ENGINEERING DESIGN (EDN315123)

External Assessment Specifications

External Assessment Specifications inform the development of external assessments. These specifications must be read in conjunction with the current course document, available on the TASC Courses webpage.

FORMAT AND STRUCTURE

The external assessment consists of one component:

- a folio.

FOLIO GUIDELINES

These guidelines provide students, teachers and markers with details for this course regarding:

- what students must do for the extended design project that forms part of their assessment
- what is expected of teachers
- how markers are to assess the student's work.

The *TASC Frequently Asked Questions – Externally assessed folios* document on the TASC Folio Assessment webpage, provides general information for all students and teachers about externally assessed folios.

Information about academic integrity requirements is available on the TASC Academic Integrity webpage.

The final folio **must** be electronically submitted by the student to their provider for external assessment. The provider **must** submit the folio to TASC via TRACS by the published *due to TASC* date, available on the TASC Folio Assessment webpage.

FOLIO STRUCTURE

The folio includes one component:

- an extended design project.

CRITERIA TO BE ASSESSED

The folio will be assessed externally by TASC to determine ratings on:

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 4: use success criteria to review, reflect on and refine the design process

Criterion 5: communicate for technical and non-technical audiences

Criterion 8: respond to problems and identified aims

Course content

- The extended design project assesses course content from all modules for criteria 1, 2, 4 and 5.
- The extended design project assesses course content from module 3 for criterion 8.
- All components are compulsory.

Item type

- Students will submit a multimodal (digital) and word-processed product.

Time allocation

- Maximum of 50 hours of class time including internal and external components.

Rating allocation

- Extended ratings of A+, A, A- … B+, B, B- … C+, C, C- … t+, t, t- or z for each of Criterion 1, 2, 4, 5 and 8.

ADVICE TO STUDENTS

You are required to submit a folio (extended design project) of your work consisting of:

1. a title page
2. a design brief
3. a research analysis essay (1500-2000 words)
4. design development
5. a production proposal
6. design production
7. a resolved engineered final design solution (product, service, environment)
8. an evaluation and recommendations
9. a list of references.

TASC will assess the folio to determine the course external assessment rating for Criteria 1, 2, 4, 5 and 8. If you do not submit a folio, you cannot achieve more than a Preliminary Achievement (PA) for this course.

Extended design project

When producing your folio (extended design project), the following points **must** be noted:

- develop and provide a clear, concise brief and production proposal
- follow a structured engineering design process as is typically applied in a professional setting
  - **NB**: it is essential that you provide evidence of design development through scanned sketches/screen shots and embedded images that show exploration and experimentation of potential design solutions through to the final solution.
- include a research analysis essay (1500 – 2000 words).
- when choosing the subject of your design project you must identify a potential user or client and take into account existing products and practice, social, ethical, economic and environmental issues and professional standards.

You **must** justify your choice in the documentation of the design process and your teacher must approve it.

Title page

The title page **must** include:

- the project title and student's TASC ID

Design brief

The design brief **must** include analysis of engineering design problem and background information connected to the identified need of the project's design intention:

- statement of problem(s)
- description of main aim(s) and objective(s)
- the potential user, target audience or intended client
- constraints, and limitations
- identification of success criteria.

Identification of potential collaborations: Research analysis

This is an integral part of the engineering design process. Research provides a window to essential information about important aspects of the brief, the investigation of materials and components and existing solutions that guide the functional intentions, understanding of professional standards, identify the STEM concepts and processes to inform the design development of the project.

This **must** include:

- review of previous work or research and relationship to current project
- evidence of stakeholder engagement
- technological, scientific and mathematical concepts to interpret problems and to inform and support decisions
- identification of professional standards in relation to ethics in engineering design practice and consumer rights

- social, ethical, economic and environmental issues related to technology, materials selected, processes used, and solution design.

This research analysis **must** demonstrate a direct connection to the project's development and be referenced appropriately.

Design development

The design development **must** include articulation of the engineering design process (diagrams, sketches, photographs, annotations):

- ideation
- consideration of alternative solutions and reasons for selection
- production drawings and plans.

Planning and design ideas are to be analysed to articulate the positive and negative aspects of each when assessed against the design brief and needs.

Production proposal

The production proposal **must** include:

- design specifications
- resource requirements (materials, components, tools, equipment, etc.)
- risk assessment
- budget/costing

Design production

The design production **must** include:

- photographs/screen grabs and supporting annotations that explain the project production process used to generate your design context. This will help to prove the project is your original work
- prototype(s) development and selection.

You **must** include testing methods and/or methods for obtaining stakeholder feedback:

- testing methodology and/or experimental design
- evidence of data collection and data analysis.

You **must** describe how prototyping and testing are to be used to articulate the positive and negative aspects of each when assessed against the design brief and needs.

- refinement of solution.

Final engineered design – resolved engineered solution (product, service, environment)

The final design should be a suitably resolved engineering design solution that addresses the project's success criteria. The final design **must** include:

- annotated photos
- video file (voice over or annotation of key features) (optional). **NB**: while the video file is not required, it is highly recommended.

Evaluation and recommendations

This section **must**:

- evaluate against the project's stated purpose and needs
- reflect on what has been achieved and what may not have been achieved
- offer recommendations for further research/testing/improvements/redesign.

References

This section **must** include:

- all in-text referencing
- a reference list.

Folio length and word count

- a maximum of 40 A4 equivalent pages (includes research, evidence of planning, concept sketches with annotations, photographs, charts/diagrams, etc.).
  - **not** included in this maximum limit:
    - a cover page (containing only the inquiry question and the candidate's TASC ID)
    - references
- the research analysis essay (1500-2000 words) is included in the 40 pages.

Presentation of folio

Electronic submission: the folio **must** be submitted to the teacher electronically as one (1) PDF file and one (1) video file (if you have chosen to create a video). See the *TASC Frequently Asked Questions – Externally Assessed folios* document on the TASC Folio Assessment webpage for detailed instructions.

When presenting your folio, the following **must** be noted:

- The folio **must** be a single coherent folio presentation.
- The folio **must** be submitted in PDF format as a **single** ZIP file no larger than 500 megabytes in total size. It must **not** be a series of separate files.
- The folio must include the research essay of 1500 – 2000 words.
- If chosen, the video file (voiceover or annotation of key features) must be a maximum length of up to three (3) minutes, and must be an MP4 or MOV file
  - **NB: external links to videos will NOT be accepted nor considered.**
- If a landscape format is chosen for the folio, then either at least two columns of text is to be

used per page, or two separate text boxes is to be used where there are between 12-15 words per line maximum. This facilitates ease of reading.

- The folio should NOT contain hyperlinks or links to other sites, files or external sources. Markers will NOT access these.
- You are expected to provide a reworked, and polished, word-processed product.
- Your teacher is required to see all versions of your work, so it is essential to 'Save as' each time you produce a new draft of your work.
- Allowances **will not** be made for technological failures including software and hardware malfunctions. The best way to protect yourself from technological failure is to make a hard copy of each draft.
- Proofreading and editing are an essential part of the process. Careful attention needs to be given to correct spelling of all proper nouns.
- Quotations must be presented as outlined in the referencing system used.
- Your digital design solution must use 1.5 line spacing and a clear, legible font of approximately 11-point size, to support readability on electronic devices.
- Your TASC ID **must** appear on every page of the folio as a header.
- Every page must be paginated.
- Borders, decorations and "project" style covers do not add to the integrity of the extended design project and must not be used.
- **Do not** include any identifying information, including your name, your teacher's name, or the name of your school anywhere in your submission. This includes the document content, file name, headers, footers, or cover pages.

REFERENCING

- for this course a recognised referencing system is required.
- regardless of the formal referencing style chosen, you must consistently use a single referencing style in all components of your folio.
- refer to Academic Integrity information on the TASC website for information about referencing styles, frequently asked questions, and tips and hints for correct referencing.
- a detailed list of works cited must be shown in the Reference List.

DECLARATION FORM

Students **must** complete and submit to their provider the Student Folio Declaration available under the *Supporting documents* on the relevant course page on the TASC website before submitting their folio. Further information for students and providers on the Student folio declaration form is available in the *Student Folio Declaration Form Information Sheet* on the Folio assessment webpage.

ADVICE TO TEACHERS

For each of your students you are required to:

- encourage the selection of an extended design project topic that links with an area of genuine interest to them
- approve the extended design project topic
- advise students to rein in the scope of the extended design project rather than encourage the choice of expansive and overly ambitious topics. It is vital that students are advised to produce a fully resolved engineering design project such that each stage of the engineering design process is fully addressed for the context of the project.
- consult with your students regularly during the development of their project
- see all work as it progresses
- make sure the presentation and content requirements for the folio and the penalties for not meeting them are clearly explained and reiterated on a regular basis throughout the folio period
- ensure the students are aware that the project must have rigor in terms of design and design process, including context and purpose.

Submission of folio

The provider **must** submit the folio to TASC via TRACS as one complete electronic document by the published *due to TASC* date, available on the TASC Folio Assessment webpage.

TRACS submission requirements are available on the TRACS Resources webpage.

INSTRUCTIONS TO MARKERS

The Criteria to be assessed through the marking of the Folio are:

Design brief

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 5: use oral and written communication for technical and non-technical audiences

Criterion 8: respond to problems and identified aims

Research analysis essay

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 4: use success criteria to review, reflect and refine the design process

Criterion 5: use oral and written communication for technical and non-technical audiences

Criterion 8: respond to problems and identified aims

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Design development

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 4: use success criteria to review, reflect and refine the design process

Criterion 5: use oral and written communication for technical and non-technical audiences

Criterion 8: respond to problems and identified aims

Production proposal

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 5: use oral and written communication for technical and non-technical audiences

Design production

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 4: use success criteria to review, reflect and refine the design process

Criterion 5: use oral and written communication for technical and non-technical audiences

Final engineered design

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 4: use success criteria to review, reflect and refine the design process

Criterion 5: use oral and written communication in for technical and non-technical audiences

Criterion 8: respond to problems and identified aim

Evaluation and recommendations

Criterion 1: apply critical and creative thinking to the design of a solution

Criterion 2: produce prototypes to develop engineering design solutions

Criterion 4: use success criteria to review, reflect and refine the design process

Criterion 5: use oral and written communication for technical and non-technical audiences

Criterion 8: respond to problems and identified aims

References

Criterion 5: use oral and written communication for technical and non-technical audiences

Prior to the commencement of marking, markers will be required to meet with the Marking Co-ordinator. This meeting will include training in the use of the marking guide, the course criterion elements and standards when determining ratings.

PENALTIES

TASC takes the issue of academic integrity very seriously. If it is found that you breached the External Assessment Rules, available on the TASC Policies page and have not maintained academic integrity when submitting your work for assessment a penalty may be applied.

Additional penalties not relating to academic integrity will also be applicable throughout the marking process:

- folios that exceed the 40-page limit will only have the first 40 pages assessed.

Appendix 1 – Folio Overview

COMPONENT 1	EXPLANATION	CRITERIA ASSESSED
Title page	Project title and candidate's TASC ID.	
Design brief	Analysis of engineering design problem and background information connected to the identified need of the project's design intention: • statement of problem(s) • description of main aims(s) and objectives(s) • the potential user, target audience or intended client • constraints, and limitations • identification of success criteria.	1 5 8
Research analysis essay (1500 – 2000 words)	This is an integral part of the engineering design process. Research provides a window to essential information about important aspects of the brief, the investigation of materials and components and existing solutions that guide the functional intentions, understanding of professional standards, identify the STEM concepts and processes to inform the design development of the project. This includes: • review of previous work/research and relationship to current project • evidence of stakeholder engagement • technological, scientific and mathematical concepts to interpret problems and to inform and support decisions • identification of professional standards in relation to ethics in engineering design practice and consumer rights • social, ethical, economic and environmental issues related to technology, materials selected, processes used, and solution design This must demonstrate a direct connection to the project's development and be referenced appropriately.	1 4 5 8
Design development	• Articulation of the engineering design process (diagrams, sketches, photographs, annotations) • Ideation • Consideration of alternative solutions and reasons for selection • Production drawings and plans.	1 2 4 5 8

COMPONENT 1	EXPLANATION	CRITERIA ASSESSED
	Planning and design ideas are to be analysed to articulate the positive and negative aspects of each when assessed against the design brief and needs.	
Production proposal	The Production proposal includes: • design specifications • resource requirements (materials, components, tools, equipment, etc.) • risk assessment • budget/costing • identification of potential collaborations.	1 2 5
Design production	The candidate must include photographs/screen grabs and supportive annotations that explain the project production process used to generate the design context. This helps to prove the project is original work. • Prototype(s) development and selection. The candidate must include testing methods and methods for obtaining stakeholder feedback. This may include: • testing methodology/experimental design • evidence of data collection and data analysis. The candidate must describe how prototyping and testing are to be used to articulate the positive and negative aspects of each when assessed against the design brief and needs. • Refinement of solution.	2 4 5
Final engineered design - Resolved engineered solution (product, service, environment)	The candidate must include a suitably resolved engineering design solution that addresses the project's success criteria. • annotated drawings, models, photos of prototype • Optional but recommended video file (MPG4, voice over or annotation of key features), of up to three (3) minutes in length • Final costing and specifications.	2 4 5 8
Evaluation and recommendations	The candidate must evaluate against project's stated purpose and needs. Reflect on what has been achieved and also what may not have been achieved. Recommendations for further research, testing, improvements or redesign.	1 2 4 5

COMPONENT 1	EXPLANATION	CRITERIA ASSESSED
		8
References	Include in-text referencing and a reference list.	5

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