the event, FS East will not refund the registration fees.

After the quiz results are fixed, every team on the starter list has 2 days to pay the registration fee via bank transfer.

A payment receipt document provided by the account holder's bank should be submitted to hello@fseast.eu as a confirmation. Please mind the deadline, as you can be moved to the end of the waiting list due to late payment.

BANKING INFORMATION

Account holder: Járműmérnökök Egyesülete

Account holder address: 8th Puskás Tivadar Street, Győr, 9027, Hungary

Account number: 110400511-50526983-78711011

IBAN: HU15 1040 0511 5052 6983 7871 1011

BIC (SWIFT) code: OKHBHUHB

Bank name: K&H Bank Zrt.

Bank address: 9th Lechner Ödön fasor, Budapest, 1095, Hungary

Remark: FS East registration fee, [Team Name]

11.3. PAYMENT INFORMATION FOR TEAMS ON THE WAITING LIST:

THE FIRST PART OF THE REGISTRATION FEE FOR THE (TOP 5 COMBUSTION, 5 ELECTRIC, AND 3 DRIVERLESS) TEAMS ON THE WAITING LIST WILL BE

- CV: 500 EUR + VAT (27%)
- EV: 600 EUR + VAT (27%)
- DV: 800 EUR + VAT (27%),

which also has to be paid within 2 days, or you will be moved to the end of the waiting list.

WHEN THEY GET ON THE STARTING LIST, THEY WILL HAVE TO PAY THE REST OF THE REGISTRATION FEE.

- CV: further 1200 EUR + VAT (27%)
- EV: further 1300 EUR + VAT (27%)
- DV: further 1400 EUR + VAT (27%)

VAT-free payment is only acceptable from teams with a valid EU VAT number. In case your team doesn't have an EU VAT number, please transfer the full amount including the 27% VAT.

You are able to request a proforma invoice before payment at hello@fseast.eu.

IMPORTANT:

Registration fees are not refundable if a team can not participate for any reason.

12. REGISTRATION AFTER DOCUMENT UPLOAD DEADLINES

If there are open slots on the registration list, teams can apply to participate in the event.

At the moment of the registration the team has to upload all of the requested documents (see documentation rules on the FS East homepage) with exceeded deadlines and pay the registration fee.

LATE SUBMISSION PENALTY POINT CALCULATION:

- If the documents are accepted after the first submission, no penalty points will be added.
- If the first submission fails, but the second is accepted, 50% of the penalty points will be added.
- After the third submission 100% of the penalty points will be added.

The documents with not expired deadlines are treated as any other team's documents.



FS EAST RULES

1. INTRODUCTION

Formula Student East® (hereafter “FS East®”) is a FSAE style Formula Student engineering competition in Hungary, organised by the Association of Automotive Engineers (formerly Engineers for the Automotive Higher Education Association) from 2016. Formula Student East 2021 will allow to participate vehicles with conventional internal combustion engine (gasoline or ethanol fuelled) and electric powertrain. Furthermore Formula Student East welcomes the participation of driverless vehicles (both with internal combustion or electric powertrain).

The three categories will be evaluated separately:

- Internal Combustion Vehicles (hereafter CV)
- Electric Vehicles (hereafter EV)
- Driverless Vehicles (hereafter DV)

2. GENERAL

2.1 COMPETITION DATES AND PLACE

FS East 2021 will be held between 7th and 11th August, 2021 at the Hungaroring racetrack in Mogyoród:



2.2 FS EAST 2021 RULES

The FS East competition is compliant with the Formula Student Rules 2020 document (hereafter “Rules 2020”) published by Formula Student Germany, which is applicable for 2021:

https://www.formulastudent.de/fileadmin/user_upload/all/2020/rules/FS-Rules_2020_V1.0.pdf

The FS East rules presented in this and the further rule include specific rule changes and additions to the Rules 2020. In case of a conflict between the Rules 2020 and the FS East 2021 Rules, the FS East 2021 Rules supersede the Rules 2020.

Additionally, all guidelines and clarifications posted in the ‘Rules and Important Documents’ section on the FS East website for the current season are considered as official documents and therefore are applicable to the teams competing at FS East 2021.

2.3 RULE CATEGORY CLARIFICATION

[EV Only] rules are applied to vehicles with electrical drivetrain,

[CV Only] rules are applied to vehicles with internal combustion engine.

[DV Only] rules are applied to the driverless vehicles, regardless of the drivetrain, however they are still obligated by the drivetrain specific rules.

2.4 RULES QUESTIONS

Any rule clarification questions and rule ambiguities concerning the rules for FS East will be resolved by the FS East Rules Committee. The Rules Committee will answer both FS East 2021 Rules and Rules 2020 questions, but the decisions and clarifications given are only valid for the FS East competition and only for the present competition year.

Rules questions should be submitted to hello@fseast.eu. Do not ask about more than one rule per mail.

2.5 OFFICIAL LANGUAGE

The FS East official language is English.

2.6 OFFICIAL TIME

The FS East official time:

From	Till	Time
25 October 2020	27 March 2021	Central European Time (CET)
28 March 2021	30 October 2021	Central European Summer Time (CEST)

For all deadlines and decisions only the FS East server time is authoritative.

1 day equals 24 hours. One day later is 24 hours after the defined deadline time or reply time of an official.

To convert CET or CEST to your local time you can use following website: www.timeanddate.com/worldclock/converter.html

2.7 FS EAST REGISTRATION

2.7.1 FS EAST REGISTRATION RULES

FS East Registration Rules are available above from Page 4.

2.7.2 FS EAST REGISTRATION REQUIRED CONTACT INFORMATION

During the team registration process the team has to add all the necessary information: team data, university data, billing information and car data.

All participants have to register at www.login.fseast.eu and have to submit all necessary data about themselves (Health Insurance Certificate, etc.). The Team Captain's responsibility is to make sure all team members have registered and the uploaded data and documents are correct.

2.7.3 MULTIPLE REGISTRATIONS WITH THE SAME CAR

See Registration Rules 2.2.

2.7.4 FACULTY ADVISOR

FS East recommends that all participating teams have a Faculty Advisor present with them at the competition. In the event that no Faculty Advisor is present during the competition, the Team Captain will take over all responsibilities of the Faculty Advisor.

Any Faculty Advisor being registered as such must be a valid member of the faculty he/she is representing and can not be a student.

2.8 EVENT HANDBOOK

The FS East event handbook may contain special event procedures and restrictions for example regarding working on the car etc. It has to be read and understood by all event participants.

2.9 UNSPORTSMANLIKE CONDUCT

Unsportsmanlike conduct, intentional deception of a judge or a scrutineer, or dangerous irresponsible behavior will be reason for instantaneous disqualification.

2.10 TESTING AND WORK SAFETY

FS East is not responsible for the use of the cars other than at the event in Zalaegerszeg.

Furthermore, the organizers of the FS East dissociate themselves from all activities of the teams besides FS East and associated events. Nevertheless, all teams are advised to follow common practices and common sense when working on the vehicle and when operating the vehicle, also before and after the FS East event.

Cars designed and manufactured for the participation of Formula Student events should not participate in events not suitable for Formula Student vehicles like hill climbs, drag races or similar events. Teams should never use their cars for wheel-to-wheel races.

The following listed requirements should at least be met to qualify as a safe testing/driving environment, but does not mean that following these guidelines guarantee safety under all circumstances.

- Driver wearing full protection gear incl. arm restraints
- Working TSAL, IMD, BMS/AMS, Torque Encoder plausibility check, torque/brake encoder plausibility check, brake system plausibility device, ETC plausibility check, ASSI and EBS if applicable.
- Rules compliant frame/monocoque
- Mounted impact attenuator
- No wheel to wheel racing
- No other passenger cars, trucks etc. being driven on the same premise at the same time, unless the area is clearly separated
- No driving under low visibility conditions
- No driving at speeds above typical event speeds, see Part D of the Rules 2020 for details
- No driving in areas where crashing into obstacles at the height of the driver's head is possible, such that parts of the vehicle may pass below an obstacle, but the driver's head can be trapped between the obstacle and the main roll hoop for example.

FS East reserves the right to disqualify a registered team in case of unsafe driving behavior, especially if the reputation of Formula Student organizers, sponsors and other teams is compromised. The decision to remove a team from the FS East competition has to be made unanimously by the FS East rules committee and will be made public on the FS East website.

NOTE: This rule has not been established to annoy you, but to ensure that we experience a safe and accident-free Formula Student season.

2.11 CHARGING CONNECTOR AND MAX. POWER [EV ONLY]

Only 32 A three phase (5 pin) sockets, and 16 A single phase versions will be available in the Charging Area.

3. DEADLINES, PENALTIES AND ADDITIONAL INFORMATION REGARDING DOCUMENTATION

MISSING A DEADLINE RESULTS IN PENALTIES AS SPECIFIED BELOW.

Note, that for the penalties regarding late submission of documentation, 1 day exactly equals 24 hours. For further details see "Official Time".

Teams, which upload obviously unusable information just to pass a deadline can be de-registered from the event in case of recurrence. Affected teams receive a warning in advance.

If the document is rejected, a new resubmission deadline is defined automatically by the system. It is 4 days (96h) or 7 days (168h) after the rejection time depending on the type of the document. (See the table below.)

Late submissions (missing the original deadline or the resubmission deadline after a rejection) will be penalized with 10 (ten) or 5 (five) points for each overdue day depending on the type of the document. (See the table below.)

- A 3rd rejection of a document will be penalized with an extra 25 (twenty-five) points.
- A 4th rejection of a document will be penalized with an extra 50 (fifty) points.
- A 5th, and any further rejection of a document will be penalized with an extra 75-75 (seventy-five per occasion) points.

Failure to submit Engineering Design Report, or Design Spec Sheet, or Autonomous Design Report, or Cost Report Documents - Electronic Copy, or Executive Summary - Electronic Copy documents will automatically result in zero points for the given Event.

3.1 ELECTRONIC THROTTLE CONTROL (ETC) SYSTEM DESCRIPTION [CV & CV-DV ONLY]

CV teams, which are using Electronic Throttle Control have to upload an ETC System Description. A template will be available on the www.fseast.eu website.

Late submission of the System Description will require the team to revert to a mechanical throttle arrangement.

3.2 FUEL TYPE ORDER [CV ONLY]

The teams must inform FS East of the type of fuel they intend to use.

The fuel type can be chosen after registration at FS East website.

The fuel types provided are expected to be:

- Gasoline, RON 100
- MOL Racing Fuel DRX (ethanol 85%, with 15% RON 106 maingrade gasoline).

3.3 ELECTRICAL SYSTEM FORM (ESF) [EV ONLY]

All EV teams and DV teams with electric traction system must submit an Electrical System Form.

A template of this form is supplied on the www.fseast.eu website.

No.	Document	Category	Deadline	Required for	Re-upload deadline (days)	Daily penalty points	Maximum applicable penalty point
1	Electronic Throttle Control - System Description	CV and DV with ETC	April 19th, 2021, 23:59 CEST	Dynamic Events	7	10	No Limit
2	Structural Equivalency Spreadsheet (SES)/ Structural Equivalency 3D model (SE3D)	All	April 19th, 2021, 23:59 CEST	Dynamic Events	7	10	No Limit
3	Impact Attenuator Data (IAD)	All	April 19th, 2021, 23:59 CEST	Dynamic Events	7	10	No Limit
4	Electrical System Form (ESF)	EV, DV EV	May 12th, 2021, 23:59 CEST	All Events	7	10	No Limit
5	Autonomous System Form (ASF)	DV	May 12th, 2021, 23:59 CEST	All Events	7	10	No Limit
6	Team Member Designation and Health Insurance Certificate	All	July 9th, 2021, 23:59 CEST	All Events	-	-	-
7	Engineering Design Report	All	June 25th, 2021, 23:59 CEST	Engineering Design Event	4	5	150 out of 150 (Engineering Design)
8	Design Spec Sheet	All	June 25th, 2021, 23:59 CEST	Engineering Design Event	4	5	150 out of 150 (Engineering Design)
9	Autonomous Design Report	DV	June 25th, 2021, 23:59 CEST	Engineering Design Event	4	5	150 out of 150 (Engineering Design - Autonomous part)
10	Executive Summary - Electronic Copy	All	June 25th, 2021, 23:59 CEST	Business Plan Presentation Event	4	5	75 out of 75 (Business Plan Presentation)
11	Vehicle Status Video (VSV)	All	June 25th, 2021, 23:59 CEST	All Events	7	10	No Limit
12	Cost Report Documents - Electronic copies	All	July 9th, 2021, 23:59 CEST	Cost and Manufacturing Event	4	5	100 out of 100 (Cost and Manufacturing)
13	Pitch Video	All	July 9th, 2021, 23:59 CEST	Business Plan Presentation Event	-	-	-
14	Business Plan Presentation - Electronic Copy	All	Aug 5th, 2021, 15:59 CEST	Business Plan Presentation Event	-	-	75 out of 75 (Business Plan Presentation)
15	Cost Report Documents - Written Copies	All	Aug 5th, 2021, 15:59 CEST	Cost and Manufacturing Event	-	-	100 out of 100 (Cost and Manufacturing)

The ESF must contain the datasheets of the following safety related components:

- Motors
- Motor controller
- Accelerator Pedal Position Sensor (APPS) (if not self-made)
- Brake system encoder
- Battery cells of tractive system accumulators
- Accumulator isolation relay
- Accumulator management system (if not self-made)
- HV disconnect (if not self-made)
- HV and LV wiring
- Discrete components of pre-charge and discharge circuits
- Master switches
- Shutdown buttons
- Brake-over-travel-switch
- Fusing (HV, LV, cell fuses)
- Chargers

3.4 ELECTRICAL SYSTEM OFFICER(S) DECLARATION [EV ONLY]

All EV teams and DV teams with electric traction systems must declare Electrical System Officer(s).

Please note the responsibilities of the ESO in A4.8 of the Rules 2020.

The ESOs have to be nominated by the team captain on login.fseast.eu.

The number of ESOs are limited to 5 per team.

No Diploma or degree will be required, but a liability statement needs to be received and signed on the event.

3.5 AUTONOMOUS SYSTEM FORM (ASF) [DV ONLY]

All DV teams must submit an Autonomous System Form.

A template of this form is supplied on the www.fseast.eu website.

The ASF must contain the datasheets and the certifications of the following autonomous system related components:

- Emergency Brake System
- Service Brake
- Steering System
- All used sensors
- All used processing units

3.6 AUTONOMOUS SYSTEM OFFICER(S) DECLARATION [DV ONLY]

All DV teams must submit an Autonomous System Responsible(s) Form. Please note the responsibilities of the ASR in A4.9 of the Rules 2020.

The ASOs have to be nominated by the team captain on login.fseast.eu.

The number of ASRs are limited to 5 per team.

No Diploma or degree will be required, but a liability statement needs to be received and signed on the event.

3.7 ENGINEERING DESIGN DOCUMENTS

3.7.1 ENGINEERING DESIGN REPORT

All teams must submit the Engineering Design Report on the FS East website not later than the above specified deadline.

Once the organizers accepted the document, the submission is considered to be complete.

3.7.2 DESIGN SPEC SHEET

All teams must submit the Design Spec Sheet on the FS East website not later than the above specified deadline. Once the organizers accepted the document, the submission is considered to be complete.

3.7.3 AUTONOMOUS DESIGN REPORT [DV-ONLY]

All DV teams must submit the Autonomous Design Report on the FS East website not later than the above specified deadline. Once the organizers accepted the document, the submission is considered to be complete.

3.8 COST REPORT DOCUMENTS

3.8.1 ELECTRONIC COPY

The upload of the Cost Report Documents (BOM, CBOM, DBOM, Cost Explanation File, Supporting Material) to the FS East website must be done according to the Static Rules chapter not later than the above specified deadline. Once all steps have been completed, the submission of the Cost Report Documents is considered to be complete.

3.8.2 WRITTEN COPY

Do not send the Written Copy by post; it must be submitted at the FS East Event Control at the above specified deadline.

3.9 BUSINESS PLAN DOCUMENTS

3.9.1 EXECUTIVE SUMMARY

The Executive Summary must be uploaded on the FS East website not later than the above specified deadline.

3.9.2 BUSINESS PLAN PITCH VIDEO

Teams who would like to submit a video should upload it to YouTube as a Public or Unlisted video, and the link of the video should be submitted to the FS East website. The length of the video is maximum 30 sec.

There is no possibility for resubmission of Pitch Videos, every video should be submitted until the deadline defined above.

3.9.3 BUSINESS PLAN PRESENTATION - ELECTRONIC COPY

The Business Plan Presentation - Electronic Copy must be submitted at the FS East website at the above specified deadline.

3.10 TEAM MEMBER DESIGNATION AND HEALTH INSURANCE CERTIFICATE

Participating team members must be designated prior to the event.
To designate a team member, please visit the login.fseast.eu website.

In case the health insurance data of one or more team members is missing or incorrect, FS East will decline the designation of the team member(s) in question. Only designations of team members with complete and correct health insurance information will be accepted. Team members that were declined can be registered again after their health insurance data has been corrected.

4. TECHNICAL RULES

4.1 GENERAL VEHICLE REQUIREMENTS AND RESTRICTIONS

4.1.1 FIREWALL PROTECTION

Specific FS East change of Rules 2020 T4.8.4

At the contactpoint of the floor of the cockpit and the firewall no gap is allowed up to a height of 20mm.
Fire resisting tapes or non rigid materials are forbidden.

4.1.2 GAS CYLINDER/TANK AND THE PRESSURE REGULATOR PROTECTION

Specific FS East change of Rules 2020 T9.1.1

The gas cylinder/tank and the pressure regulator must be adequately protected against any heat sources and located at least 50mm from any exhaust system component.

4.1.3 VEHICLE IDENTIFICATION

4.1.3.1 TECHNICAL INSPECTION STICKER SPACE

Specific FS East change of Rules 2020 IN1.3

The FS East technical inspection sticker will be placed on the nose of the car directly in front of the cockpit opening.
A space 100 mm tall x 125 mm wide must be made available for this sticker.
Vehicles that are being entered into multiple competitions in the FSAE series must allow sufficient space along the nose centerline for all inspection stickers.

4.1.3.2 TRANSPONDERS

Specific FS East change of Rules 2020 T12.3

Transponders will be provided by FS East. Only provided transponders will be accepted.
The allowed mounting position and orientation will be published in the event handbook.

4.1.4 DRIVER'S UNDERCLOTHING

Specific FS East addition of Rules 2020 T13.3.5

All drivers have to wear underwear (long pants and long sleeve t-shirt) certified to SFI 3.3 or FIA 8856-2000.

4.1.5 TIRES

Specific FS East addition to Rules 2020 T2.5.4

Any treatment with any kind of traction enhancer is not allowed. Using a modified tire for any dynamic event will result in a DNF.

4.1.6 INSPECTION HOLES

Specific FS East completion to Rules 2020 T3.7.6

The Technical Inspectors may check the compliance of other tubes that have minimum dimensions specified.
This may be done by the use of ultrasonic testing or by the drilling of additional inspection holes at the inspector's request.
Inspection holes must be located so that the outside diameter can be measured ACROSS the inspection hole with a vernier caliper, i.e. there must be access for the vernier caliper to the inspection hole and to the outside of the tube one hundred eighty degrees (180°) from the inspection hole.

4.1.7 LOW VOLTAGE SYSTEMS (≤ 60 VDC)

Specific FS East completion to Rules 2020 T11.7.2

The maximum permitted voltage that may occur between any two electrical connections in the LVS is 60 V DC or 25 V AC RMS.
The only exceptions are 3-phase devices where 48V AC RMS line voltage limit replaces the phase limit.

4.1.8 LOW VOLTAGE SHORT CIRCUIT PROTECTION

Specific FS East completion to Rules 2020 T11.7.6

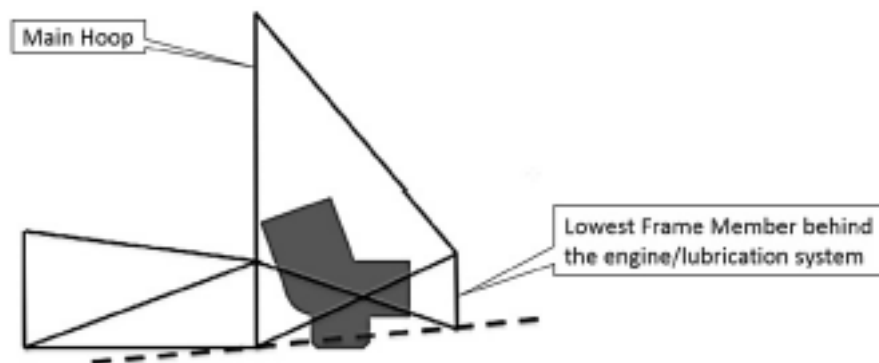
The LV and HV wiring have to be mechanically unloaded and tension free, no additional weight is allowed to be attached to the cables except coatings and bonding. Fuses, connectors and relays, switching devices have to be mechanically fixed to a rigid surface.

4.2 SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES

4.2.1 ENGINE LUBRICATION SYSTEM

Specific clarification of Rules 2020 T7.3.1

The lowest point of the engine lubrication system must be no lower than the line between the lowest point of the main roll hoop and the lowest frame rail behind the engine and/or lubrication system. If the engine oil pump or any other part of the lubrication system is lower than this line, it must be protected by a sufficient skid plate, or frame tubes installed longitudinally under the affected part of the engine lubrication system.



The engine lubrication system must be protected from surface contact in any situation while in operation on track, especially in case of a suspension failure. The skid plate itself can not be mounted to parts of the engine.

4.2.2 ELECTRONIC THROTTLE CONTROL (ETC)

4.2.2.1 THROTTLE POSITION SENSOR - TPS

Specific FS East addition to Rules 2020 Rule CV1.6

Teams must always use the highest measured TPS value as valid TP signal. If three sensors are used, then in case of a sensor failure the wrong sensor must be dedicated as “incorrect” and it is not allowed to use it later in the solution. (CV1.6.7 is valid for the remaining two faultless sensors.)

4.2.2.2 ACCELERATOR PEDAL SENSOR - APPS

Specific FS East addition to Rules 2020 Rule T11.8

Teams must always use the lowest measured APPS value as valid APP signal. If three sensors are used, then in case of a sensor failure the wrong sensor must be dedicated as “incorrect” and it is not allowed to use it later in the solution. (T11.8.8 is valid for the remaining two faultless sensors.)

4.3 SPECIAL REQUIREMENTS AND RESTRICTIONS FOR ELECTRIC VEHICLES

4.3.1 CLARIFICATION ON ACCUMULATOR MANAGEMENT SYSTEM(S)

Specific FS East addition to Rules 2020 Rule EV5.8

The AMS must keep the accumulator cells within their safe operation limits with respect to charge and discharge currents according to the manufacturer's data sheet.

The AMS must be able to read and display all cell voltages, TS current, temperatures, e.g. by connecting a laptop to the AMS. This must be demonstrated during E-Scrutineering.

The AMS readings must be within +/- 15 mV from the actual cell voltage. This will be checked during Scrutineering.

4.3.2 DEVICE TO BE USED FOR CHECKING CELL TEMPERATURE

Specific FS East addition to Rules 2020 Rule EV5.8.5

FS East will not install a monitoring device for temperature monitoring.

4.3.3 CURRENT LIMIT VIOLATIONS

Specific FS East addition to Rules 2020 Rule EV2.2

The data logger data will be checked against the maximum accumulator charge and discharge currents stated in the ESF, as well as the values stated in the FSG rules.

4.3.4 DATA LOGGER DOWNLOAD

It is the responsibility of the team to ensure that the data logger data from each event is made available to the organizers by having it downloaded with an official one hour after the closing of the respective event latest. Failure to make the data available within the specified time period due to the teams fault will result in the team not being scored for the respective event.

4.3.5 SPECIFIC FS EAST RULE FOR ATTACHMENT OF HV-COMPONENTS

The accumulator attachment to the major structure must follow T10 - Fasteners of Rules 2020. A usage of self-locking helicoil inserts is not applicable. This also applies to electric motors.

4.4. TECHNICAL INSPECTION - GENERAL REQUIREMENTS

4.4.1 SES TEMPLATE

The official SES template of FS East is the FSG20 SES v1.1 document published by Formula Student Germany at www.formulastudent.de.

4.4.2 IAD TEMPLATE

Specific FS East addition to Rules 2020 T3.18.1

The official IAD template of FS East is the FSEAST-IADv1.0 document published by Formula Student East at www.fseast.eu.

4.4.3 INSPECTION & TESTING REQUIREMENT

Specific FS East addition to Rules 2020

Before passing all parts of technical inspection, the car may only be moved around on the event site with all detachable keys of the Master Switches [all vehicles] and HVD [EV and DV-EV only] removed.

Broken seals must be replaced by a scrutineer, but rescrutinering may be requested by the scrutineer.

4.4.4 CAR WEIGHING

Specific FS East addition to Rules 2020 Rule IN8

If the car weight changes due to replacement of broken parts, the car must be presented for tech inspection and then re-weighed. It is the team's responsibility to have the car re-weighed before entering a dynamic event after changing parts.

4.4.5 BRAKE TEST

Specific FS East addition to Rules 2020 Rule IN11

The brake system will be dynamically tested and must demonstrate the capability of locking all four (4) wheels at the same time and stopping the vehicle in a straight line at the end of an acceleration run specified by the brake inspectors.

4.4.6 BOTS TEST

Specific FS East addition to Rules 2020 T6.2

In case the actuation of the BOTS during a failure of the brake system is not apparent and not documented (video, CAD cinematic, pictures) sufficiently, a brake failure will be simulated during scrutineering.

This will be tested by opening the brake bleeder nipple at the brake caliper at one of both brake circuits.

If the brake circuit is opened, the brake pedal must actuate the BOTS in every situation (e.g. balance bar position).

4.5. TECHNICAL INSPECTION - SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES

4.5.1 INSPECTION OF ELECTRONIC THROTTLE CONTROL (ETC)

Internal combustion engine vehicles equipped with ETC will have two parts of technical inspection: mechanical inspection and electrical inspection.

The electrical inspection is the second part of the inspection, it is held in the engine test area and will focus on the operation of ETC.

4.5.2 INSPECTION OF BSPD CIRCUIT

All combustion vehicles must have a BSPD circuit, see Rules 2020 T11.6

A template circuitry can be found on the FSG website:

https://www.formulastudent.de/fileadmin/user_upload/all/2019/important_docs/FSG19_BSPD_v0.3.zip

The inspection of BSPD circuit is held in the engine test area and will focus on its operation.

4.6 SCRUTINEERING PROCEDURE

The following steps need to be passed during the scrutineering, according to classification of the car.

	EV	CV	DV
EV1 Scrutineering	X		X (EV only)
Accumulator Scrutineering	X		X (EV only)
Mechanical Scrutineering	X	X	X
EV2 Scrutineering	X		X (EV only)
ETC/BSPD Inspection		X	X (CV Only)
Autonomous System Test			X
Driver Egress & Safety Test	X	X	X
Tilt Test	X	X	X
Noise Test		X	X (CV only)
Rain Test	X		X (EV only)
Brake Test	X	X	X
EBS Test			X

4.6.1 STATIC SCRUTINEERING EVENTS

4.6.1.1 PRE-INSPECTION

There will be no Pre-Inspection on FS East 2020.

4.6.1.2 EV 1 SCRUTINEERING [EV-ONLY]

Electrical Scrutineering of the Low Voltage systems of the car. The TS accumulator must be outside of the car.

4.6.1.3 ACCUMULATOR SCRUTINEERING [EV-ONLY]

Electrical Scrutineering of the TS Accumulator and Charging systems of the car. Can be done independently from EV1.

Teams also have to present all safety equipment and high voltage rated tools.

4.6.1.4 MECHANICAL SCRUTINEERING

Mechanical Scrutineering of the car.

EV only: the Accumulator Scrutineering has to be passed and the TS accumulator has to be mounted inside of the car.

4.6.1.5 EV 2 SCRUTINEERING [EV-ONLY]

Electrical Scrutineering of the Tractive System of the car. The car must be in ready-to-race condition, and every scrutineering stage mentioned before have to be passed to start the EV2 scrutineering.

4.6.1.6 AUTONOMOUS SYSTEMS SCRUTINEERING [DV-ONLY]

Scrutineering of the Autonomous systems of the car. The car must be in ready-to-race condition, and every scrutineering stage mentioned before has to be passed to start the Autonomous Systems scrutineering.

4.6.1.7 DRIVER EGRESS & SAFETY TEST

During the Driver Safety Test, each team have to present their safety equipment, and also demonstrate the driver emergency exit situation.

Teams must also present every item listed in Rules 2020 T13.

4.6.2 EQUIPMENTS AT ELECTRIC VEHICLES INSPECTION

For the electrical inspection of the technical inspection each team must present the following equipment:

- TS accumulator charger to be used during the event (EV2)
- all TS accumulator containers to be used during the event (EV2)
- TS Accumulator Container Hand Cart (EV2)
- Tools as listed in Rules 2020 rule IN3.2.1 and IN4.2.1

4.6.3 READY-TO-RACE CONDITION

Before Drivers Safety Test, the car has to be in ready-to-race condition. No body part change or additional venting hole covering is allowed after this point.

4.6.4 MAINTENANCE DURING SCRUTINEERING

If the team decides to fix any founded issue during the inspection, they have total 15 minutes maintenance time in the scrutineering pit, which is measured cumulatively. After 15 minutes the team have to leave the area.

4.7 SPECIAL REQUIREMENTS FOR DRIVERLESS VEHICLES

4.7.1 DATA LOGGER CONNECTIONS

Driverless cars with electrical drive have to provide a CAN channel for the data logger. The specification of the bus parameters and the required CAN messages are described in the Data Logger Specification.

4.7.2 DATA LOGGER AND RES CONNECTION

The Remote Emergency System (RES) and the data logger must share the same CAN bus.

4.7.3 REMOTE EMERGENCY SYSTEM

The RES that has to be used for the competition is a GF2000i-codec/T53R98 combination from Gross-Funk GmbH.

4.7.4 RE-RUN DEMANDS

System misbehavior and faulty logs caused by misuse of the CAN messages eliminates the demand for a re-run and may lead to a Disqualified (DQ).

4.7.5 SPECIAL REQUIREMENTS FOR THE DV SCRUTINEERING

During the Driverless Scrutineering the EBS (Emergency Brake System) will be triggered multiple times.

Every team should be able to reset their EBS in 5 minutes.

Reference design can be found [here](#).

4.7.6 AUTONOMOUS SAFETY FORM

In addition to Rules 2020 DV 2.7.2 the Autonomous Safety Form also must contain the following chapters:

- Documentation of the Autonomous State Machine DV 2.4
- Documentation of the ASSI
- Documentation of the AMI
- Documentation of the start-up procedure

4.8 SPECIAL REQUIREMENTS FOR A5.6 VEHICLE STATUS VIDEO (VSV)

FSEast will require Vehicle Status Video. If the team fails to meet the requirements presented in Rules 2020, it is the FS East organizers' own subjective decision to let the team compete on the event or not.

4.9 ADDENDUM TO REGISTRATION RULES 2.2

After registration rule 2.2 the teams are allowed to participate in multiple categories with the same car. This possibility leads to some collisions between the technical rules and the exceptions for driverless vehicles which we want to clarify.

4.9.1 CHANGES BETWEEN TWO CATEGORIES

After the passed technical and autonomous scrutineering the team's are allowed to make changes at the autonomous system, EBS, sensors and components (defined in DV2, DV3 and DV4) between the CV/EV and DV disciplines.

A documentation on the scope of changes must be brought to the technical inspection.

Depending on the scope of the changes other technical inspections (brake test, EBS test, etc.) between the CV/EV and DV disciplines can be required.

4.9.2 ADDENDUM RULE A2.3.2

The exceptions (T3.4.3, T3.7.4, T3.9.5, T4.5.1, T4.5.3) for driverless vehicles named in rule A2.3.2 are prohibited.

4.9.3 TECHNICAL INSPECTION

The car has to pass the mechanical inspection in driverless and non driverless configuration - including cross-section and percy templates.

4.9.4 ACTUATORS INSIDE THE DRIVER CELL

Open actuators, chain and belt drives have to be covered and must comply with rule T7.3.5 and T7.3.6.

4.9.5 ATTENDANCE AT DYNAMIC EVENTS

It is the team's responsibility to enter all dynamic events in time with the same car in both CV/EV and DV categories.

4.9.6 CHARGING DV/EV CARS

It is the team's responsibility to schedule their TS accumulator charging for the dynamic events.

The schedule will be available prior to the competition but changes are possible due to unexpected events.

5. STATIC EVENTS

During all static events (both initial and final judging) a team member may participate only in that team's event, which she/he is registered in. Universities participating with multiple vehicles are considered as separate, individual teams and each participant must be a member of one and only one team. Active participation on other teams' static event will be penalized. Enforcing this principle, the distinct static events of these teams will be scheduled in parallel, in the same time slot.

5.1 BUSINESS PLAN PRESENTATION EVENT

5.1.1 BUSINESS PLAN DOCUMENTS

The Business Plan Presentation Event's documents consist of the following documents:

- Executive Summary
- Pitch Video (optional)
- Business Plan Presentation Electronic

5.1.1.1 EXECUTIVE SUMMARY

Judging will begin with the inspection and analysis of the priorly submitted Executive Summary, which is the principal document of the Business Plan Presentation.

The Executive Summary must be uploaded in Adobe Acrobat® format (*.pdf file) to the FS East website no later than the given deadline. The executive summary must not exceed one (1) page. The team name and car number for exact identification must be written on it.

Specific FS East rule addition

The executive summary should contain:

- one outstanding, innovative business model idea (why is your BP better?)
- the 3 main foreseeable cost categories with estimated values for the following 3 years
- the breakeven point

In case of the Executive Summary is not compliant with the rules, the team will receive 75 penalty points and will be asked to resubmit the document. Penalty points remain valid even if resubmission is asked until the Executive Summary can be accepted.

5.1.1.2 PITCH VIDEO

Teams have the opportunity to upload their Business Plan Pitch Video (BPPV).

The video that it considered the best by the organizers will receive a Special Award.

Teams who would like to submit a video should upload it to YouTube as a Public or Unlisted video, and the link of the video should be submitted to the FSEast website. The length of the video is maximum 30 sec.

The pitch video should be considered as the first impression of the business idea and has to contain the relevant investment figures.

There is no possibility for resubmission fo Pitch Videos, every video should be submitted until the deadline defined above.

5.1.1.3 BUSINESS PLAN PRESENTATION ELECTRONIC COPY

Specific FS East rule addition

All teams must submit the final version of their presentation no later than the given deadline.

Teams cannot change their presentation for the initial judging after their electronic copy is submitted.

5.1.2 DEEP DIVE TOPIC

All teams will receive the same specific Deep Dive Topic from the organizers prior to the competition, which has to be part of the ten minute presentation.

The topic with further information will be published on the FS East website no later than 4 weeks before the event.

5.1.3 DATA PROJECTION EQUIPMENT

Plasma display/LCD Monitors will be provided by FS East. These displays will have VGA+HDMI Input Connectors. The organizers will not provide any other presentation equipment (e.g. laptop). Teams planning to use other equipment as a part of their presentation, are responsible for bringing, or otherwise arranging for their own equipment. Please note that only Schuko sockets (CEE 7/3) will be provided.

5.1.4 JUDGING SEQUENCE

At FS East Business Plan Presentation Judging will consist of two parts for each category:

1. Initial judging of all teams
2. Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate in the final. In this case the results are determined based on initial judging.

Teams participating in the Business Plan Presentation Final will be informed about their participation during the event.

5.1.5 BUSINESS PLAN PRESENTATION SCORING FORMULA

There is a maximum of seventy-five (75) points from the FS East Business Plan Presentation Judging Score Sheet.

The final score of a team is based on the average of the Judges' scoring sheets.

Each category is evaluated separately.

NOTE: If rounding - down or up - the average is needed, it will be decided by Judges in the given Judge Group on spot, before the Static Day ends.

NON-FINALIST

BPP SCORE = (P_{YOUR}/P_{MAX})X(75-N)

Where:

"P_{MAX}" is the highest score awarded to any team in the given category not participating in the finals

"P_{YOUR}" is the score awarded to your team

"n" is the number of finalists in the given category (**NOTE:** n can be 0 as well)

FINALISTS

BPP SCORE = 75-(N-1)

Where:

"n" is the place achieved in the Business Plan Presentation Final

It is intended that the scores will range from near zero (0) to seventy-five (75) to provide good separation.

NOTE: CV, DV and EV categories will be evaluated separately. The scoring sheet's structure and its content will differ from the one defined in Rules 2020 as it will be prepared by the FS East organizers prior to the Event.

5.2 COST AND MANUFACTURING EVENT

5.2.1 COST REPORT DOCUMENTS

The Cost Report Documents (CRD) consist of the following documents:

- The BOM including DBOM and CBOM created online on the Formula Student Germany website
- The supporting material file uploaded as a pdf file to the competition website
- The cost explanation file uploaded as a pdf file to the competition website

All CRD documents must be printed by the team and brought as a hard copy to the Event Control on the 5th of August.

Two hard copies or a splittable folder of the CRD is allowed to be used at the discussion.

Without submitted electronic or written copy of any of the Cost Report Documents a team will not be allowed to take part in the corresponding events (Discussion and Cost Understanding) and will receive a score of 0 (zero) for the Cost and Manufacturing Event.

5.2.1.1 ELECTRONIC COPY

Prior to the competition, the Cost Report Documents (CRD) must be submitted to the competition website no later than the given deadline.

For the creation of the BOM, the teams are expected to use the CBOM tool available on the www.formulastudent.de website. This tool provides a printable *.pdf version of the BOM.

All the three (3) CRD should be uploaded as separate documents in *.pdf file. For submission all the CRD files must be compressed into **one (1) *.zip** file.

Filename nomenclature:

- CAR#_CRD.zip (e.g. 01_CRD.zip) for the zip archive.
- CAR#_BOM.pdf (e.g. 01_BOM.pdf) for the Bill of Materials.
- CAR#_SUP_MAT.pdf (e.g. 01_SUP_MAT.pdf) for Supporting Material.
- CAR#_COST_EXPL.pdf (e.g. 01_COST_EXPL.pdf) for the Cost Explanation.


NOTE:

- Incomplete submissions (e.g. only the BOM) will be counted as not submitted. Only with all three (3) parts accomplished the submission of the Cost Report is complete. A team can decide not to submit a Supporting Material at the price of losing points, in which case they should upload an empty *.pdf file with the correct nomenclature.
- Failure to meet the nomenclature requirements results in a maximum of minus two (-2) points.

5.2.1.2 WRITTEN COPY

The written copies must be identical to the electronic copies (the full report). The written copy must be presented during the discussion part of the Cost and Manufacturing Event. The hard copy must be identical to the uploaded version, otherwise five (5) penalty points will be deducted from the team's Cost and Manufacturing Event score.

All CRD Written Copies must be handed in one or more ring binders, labelled as follows:

	
Cost Report Documents Written Copy	
University name:	xxxxxxx
Team name:	xxxxxxx
FS East Car number:	xxx

Do not send the Written Copy by mail; it must be submitted at the FS East Event Control no later than the given deadline.

5.2.1.3 COSTED BILL OF MATERIALS (CBOM)

The chosen system that must be submitted for a CBOM at FS East 2021 will be "Electrical System".

5.2.1.4 DETAILED BILL OF MATERIALS (DBOM)

The chosen systems that must be submitted for a DBOM at FS East 2021 will be "Suspension System".

5.2.2 JUDGING SEQUENCE

At FS East Cost and Manufacturing Event Judging will consist of two parts for each category:

1. Initial judging of all teams
2. Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate the final. In this case the results are determined based on initial judging.

Teams participating in the Cost and Manufacturing Event Final will be informed about their participation during the event.

5.2.3 COST AND MANUFACTURING SCORING FORMULA

The overall Cost and Manufacturing Event maximum scoring is 100 points.

5	Format and Accuracy of Documents
5	Knowledge of Documents and Vehicle
20	Content and Completeness of the BOM
20	Realism of the CBOM
50	Cost understanding

Each category is evaluated separately.

NON-FINALIST

$$\text{CME SCORE} = (P_{\text{YOUR}} / P_{\text{MAX}}) \times (100 - N)$$

Where:

"P_{MAX}" is the highest score awarded to any team in the given category not participating in the finals

"P_{YOUR}" is the score awarded to your team

"n" is the number of finalists in the given category (**NOTE:** n can be 0 as well)

FINALISTS

$$\text{CME SCORE} = 100 - (N - 1)$$

Where:

"n" is the place achieved in the Cost and Manufacturing Event Final

5.2.4 RESULT REVISION

After the initial evaluation the judges will review all cost reports and given scores. In case of debatable/questionable situations the final decision falls within the competence of the Cost and Manufacturing Event Leader. The same rule applies in case of complaints.

5.3 ENGINEERING DESIGN EVENT

5.3.1 ENGINEERING DESIGN DOCUMENTS

The Engineering Design Documents consist of the following documents:

- Engineering Design Report (EDR)
- [DV only] Autonomous Design Report (ADR)
- Design Spec Sheet (DSS)

These documents must be uploaded to the FS East website no later than the given deadline.

Without the successful submission of all documents (2 for CV and EV, 3 for DV) a team might not be allowed to take part in the Engineering Design Event and might be given a score of zero (0) for the whole event. The submission is considered to be successful if the organizers have checked if the documents fulfill the formatting and content requirements and they have accepted them.

In case of formatting and naming errors in the documents penalty can be applied up to a maximum of -10 (minus ten) points for CV/EV and -20 (minus twenty) points for DV, which will be deducted from the Engineering Design score after the Engineering Design Final

Filename nomenclature:

- CAR#_EDR.pdf (e.g. 01_EDR.pdf) for the Engineering Design Report.
- CAR#_ADR.pdf (e.g. 01_ADR.pdf) for the Autonomous Design Report. [DV only]
- CAR#_DSS.pdf (e.g. 01_DSS.pdf) for the Design Spec Sheet.

5.3.1.1 ENGINEERING DESIGN REPORT (EDR)

The Engineering Design Report must be submitted in a single Adobe Acrobat® (*.pdf) file.

The documents must be prepared according to the Rules 2020 S3.2.

The EDR **must not exceed** eight pages, consisting of not more than **five pages of content** (text, which may include pictures, graphs, tables, etc.) and **three pages of drawings**. The three EDR drawings must show the vehicle from **front, top and side views**. Additional detailed views, cross-sections can appear on the drawings. Each of the three drawings must appear on a **separate page**. Pay attention to the quality of the drawings, follow the general rules of **engineering drawings**. Photos, renders, screenshots of the CAD software are not meeting the requirements. The function of the EDR is to provide information from one engineer (the designer) to another engineer (the judge), the content and the drawings must serve this function. For further formatting directives see Rules 2020 S3.2.2 - S3.2.8.

The size of the document **must not exceed five megabytes (5MB)**. A properly sized document will be much smaller than five megabytes in file size. Please ensure that graphs and photos within the Acrobat file are of an appropriate resolution.

5.3.1.2 [DV ONLY] AUTONOMOUS DESIGN REPORT (ADR)

The Autonomous Design Report must be submitted in a single Adobe Acrobat® (*.pdf) file.

The documents must be prepared according to the Rules 2020 S3.4.

The ADR must be written as a **scientific paper** and **must not exceed five pages**. For further formatting directives see Rules 2020 S3.4.4 - S3.4.6.

The size of the document **must not exceed five megabytes (5MB)**. A properly sized document will be much smaller than five megabytes in file size. Please ensure that graphs and photos within the Acrobat file are of an appropriate resolution.

5.3.1.3 ENGINEERING DESIGN SPEC SHEET (DSS)

The Design Spec Sheet must be submitted in a single Adobe Acrobat® (*.pdf) file. The FS East DSS template and further information will be published on the FS East website. The template must not be altered or reformatted prior the submission. A properly filled out DSS should be **6 pages long for CV and EV categories**, and **7 pages long for DV category**.

In the DSS metric units must be used only.

5.3.2 JUDGING SEQUENCE

At FS East Engineering Design Judging will consist of two parts for each category:

- Initial judging of all teams
- Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate the final. In this case the results are determined based on initial judging.

Teams participating in the Engineering Design Final will be informed about their participation during the event.

5.3.3 ENGINEERING DESIGN SCORING

The overall Engineering Design Event maximum scoring is 150 points for CV/EV and 300 points for DV. Each category is evaluated separately.

NOTE: All categories as mentioned in Rules 2020 S3.8.2 will be evaluated, but the score-sheet structure and the content of it will differ from Rules 2020, as it will be prepared by the FS East organisers prior to the Event.

6. DYNAMIC EVENTS

AS DEFINED IN THE RULES 2020 PART D.

Only those people can enter to the Dynamic Area during the Event, who are wearing long trousers (excluding stretch and nylon pants) and closed shoes on their legs, due to safety reasons.

6.1 DYNAMIC EVENTS SCORING

AS DEFINED IN THE RULES 2020 PART D.

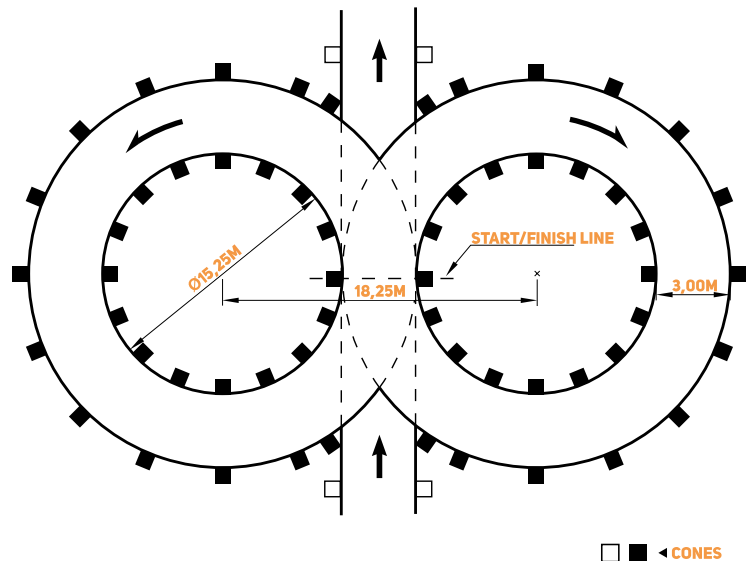
6.2 SKIDPAD EVENT

6.2.1 SKIDPAD TRACK LAYOUT AS DEFINED IN THE RULES 2020 PART D.

This means, that the skidpad layout will be the original 8 - shape layout.

TRACK LAYOUT FOR SKIDPAD EVENT

6.2.2 SKIDPAD PROCEDURE AS DEFINED IN THE RULES 2020 .



6.3 DRIVERLESS EVENTS

AS DEFINED IN THE RULES 2020, EXCEPT AS IT IS SHOWN FS EAST DYNAMIC EVENT RULES 6.5.4 SECTION.

6.4 ADDITIONAL FS EAST-SPECIFIC REMARKS

6.4.1 PIT RULES

Pit Rules will be detailed in the Event Handbook.

6.4.2 SCHEDULE

The schedule for the dynamic events will be shown in the Event Handbook. The last team that is allowed to start the run is the one, that stands at the starting line 2 minutes before the scheduled time is over. Officials have the right to refuse the start of the run, if they judge, that the run will be not completed until the scheduled finish date of the event. Teams standing in the row at closing time are not allowed to start their run. At the entrance of the test tracks, the skidpad, acceleration and autocross track, a CLOSED sign will be placed with the scheduled ending time.

For Driverless Teams, preparation must finish at least 5 minutes before the scheduled closing time. Vehicle must be in a running state 5 minutes before the closing time. These teams are allowed to finish their run, no other teams are allowed to participate.

6.5 SPECIAL ADDITION TO THE RULES 2020

6.5.1. PASSING

The passing rules do not apply to vehicles that are stopped on track or vehicles that have spun out and are not moving. When passing a stationary vehicle, it is critical to slow down, drive cautiously and to follow the instructions from the track marshals.

NOTE: Overtaking on any section of the track except passing zones is still not allowed.

NOTE: If you notice any problem causing that you have to stop, please leave the ideal line.

6.5.2 ENDURANCE WAITING QUEUE

IMPORTANT: In order to have equal and fair conditions during the Endurance event at least 3 cars have to be on the track during the whole time of the Endurance event.

Therefore the Organisers will maintain a waiting queue of 3 teams. It is the team's responsibility to arrive in the waiting queue before the deadline - which will be announced for each team in the loudspeakers 15 minutes before the deadline. A delay will be penalised with 2 minutes penalty and the team will be able to start only at the end of the endurance event.

NOTE: According to experience of earlier years Formula Student events, it is expected to have sudden need for new teams in the waiting queue in the first section of the endurance event due to early DNFs. Please be prepared to attend the queue on time!

6.5.2.1 SKIDPAD / ACCELERATION WAITING QUEUE

In general, cars standing in the first driver queue have the priority compared to second driver's car. But in case of 2 or more cars standing in both queues, the following rule is applied: 2x first drivers car is enabled to run, after that a second drivers car, and the round starts again.

6.5.3 ENDURANCE TRACK LENGTH

The full length of the Endurance event will be approximately 22 km.

The Endurance and Autocross track will be laid out with cones. In the straights, the distance between two cones will be 8-10 m in driving direction, and in some straights, the track width could be 3-8 m.

The approximate length of the Autocross and Endurance track will be 2000 metres.

6.5.4 DRIVERLESS EVENTS

Driverless Autocross Event takes place on the same track as Driverless Trackdrive Event.

Driverless Autocross and Driverless Trackdrive Event will be the same in the Event Schedule, teams can choose, whether they start their Autocross or their Endurance Run, when entering the track.

Previously collected data must be deleted before the Autocross and Trackdrive Event.

Refuelling is needed before starting Trackdrive Event.

6.5.5 DRIVERLESS CONES

The used cones during the Driverless Events are defined in the [FSG Competition Handbook 2021](#), section Track Marking.

Difference to that, that the cones will not be marked with any additional labels.

Foreseenly there will be no track limit lines at the Driverless Dynamic Events.

6.5.6 FUEL

FS East offers two types of fuels for teams:

- Gasoline, RON 100
- MOL Racing Fuel DRX (ethanol 85%, with 15% RON 106 maingrade gasoline).

Teams should come to the FS East 2021 Event with empty fuel tank. It is not possible to empty the fuel tank in the FS East Pits. Measuring the ethanol ratio of the fuel is not allowed at the event site, further details of the provided fuel can be found at www.fseast.eu. Teams must fill the tank fully at the first time.

In case of the suspension of the endurance, teams are allowed to have the engine heating procedure again. In this case, the fuel must be fueled top before the endurance starts again.

6.5.7 TIMEKEEPING

Transponders will be provided by FS East Event.

Transponders must be placed safely (securely attached, protected from debris and hot surfaces) on the left side of the vehicle (preferably on the nose cone, sidebox or diffuser) for timekeeping.

IMPORTANT: Transceiving surface of the transponder must not be faced to the ground, but point to the left parallelly to the ground and perpendicularly to the centerline of the vehicle. The transceiving surface must not be obscured by any parts of the vehicle. Image of a possible solution will be shown in the Event Handbook.

6.5.8 DRIVING BACK TO THE DRIVER CHANGE AREA

Cars, that finish Endurance / Autocross Event or coming to the Driver Change Area to change drivers, shall drive to the Driver Change Entrance line with race - speed, without holding up any other racing participants. Drivers should reduce their speed before arriving to the Driver Change Area and arrive to there slowly and safely. Drivers, who does not obey this rule (determined on the Race Leader Officials viewpoint), will get a 15 second time penalty in addition to their sum Endurance / Autocross Time.

In case of obvious slowing - down of any race car, when slow speed reduction can be harmful for other cars' racing, officials have the right to show Meatball flag for the slow car, in order to examine it in the Driver Change Area.

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CHANGELOG

Version	Date	Modification	Page
1.0.0	25th of March 2021	Initial release	-
1.1.0	8th of July 2021	Venue, date and schedule updates	