FBV 21-22 Scoring Card for Engineering Design Concept Event for CV Virtuals

Category	Overall Points	Breakdown	Points Breakdown
Overall Vehicle Concept	30	DSS (Completeness and Sensibility)	4
		Engineering Team Management (Are progressive project management/ organization methods evident? Special communication tools utilized? Are there systems / processes / standards in place for design retention / lessons learnt / component history)	8
		Manufacturability / Servicability (Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose / service vehicle? Were cost factors taken into consideration)	6
		Process - Analysis - Validation - Resources PROCESS: Engineering project objective/constraint definition, planning and evaluation. Did they analyze and define the problem? ANALYSIS: Research, benchmarking, integration, modelling and iteration(s) of the product. Did they consider different solutions identifying the strengths and weaknesses of each? VALIDATION: Execute, document and review testing to show the design operates as intended. Did they make performance predictions, perform FEA, CFD, *build test rigs, or perform other predictive/optimization analyses? Do they have the test results documented? If the results were different than predicted, do they understand why? Using this information were they able to make improvements to the design or adjust settings for improved performance? RESOURCES: Effective use of resources (financial, workshop, personnel, computation, etc.)	12
Vehicle Dynamics	30	Suspension, Steering. Use of simulation. Selection and use of materials. If present, are aero elements capable of meaningfully enhancing vehicle performance? Has the need for/against an aero package been established/justified/and supported with data?	30
Mechanical / Structural Engineering	20	Frame and aerodynamic systems. Rigidity and stress-relief methods. Load analyses. Fasteners. Use of simulation. Selection and use of materials.	20
Powertrain	30	Engine, transmission, clutch, final drive, differential, half-shafts, tripods, etc. Also peripherals, such as cooling, oiling, electronic engine controls. Fuels/lubricants selection. Selection and use of materials.	30
LV – Electrics / Electronics / Hardware	10	Design integration, plumbing/wiring, power management, schematics. Are sensitive items protected?	10
Driver Interface	15	Cockpit sizing, protection and driver interfaces, seat, belts, steering wheel and column, braking system. Is this car as safe as it can be? Selection and use of materials.	15
Presentation	15	Organization (Were the concepts presented in a logical order? Clarity and coherence of the content? Thoroughness of the ideas presented and the analysis?)	5
		Visual Aids (Were visual aids used or clear visual references made to the car? Were the illustrations visible for all of the audience? Lack of grammatical and spelling errors?)	5
		Delivery (Did the presenters speak in a clear voice? Clarity of voice projection and appropriate volume? Did the presenters show enthusiasm and promote confidence in the technical aspects?)	5
Q&A Session	50	*Based on Q&A delivery posed by present judges.*	50
		TOTAL POINTS:	**200**

Definitions:

Selection / Use of materials	Has the team demonstrated understanding of tribology, viscosity characteristics, viscous drag, additive packages, coatings, etc.? Have special materials or surface prep been used to reduced drag, weight, increased strength, or heat management? (Ti, Inconel, ceramic bearings, coatings, heat-treat, peening, etc.)
Use of Simulation	Use of available student software - CAD, FEA, CFD etc. for design / dynamics verification

DESIGN JUDGING SCORING RUBRIC

Scores are determined using the below Rubric:

Rating	% Range	Description			
Outstanding	90-100	The team has demonstrated a very high level of competence with respect to the criteria being judged.	There is clear evidence of considerable original and innovative work of high quality, including analysis or other evaluation. Substantial experimental and numerical analysis had been undertaken.	The implementation and experimentation phases of the work have been completed to a very high standard.	The presentation and reporting of the results was free of error and of a very high standard.
Very Good	80-89	The team has demonstrated a high level of competence with respect to the criteria being judged.	There is clear evidence of considerable original work of high quality, reasonable innovation, including analysis or other evaluation. Some experimental and/or numerical analysis had been undertaken.	The implementation and experimentation phases of the work have been completed to a high standard.	The presentation and reporting of the results was free of error and of a high standard, but some aspects could be improved.
Good	70-79	The team has demonstrated a more than adequate level of competence with respect to the criteria being judged.	There is evidence of the team's ability to synthesise and organise information in a useful and critical manner. However, the team's work requires further experimental and/or numerical analysis.	The implementation and experimentation phases of the work have been completed to a reasonable standard.	The presentation and reporting of the results was of a good standard, but required improvement in several key areas.
Adequate	60-69	The team has demonstrated a minimum level of competence with respect to the criteria being judged.	There is evidence of the team's ability to synthesise and organise information in a useful and critical manner. However, the team's work showed several shortcomings and required substantial additional research and/or analysis.		The presentation and reporting of the results met the minimum level of competence, but required substantial overall improvement.
Inadequate	50-59	The team's work is deficient in one or more of the criteria being judged, and shows substantial shortcomings in the results and/or analysis			
Failed	0-49	The team's work is so deficient with respect to one or more of the criteria being judged that it cannot be considered to have met the expected level of knowledge and understanding of the Formula Student criteria.			

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Notes:

• To achieve a rating (Outstanding, Very Good, etc.), all description criteria must be satisfied, else the next lowest rating is to be given; e.g. drop to "Good" from "Very Good" if only achieving 3 out of 4 criteria.

• Judges can apply any percentage value within the range shown for the achieved rating, to grade performance and establish relative performance of individual teams.