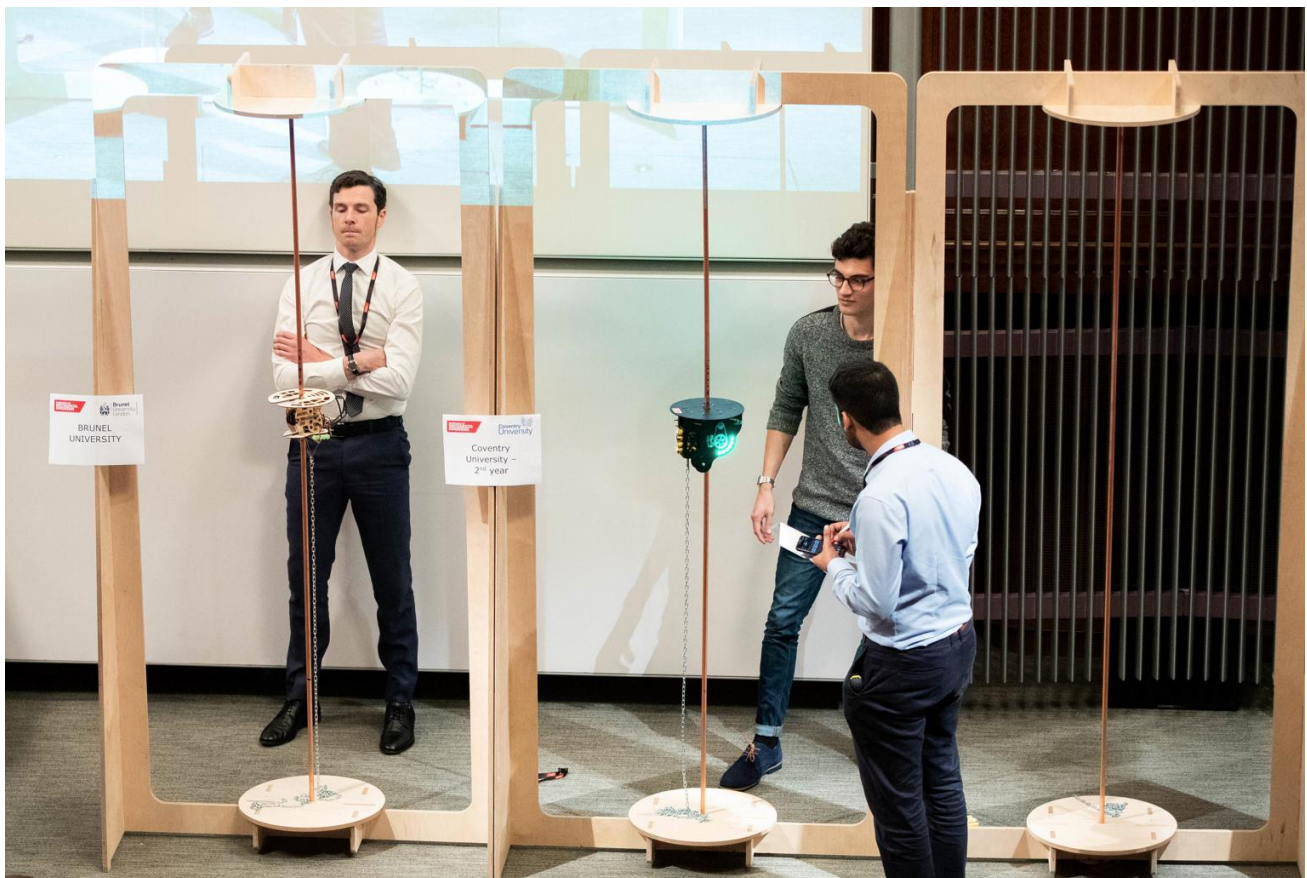


DESIGN CHALLENGE GENERAL SPECIFICATION 2026

IMechE DESIGN CHALLENGE

GUIDANCE FOR ALL PROJECTS



General Specification for the 2026 Design Challenge

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Note: this specification must be read in conjunction with the respective document

"IMechE Design Challenge - Project Specification and Rules 2026"
available on the [IMechE Design Challenge website](#).

Please check the IMechE Design Challenge website for updates.

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List of Amendments:

Version	Page	Details	Date
1.1	-	First release; overall reduction in size of the documentation, certificates and prizes reviewed, reviewed disqualified and penalties	13/06/2025
1.2	5; 6; 7; 17 18; 19; 20; 27; 28; 30; 31;32.	Sections: 1 amended; 1.12 new registration fees; 1.2 amended; 1.8 clarified; 1.8.1 new; 1.10 new; 6 amended; 6.25 amended; 6.26 to 6.27 new content; 7.3 added; table 7.13 amended; table 14.6 amended; 15.12 to 15.14 new; Appendix 1	15/12/2025
1.3	5; 13; 29	Sections: 5 devices nomenclature; 4.43 typo; 15.21 amended	25/01/2026

List of Major Changes Since 2025

- Simplified structure
- Reduced overlaps with Project Specification

Please report any errors to designchallenge@imeche.org so that corrections can be made.

1. Introduction and Purpose of the Design Challenge

The purpose of the Design Challenge competition is to simulate a real-world project, allowing students to develop cross-functional skills. Working in teams, students will design, build and test a self-contained device from a precise Project Specification.

Universities, Colleges, BTECH and other science educational institutes can run internal qualifiers to select up to two teams per category to progress to their respective Regional Finals. The winning team from each region progresses to the national final. The judging panel could decide to allow to the National Final a different number of teams, see 1.10.

- 1.1 The competition is open to teams of three to six students. There are five competition elements to the Design Challenge at the Regional Competition and National Final:
 - 1.1.1 Design Competition: Create a complete and representative 3D model (virtual prototype) of the device along with a comprehensive Bill of Materials (BoM).
 - 1.1.2 Poster Competition: Produce an A3 (portrait) poster to summarise and publicise the team's work.
 - 1.1.3 Presentation Competition: Give a time bound video recorded presentation with elements narrated by each team member.
 - 1.1.4 Peer Review (Regional Competition Only): The competing students at the regional and national finals will be asked to score all the other competing teams. Not applicable if three or less teams are competing in the same category. Excludes category 4.13.1.
 - 1.1.5 Design Excellence (National Finals Only): The Industry representative (or a member nominated by the judging panel) will evaluate and assess the design, based on both engineering and design principles. Not applicable if three or less teams are competing in the same category. Excludes category 4.13.1.
 - 1.1.6 The Challenge: demonstrate the device capability to meet the project requirements by performing a series of operations. Excludes category 4.13.1.
 - 1.1.7 The elements 1.1.1, 1.1.2 and 1.1.3 are scored ahead of the event by members of the Design Challenge based on the files submitted. The top 3 teams in 1.1.1 and 1.1.3 will have live a slot in the Regional and National final.
- 1.2 The recommended format of the regional and national finals is as follows:
 - Regional Final
Closure of the documentation and files submissions 1 week before the event date; see Appendix 4 – Submission checklist for teams.

On the competition day:

- ⇒ Formal opening and outline of the day
- ⇒ Design Competition for the 3 highest scoring teams in each category
- ⇒ Presentation Competition for the 3 highest scoring teams in each category
- ⇒ Device scrutineering - excludes category 4.13.1
- ⇒ Peer Review scoring and submission
- ⇒ The Challenge – heats and finals

- ⇒ Judges meeting and deliberation
- ⇒ Final announcements, prizes and closure of the day
- National Final

Closure of the documentation and files submissions 1 weeks before the event date; see Appendix 4 – Submission checklist for teams. National Final excludes category 4.13.1

On the competition day:

- ⇒ Formal opening and outline of the day
- ⇒ Design Competition for the 3 highest scoring teams in each category
- ⇒ Presentation Competition for the 3 highest scoring teams in each category
- ⇒ Device scrutineering
- ⇒ Design excellence scoring
- ⇒ The Challenge – heats and finals
- ⇒ Judges meeting and deliberation
- ⇒ Final announcements, prizes and closure of the day

1.3 Points will be awarded for all sections of the competition.

1.4 All the points scored for each section of the competition will be totalled (normalised to 100) as shown below.

1.4.1 Design	10/100
1.4.2 Poster	10/100
1.4.3 Presentation	10/100
1.4.4 Peer Review (Regional only) *	10/100
1.4.5 Design Excellence (National only) *	10/100
1.4.6 The Challenge **	60/100

* Not applicable if three or less teams are competing in the same category.

** Not applicable to 4.13.1

The team that accumulates the most points overall will be declared the overall winner of the Design Challenge Competition event, subject to the following conditions:

- 1.5 Teams must have a valid score in all the applicable sections.
- 1.6 The overall winner at regional finals will automatically qualify for the National finals, excludes category 4.13.1.
- 1.7 Between the regional and national finals, adjustments, refinements and overall project development are permitted. The details of these changes must be presented as part of the submission.
- 1.8 Any evidence of plagiarism will result in disqualification. Use of, or iteration on, previous years' device and deliverables is not permitted. Students will only be scored on work that is deemed to have been conducted this year for this year's competition.
- 1.8.1 For the deliverables, re-use of previous years' work, unattributed use of external sources (books, websites, images, models, consultants etc), unattributed use of AI/LLMs is not permitted. Any work that is deemed to have not originated within

the team will not be scored and may attract a penalty. The judges' ruling on this will be final.

- 1.9 In the event of a tied overall score, the judges may award the overall winner to the team with the highest points in The Challenge - 1.4.6; excludes category 4.13.1.
- 1.10 Depending on overall scoring, practical challenge results and number of teams attending the regional elimination phase, the judging panel could decide to allow two or no team from the Foundation or Advanced categories to progress to the national final. Decisions will be made on a case-by-case evaluation and communicated promptly to the organisers.
 - 1.10.1 Two team progressing to the national final - example of rationales: score exceeding 95% marks in both static and practical challenge; more than 12 teams physically participating in the regional final with successful operation of the prototypes presented.
 - 1.10.2 No team progressing to the national final - example of rationales: vehicles not compliant with safety or regulations; large discrepancy between vehicle as designed and physical prototypes; incomplete submission(s) for the team(s) registered in the category(es).
- 1.11 Teams' submissions are open between November and February. The regional finals are held between March and June; the national final is held in October of each year.
- 1.12 Registration fees: to attend the regional final, each competing team shall pay the following registration fees
 - *Concept Challenge* (see 4.13.1) - £30.00 + VAT
 - *Foundation Challenge* (see 4.13.2) - £60.00 + VAT
 - *Advanced Challenge* (see 4.13.3) - £70.00 + VAT

The IMechE will inform the teams interested in attending about deadlines and other subscription requirements.

2. Prizes and Certificates

In the Regional and National Competitions all team members attending will receive a certificate of attendance, in electronic (PDF) format.

At the Regional and National, the overall winning team in each category will receive the certificates specified in 2.1.

In the National Final, the overall winning team in each category (see 4.13) will receive the Design Challenge Trophy to keep until the next National competition.

2.1 Certificates

Certificates will be available for the following, in both regional and national finals:

The winning team of the Design Competition (1.4.1)

The winning team of the Poster Competition (1.4.2)

The winning team of the Presentation Competition (1.4.3)

The winning team of the Peer Review (1.4.4)

The winning team of the Design Excellence Competition (1.4.5) (National Finals only)

The winning team of The Challenge (1.4.6)

The overall winner of the Design Challenge Competition (1.4)

Participation certificates for each team member in PDF Format

2.2 Prize money

Cash prizes will be awarded at the National Final as follows:

1st *Foundation Challenge* (see 4.13.2) - £200.00

2nd *Foundation Challenge* (see 4.13.2) - £150.00

3rd *Foundation Challenge* (see 4.13.2) - £100.00

1st *Advanced Challenge* (see 4.13.3) - £300.00

2nd *Advanced Challenge* (see 4.13.3) - £250.00

3rd *Advanced Challenge* (see 4.13.3) - £200.00

3. Sponsor Awards

Industry partners may award additional Sponsor Awards. These are not a formal, or obligatory, part of the competition, and do not affect the scoring of submissions.

4. Rules for The Challenge

General

- 4.1 Each team will produce one single device.
- 4.2 The device must remain self-contained within a given envelope at any time of the inspection and during the competition, except for 5.2 where a remote switch is required.
- 4.3 Remote controllers, wireless technology, wireless programming and the use of GPS tracking is not allowed.
- 4.4 No proprietary and pre-programmed control units or devices may be used. Examples, but not limited to, are Lego Technic modules, vision camera – scanning systems for industrial applications, or similar.
- 4.5 Devices should be manufactured using available facilities and materials, using processes that students can undertake themselves. No manufacturing is to be outsourced.
- 4.6 Off the Shelf (OtS) components may be purchased, such as motors, batteries, gears, bearings, fasteners and similar.
- 4.7 All devices must be 'signed off' by the University, College or institute staff member the team belongs to. Clear details of the name and contact for the member shall be provided – applicable to see 4.13.2 and 4.13.3.
- 4.8 The University, College or institute staff member(s) signing off the documents is(are) responsible for overall safety of the device.
- 4.9 All devices must be available for scrutineering prior to commencement of the competition – applicable to 4.13.2 and 4.13.3.
- 4.10 On the day of the competition, evidence of passing the scrutineering process is a IMechE sticker on the device and on the checklist associated. Vehicles without a sticker will not be allowed to compete – applicable to 4.13.2 and 4.13.3.
Devices can be modified to meet the requirements and submitted again for scrutineering within the available time.
- 4.11 Photographic and filming activities may take place to monitor the activities in the competition lanes so that if there is a dispute it can easily be resolved.
- 4.12 Costs, mass, calculations and numbers in general will be presented together with the Units of measurements that identifies them.

Categories

- 4.13 The Design Challenge is open to three categories: Concept, Foundation and Advanced prototypes.
- 4.13.1 *Concept Challenge*: Virtual project only - no physical prototype. Sections 1 and 4.14 will apply. This category is open to technical college level up to first year university undergraduates (English System Level 4 - Year 1 / Scottish System SCQF level 8 - Year 2), see Appendix 3 – College and university academic equivalence.

4.13.2 *Foundation Challenge*: Device built without programmable elements. Sections 1 and 4.14 will apply. This category is open to technical college level up to first year university undergraduates (English System Level 4 - Year 1 / Scottish System SCQF level 8 - Year 2), see Appendix 3 – College and university academic equivalence.

4.13.3 *Advanced Challenge*: Device with programmable element(s); competition with multiple targets / complex mission. Sections 1 and 4.15 to 4.18 will apply. This category is open to any team.

4.14 In the categories *Concept Challenge* 4.13.1 and *Foundation Challenge* 4.13.2 no programmable circuitry is allowed. All the electric and electronic layout shall be based on analogue circuitry principles.

4.15 In the category *Advanced Challenge* 4.13.3, programmable devices such as Raspberry Pi, Arduino, NodeMCU, Teensy and similar are allowed. Such devices shall be purchased as non-pre-programmed. The team must show evidence of independent coding techniques capacity.

4.16 In the category *Advanced Challenge* 4.13.3, the programmable electronic device selected and installed must not include any type of wireless communication, including but not limited to Wi-Fi, Bluetooth, Zigbee and similar protocols. If a programmable electronic has any sort of wireless communication capability, such function must be disabled.

4.17 In the category *Advanced Challenge* 4.13.3, the code shall not include any element that requires editing between runs.

4.18 In the category *Advanced Challenge* 4.13.3, no software re programming or tuning is allowed between runs.

4.19 Any repair eventually needed must be performed within the given time, either before or between runs.

Safety

4.20 When a physical prototype is part of the competition, a comprehensive risk assessment, signed by a representative of the institution the team belongs to should be provided.

4.21 Each individual educational institution is required to provide their own risk assessment – no standardised template is provided by the IMechE Design Challenge organisation.

4.22 If an electric energy accumulation is installed (battery or capacitors), a single bank – pack must be installed and a single main electric fused connection - line should be provided to all services and systems on the device.

4.23 Lithium batteries are not permitted.

4.24 Safe, rechargeable batteries are allowed, providing they are not altered in any way by direct soldering, overcharging and similar operations.

4.25 A single main fuse must be installed between the battery and any other wiring. If the maximum current draw cannot be proven, a maximum current fuse of 10A is permitted.

- 4.26 All electrical joints are required to be protected from finger contact at any time. Any other safety related item must be present on the device at any point and not come loose in any phase of the competition.
- 4.27 Gears, belts and movable items that could cause finger trapping or tangling with cables must be managed via the use of fences, protection, or enclosed inside the device chassis element.
- 4.28 Cables, ropes, transmission elements and other flexible elements must not rub or contact at any time against any elements contributing to the movement or the outside structure dedicated to performing the mission, such as floor, barriers, pipes or similar.
- 4.29 Any cord, line, chain or similar devices should be considered and assessed in the design process. It's deployment during the mission must be evaluated carefully to avoid entanglement or entrapment.
- 4.30 Pressurised air systems may be allowed. They must be safe and assessed by the Design Challenge Steering Committee ahead of the project submission. A guideline for maximum energy storage for pressurised vessel is as per "Pressure Equipment Directive" (Directive 97/23/EC). An example could be volume $<0.1\text{l}$, PS $<25\text{bar}\cdot\text{l}$ and fluid used Group 2 (air).
- 4.31 No explosive charges or fluid combustion systems can be used.
- 4.32 Spring loaded devices may be allowed. They must be safe and assessed by the Design Challenge Steering Committee ahead of the project submission. A guideline for maximum energy released is 2J max – from calculation, excluding any loss due to friction or hysteresis. An example is the impact of 0.5kg mass dropped vertically from 400mm distance.
- 4.33 Teams must supply their own safety glasses and any other relevant Personal Protection Equipment (PPE) as specified within their Risk Assessment.
- 4.34 Teams that fail to provide suitable PPE or wear those when required will have the score of the run involved erased / not accounted for. Two PPE fault in the same event will lead to the team being disqualified from The Challenge section of the event.

Project budget and device cost

- 4.35 A full parts list with all itemised costs must be produced: this is the Bill of Materials (BoM). See sections 6, 7 and run.

- 4.37 Appendix 1 – BoM structure and reporting examples for further details.
- 4.38 Costs must be clearly presented and accounted as inclusive of VAT.
- 4.39 The BoM consists of two different levels: the total BoM cost, including any consumable used and the IMechE BoM cost, where items with an individual value below 20p (£0.20) are not included.
- 4.40 The maximum allowable difference between total BoM cost and the IMechE BoM cost is 10%.
- 4.41 Project max allowed budget:
 - 4.41.1 For categories *4.13.1 Concept Challenge* and *4.13.2 Foundation Challenge*: IMechE BoM cost max £50.00 (including VAT).
 - 4.41.2 For category *4.13.3 Advanced Challenge*: IMechE BoM cost max £90.00 (including VAT).
- 4.42 All elements, products, parts and materials used to propose the design (4.13.1) or to propose and produce the design (4.13.2 and 4.13.3) shall be included in the BoM. Each BoM line shall list the as-new retail purchase price from a VAT registered company. No carriage cost shall be included or considered.
- 4.43 Any material provided directly via the University/Institute lab facilities, both as form of consumable or as reclaimed parts should be costed as new, referring to a potential source as listed in 6.
- 4.44 Cost evidence should include links to third party websites or a quotation where such component or material could be purchased from.
- 4.45 Ropes, chains, balls and similar external elements that form part of the competition but not of the device shall not be included in BoM.
- 4.46 Any replacement or substitute parts used during the heats and final of The Challenge shall be included. Examples, but not limited to, are spare sets of batteries.
- 4.47 The cost of generic tools and consumables related to the manufacturing of useable parts or of the vehicle but don't form part of the actual vehicle should not be included in BoM. Examples not to be accounted for: drills, chargers for battery chargers, bladders, snips, any additional tool used to setup the device that don't remain together with the device during the competition or transport cases.
- 4.48 Refer to sections 6, 7 for further details on the BoM management.

Competition rules:

- 4.49 The devices must not be modified between scrutineering and runs, in any form that may invalidate the features evaluated during the scrutineering process.
- 4.50 No practice runs are permitted on the lanes or rigs. The competition organisers will provide dedicated areas for setup activities.
- 4.51 Clear instruction on the running order for the heats and finals will be given at the event.

- 4.52 All teams must display an A4 sheet detailing the teams name and college or university. This must be clearly displayed as instructed during any run in which the team is taking part.
- 4.53 There will be multiple competition lanes – rigs in the main competition, depending on how the event will be organised.
- 4.54 The organisers will show the equivalence between different lanes - rigs, by showing the measurements taken. The teams cannot make a note of it and use it for any physical adjustment or software input in the device on the competition day.
- 4.55 A heat or final will involve running on different lanes /rigs, as selected by the judging panel if available. Heats may consist of multiple teams' devices running in parallel.
- 4.56 Participating teams will have a maximum of 3 minutes before a heat to prepare and position their device accordingly to the rules.
- 4.57 Teams not ready within the allotted time before a run will forfeit that attempt.
- 4.58 The time limit for runs in the heats and final will be 3 minutes. Time will start from the end of the timekeeper's starting countdown. Devices that don't complete the mission within the time limit will forfeit that attempt.
- 4.59 In each a run, the device will have one attempt only to perform the mission.
- 4.60 Each team must appoint a 'Device Controller' who will be the only person to attend to the device during the preparation and start of each run. This includes any form of repair, tuning or alteration.
- 4.61 During each phase of the finals, all other team members must be outside the test area. A judge will be allocated to each test area to ensure the correct procedure is followed.
- 4.62 If a device is started before the starter's order, it will forfeit that attempt.
- 4.63 If a device fails to start within 10 seconds of the START command during a run, it will score 0 points for that attempt.
- 4.64 Repairs and minor alterations are allowed to the device between each run within a 2-minute time limit.
- 4.65 The device should be left independently to operate in each attempt and no operator shall touch the device at any point.
- 4.66 If the device controller touches the device before all the teams are allowed to do so, that attempt will be considered null.

5. Project Specification

The Project Specification is a separate document, reviewed every year to ensure relevance to more recent technologies and engineering developments.

The recurrent projects proposed for the DC competition are:

- 5.1 Repeatable vehicle
- 5.2 Line launcher
- 5.3 Internal pipe climber
- 5.4 External pipe climber
- 5.5 Automatic EV Charging

The Steering Committee decides which device is selected.

6. Rules for the Design Competition

The Design Competition evaluates different aspects of the design process. It includes review of a 3D CAD model representing the design of the prototype and the Bill of Material associated with it.

The aim should be to represent all details of the product necessary to perform its mission and have a comprehensive BoM that reflects both the CAD model and what has been consumed to build the device.

The Device must be conceived and designed by this year's student team members for the purpose of this year's competition.

The student team may use information from professionals or from academics provided this information is given as a discussion of alternatives with pros and cons and shall not be given as a directive.

The students must make all design decisions.

All design decisions should be evidence based. The team will be asked to provide evidence for design decisions through deliverables. The team will be asked to discuss design decisions by the scrutineering team at the live event.

- 6.1 To compete in the Design Challenge, Teams should submit a 3D model and a BoM.
- 6.2 A single file must be submitted, representing the assembly. The 3D CAD shall be either in "*.STEP" (AP203 file spec.) or "*.X_T" (Parasolid) format.
- 6.3 Submitted models must be an assembly of individual solid bodies. Each individual body must be identifiable at least by part number aligned with similar classification in the BoM associated, see 4.35 to 4.48 and 7.
- 6.4 The virtual prototype will be judged for similarity on the day.
- 6.5 The BoM must include the estimated mass from CAD and the devices will be measured on a commercial scale on the day, assessing the difference between virtual and real mass.
- 6.6 The top 3 CAD models will be projected onto the screen during the review by the judges.
- 6.7 Liquid adhesives, solder, solder flux are examples of items that should not be modelled but should be accounted for in the BoM.
- 6.8 Any design changes or iterations made between the Regional and National finals must also be presented and highlighted, substantiating the development process.

The BoM element links the design intent in virtual environment with the execution, ensuring each item necessary to build the device has been procured. The BoM shall include individual element costs, mass and a link to where such component could be procured.

- 6.9 The BoM should be organised to deliver two totals: one for items costing more than £0.20 (the IMechE BoM cost) and one for all items installed and consumed, including items of less than £0.20 (the total BoM cost), see 4.35 to 4.47.

- 6.10 Every individual item installed, or part of the prototype must be included in the BoM.
- 6.11 Materials, manufacturing and sourcing (made in house or bought in) is required to be listed in the BoM.
- 6.12 Each BoM item must be numbered and detailed with the following information as minimum, see *Appendix 1* for examples:
- Part Number / Part Name / Part description
 - Design iteration / revision
 - Quantity (units; g; mm)
 - Unit cost (£/unit; £/m - VAT inc.)
 - Unit mass (g)
 - Total Mass (g)
 - Manufacturing technique or purchased item
 - Hyperlink to the selected purchase option
- 6.13 The BoM last line shall contain
- Total device cost (£ - VAT inc.)
 - IMechE BoM cost (£ - VAT inc.)
 - CAD mass (g)
- 6.14 Each material or component purchased in bulk shall be included and charged as the fraction consumed. Example: 1m of M8 threaded rod that costs £4.80 (VAT included), consumed in 50mm lengths per each item, shall be costed as $(£4.80 / 1000 \times 50) = £0.24$.
- 6.15 If additive manufacturing (3D printing) is available as "in house" facility, a standard – flat cost of £0.10 /g to the CAD estimated mass will be applied.
- 6.16 Milling and turning (subtractive manufacturing) is to be costed at 5 times the ration of the billet consumed. Example: 1m of drawn aluminium costs £18.80, consumed in 80mm to turn an axle, shall be costed as $(£18.80 / 1000 \times 80 \times 5) = £7.52$.
- 6.17 If laser cutting is available as "in house" facility, no additional cost shall be applied to the proportion of the raw material used.
- 6.18 The part number and description are unique identifiers. CAD assembly and BoM will use the same terminology.
- 6.19 BoM item index may be added if any part of the submission utilises an assembly view with balloons to highlight key elements.
- 6.20 Design iteration – revision index – release index shall be included if multiple versions of a component / series of components have been developed and utilised. Only the iteration installed on the device should be listed in BoM and detailed accordingly.
- 6.21 Commercial Off-the-Shelf (COTs) components, such as consumables and standard commercial items shall be listed in CAD and BoM with the same part number or description used to purchase it.

- 6.22 If an OtS component is modified in any way so that it can no longer be interchanged with the unmodified purchased item, it becomes equivalent to any other proprietary designed part. Any machining operation applied to it shall be costed accordingly, see 6.14, 6.16 and 6.17 if applicable.
- 6.23 Consumables are elements or products necessary to finalise the assembly, such as liquid adhesives or similar. They must be listed and accounted for in BoM but don't require to be modelled in CAD.
- 6.24 Consumables and tools used to progress the manufacturing should not be listed. Examples: drill bits, lint free cloth, degreasing agents and others.
- 6.25 BoM examples, including summary available in Appendix 1 – BoM structure and reporting examples.

Environmental impact – optional element

Additional optional element to the BoM analysis is the environmental impact analysis of the design and prototype – as executed.

The purpose is to compare a full business impact / lifecycle management cost with the total device cost, in GBP (£). Parameters as below:

- 6.26 Transport impact, calculated as distance from the sourcing location (website or distributor stock – location) as £1/kg/100mile. Example: a set of screws, overall mass 10g purchased from 1000miles distance, will add an extra +£0.10 end of life cost.
- 6.27 Environmental impact – recyclability: is the material recyclable?
 - 6.27.1 No: cost of disposal is 20% of BoM cost. Applies to all plastics, adhesives, lubricants, tapes, clips, ... Example: 3D printed chassis costed £4, will add £0.80 end of life cost.
 - 6.27.2 Yes but requires special processes: cost of recycling is 10% of BoM cost. Applies to batteries, electronic components, complex parts (e.g. plastic wheels integrating metallic bearings and similar). Example: Arduino Uno board costed £22.69, will add £2.27.
 - 6.27.3 Yes but no benefit: cost neutral, line entry £0. Applies to wood, paper.
 - 6.27.4 Yes and the recycled material has residual commercial value at disposal: bonus – return of investment at recycling point 20% of initial BoM cost. Applies to metals, including cables, if purchased as raw materials. Example: electric cables costed £1.5, will benefit -£0.30.

7. Scoring for the Design Competition

The virtual prototype CAD model and the associated BoM will be scored in accordance with the requirements listed below. Unless specified differently, this applies to all three categories 4.13.1 Concept Challenge, 4.13.2 *Foundation Challenge* and 4.13.3 *Advanced Challenge*.

- 7.1 CAD models must be submitted electronically in “*.STEP” (AP203 file spec.) or “*.X_T” (Parasolid) format.
- 7.2 BoM to be submitted in excel (.xlsx) or PDF format.
- 7.3 Evidence of design evolution and engineering justification: decision criteria, calculations, reviews and iterations loop.
- 7.3.1 7.3 above can be presented either as independent design log file or through the evidence required in the poster (see 8.5) and in the presentation (see 10.4).
- 7.4 The submitted files are the version that will be judged.
- 7.5 Overall quality and level of details of the virtual prototype – CAD model.
- 7.6 Integrity and alignment of CAD and associated BoM.
- 7.7 Compliance with the DC rules in terms of submitted CAD file (one single file representing the assembly and file format).
- 7.8 Accuracy of the BoM
- 7.9 Accuracy of cost of both manufactured and bought-in elements, costed as detailed in 6.9 to 6.17.
- 7.10 Accuracy of the 3D model compared to the physical prototype
- 7.11 Mass of the final device compared with the mass listed in BoM.
- 7.12 The design review will last max 5 minutes per team.

7.13 Scoring table:

	No	Description	Points
3D model	1	Overall quality of the virtual prototype - CAD model	20
	2	Inclusion of the finer details such as fasteners and standard parts	10
	3	Compliance with Design Challenge rules - CAD format and integrity of the file submitted (see 7.1)	5
Bill of Materials	4	Overall accuracy of the BOM - including all items in the assembly (7.8)	15
	5	Cost analysis for the entire device; presence of IMechE BoM cost and total BoM cost (see 6.13)	10
	6	Accuracy of costs for manufactured parts and bought components, including spares. Availability of links. (See 6.9 to 6.23)	5
Review at competition - Regional & National (Live)	7	Accuracy of the virtual model compared to the real device on display, including fasteners and standard parts (*see 7.14)	10
	8	Mass of the actual device compared to the calculated BOM mass (*see 7.14)	5
	9	Design review (See 6.6, 7.3 and 7.12)	20
Max points available - <i>Concept Challenge</i>			85
Max points – <i>Foundation and Advanced Challenge</i>			100

7.14 Elements identified with *are not applicable the category 4.13.1 Concept Challenge.

7.15 For the category 4.13.1 Concept Challenge the score will be normalised to 100 pt max.

8. Rules for the Poster Competition

The poster is a demonstration of the team's ability to communicate their design solution, the journey to achieving the design, display of cost and performance graphically.

- 8.1 Posters must also be submitted electronically in .PDF format.
- 8.2 The submitted poster is the version that will be judged.
- 8.3 The poster should be A3 size in portrait format (297 × 420mm / 11.7 × 16.5").
- 8.4 It should clearly display the logos of the team's university, college or educational institution and of the IMechE, the names of all the team members and if it is a curricular or an extra-curricular activity.
- 8.5 The poster should introduce the purpose of the competition, describe the device, how it operates and the engineering principles it is based on.
It should include as minimum:
 - 8.5.1 Sketch, 3D visualisation or 2D technical drawings
 - 8.5.2 Text to introduce the competition and describe the device
 - 8.5.3 Engineering calculations with expected – calculated performance
 - 8.5.4 Total BoM cost, IMechE BoM cost, mass
 - 8.5.5 Summary cost / BoM extract
- 8.6 Each team should display their poster in A3 format, printed in colours, on the area provided.

9. Scoring for the Poster Competition

The poster will be scored in accordance with the requirements listed below. Unless specified differently, this applies to all three categories *4.13.1 Concept Challenge*, *4.13.2 Foundation Challenge* and *4.13.3 Advanced Challenge*.

- 9.1 Compliance with rules – size (A3) and orientation (portrait), file format (PDF). 0 points if any of the three requirements are not fulfilled.
- 9.2 Information on the educational institution represented and the IMechE (logos), the team members' names, if it is a curricular or extracurricular activity.
- 9.3 Use of colour, layout, text and space to convey meaning. Measurements Units close to any number (SI applies). Correct and uniform number of decimal digits. No grammar or spelling errors.
- 9.4 Short description of the competition purpose. Short description of the competing device.
- 9.5 Diagram(s) – sketch(es), pictures, CAD renders or model of the device.
- 9.6 Evidence of the engineering science underpinning the device. Performance calculation estimates.
- 9.7 BoM costing results, summary costing of different elements, mass.
- 9.8 Scoring table:

	No	Description	Points
Visual Impact	1	Compliance with rules – size (A3) and orientation (portrait) and file format (PDF) (See 9.1)	10
	2	Educational institution represented and the IMechE (logos), team members' names, competing category, curricula or extra curricula activity (See 9.2)	10
	3	Good use of colour, readable. Units and decimals appropriate. No grammar or spelling errors. (See 9.3)	15
Technical Content	4	Description of the competition and of the device (See 9.4)	20
	5	Diagram, sketches, renders or CAD screenshots (See 9.5)	15
	6	Evidence of the engineering science underpinning the device (See 9.6)	15
	7	Different BoMs, summary costs of the different elements, mass (Not the full BoM, see 9.7)	15
Max points			100

10. Rules for the Presentation Competition

The purpose of the presentation is to explain to an audience of any background and understanding, the purpose of the product, its design from the initial concept selection through the evaluations, the expected and calculated performance cost.

- 10.1 The presentation shall be submitted in electronic – video format, .MP4.
- 10.2 The file submitted is the version that will be judged.
- 10.3 The presentation should be delivered by all the team members within a maximum length of five minutes.
- 10.4 The presentation should as a minimum:
 - 10.4.1 Introduce the DC and describe briefly the final competing device
 - 10.4.2 Describe steps the team followed to arrive at the design
 - 10.4.3 Display the principal features of the final design
 - 10.4.4 Demonstrate the engineering science and calculation to substantiate the device performance
 - 10.4.5 Exhibit the total cost, with major area summary, comparison between total and IMechE BoM cost, CAD mass
- 10.5 The top three teams, after delivering the presentation live at the final, will answer questions on their design for up to three minutes.

11. Scoring for the Presentation Competition

The presentation will be scored in accordance with the requirements listed below. Unless specified differently, this applies to all three categories 4.13.1 Concept Challenge, 4.13.2 Foundation Challenge and 4.13.3 Advanced Challenge.

- 11.1 Quality of presentation: logic structure, fluent speech, clear, within the maximum allowed time, correct format for the file submitted.
- 11.2 Excessive length of the presentation or video recording not in the correct file format will result 0 points for 11.1.
- 11.3 The speaker should support and integrate the visual element on the presentation without reading the content of the slides.
- 11.4 Quality and integrity of visual aids: clear and easily readable, integrated by the speaker. No grammar, spelling errors, missing measurement units, incorrect digits. Logos of the universities and of the IMechE are ideal
- 11.5 Introduction of the Design Challenge, summary of the competition intent and principal features of the device.
- 11.6 Names of the team members, whether curricular or extracurricular activity, category of the competition, applicable year or level of the team members.
- 11.7 Steps followed to reach the final design from the first concept selection.
- 11.8 BoM cost comparison; summary of major area costs
- 11.9 Engineering science that underpins the final design, including calculations and performance estimates.
- 11.10 Answer to judges' questions for the three finalist teams.
- 11.11 Scoring table:

	No	Description	Points
Presentation Style	1	Overall quality of presentation (See 11.1, 11.2 and 11.3)	15
	2	Quality and integrity of visual aids and content (See 11.4)	15
Technical Content	3	Introduction of the competition, summary, team details (See 11.5 and 11.6)	15
	4	Steps followed to reach the final design, BoM analysis (See 11.7 and 11.8)	15
	5	Engineering science that underpins the final design (See 11.9)	20
Review at competition	6	Answer to judges' questions * (see 11.10/11.12)	20
Max points			100

11.12 Only to the 3 best presentations, see 10.5 and 11.10.

12. Rules for the Peer Review Competition

The peer review purpose is the opportunity for students to express their view on the design and execution proposed by other teams. It is held at regional finals only and it applies to the categories *4.13.2 Foundation Challenge* and *4.13.3 Advanced Challenge*.

- 12.1 The students will rank according to the requisites listed in section 14 on a slip provided on the day.
- 12.2 If there are less than three teams entering per category, there will be no peer review competition.
- 12.3 The students will rank the top three teams if 4 or more teams are competing in the same category and submit the slip with the results.
- 12.4 The students cannot score their own team or categories different from the one they are competing in.
- 12.5 Whilst the Peer Review evaluation is being carried out, there must be at least one member of each team present to answer questions.
- 12.6 The students cannot directly express judgements on the adherence to the DC rules or to the safety of the devices.
- 12.7 Doubt on adherence to the DC rules or safety of the devices are not part of the Peer Review competition and shall be flagged directly and privately to the judging panel, without discussing with any other team.

13. Rules for the Design Excellence Competition

The design excellence review is the opportunity for students to get external feedback from an industry representative. It is held at national finals only and it applies to the categories *4.13.2 Foundation Challenge* and *4.13.3 Advanced Challenge*.

- 13.1 The students will be scored by an industry representative or an independent reviewer nominated by the judges.
- 13.2 The industry representative will rank according to the requisites listed in section 14.
- 13.3 Whilst the Design Excellence evaluation is being carried out, there must be at least one member of each team present to answer questions.

14. Scoring for the Peer Review and Design Excellence Competitions

The Peer Review and the Design Excellence Competition shall be scored in accordance with the requirements listed below. This applies to the categories *4.13.2 Foundation Challenge* and *4.13.3 Advanced Challenge*.

14.1 Design principles applied: sound, clear, well explained

14.2 Simplicity of design

14.3 Robustness of the design and of the prototype.

14.4 Manufacturing excellence: does it look executed and robustly assembled?

14.5 Appearance: would it potentially attract a customer?

14.6 Scoring table:

Peer Review / Design Excellence	No	Description	Points
	1	Design principles applied (See 14.1)	20
	2	Simplicity of design (See 14.2)	20
	3	Robustness (See 14.3)	20
	4	Manufacturing excellence (See 14.4)	20
	5	Appearance (See 14.5)	20
		Max points	100

The judging panel present at the event will collate the slips submitted, sum all the scoring received per each team and normalise to 100.

15. General notes, enforcement of the rules, disqualifications and penalties

- 15.1 Only teams that have a valid entry in all the applicable elements of the competition (see 1.4) will be scored as contender of the overall winner of the competition.
- 15.2 Whenever a calculation requires rounding, the decimals will be rounded as follows: 0, 1, 2, 3, or 4 will be rounded down; 5, 6, 7, 8, or 9 will be rounded up.
- 15.3 0 (zero) is considered a valid score.
- 15.4 No submission is not considered a valid entry.
- 15.5 On matters relating to test equipment and procedure, the authority will be the Chair of the IMechE Design Challenge organising committee, or his/her delegated representative(s).
- 15.6 The panel of judges for the competition consists of impartial IMechE, university and industry representatives, depending on availability.
- 15.7 Institutions representatives are responsible for ensuring that the spirit of the competition is adhered to during all stages.
- 15.8 Appeals: if a team wishes to lodge a complaint, to query a procedure or rule infringement, they must do so through the Chair of the IMechE Design Challenge organising committee, or his/her delegated representative(s). Any complaint will be investigated immediately, by at least two judges, and a response will be issued within a reasonable time.
- 15.9 Appeals must be raised by a nominated team leader. The remaining team members, team supervisors, or staff members, can only contribute to an appeal if requested to do so by the Chair of the IMechE Design Challenge organising committee, or his/her delegated representative(s).
- 15.10 The decisions of the panel of judges will be final. Judges may consult and vary the execution and development of the day slightly from the high-level planning to maintain the smooth running of the competition.
- 15.11 If a particular region decides to authorise deviation(s) from these rules without agreement of the DC Steering Committee, the winner(s) of that regional final will not be eligible for the national final. Any queries about the equipment during the competition must be raised with the head judge. Only the team leader is allowed to approach the official and the team must abide by any decision made.

General Officials Authority

- 15.12 The officials reserve the right to revise the schedule, date and location of the competition and/or interpret or modify the competition rules at any time and in any manner that is, in their sole judgement, required for safe and efficient operation of the challenge.
- 15.13 All team members are required to cooperate with and follow all instructions from the officials.
- 15.14 Official announcements shall be considered part of the rules.

Disqualification

- 15.15 If at any point the device is considered unsafe, it loses some safety protections such as electrical protections, safety pins (whenever applicable), locking mechanism or any other safety related concern, it will be withdrawn from the Challenge competition and disqualified.
- 15.16 Continued breaches or behaviour unbefitting of the spirit of the challenge will result in the team being disqualified from the whole competition.
- 15.17 Any team not ready to compete within the time allowed, including but not limited to the installation of spares will be disqualified.
- 15.18 Absence of safety elements listed in 4.20 to 4.27 or breach of 4.34 and 4.49 will disqualify the team from any element of the competition.
- 15.19 If the device or the team members interfere with other devices or other teams during the competition, the device and the team causing the interference will be disqualified. The run affected will be repeated.
- 15.20 Devices with active wireless communication during any run, see 4.16, will be disqualified.

Penalties

- 15.21 Late submissions will be considered an unfair advantage. Penalties will apply to the elements 1.1.1, 1.1.2, 1.1.3 and 1.1.6 of the competition as follows:
- 15.22 Entries submitted between the 1-week deadline and 24 hours before the start of the competition reduced by 50%
- 15.23 Entries submitted less than 24 hours before the start of the competition will be considered valid submission, will not be assessed and will score 0 points.
- 15.24 Any significant changes to submitted entries will also be treated as late submissions and treated as 15.22.
- 15.25 Devices designed over budget will be considered having an unfair advantage. Penalties will apply to all elements of the competition and as follows:
 - 15.25.1 Incomplete BoM reduction of 20%
 - 15.25.2 Difference between total BoM and IMechE BoM greater than 10% reduction of 20%
 - 15.25.3 IMechE BoM over budget reduction of 50%.
- 15.26 Penalties 15.21 and 15.25 can be cumulated.
- 15.27 Breach of any rule during competition will forfeit that heat or final.
- 15.28 Device completing the mission over time will cumulate 0 points in that run.

Appendix 1 – BoM structure and reporting examples

BoM structure and summary reporting examples

Institution of
MECHANICAL
ENGINEERS

Bill of Materials Example

Device area	BoM Item line	Part Number	Design iteration / revision	Part Name / description	Manufacturing technique or purchased item	Quantity (units / mm)	Unit cost (£/unit - VAT inc.)	Unit mass (g)	Total cost (£ - VAT inc.)	IMEchE BoM cost (£ - VAT inc.)	Total mass (g)	Supplier	Hyperlink	Invoice (if available)
Mechanical structure	1	M001	9	Bearing Housing Assembly	3D printed	4	£ 0.50	5	£ 2.00	£ 2.00	20.0	A	Hyperlink_01	Invoice_01
	2	M002	5	Angle Bracket	Laser cut	1	£ 0.25	2	£ 0.25	£ 0.25	2.0	B	Hyperlink_02	Invoice_02
	3	ISO-2338-6x12	1	Parallel Unhardened Pin	Purchased	4	£ 0.15	15	£ 0.60	£ -	6.0	C	Hyperlink_03	Invoice_03
	4	M003	8	Bearing Housing Assembly - Gearbox	CNC / machined	2	£ 150	5	£ 3.00	£ 3.00	10.0	D	Hyperlink_04	Invoice_04
	5	M004	14	Chassis main	3D printed	1	£ 2150	215	£ 2150	£ 2150	215.0	E	Hyperlink_05	Invoice_05
	6	ISO-4762-M3x25	1	Hex Socket Head Cap Screw	Purchased	15	£ 0.10	2.5	£ 1.50	£ -	37.5	F	Hyperlink_06	Invoice_06
	7	ISO-10542-M3x10	1	Hex Socket Countersunk Head Screw	Purchased	4	£ 0.10	2.5	£ 0.40	£ -	10.0	G	Hyperlink_07	Invoice_07
	8	DIN-471-3	1	Basic Circlip - External	Purchased	4	£ 0.10	2.5	£ 0.40	£ -	10.0	H	Hyperlink_08	Invoice_08
	9	ISO-6194-6-22-7	1	Rotary Lip Seal	Purchased	1	£ 100	2.5	£ 100	£ 100	2.5	I	Hyperlink_09	Invoice_09
	10	12-1217	1	Gearbox assembly	Purchased	1	£ 4.00	85	£ 4.00	£ 4.00	85.0	J	Hyperlink_10	Invoice_10
Electric and electronic components	Mechanical structure - IMechE BoM - Partial (£)					£ 3175								
	11	RS-361-579	1	Hook Up Wire 0.5mm 20 AWG - Black	Purchased	0.55	£ 0.210	28	£ 0.12	£ 0.12	15.4	AU	Hyperlink_11	Invoice_11
	12	RS-186-4261	1	Hook Up Wire 0.5mm 20 AWG - Red	Purchased	0.55	£ 0.210	28	£ 0.12	£ 0.12	3.2	BB	Hyperlink_12	Invoice_12
	13	RS-238-9715	1	Geared DC Motor, 5.75 V, 6 – 15 V dc	Purchased	1	£ 3.87	125	£ 3.87	£ 3.87	483.8	TwT	Hyperlink_13	Invoice_13
	14	RS-734-7179	1	Toggle Switch, On-On, DPDT	Purchased	1	£ 182	12	£ 182	£ 182	218	XC	Hyperlink_14	Invoice_14
	15	SVE-484243	1	6 AA Battery holder	Purchased	1	£ 1.35	25	£ 1.35	£ 1.35	33.8	D	Hyperlink_15	Invoice_15
	16	E-30172200	1	AA Battery cell	Purchased	6	£ 0.45	22	£ 2.70	£ 2.70	55.4	Z	Hyperlink_16	Invoice_16
	17	RS-228-5562	1	Red LED 5mm	Purchased	1	£ 0.43	0.5	£ 0.43	£ 0.43	0.2	HY	Hyperlink_17	Invoice_17
	18	RS-228-6004	1	Green LED 5mm	Purchased	1	£ 0.43	0.5	£ 0.43	£ 0.43	0.2	KY	Hyperlink_18	Invoice_18
Consumables	19	RS-276-805	1	Magnetic Buzzer 5V	Purchased	1	£ 2.24	18	£ 2.24	£ 2.24	40.3	W	Hyperlink_19	Invoice_19
	Electric and electronic - IMechE BoM - Partial (£)					£ 13.08								
	20	RS-244-549	1	Solder	Purchased	5	£ 0.005	0.4	£ 0.03	£ -	2.0	AU	Hyperlink_21	Invoice_21
	21	RS-473-423	1	Instant adhesive	Purchased	5	£ 0.25	0.2	£ 1.25	£ 1.25	0.3	KY	Hyperlink_18	Invoice_18
Consumables - IMechE BoM - Partial (£)					£ 1.25									
22	RS-104-7319	1	PVC electrical tape	Purchased	12	£ 0.05	0.02	£ 0.60	£ -	0.0	W	Hyperlink_19	Invoice_19	

Figure 1 – Comprehensive BoM structure – table example

BoM summary table		
Mechanical structure - IMechE BoM	£	31.75
Electric and electronic - IMechE BoM	£	13.08
Consumables - IMechE BoM	£	1.25
Total IMechE BoM	£	46.08
Total device cost	£	49.60
Total cost / IMechE cost		7.6%
CAD mass (g)		1058.4

Figure 2 – IMechE BoM summary with comprehensive cost and CAD mass – table example

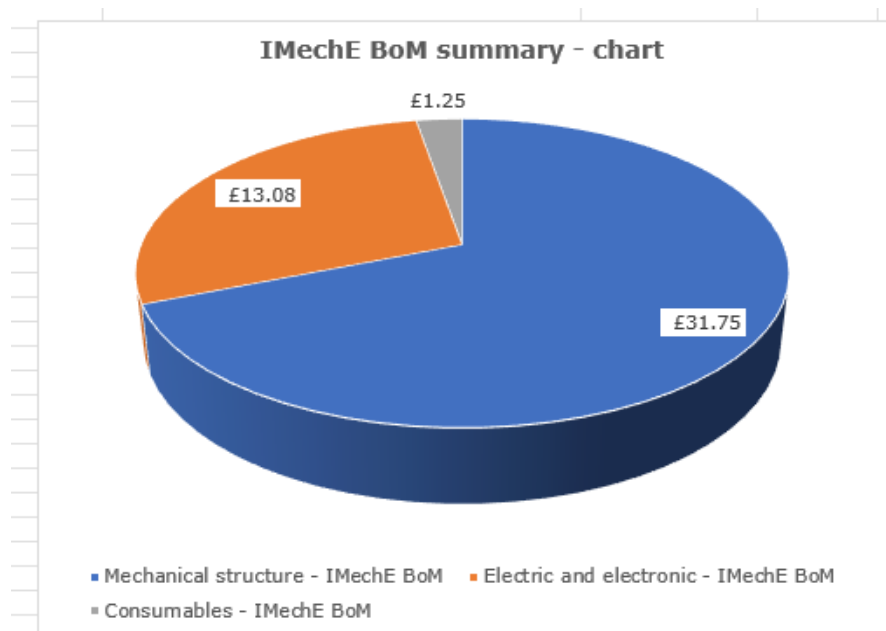


Figure 3 – IMechE BoM summary – graphical example

Bill of Materials Example									
Device series	Part Number	Design / Revision	Part Name / Description	Material / Finish	Quantity / Unit	Unit cost / Price	Unit mass / Weight	Unit volume / Volume	Unit cost / Price
Mechanical structure	1	1	Base Housing Assembly	3D printed	1	£ 0.05	5	£ 2.00	£ 0.05
	2	1	Angled Bracket	Latex cut	1	£ 0.25	2	£ 0.25	£ 0.25
	3	1	Parallel Unthreaded Pin	Purchased	4	£ 0.15	15	£ 0.60	£ 0.15
	4	1	Base Housing Assembly - Capion	3D printed	2	£ 1.50	5	£ 3.00	£ 1.50
	5	1	Chassis main	3D printed	1	£ 2.150	25	£ 21.50	£ 2.150
	6	1	Hex Socket Head Cap Screw	Purchased	15	£ 0.10	25	£ 1.50	£ 0.10
	7	1	Hex Socket Head Cap Screw	Purchased	4	£ 0.10	25	£ 1.50	£ 0.10
	8	1	Base Cradle - External	Purchased	4	£ 0.10	25	£ 1.50	£ 0.10
	9	1	Base Cradle - Internal	Purchased	1	£ 1.00	25	£ 1.00	£ 1.00
	10	1	Base Cradle - External	Purchased	1	£ 4.00	95	£ 4.00	£ 4.00
Electric and electronic components	11	1	Microcontroller Unit	Purchased	0.95	£ 0.20	20	£ 0.15	£ 0.15
	12	1	Microcontroller Unit	Purchased	0.95	£ 0.20	20	£ 0.15	£ 0.15
	13	1	Microcontroller Unit	Purchased	1	£ 3.87	05	£ 3.87	£ 3.87
	14	1	Microcontroller Unit	Purchased	1	£ 1.82	12	£ 1.82	£ 1.82
	15	1	Microcontroller Unit	Purchased	1	£ 1.35	25	£ 1.35	£ 1.35
	16	1	Microcontroller Unit	Purchased	6	£ 0.45	22	£ 2.70	£ 0.45
	17	1	Microcontroller Unit	Purchased	1	£ 0.45	05	£ 0.45	£ 0.45
	18	1	Microcontroller Unit	Purchased	1	£ 0.45	05	£ 0.45	£ 0.45
	19	1	Microcontroller Unit	Purchased	1	£ 2.24	8	£ 2.24	£ 2.24
	20	1	Microcontroller Unit	Purchased	9	£ 0.05	04	£ 0.05	£ 0.05
Consumables	21	1	Instant adhesive	Purchased	5	£ 0.25	02	£ 1.25	£ 0.25
	22	1	PVC electrical tape	Purchased	12	£ 0.05	02	£ 0.60	£ 0.05
	23	1	Consumables - Microcontroller Unit	Purchased	1	£ 0.05	02	£ 0.60	£ 0.05

Figure 4 – Comprehensive BoM structure with business and environmental impact add-on – table example

BoM summary table - With business impact	
Mechanical structure - IMechE BoM	£ 31.75
Electric and electronic - IMechE BoM	£ 13.08
Consumables - IMechE BoM	£ 1.25
Total IMechE BoM	£ 46.08
Total device cost	£ 49.60
Total cost / IMechE cost	7.6%
Business device cost - including transport and end of life impact	£ 57.34
CAD mass (g)	1058.4

Figure 5 – IMechE BoM summary with comprehensive cost, cad mass and business – environmental impact – table example

Appendix 2 – Peer review slip example

Peer review slip example: detail and summary notes

Team name:													
No	Description	Points	Team A		Team B		Team C		Team D		Total		
			Notes	Points	Notes	Points	Notes	Points	Notes	Points			
1	Design principles applied	20											
2	Simplicity of design	20											
3	Robustness	20											
4	Manufacturing excellence	20											
5	Appearance	20											
Max points		100	Total:		Total:		Total:		Total:		Total:		

We have reviewed the other teams' designs and would rank the top three "best designs" as:

1 st	
2 nd	
3 rd	

Figure 6 - Peer review slip example (Foundation and Advanced)

Appendix 3 – College and university academic equivalence

The following table is considered as equivalence between university levels between the English and the Scottish Systems.

Table 1 - English - Scottish system equivalence table

English System		Scottish System	
Level 3	A - Level	SCQF level 7	Year 1 / AH @ school
Level 4	Year 1	SCQF level 8	Year 2 – Direct entry from A-levels or AH
Level 5	Year 2	SCQF level 9	Year 3
Level 6	Year 3 BEng(hons)	SCQF level 10	Year 4 BEng(hons)
Level 7	Year 4 MEng	SCQF level 11	Year 5 MEng

Any team could compete in 4.13.3 *Advanced Challenge*, if desired.

Any college plus the levels highlighted in green are considered the max threshold for competing in 4.13.1 *Concept Challenge* and 4.13.2 *Foundation Challenge*.

Appendix 4 – Submission checklist for teams

Submission on IMechE website – 1 week ahead of the event

- Design Competition - virtual prototype CAD model - in “*.STEP” (AP203 file spec.) or “*.X_T” (Parasolid) format
- Design Competition - Bill of Materials (BOM) (including receipts - links to website) – PDF and Excel format
- Poster Competition** – A3 portrait – PDF
- Presentation Competition*** - Presentation shall be submitted in video format – MP4 and PPT
- Pre-scrutineering form / device sign off by Academic Advisor - PDF

Available on the day

- Team and university logo with names – A4 printed (better if laminated)
- Project presentation slides – PowerPoint - USB drive
- Bill of Materials (including receipts - links to website) - USB drive and printed A3
- A3 poster - Printed
- Risk Assessment signed by academic lead - printed
- Pre-scrutineering form signed by academic lead - printed

Appendix 5 – Scrutineering check sheet



UNIVERSITY NAME	
TEAM NAME	

Section/ Rule #	Description of check	Pass [✓]
1.5	Check that the team is eligible for the overall win. Are all the static sections of the competition been delivered in the correct format and within the deadlines?	
4.2	The device shall remain self-contained within a given envelope.	
4.3	The device must be fully autonomous, no remote control system should be present.	
4.4	No pre-programmed electronics allowed	
4.7	Check that the design has been signed off by a staff member.	
4.20	A risk assessment is available when a physical device is part of the competition.	
4.22	When an electrical energy source is installed, there is only an individual one (e.g. single battery / single battery pack).	
4.23	No lithium batteries are installed.	
4.25	A single fuse is present on the main power supply line.	
4.26	All electrical connections and joints are protected.	
4.27	Gears, shafts and movable parts shall not pose a risk for finger trapping and shall not risk tangling with internal cables, belts or other elements of the device.	
4.30	Check if a pressurised system is being used it complies with the regulations.	
4.31	Check that no explosive charges or combustion is being used.	
4.33	The team has supplied their own PPE and is using them accordingly to the agreed procedures. Two PPE fault in the same event	

	will lead to the team disqualified from The Challenge section of the event.	
4.35	A full parts list - BoM is supplied.	
4.41	The device BoM cost is within allowed budget – depend on category. Over budget is considered unfair advantage.	
4.46	Spares used during the competition for tuning or adjustments and additional batteries are included in BoM.	
6.5	The mass estimate from CAD – virtual model has been provided.	
6.10	All elements, parts and materials are correctly costed in BoM.	
6.25	A full BoM and a summary one are supplied in the sections identified.	

Academic / UTC / Institute Advisor / Judge declaration:

I have thoroughly reviewed the team's device ahead of the Regional/National Finals submission for the event and hereby declare that:

- The device is deemed safe to operate in a lecture theatre or sports hall environment
- The device meets all the above Scrutineering checks

Signed

Print

Date