

FORMULA
STUDENT **EAST**
28TH JULY

OFFICIAL RULES

GYŐR - GÖNYŰ
FSEAST.EU

TABLE OF CONTENTS

1. Introduction	3	5. Special requirements and restrictions for Internal Combustion engine vehicles	13
2. General	3	5.1 Engine Lubrication System	13
2.1 Competition Dates and Place	3	5.2 Fuel Rails	14
2.2 FS East 2016 Rules	3	5.3 Electronic Throttle Control (ETC)	14
2.3 Rules Questions	3	6.Special requirements and restrictions for Electric vehicles	14
2.4 Official Language	3	6.1 Maximum permitted voltage	14
2.5 Official Time	4	6.2 Clarification on Accumulator Monitoring Systems	14
2.6 FS East Registration	4	6.3 Device to be used for checking compliance to FSAE®2016 EV3.6.3	15
2.7 Event Handbook	5	6.4 Current limit violations	15
2.8 Testing and Work Safety	5	6.5 100ms-continuity violations	15
2.9 [Electric vehicles only] Charging Connector and max. Power	5	6.7 Galvanic Separation in Accumulator Containers	15
3. Deadlines, penalties, and additional information regarding documentation	6	6.8 Specific FS East rule for attachment of HV-components	15
3.1 Structural Equivalency Spreadsheet (SES)	7	7. Technical Inspection	16
3.2 Impact Attenuator Data (IAD)	7	7.1 Inspection & Testing Requirement	16
3.3. Electronic Throttle Control (ETC)	8	7.2 Equipments at Electric Vehicles inspection	16
3.4 Fuel Type Order	8	7.3 Inspection of Electronic Throttle Control (ETC)	16
3.5 Electrical System Form (ESF)	8	7.4 Car weighing	16
3.6 Electrical System Advisor(s) Form	9	7.5 Brake test	17
3.7 Engineering Design Report and Design Spec Sheet	9	8. Static Events	17
3.8 Cost Report	9	8.1 Business Logic Case	17
3.9 Business Logic Case	9	8.2 Business Plan Presentation	17
3.10 Team Member Designation and Health Insurance Certificate	9	8.3 Engineering Design Event	18
4. General Vehicle Requirements and Restrictions	10	8.4 Cost, Manufacturing and Sustainability Event	19
4.1 Alternative Frame Rules	10	9. Dynamic events	22
4.2 Drivers Cell	10	9.1 Dynamic Events Scoring	22
4.3 Ventilation of Enclosed Structures	10	10. Additional FS East-specific remarks	22
4.4 Impact Attenuator	10	10.1. Pit Rules	22
4.5 Laminate testing	11	10.2. Behavior	22
4.6 Driver Egress	11	10.3 FSAE Rule "D8.9 Endurance Fuel Fill – IC cars	22
4.7 Vehicle Identification	11	11. Changelog	23
4.8 Driver's Underclothing	12		
4.9 Tire and Rim Combination	12		
4.10 Tires	12		
4.11 Steering System	12		
4.12 Minimum Radii of edges	12		
4.13 Inspection Holes	12		
4.14 Grounded low voltage systems (<=60 VDC)	13		
4.15 External batteries	13		
4.16 Quick Jack	13		

1. INTRODUCTION

Formula Student East® (hereafter “FS East®”) is a brand new FSAE style Formula Student engineering competition in Hungary, organised by Engineers for the Automotive Higher Education Association from 2016.

Formula Student East will allow to participate vehicles with conventional combustion engine (gasoline or E85 fuelled) and electric powertrain vehicles, which will directly compete against each other.

This rules document contains the FS East rules. These specific rules are an addition to the 2016 Formula SAE® (hereafter “FSAE”) rules. In case of a conflict between the 2016 FSAE rules and the 2016 FS East rules, the 2016 FS East rules supersede the 2016 FSAE rules.

2. GENERAL

2.1 COMPETITION DATES AND PLACE

FS East 2016 will be held between 28th and 31st July, 2016 in Győr, Hungary.

2.2 FS EAST 2016 RULES

The FS East competition is compliant with the FSAE 2016 competition rules.
http://www.fsaeonline.com/content/2016_FSAE_Rules.pdf

The FS East rules presented in this document include specific rule changes and additions to the FSAE 2016 rules. These changes and additions supersede the specific sections of the published FSAE 2016 rules.

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 2016.

2.3 RULES QUESTIONS

Any rule clarification questions or 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 and FSAE rule 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 rules@fseast.eu. Do not ask about more than one rule per mail.

2.4 OFFICIAL LANGUAGE

The FS East official language is English.

2.5 OFFICIAL TIME

The FS East official time:

From	Till	Time
25th October 2015	27th March 2016	Central European Time (CET)
27th March 2016	30th October 2016	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

2.6 FS EAST REGISTRATION

2.6.1 FS EAST REGISTRATION RULES

FS East Registration Rules are available at the Rules and Important Documents section of the FS East homepage.

2.6.2 FS EAST REGISTRATION REQUIRED CONTACT INFORMATION

Once the team has officially been registered for FS East event, each team member and faculty advisor is required to add his/her identifying information online.

Participants may only be added (registered) by the team's official contact person (the person who registered the team for the event).

2.6.3 INDEPENDENT TEAMS

In the case that a university takes part in FS East 2016 with two cars, one with internal combustion engine and one using electric drivetrain, then these teams may not share team members in any static or dynamic events.

2.6.4 SOCIETY MEMBERSHIP

Every participating team member must be a member of one of the FISITA engineering societies:

www.fisita.com/membership/members

2.6.5 STUDENT STATUS

Students seeking a PhD degree/PhD Students or equivalent are not allowed to participate at FS East.

2.6.6 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.

2.7 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.

2.8 TESTING AND WORK SAFETY

FS East is not responsible for the use of the cars other than at the event in Győr. 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 guarantees 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 and ETC plausibility check 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 FSAE rules 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 2016 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.

2.9 [ELECTRIC VEHICLES ONLY] CHARGING CONNECTOR AND MAX. POWER

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

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 24h. 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.
- Late submissions will be penalized with 10 (ten) points for each overdue day.
- A late submission to a request from the FS East Officials later than 7 days will be penalized with 10 (ten) points for each overdue day.
- A 3rd rejection of a document will be penalized with an extra 50 (fifty) points.
- A 4st rejection of a document will be penalized with an extra 75 (seventy-five) points.
- A 5st, and any further rejection of a document will be penalized with an extra 100-100 (hundred per occasion) points.
- Failure to submit Engineering Design Report, or Design Spec Sheet, or Cost Report- Electronic Copy, or Business Logic Case- Electronic Copy documents will automatically result in zero points for the given Event.

FORMULA STUDENT EAST WILL APPLY MARCH 12TH, 2016, 23:59 CET AS A DEADLINE FOR THE FOLLOWING:

Document:	Required for:
Electronic Throttle Control - Notice of intent	ETC system
Alternative Frame Rules - Notice of intent	Alternative frame

FORMULA STUDENT EAST WILL APPLY APRIL 23RD, 2016, 23:59 CEST AS A DEADLINE FOR THE FOLLOWING DOCUMENTS:

Document:	Required for:
Business Logic Case - Electronic Copy	Business Plan Presentation

FORMULA STUDENT EAST WILL APPLY MAY 21ST, 2016, 23:59 CEST AS A DEADLINE FOR THE FOLLOWING DOCUMENTS:

Document:	Required for:
Team Member Designation and Health Insurance Certificate	All events

FORMULA STUDENT EAST WILL APPLY **MAY 28TH, 2016, 23:59 CEST**
AS A DEADLINE FOR THE FOLLOWING DOCUMENTS:

Document:	Required for:	Maximum applicable penalty points:
Structural Equivalency Spreadsheet (SES) / Structural Requirements Certification Form (SRCF)	Dynamic events	no limit
Impact Attenuator Data (IAD)	Dynamic events	no limit
Electrical Systems Form (ESF)	All events	no limit
Electronic Throttle Control - FMEA (ETC FMEA)	Dynamic events	no limit
Electric System Advisor(s) Form	All events	no limit
Engineering Design Report and Design Spec Sheet	Engineering Design	100 out of 150 (Engineering Design)
Cost Report - Electronic Copy	Cost, Manufacturing and Sustainability Event	100 out of 100 (Cost, Manufacturing and Sustainability)

FORMULA STUDENT EAST WILL APPLY **JULY 28TH, 2016, 17:59 CEST (ON THE EVENT SITE)**
AS A DEADLINE FOR THE FOLLOWING DOCUMENT:

Document:	Required for:	Maximum applicable penalty points:
Business Plan Presentation - Written Copy	Business Plan Presentation	75 out of 75 (Business Plan Presentation)
Cost Report - Written Copy	Cost, Manufacturing and Sustainability Event	100 out of 100 (Cost, Manufacturing and Sustainability Event)
Cost Report Addendum	Cost, Manufacturing and Sustainability Event	----

3.1 STRUCTURAL EQUIVALENCY SPREADSHEET (SES)

3.1.1 SUBMISSION OF SES + 3 DIMENSIONAL CAD MODEL

All teams must submit a SES. The FSAE SES spreadsheet form is supplied on the www.fsaonline.com website.

Additionally, all teams must provide a 3 dimensional CAD model of the frame / monocoque including all members of the primary structure in "IGES" file format. The size of the "IGES" file is limited to 40MB.

For electric vehicles: The accumulator container(s) and attachment method must also be included.

In case of any question regarding SES documentation please contact ses@fseast.eu.

3.2 IMPACT ATTENUATOR DATA (IAD)

All teams must submit an IAD form containing the test results, description of the test setup, the used test equipment and photo documentation of the IA structure before and after the test. A template of this IAD form is supplied on the www.fsaonline.com website.

The completed IAD form must be uploaded to the FS East website.

In case of any question regarding IAD documentation please contact iad@fseast.eu.

3.3. ELECTRONIC THROTTLE CONTROL (ETC)

3.3.1 NOTICE OF INTENT

ETC Notice of Intent (FSAE 2016 Rule IC1.17) must be sent to etc@fseast.eu.
A template of this form is supplied on the www.fsaonline.com website.

Late submission of Notice of Intent will require the team to revert to a mechanical throttle arrangement.

3.3.2 FAILURE MODE AND EFFECT ANALYSIS (FMEA)

A template of this form is supplied on the www.fsaonline.com website.
The filled template (FSAE 2016 Rule IC1.18) must be uploaded to the FS East website.

Late submission of FMEA will be penalized as it is written at the beginning of FS East 2016 Rule 3.

3.4 [IC VEHICLES ONLY] FUEL TYPE ORDER

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 98 octane (ROZ 98) gasoline and E-85.

3.5 [ELECTRIC VEHICLES ONLY] ELECTRICAL SYSTEM FORM (ESF)

All electric teams must submit an Electrical System Form.
A template of this form is supplied on the www.fsaonline.com website.

THE ESF MUST CONTAIN THE DATASHEETS OF THE FOLLOWING SAFETY RELATED COMPONENTS:

- Motors – EV2.1
- Motor controller
- Torque encoder (if not self-made) – EV2.3
- Brake system encoder – EV2.4
- Battery cells of tractive system accumulators – EV3.1
- Accumulator isolation relay – EV3.5
- Accumulator management system (if not self-made) – EV3.6
- HV disconnect (if not self-made) – EV4.7
- HV and LV wiring
- Discrete components of pre-charge and discharge circuits – EV4.11
- Master switches – EV5.2
- Shutdown buttons – EV5.3
- Brake-over-travel-switch – EV5.4
- Fusing (HV, LV, cell fuses) – EV6.1
- Chargers – EV8.3

3.6 [ELECTRIC VEHICLES ONLY] ELECTRICAL SYSTEM ADVISOR(S) FORM

All electric teams must submit an Electrical System Advisor(s) Form.
Please note the responsibilities of the ESA in A5.3 of the FSAE rules.
A template of this form is supplied on the www.fsaonline.com website.

3.7 ENGINEERING DESIGN REPORT AND DESIGN SPEC SHEET

All teams must submit an Engineering Design Report and the Engineering Design Spec Sheet on the FS East website prior to the deadline. (Both are required.)

3.8 COST REPORT

3.8.1 ELECTRONIC COPY

The upload of the cost report to the FS East website must be done as shown below at "8.4.3 Electronic Copy".
Once all steps have been completed, the submission of the cost report is complete.

3.8.2 WRITTEN COPY

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

3.8.3 ADD ITEM REQUESTS

AI Rs to be considered for the Cost, Manufacturing and Sustainability Event 2016 must be submitted not later than the above specified date.

3.8.4 COST ADDENDUM

The cost addendum must be submitted at the FS East Event Control. (See the deadline above.)

3.9 BUSINESS LOGIC CASE

The Business Logic Case must be uploaded on the FS East website not later than the above specified date.

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 FS East 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. GENERAL VEHICLE REQUIREMENTS AND RESTRICTIONS

4.1 ALTERNATIVE FRAME RULES

FS East accepts entries complying with the Alternative Frame Rules (including accumulator container structure). The Notice of intent must be sent to afr@fseast.eu

Teams must follow the Formula SAE® AF Rules.

4.2 DRIVERS CELL

SPECIFIC CLARIFICATION OF FSAE 2016 RULE T3.5.5

FSAE 2016 Rule T3.5.5 is valid for the primary structure (defined in FSAE 2016 Rule 3.3) in general, as long as the driver's cell is constructed following the Minimum Material Requirements (defined in FSAE 2016 Rule T3.4) rules or the Alternative Tubing and Material rules (defined in T3.5, T3.6 and T3.7 of FSAE 2016 Rule).

4.3 VENTILATION OF ENCLOSED STRUCTURES

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE IC2.7.3 AND ADDITIONAL FS EAST RULE FOR ELECTRIC VEHICLES

Enclosed monocoque structures and belly pans must be vented to prevent accumulation of fuel. At least 2 holes, each of a minimum diameter of 25 mm, must be provided in the lowest part of the structure to prevent accumulation of volatile liquids and/or vapors. The rule is valid to any liquids in case of electric vehicles.

4.4 IMPACT ATTENUATOR

4.4.1 IMPACT ATTENUATOR DESIGN

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T3.20.2

Additional to the FSAE 2016 Rule T3.20.2 requirements Impact Attenuators must have a closed front section.

4.4.2 IMPACT ATTENUATOR TESTING

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T3.21.2

Quasi-static testing is not allowed. Only dynamic tests (drop down, sledge or pendulum tests) are allowed.

4.4.3 ANTI INTRUSION PLATE (AIP) TESTING

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T3.38

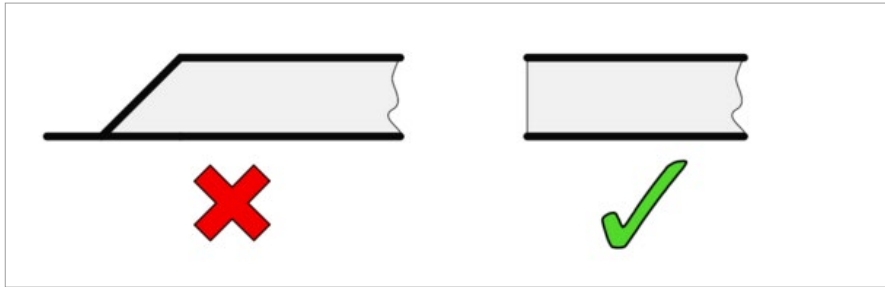
Equivalence of composite AIP to the baseline material (T3.20.3) must be shown by a physical test (T3.38.3). Results must be included in the SES.

The composite AIP must be included in the dynamic test of Impact Attenuator, and must not fail. A failure is defined if the IA plate is damaged in any way (e.g. broken) or the attachment points of AIP are destroyed.

4.5 LAMINATE TESTING

SPECIFIC FS EAST COMPLETION OF FSAE 2016 RULE T3.30.

Laminating together the inner and outer skins on any side of the specimen is not permitted.



All representative test panels must be manufactured this way.

4.6 DRIVER EGRESS

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T4.8

The driver egress, required by FSAE 2016 Rule T4.8 must be possible in all steering wheel positions.

4.7 VEHICLE IDENTIFICATION

4.7.1 SCHOOL NAME

SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE T13.2

Following school type abbreviations are accepted. The city name must be written fully.

- Technical University - TU + City
- University of Applied Sciences – UAS + City
- University - Uni + City
- Berufsakademie - BA + City
- If the university uses a shortcut in their proper name, this shortcut is acceptable + city

EXAMPLES

real name: Rheinisch-Westfälische Technische Hochschule Aachen proper name: RWTH Aachen

real name: Oregon State University Corvallis proper name: OSU Corvallis

real name: Rochester Institute of Technology proper name: Rochester IT

4.7.2 TECHNICAL INSPECTION STICKER SPACE

SPECIFIC FS EAST CHANGE OF FSAE 2016 T13.4

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.

4.7.3 TRANSPONDERS

SPECIFIC FS EAST CHANGE OF FSAE 2016 T12.2 AND 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.

4.8 DRIVER'S UNDERCLOTHING

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T14.6

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

4.9 TIRE AND RIM COMBINATION

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T6.4.1

During technical inspection each team needs to present one set of tires for dry conditions and one set of tires for wet conditions.

Tires on the same axle must have the same manufacturer, size and compound.

The tire type/rim type combination presented during Scrutineering must be the same for all dynamic events.

The rims for dry tires and wet tires can be different.

4.10 TIRES

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T6.4.2

Any treatment with any kind of traction enhancer is not allowed.

Using a modified tire for any dynamic event will result in a DNF.

4.11 STEERING SYSTEM

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T6.5.8

Steering systems using cables or belts for actuation are prohibited.

4.12 MINIMUM RADII OF EDGES

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE T3.23. AND T9.5

All other edges as named in T3.23. and T9.5 that could contact a pedestrian must have a minimal edge with a radii of at least 1 mm.

4.13 INSPECTION HOLES

To allow the verification of tubing wall thickness, 4.5 mm (0.18 inch) inspection holes must be drilled in a non-critical location of both the Main Hoop and the Front Hoop before technical inspection begins. In addition, 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.

4.14 GROUNDED LOW VOLTAGE SYSTEMS (≤ 60 VDC) SPECIFIC FS EAST COMPLETION TO FSAE 2016 RULE IC4.4.1 AND EV3.7.1

If the battery is situated out of the frame, it must be protected from any collisions.

4.15 EXTERNAL BATTERIES

The use of external batteries (e.g. for an external jump start) inside the Dynamic Area, except the Engine Test Area is not permitted.

4.16 QUICK JACK

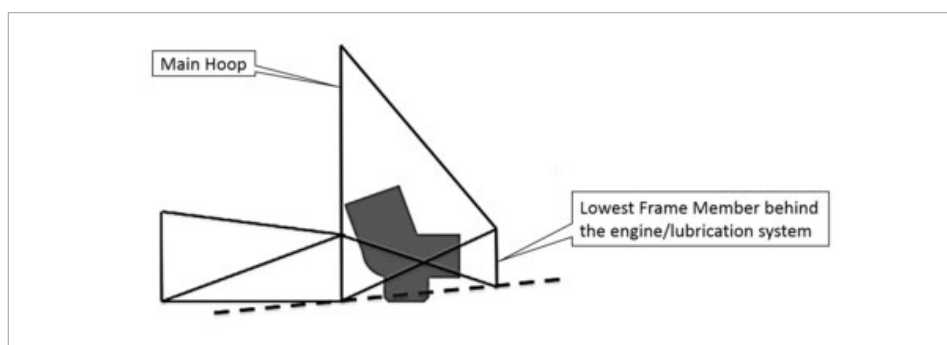
Each team must present a quick jack to lift up the car by using the jacking point during Technical Inspection.

The quick jack must be able to lift up the car safely, so that the driven wheels are at least 10.2 cm (4 in) off the ground. All-wheel driven cars must be able to lift up both axles at least 10.2 cm (4 in) off the ground.

5. SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES

5.1 ENGINE LUBRICATION SYSTEM

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 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.

5.2 FUEL RAILS

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE IC1.9

The use of fuel rails made from plastic, carbon fiber or rapid prototyping flammable materials is prohibited. The use of OEM Fuel Rails is acceptable.

5.3 ELECTRONIC THROTTLE CONTROL (ETC)

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE IC1.11.3

In case of using an unmodified OEM Throttle Control System, a second spring is not necessary. The requirement is that the part is not modified in any way and is used as “provided by the manufacturer” status.

5.3.1 THROTTLE POSITION SENSOR - TPS

SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE IC1.12

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. (IC1.12.3 is valid for the remaining two faultless sensors.)

5.3.2. ACCELERATOR PEDAL SENSOR - APPS

SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE IC1.13

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. (IC1.13.4 is valid for the remaining two faultless sensors.)

6.SPECIAL REQUIREMENTS AND RESTRICTIONS FOR ELECTRIC VEHICLES

6.1 MAXIMUM PERMITTED VOLTAGE

SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE EV1.1.2

The maximum permitted voltage that may occur between any two electrical connections at FS East is 600 VDC.

6.2 CLARIFICATION ON ACCUMULATOR MONITORING SYSTEMS

SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE EV3.6

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, e.g. by connecting a laptop to the AMS. This must be demonstrated during E-Scrutineering.

6.3 DEVICE TO BE USED FOR CHECKING COMPLIANCE TO FSAE@2016 EV3.6.3

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

6.4 CURRENT LIMIT VIOLATIONS SPECIFIC FS EAST ADDITION TO FSAE 2016 RULE EV2.2

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

6.5 100MS-CONTINUITY VIOLATIONS SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE EV2.2.4

FS East will not punish 100ms-continuity violations for exceeding the power or voltage limits.

6.6 INTERLOCKS SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE EV3.3.6

An interlock / pilot signal is always needed for EVERY tractive system connection unless the connection is made within a housing or the connection is current limited by appropriate body protection resistors (see EV4.4.6).

6.7 GALVANIC SEPARATION IN ACCUMULATOR CONTAINERS

6.7.1 CLARIFICATION ON FSAE 2016 RULE EV4.1.4

The mentioning of galvanic separation in this rule is redundant to rule EV1.2.7 and should only encourage teams to check for compliance to EV1.2.7. Therefore no extra galvanic separation is needed.

6.7.2 CLARIFICATION ON FSAE 2016 RULE EV5.2.4

The sentence "Interlocks between the TSMS and AIR's must not be in the low (ground) connection to the AIR coils." can be ignored as it is not consistent with other requirements contained in this rule.

6.8 SPECIFIC FS EAST RULE FOR ATTACHMENT OF HV-COMPONENTS

The accumulator attachment to the major structure must follow T11 of FSAE 2016 Rules. A usage of self-locking helicoil inserts is not applicable. This also applies to electric motors.

7. TECHNICAL INSPECTION

7.1 INSPECTION & TESTING REQUIREMENT

For the electric vehicles the electrical inspection will be divided into two parts. The first part of the electrical inspection must be held in the pits before the mechanical inspection.

For the combustion engine cars the technical inspection will start with the mechanical inspection in the pits.

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 removed.

Scrutineers will mark or seal various different approved parts (i.e. restrictor, insulation monitoring device, accumulator containers, energy meter, tires, rims etc.). The car can be disqualified from any dynamic event by using unmarked parts or substituting marked parts. Parts with broken seals are equivalent to being unmarked.

Broken seals may only be replaced by a scrutineer, but rescrutineering may be required by the scrutineer.

7.2 EQUIPMENTS AT ELECTRIC VEHICLES INSPECTION

FOR THE ELECTRICAL INSPECTION OF THE TECHNICAL INSPECTION EACH TEAM MUST PRESENT THE FOLLOWING EQUIPMENT:

- accumulator charger to be used during the event
- all accumulator containers to be used during the event
- Accumulator Container Hand Cart
- Tools as listed in FSAE 2016 rule EV8.5

7.3 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.

7.4 CAR WEIGHING

All cars will be weighed in ready to race condition. All fluids and coolant must be in the car. This weight will be the car's Official Technical Inspection weight. There will be a penalty if the car weight changes during Dynamic Competition. The allowable weight tolerance is ± 5.0 kg. In the case of overweight or underweight in comparison to the Technical Inspection weight, the team will be penalized -20 (twenty) points for each kg (or portion of a kg) of additional or missing weight. This point penalty will be deducted from the Engineering Design Event score. (Each 0.1 to 1.0 kg = -20 points)

EXAMPLE:

If the car is 5.3 kg underweight:	5.3 kg minus the 5.0 kg tolerance = 0.3 kg	equals -20 Points
If the car is 7.8 kg overweight:	7.8 kg minus the 5.0 kg tolerance = 2.8 kg	equals -60 Points

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.

7.5 BRAKE TEST

SPECIFIC FS EAST COMPLETION OF 2016 FSAE RULE T7.2

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.

8. STATIC EVENTS

8.1 BUSINESS LOGIC CASE

AS DEFINED IN THE FSAE 2016 RULES.

The official template for preparation can be found on FSAE website.
It must be uploaded/sent via mail as a .pdf file, clarification later.

8.2 BUSINESS PLAN PRESENTATION (75 POINTS)

8.2.1 BUSINESS PLAN PRESENTATION WRITTEN COPY

SPECIFIC FS EAST RULE ADDITION

All teams must submit their printed out version of their presentation.

Changes can not be made to the printed out version, if needed only the color (for ex. black to white) can be changed!

Please take the written copy into account at the preparation of your presentation.

8.2.2 DEEP DIVE TOPIC

SPECIFIC FS EAST RULE ADDITION

After submission of the Business Logic Case all teams will receive a specific Deep Dive Topic from the organizer's prior to the competition. The task will be uploaded on the FS East website.

Further information on the Deep Dive Topic will be published later.

8.2.3 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 (for ex. laptop). Teams planning to use other

equipments as a part of their presentation, are responsible for bringing, or otherwise arranging for their own equipment.

All teams must take care that only Schuko sockets (CEE 7/3) will be provided.

8.2.4 JUDGING SEQUENCE

AT FS EAST THE BUSINESS PLAN PRESENTATION JUDGING WILL CONSIST OF TWO PARTS:

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

8.2.5 SCORING FORMULA

The scoring of the event is based on the average of the two or three presentation judging forms. There is a maximum of seventy-five (75) points from the FS East Presentation Judging Form.

NON FINALIST

Presentation Event score = $(P_{\text{your}}/P_{\text{max}}) \times (75-n)$

FINALISTS

"n" th Place $75-(n-1)$ points

WHERE:

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

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

"n" is the number of finalists

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

NOTE: The score-sheet structure and the content will differ from the format given in FSAE Rules 2016.

8.3 ENGINEERING DESIGN EVENT (150 POINTS)

8.3.1 JUDGING SEQUENCE

AT FS EAST ENGINEERING DESIGN JUDGING WILL CONSIST OF TWO PARTS:

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

8.3.2 ENGINEERING DESIGN REPORT AND DESIGN SPEC SHEET

The Engineering Design Report (EDR) and the Design Spec Sheet (DSS) must be uploaded to the FS East website no later than the given deadline.

Without submitted documents (both documents are required) a team will not be allowed to take part in the Engineering Design Event and will result in a score of 0 (zero) for the whole event.

In case of formatting and naming errors in the documents penalty can be applied up to a maximum of -10 (minus ten) points (-5 points for each document), which will be deducted from the Engineering Design Score after the Engineering Design Final.

8.3.3 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 FSAE Rules 2016 Article S6.2.2. The size of the document must not exceed 5MB.

A responsibly sized document will be much smaller than 5MB in file size. Please ensure that graphs and photos within the Acrobat file are of an appropriate resolution.

8.3.4. ENGINEERING DESIGN SPEC SHEET (DSS)

The Design Spec Sheet must be submitted in Microsoft Excel® Format (*.xlsx file). The format of the file must not be altered. The FS East Design Spec Sheet corresponds with FSAE Design Spec Sheet. The DSS templates are available on the www.fsaonline.com website. The template must not be altered or reformatted prior the submission.

In the DSS metric units must be used only.

FILENAME NOMENCLATURE:

Engineering Design Report: CAR#_EDR_FSEAST16.pdf (e.g. 01_EDR_FSEAST16.pdf)

Design Spec Sheet: CAR#_DSS_FSEAST16.xlsx (e.g. 01_DSS_FSEAST16.xlsx)

8.4 COST, MANUFACTURING AND SUSTAINABILITY EVENT (100 POINTS)

8.4.1 PARTS OF THE COST, MANUFACTURING AND SUSTAINABILITY EVENT SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE S4.3

The Cost, Manufacturing and Sustainability Event of FS East consists of Cost Report, Discussion, Real Case, and a Sustainability Presentation. The FS East 2016 Sustainability task will be released along with the Real Case task prior to the event.

8.4.2 COST REPORT

The Cost Report consists of two parts, a written report and an electronic report. The electronic Cost Report must be uploaded to the FS East website no later than the given deadline.

Without a submitted electronic or written cost report a team will not be allowed to take part in the corresponding events (Discussion, Real Case, Sustainability Presentation) and will receive a score of 0 (zero) for the Cost, Manufacturing and Sustainability event.

8.4.3 ELECTRONIC COPY

The electronic copy must be the full report. This includes the full vehicle EBOM, all parts & assemblies and supporting documentation. The cost calculations must be done with the help of the Cost Tables, and the electronic copy must be parametric with the help of excel functions.

The supporting material must be a separate document from the cost report tables, e.g. in one PDF containing only drawings, schematics etc. You must refer to available supporting material within the appropriate cost tables (e.g. "see 01_SUP_MAT_FSEAST16.pdf, p.21").

FILENAME NOMENCLATURE:

CAR#_BOM_FSEAST16.xls (e.g. 01_BOM_FSEAST16.xls) for the actual cost report.

CAR#_SUP_MAT_FSEAST16.pdf (e.g. 01_SUP_MAT_FSEAST16.pdf) for supporting material.

For valid Electronic Copy submission, merge all the supporting material in one .pdf file.

The upload of the cost report must be done in the three steps as shown below. Once all three steps have been completed, the submission of the cost report is complete.

1. Upload of the cost tables as a Microsoft Excel® file (.xlsx).
2. Upload of the supporting material as one separate .pdf file.
The supporting material should consist of drawings, exploded view drawings and/or pictures of your vehicle which allows the Judges to understand your EBOM. Keep in mind, lack of detailed supporting material can decrease your final points for your Cost Report.
3. Enter the cost summary in a given template on the FS East website.

EBOM formatting

The EBOM template available from fsaonline.com has to be used.

ESPECIALLY IMPORTANT ARE:

- the correctness of the eight sections
- the team name, car#, and event name
- the properly used sums and formulae
- the complete BOM (Material, Process, etc. filled out and correctly multiplied)
- the referenced detail page numbers.

Incorrect entries and non-adherence to the template may result in points deducted from the final score in the Cost, Manufacturing and Sustainability Event.


Failure to meet the formal requirements (e.g. parametric EBOM, nomenclature, supporting material, cost summary) results in the rejection of the documentation for the first time. The team will have 7 days (including weekend) from the request of correction to upload a reworked document. If the document is rejected a second time, the team can participate in the events, however will receive a penalty of -10 (minus ten) points, which will be deducted from the Cost, Manufacturing and Sustainability Event Points. Minor formal errors (e.g. university name, car number) could also result in a maximum of -3 (minus three) points.

NOTE: Not completely filled electronic reports (e.g. only the EBOM, or insufficiently filled sections) will be counted as not submitted.

8.4.4 WRITTEN COPY

The written copy must be identical to the electronic copy (the full report). The written copy must be presented during the discussion part of the Cost, Manufacturing and Sustainability Event. In case of differences between the written copy and the electronic copy, which are not covered by addenda per FSAE Rule S4.17, the copy with the higher price will be judged and the team will be penalized with maximum -10 (minus ten) points depending on the differences.

The Written Copy must be handed in one or more ring binders, labelled as follows:

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

Do not send the Written Copy by mail; it must be submitted at the FS East Event Control.

8.4.5 COST TABLES

The latest version of the Cost Tables available on May 26th, 2016, 12:00 CEST from fsaeonline.com will be used during the Event.

8.4.6 ADD ITEM REQUESTS

AIRs to be considered for the Cost, Manufacturing and Sustainability Event 2016 must be submitted no later than the above specified date.

An AIR must be required via email to static@fseast.hu by sending the correctly filled out Excel® template: www.fsaeonline.com/content/Cost_Table_Add_Request.xls.

8.4.7 COST ADDENDUM

For valid addendum submission teams must enter the Cost Summary for addendum in the given template on the FS East website no later than the given deadline.

The Addendum must be also handed in as a written copy at the Event Control before the above given deadline. For this the teams must use the FSAE cost addendum form given in the Formula SAE Rules® 2016 Appendix S-5. Every change must be presented in a detailed spreadsheet with the help of cost tables and supporting material.

8.4.8 SCORING FORMULA

$\left(20 \times \frac{\frac{P_{max} - 1}{P_{your}}}{\frac{P_{max} - 1}{P_{min}}} \right) \times \frac{S_{Your.Discussion}}{40}$	20	<p>LOWEST COST</p> <p>The participating teams will be ranked by the total adjusted cost from the BOM which is weighted by their score received for Discussion. The range for the score is 0-20 points and the calculation is based on the formula on the left.</p>
(Points determined by Judges)	40	<p>ACCURACY, CLARITY & EVENT DAY / DISCUSSION</p> <p>The cars will be reviewed for part content, manufacturing feasibility and accuracy of the cost information. Supporting documentation will be assessed based on its quality, accuracy and thoroughness. The range for the score is 0-40 points.</p>
(Points determined by Judges)	20	<p>EVENT DAY / REAL CASE</p> <p>The teams must be prepared to discuss in detail the “Real Case” scenario distributed prior to the competition. The materials will include more specifics about the goal and scoring of the scenario. The range for the score is 0-20 points.</p>
(Points determined by Judges)	20	<p>EVENT DAY / SUSTAINABILITY PRESENTATION</p> <p>The teams are expected to give a 10 minute presentation on a sustainability issue, which will be issued prior to the competition. The materials will include more specifics about the goal and scoring of the assignment. The range for the score is 0-20 points.</p>
	100	Total points

WHERE:

“P_{your}” is the adjusted cost of your car (with penalties) in dollars.

“P_{min}” is the adjusted cost of the lowest cost car in dollars.

“P_{max}” is the cost of the highest cost car in dollars.

“S_{your}” is the score you received for Discussion.

8.4.9 COST REPORT PENALTIES PROCESS

SPECIFIC FS EAST CHANGE OF FSAE 2016 RULE S4.18

Only penalty method A will be used for FS East, described in Rule S4.19 “Penalty Method A – Fixed Point Deductions” of the Formula SAE® 2016 Rules. The FSAE 2016 Rule S4.20 “Penalty Method B – Adjusted Cost Deductions” is not valid for the FS East competition.

8.4.10 FINAL REVISION

At the end of the Event Day (29th of July) 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, Manufacturing and Sustainability Event Leader. The same rule applies in case of complaints.

9. DYNAMIC EVENTS

AS DEFINED IN THE FSAE 2016 RULES PART D.

9.1 DYNAMIC EVENTS SCORING

As defined in the FSAE 2016 Rules Part D.

10. ADDITIONAL FS EAST-SPECIFIC REMARKS

10.1. PIT RULES

Pit Rules will be detailed in the Event Handbook.

10.2. BEHAVIOR

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

10.3 FSAE RULE D8.9 ENDURANCE FUEL FILL – IC CARS

FS East will pay a special attention to FSAE Rule D8.9 Endurance Fuel Fill – IC cars
Before entering the event each vehicle’s fuel tank must be filled to the fuel level line (see Rule IC2.6.6, “Fuel Level Line”) at the fueling station. During fueling, once filled to the scribe line, no shaking or tilting of the tank or fuel system (incl. entire vehicle) is allowed.”

11. CHANGELOG

22th of February 2016 - Version 1.0.0
Initial release
Version 1.0.0

Version	Date	Modification	Page
1.0.0	22nd February, 2016	Original document	-



Engineers for the Automotive
Higher Education Association

Részletek vagy az egész dokumentum felhasználása csakis az MJMFE írásos engedélyével lehetséges.
Copyright MJMFE 2016.

No part of this document or the whole publication may not be used without the prior written permission of Engineers for the Automotive Higher Education Association.
Copyright EAHE 2016.

FORMULA **EAST**
STUDENT
28TH JULY

