DEPARTMENT OF COMPUTING

University of Staffordshire | School of Digital, Technology, Innovation and Business

Module Title: **Robotic Modelling and Drone Skin Design**

Module Code: **COMP60019**

Module Leader: **Luke Emery**

Assignment: **Portfolio Equivalent to 3000 Words**

Weighting: **Assignment Weighted at 100%**

Assignment Learning Outcomes

1. DEMONSTRATE A CLEAR UNDERSTANDING OF THE METHODS BY WHICH PHYSICAL AND VIRTUAL PROTOTYPES CAN BE INTEGRATED TOGETHER INTO A STRUCTURED PRODUCT DEVELOPMENT PROCESS.	Knowledge and Understanding Learning
2. DEVELOP (THROUGH PROBLEM BASED LAB WORKS) METHODS OF DETERMINING THE BEST SOLUTION TO A GIVEN PROBLEM.	Problem Solving Enquiry
3. SELECT AN APPROPRIATE PROTOTYPING METHOD AND APPLY THIS TO A GIVEN PRODUCT DEVELOPMENT SITUATION.	Application Reflection

Submission

This assignment is due to be submitted by **16:59** on the **16th of May 2025**.

Deliverables must be submitted via the "**Gradebook**" tab on **Blackboard** as a .zip (compressed with Windows Explorer) file containing:

- The complete directory, containing all source files, Markdown files and 2D/3D assets of the online portfolio from the GitHub Pages repository
- A text file titled "Links", containing links to the portfolio and to the repository

The online portfolio must not be modified after submission, modification dates are displayed within the repository and will be checked.

Submission Rules

Late submission, or failure to submit will result in no marks being awarded.

Failure to submit in the required format (detailed in Submission) or failure to submit via the correct upload location on Blackboard will result in no marks being awarded.

The content of the portfolio submission, although presented in an interactive format must be equivalent to the limit of 3000 words.

Titles, bibliography, appendices, tables, graphs, and figures are excluded from the word count.

University Regulations

University regulations regarding exceptional circumstances and academic misconduct apply.

https://www.staffs.ac.uk/students/course-administration/academic-policies-and-regulations/home

Any questions about the assessment should be directed to the module leader. Formative guidance and feedback will be provided in tutorial sessions to aid development of the portfolio.

Assignment Specification

This module has explored techniques that can be leveraged to design, and later develop, a prototype exoskeletal solution for robotic applications through practical experience in tutorials, workshops, and technical instructions.

Critically, a path from virtual prototypes to physical prototypes has been investigated through the means of the following technologies:

- 3D scanning hardware, software, and workshop facilities
- Motion capture hardware, software, and stage facilities
- Computer Aided Design (CAD) software package
- 3D modelling software
- Haptic input hardware and associated 3D sculpting software
- 3D printing hardware and workshop facilities
- Laser cutting hardware and workshop facilities
- Resin production and postproduction, and composite workshop facilities

From these experiences, and appropriate background research, it is required for a GitHub Pages based portfolio to be developed which is equivalent to 3000 words.

This portfolio must record the experience of developing the prototype solution, from an individual perspective, within a product development process. Design decisions should be justified, with referenced information where appropriate, and the techniques that have been explored throughout the duration of this module should be critically appraised for their effectiveness and suitability to both the prototype solution developed in tutorials and wider industrial situations.

It may be valuable to consider contemporary industrial applications of the techniques and what advantages or disadvantages a prototyping method may present in the context of product development; with regard to attributes such as cost, durability, environmental, availability and practicality.

The portfolio will leverage interactive display of 2D and 3D designs, permitting the viewer to see the virtual prototype within the context of a supporting narrative, either embedded in a webpage or markdown document. Please provide an intuitive form of navigation to sections of the portfolio, as with any standard report.

Product designs, creations, and artefacts should be included with a supporting narrative to demonstrate and reflect on the appropriate selection of prototyping methods and integration of both the virtual and physical prototypes to achieve a theoretical production ready solution.

Assessment Criteria

Criteria	Detail	Mark %
Reflective Narrative of Product Development	An explanation of the processes undertaken to move from virtual prototypes to physical prototypes, providing reasoning behind design decisions or revisions in the context of a product development process. The narrative should reflect the steps that informed an appropriate selection of prototyping methods. 0-12 The steps taken to move from a virtual prototype to realising the design as a physical artefact are described. No, or little justification is linked to the critical appraisal of techniques used. No or little reflective thought discussed. 13-26 A link between the critical appraisal of the techniques used and the decisions to use these techniques within the product development stages is described. Some reflection regarding the workflow is discussed. 27-40 Excellent reasoning provided for design decisions, the narrative clearly identifies the steps taken, and why they were taken, to progress from a virtual prototype to realising the design as a physical artefact. Alternative or improved workflows are described in reflection of the experiences in developing the product.	40

Critical Appraisal of the Techniques Explored	In conjunction with the narrative of the development undertaken, both techniques that were used and were not used should be critically appraised with consideration about both their suitability for the product development completed during tutorials and other contemporary industrial applications.	40
	<u>0-12</u> Little or no critical appraisal given for techniques explored within the scope of the module. This is not linked to the decisions made during the product development process. <u>13-26</u> Techniques that were used in the product development cycle are critically appraised but little justification given for why this appraisal informed the decision to use or not use the technique. Some discussion is presented about the suitability of the technique in other contemporary applications. <u>27-40</u> Both techniques that were, and were not, used in the product development cycle are critically appraised and the justification is used within the context of the narrative of the authors experience to produce a physical artefact from virtual designs. The appraisal considers the suitability of the technique within the context of both the product developed in tutorials and in contemporary industrial applications. Consideration is given to attributes of the technique that may affect decision making during project management and product development.	

Appropriate Presentation and Inclusion of Designs and Artefacts	Designs and artefacts are included to provide visual context to the narrative being presented in the body of the portfolio.	10
	<u>0-2</u> No, or only a small number of visual artefacts included to illustrate the prototype development. <u>3-6</u> An appropriate number of visual artefacts are included, possibly in both 2D and 3D formats. <u>7-10</u> An appropriate number of visual artefacts are included, in both 2D and 3D formats and clearly illustrate the experiences of the author by being presented at relevant points in the portfolio narrative.	

Harvard Referencing	Correctly formatted and appropriate references in body of portfolio evidencing well-reasoned, justified, and researched arguments.	6
	<u>0-2</u> Inadequate referencing. <u>3-4</u> Appropriately and adequately referenced with bibliography but incorrectly formatted. <u>5-6</u> Fully referenced with bibliography, in the correct format with no omissions.	
Professional Presentation	Portfolio is intuitive to navigate, makes appropriate use of headings, paragraphs, and sections.	4
	<u>0-1</u> Does not satisfy professional presentation. <u>2-3</u> Adequate use of headings, paragraphs, and sections. <u>4</u> Excellent use of headings, paragraphs, and sections. The portfolio can be intuitively navigated.	
Total		**100**