

# ESC101 ENGINEERING SCIENCE PRAXIS I -- 20229

## DEISGN BRIEF INDEPENDENT ASSESSMENT TOOL

### Constraints

1. **Must** present an opportunity that can be addressed through a verifiable physical design concept
2. **Must not** present preliminary or proposed engineering design(s) that address the opportunity
3. **Must** be submitted as a single PDF file through Quercus.
4. **Should not** exceed 1800 words of text, exclusive of references, graphical elements, or appendices
5. **Must** include a total word count at the top of the document.
6. **Must** incorporate a title that allows a reader to understand the opportunity
7. **Must** be in 11pt or 12 pt. font with 1-1.25 line spacing and 1.0 inch margins
8. **Must** be completely anonymous with respect to your team, that is it **must not** include any information (e.g. names, student numbers, identifiable photos, team identifier, etc.) that could be used to identify members of your team in the body of the Brief itself
9. **Must** include relevant extracts from any used references in an Appendix titled "Source Extracts."

### Metrics and Criteria

	Unacceptable	Satisfactory	Good	Outstanding
<b>Quality of the Opportunity</b> <ul style="list-style-type: none"> <li>• Reflection of the team's and primary stakeholders' interests and values</li> <li>• Represents a stakeholder(s) need(s)</li> <li>• Solvable by a team of first-year Engineering Science students</li> <li>• Representable and solvable in multiple meaningful ways</li> <li>• Cannot be solved by selection design</li> </ul>	<input type="checkbox"/> Description of the opportunity lacks connection(s) with the stakeholders' stated interests, interpreted values and/or the team's expressed interests, values or experiences. Stated stakeholder needs are vague or not supported (e.g. observation, interviews, conversations or research) Opportunity obviously requires a level of background knowledge or technical skills outside the experience of first-year EngSci students (e.g. circuitry, materials, chemistry, etc.) or requires no skill because it can be solved with an "off-the-shelf" solution.	<input type="checkbox"/> Description of the opportunity references stakeholders' stated interests and values and the team's interests and values, although the descriptions may be in broad, general terms Stakeholder needs are supported with observations, general research, and/or conversations. Opportunity may require some skilling up in specific areas, but can be done in the available time period.	<input type="checkbox"/> Team's values are used to justify the opportunity as specific and meaningful for supportable reasons The stakeholders are explained and their needs included by considering multiple perspectives, using some research, observation, or conversations. Opportunity offers multiple approaches to resolution rather than favouring a single "solution" to a problem. It invites divergence that will allow teams to find unique meaningful approaches.	<input type="checkbox"/> <b>As per Good +</b> Team's values are incorporated with the stakeholder needs to create an opportunity that has focus, meaning, and sufficient detail to allow teams to move forward efficiently The opportunity balances the need for challenge with the need for structure to create an excellent opportunity for a group of first-year EngSci students
<b>Correctness, appropriateness, and credibility of engineering requirements</b> <ul style="list-style-type: none"> <li>• Models the opportunity and stakeholder experience in engineering terms</li> <li>• Incorporates codes and standards, handbooks, DfXs, as necessary</li> <li>• Usable for Engineering Science students in their 1<sup>st</sup> term of study with limited time to complete their design activities</li> <li>• Internal consistency and consistency with remainder of the Brief</li> </ul>	<input type="checkbox"/> Requirements missing critical components (e.g. objectives) or present but will not allow alternative designs to be evaluated (e.g. metrics are unconnected to objectives), and/or requirements are not credible (e.g. constraints come from contrived numbers) Requirements make little or no reference to relevant standards, handbooks, or DfXs.	<input type="checkbox"/> Requirements will allow most alternative designs to be evaluated and compared, but may not be robust or fine-tuned enough to evaluate a broad range of potential designs Requirements founded in some credible basis (standards, guidelines, DfX definitions or handbooks.)	<input type="checkbox"/> Requirements are well supported by evidence, including research beyond the stakeholder statements into the context of the opportunity, research that supports engineering considerations of chosen DfXs; metrics are informed by relevant codes and/or standards Codes and standards are specific to the opportunity, as applicable, rather than general	<input type="checkbox"/> <b>As per Good +</b> requirements are internally consistent from objectives through metrics to constraints and criteria, such that a team can work with the whole set with minimal reframing. Uses of codes, standards, DfX are not only appropriate but are modified to be made usable for Engineering Science students in their 1 <sup>st</sup> term of study who have limited time to complete their design activities.
<b>Quality of reference designs</b> <ul style="list-style-type: none"> <li>• Selected reference designs demonstrate consideration of existing solution possibilities</li> <li>• Can be used to guide design activities</li> </ul>	<input type="checkbox"/> Reference designs are missing; or reference designs resolve the opportunity, unless the opportunity is totally over-constrained.	<input type="checkbox"/> Reference designs are present but only used to show unsatisfactory design alternatives.	<input type="checkbox"/> Reference designs are used to show what prior work has been done toward a solution or in related areas, including both positive and negative features of a reference.	<input type="checkbox"/> <b>As per Good +</b> reference designs are used to demonstrate aspects of the opportunity that are not easily shown otherwise, such as design of specific features
<b>The quality and credibility of your engineering arguments</b> <ul style="list-style-type: none"> <li>• Use data gathered from observation and research</li> <li>• Structured with an emphasis on reason</li> </ul>	<input type="checkbox"/> An over-reliance on opinion, description, or "it's obvious" statements. A lack of evidence throughout. Variety of evidence used is limited, with over-reliance on sources that are lacking in one or more of currency, relevance, authority, accuracy, or compatible purpose.	<input type="checkbox"/> Claims appear credible at first glance, with most supported by evidence. A variety of resources were used (textbooks, handbooks, reviews, direct testing, interviews...). Some evidence may be inappropriate or weak for the claim being made.	<input type="checkbox"/> Claims are supported by credible evidence throughout. Interpretive claims are supported by more substantial evidence. Personal considerations are supported with attached evidence.	<input type="checkbox"/> <b>As per Good +</b> resources are used credibly, with qualifiers and triangulation regularly applied. Acknowledgements/analysis of possible {weaknesses, risk, error, omissions} are provided.
<b>Quality of the document as a Design Brief</b> <ul style="list-style-type: none"> <li>• Allows reader to find information quickly</li> <li>• Uses structure to aid readability</li> <li>• Structure responds to content</li> </ul>	<input type="checkbox"/> Structure and tone used inappropriate to genre. Introduction lacks some elements. Arrangement of information (including sub-headings) within the report may be illogical or confusing. Paragraphs lack clear claims or support for claims.	<input type="checkbox"/> Structure and tone appropriate to genre. Introduction contains all elements. Arguments and headings follow a logical structure. Structural elements such as bullet lists or tables are present, but may be poorly used or over-used.	<input type="checkbox"/> Introduction is efficient and clear to establish purpose. Headings and sub-headings provide a clear structure for a reader. Structural elements are used appropriately and aid in clarity and understanding.	<input type="checkbox"/> <b>As per Good +</b> the document guides readers through the report structurally and conceptually. Readers can understand the central claims of the document by skimming the sub-headings or topic sentences.
<b>The coherence and clarity of your written and visual communication</b> <ul style="list-style-type: none"> <li>• Visual and text are chosen and integrated to clearly communicate meaning</li> <li>• Uses specific language of Engineering and design</li> </ul>	<input type="checkbox"/> No visuals present or are all relegated to the appendix. Visuals lack captions. Or visuals are illegible or irrelevant and thus not useful to enhance the document's message. Language errors significantly detract from the readability and professionalism of the report.	<input type="checkbox"/> Visuals are present in the document (and captioned), but may not be well used in text. Visuals may be lacking in areas where they would aid in a reader's understanding. Writing is clear, but may be repetitive or show a disruptive preference for flourish over concision.	<input type="checkbox"/> Visuals referred to and integrated with text. Choice of visuals improves understanding and clarity. Writing is clear, concise, and demonstrates awareness of specific engineering and design language. Coherence is maintained throughout paragraphs and arguments	<input type="checkbox"/> <b>As per Good +</b> visuals include appropriate guidance for the reader. Writing style and structure demonstrates nuanced control of language through appropriate use of qualifiers in arguments, clear and concise expression, and precision in word choices