**University of Huddersfield**

**School of Computing and Engineering**

# **Assignment Cover Sheet**

**Where to submit assignment:** Report and CAD Files Electronically as a pdf file via UniLearn.

**In submitting this assignment, students should be aware of the following**:

* Unless there are extenuating circumstances, work handed in after the hand-in date will receive a mark no greater than 40%; if handed in after the cut-off date (1 week after the hand-in date) the mark will be 0%.
* Student Handbook of Regulations: Section 5 covers procedures for students wishing to claim extenuating circumstances. Sections 4 and 6 define plagiarism and the procedures and penalties for dealing with it.
* You are advised to keep copies of all your assignments in case of difficulties.

**The signature below confirms** that you have read and understood the regulations concerning hand-in deadlines, penalties for late submission, plagiarism and extenuating circumstances procedures and that the work submitted is your own.

**This assignment will NOT be marked unless the following section is fully completed**

|  |  |  |  |
| --- | --- | --- | --- |
| Student Name: | | Pathway: | |
|  | |  | |
| **Signature:** | | **Student Number:** | |
|  | |  | |
|  | |  | |
| Module Title | | Module Number | Module Tutor |
| Mechanical Design | | NIM2211 |  |
| Automotive Design | | NIM2207 |  |
|  | |  |  |
| Assignment Title | | Ass. Weighting | Date Stamp: |
| Detailed Design report (individual) | | **50% OF MODULE** |  |
|  | |  |  |
| Date Due | Feedback and Marking | Words Limit |  |
|  |  | **2000-3000** |  |

**PERFORMANCE FEEDBACK: During Tutorial and on UniLearn and TurnitIn systems**

**Assessment Criteria % Weight Grade Overall Grade** …………….................

*(See Assignment Spec.)*

**Tutor’s Signature:**

……………………………....................

**Summary Comments:** *(Please include comments on performance in relation to assessment criteria)*

**Detailed Design (individual project)**

INTRODUCTION

This is an individual project and you are expected to work on and develop further the initial group project from the concept to a detailed design project ready for workshop. The final report should contain documented decision-making process.

The detailed design project aims to teach design principles to students following varied disciplines such as automotive engineering, general engineering, environmental engineering, computer aided engineering, etc. A range of projects offered has been created to give the students a choice with respect to their particular discipline. Furthermore, elements of sustainable engineering have been included to introduce students to concepts of re-useable materials and energies.

**Objectives**

* To give practice and experience in tackling an open-ended design problem
* To allow students to develop research and investigative skills
* To enable students to select materials and manufacturing processes as part of the overall design
* To enable students to develop their skills at both assembly drawing and detail design
* To introduce sustainable engineering concepts
* To enable students to develop report presentation skills

LEARNING OUTCOMES

This assignment allows you to demonstrate all of the outcomes of this module:

1. Demonstrate a detailed knowledge of individual elements of modern design concepts and methods;
2. Cognitive & intellectual Skill: Identify key areas of product design analysis and choose appropriate methods for their solution in a considered manner;
3. Practical & Professional Skills: Operate ethically in situation of varying complexity and predictability requiring the application of a wide range of techniques of modern design concepts and methods;
4. Key Transferable Skills: Select and use a range of communication methods appropriate to the product design analysis.

Working individually, you should build on the previous concept design and convert it into a workable detailed design. This assignment will include design analysis, material selection, component selection, detailed drawings and assembly drawings. Presentation should be in the form of a standard professional report complete with assembly and detail drawings as required for issue to a workshop.

## 3-D Representations

Note! You should use standard means of presenting drawings such as paper, Solid Works, however, **each student is expected to complete as a minimum 5 details drawing complex enough to demonstrate design skills (an assembly and a detail drawing of main components are required for minimum passing grade).** This mark will be extracted and used as part of your 3D mark for the module. Please note that the marking scheme reflects the need for this means of engineering communication.

**The Report:** complete with any engineering drawings, parts lists and appendices will be submitted by uploading a single PDF files to Unilearn. As a minimum requirement for passing mark, at least **five detailed** **drawings** of key components of the design must be submitted by each student individually.

**IMPORTANT!!**

1. For the report - a single file in PDF format must be submitted. Submissions in any other format will **NOT** be marked.
2. For the detailed design single zip file must be submitted. Create a copy of CAD model assembly and include all referenced parts in a single folder and compress it to zip file.
3. **Hard copy of the assembly and five detailed drawings must be submitted to the School Office by 3.30 PM on submission day.**

**Professional Report**

Whenever a report is written the following sections should be included:

* Front sheet (for administration purposes)
* Title and title page
* Contents page with page numbers
* Brief
* Introduction
* Summary
* Main body of the report with diagrams, photographs, graphical data, etc
* Conclusions and recommendations
* Bibliography and information sources
* Appendix

**Word Count:**

The word count limit for this assignment is 2000 to 3000 words. The report of at least 2000 word is expected and part exceeding 3000 words will not be marked. The word count will only include the words in your report (i.e. it will not include words in the model tree of the FEA models). Within the report the following items will be excluded from the word count:

* Title page
* Contents page
* List of symbols used, list of figures, list of tables (if present)
* Words within equations
* Words within figures, including the figure title.
* Words within tables, including the table title.
* References.

Note that figure and table titles should be brief and should not include any information not already present in the main text.

**Detailed Marking Scheme**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Not acceptable 0%** | **Needs Improving 40%** | **Meets standard 50%** | **Good 60** | **Very Good 70** | **Excellent 80** | **Exceptional 90** |
| **Detail Design planning (10%)**  Concept to reality conversion | The work has not reached a standard described by any of the descriptors. | There is some evidence of project planning and analysis of parts functions related to product specification. | The work shows basic requirements of own sub-assembly and has given adequate consideration to detail design. | Good explanation of requirements for detail design and analysis for each part separately defining the functions and investigation of possible detail design solutions. | Very good explanation of the requirements for detail design and analysis for each part separately defining the functions. Similar designs and possible detail design solutions have been explored. | The student explains requirements for detail design and analysis for each part separately defining the functions have been explored. Investigation and analysis of similar designs giving cons and pros for each part.. Based on analysis a proposed possible detail design has been generated. | The student explains requirements for his stated requirements for detail design expanding on product specification and analysis for each part separately defining the functions. The candidate has investigated and critically analysed similar designs giving cons and pros for each part investigated. Based on carried out analysis has proposed possible detail design justifying choice. |
| **Creation of detailed design (50%)**  Strength analysis  Selection of materials  Selection of components  Manufacturing considerations  3-D modelling & assembly  Fitness for purpose | Standard described by any of the descriptors has not been reached. | The required 5 parts have been detailed but with inadequate detail and consideration to how the parts will work in a larger assembly context. | The required 5 parts have been detailed and materials and manufacturing methods have been considered but without any justification for the choice. Basic analysis has been undertaken. | Design of required parts form logical sub-assembly, possible materials and manufacturing methods considered and analysed with short justification. Choice has been stated based on a cost analysis. Analysis includes FEA based on strength for some parts. | Design of required parts form logical sub-assembly, possible materials and manufacturing methods considered and analysed with short justification. Choice has been stated based on a cost analysis. FEA based on strength and optimisation of some of the parts based on analysis. | Parts designed to form logical sub-assembly, analysed possible materials and manufacturing methods based on cost calculations. Choices have been justified. Strength analysis which is coherent across different parts and optimise all the parts based on carried out analysis. | Student designs the Parts to form logical sub-assembly, analysis of possible materials and manufacturing methods based on cost calculations to justify the choices. Strength analysis which is coherent across different parts and optimise all the parts based on carried out analysis. Demonstrate exceptional proficiency in using variety of engineering tools and software. |
| **Design Documentation and Communication (30%)**  Quality of drawing and layout  Drawing projection & tile block  Use of tolerances  Use of Hidden detail & sections  Manufacturing finish symbols  Manufacturing process selection  Supplementary notes on drawings | Standard described by any of the descriptors has not been reached. | Detailed drawings of the designed parts presented, most dimensions are correct but lack of quality, coherent and comprehensive detailing. | Detailed drawings of the designed parts presented, most dimensions are correct, proper use of projections and hidden details. | Detailed drawings of the designed parts presented, most dimensions are correct, proper use of projections and hidden details. Coherent use of tolerances across most of the parts. | Detailed drawings of the designed parts presented, most dimensions are correct, proper use of projections and hidden details. Coherent use of tolerances across all of the parts. Surface finish appropriately defined on the drawings. | Detailed drawings of the designed parts presented, clear and correct dimensioning of all parts, proper use of projections and hidden details. Coherent use of tolerances across all of the parts. Surface finish appropriately defined on the drawings. | Detailed drawings of the designed parts presented, clear and correct dimensioning of all parts, proper use of projections and hidden details. Coherent and appropriate use of tolerances across all of the parts. Surface finish appropriately defined on the drawings. Use of manufacturing methods, tolerances and surface finish justified. Use of supplementary notes for detail design and/or assembly. |
| **Quality of Final Report (10%)**  Format, structure and presentation (aim, objective)  Evidence of decisions making  Discussion and conclusions | Standard described by any of the descriptors has not been reached. | The report presents satisfactory standard and describes created parts in comprehensive way. | The report presents good standard, is well structured and describes created parts and choice making process. | The report is professionally presented, is well structured and describes created parts and choices in comprehensive way, with few grammatical errors. | The report is professionally presented, is well structured and describes created parts and choices in comprehensive way with no significant grammatical errors. Clear aims and objectives are stated, design process well discussed. | The report is professionally presented, is well structured and describes created parts and choices are well evidenced. Clear aims and objectives are stated, design process discussed and conclusions are logical. No grammatical errors. | The report presents the highest professional standard, is well presented and structured. It describes created parts and choices are well evidenced. Clear aims and objectives are stated and implemented throughout the report, design process discussed. No grammatical errors and conclusions are supported by the results presented in the report. |