Team Design and Project Skills (TDPS)

Course Handbook 2018/2019

University of Glasgow

Contents

1. Course Overview

1.1 Introduction

Faced with the fast-growing development of the electronics industry, students entering the corporate environment must be able to solve practical problems, work as a team and communicate well. This course was therefore designed to meet the needs of industry and the IET accreditation requirements. In particular, this handbook is intended to answer many questions related to Glasgow University's flagship course on Team Design and Project Skills. It contains invaluable information about the UESTC 3010 course and what is required from students to be awarded the appropriate credits. Students should remember to keep this handbook safe, since it will be a useful reference throughout the course. This handbook is updated annually and students are advised to take time to study it again. Team Design and Project Skills (TDPS) is a mandatory course of the joint Glasgow College UESTC programme. The course is based on a team learning activity that aims to cultivate students' professional knowledge, practical skills and core competencies in electronic and communications engineering. Students taking this course should be able to build experience of working in a team to design and construct electronic systems that must perform specific tasks within a specified budget.

1.2 Moodle

The course is supported by a Moodle site. UESTC3010 can be accessed at https://moodle.gla.ac.uk/course/view.php?id=14648

1.3 Course Intended Learning Outcomes:

By the end of this course, you should be able to:

- Analyse technical requirements to develop an overall design plan.
- Design, assemble and test electronic hardware to perform specific functions.
- Design, populate and test printed circuit boards.
- Interface electronic and electrical (power) systems.
- Select and use appropriate components using the manufacturers' information, including data sheets.
- Appropriately use a microcontroller.
- Maintain control of a project budget.
- Maintain a personal technical laboratory notebook.
- Use a project planning methodology to keep track of progress.
- Run a project without undue reliance on a supervisor.
- Perform productively as a team, recognising contributions from all team members.
- Appreciate the duty to comply with Health and Safety legislation.
- Critically analyse published information for its content, arguments and validity.
- Write a concise researched technical report that clearly addresses and analyses pertinent issues.
- Use appropriate language and style, demonstrating effective command of English including some complex usage.
- Read and understand the essential elements of a scientific or engineering article.

2. Course Content

The course structure is outlined in the timetable shown in table 1 below. There are two cohorts taking this module. These are the Electronic Engineering and the Electronic Engineering with Communications cohorts. Each lecture typically lasts 2 teaching sessions, which is approximately 1.5 hours and takes place weekly throughout the semester. The total contact time for each cohort is approximately 5.5 hours.

Session	EEE	EE with Comms
1: Introduction: Routes, Tasks and Rules.	**1st March 2019 10:20 – 11:05**	**26th February 2019 16:20 – 17:05**
2: Project Planning Methodologies	**1st March 2019 11:10 – 11:55**	**26th February 2019 17:10 – 17:55**
3: Laboratory Notebook Practices	**27th March 2019 10:20 – 11:05**	**27th March 2019 16:20 – 17:05**
4: Writing the Laboratory Notebook	**27th March 2019 11:10 – 11:55**	**27th March 2019 17:10 – 17:55**
5: Teamwork and Team Development	**28th March 2019 08:30 – 09:15**	**29th March 2019 10:20 – 11:05**
6: Teamwork and Team Development	**28th March 2019 09:20 – 10:05**	**29th March 2019 11:10 – 11:55**
Group Meetings	**Week 5**	
Formative Assessment Deadlines	**Laboratory notebook due in week 5**	
Summative Assessment Deadlines	**Lab Notebook - 18th March 2019.** **Team Presentation – Week 14. Your teams will need to sign up for a time slot in Moodle:** https://gla-my.sharepoint.com/:x:/r/personal/rami_ghannam_glasgow_ac_uk/_layouts/15/Doc.aspx?sourcedoc=%7B192444f1-f879-40e5-a54a-bd8b05287d97%7D&action=default&cid=9157a0a8-d2ed-4af5-807a-730ad1505000 **Live (final) Team demonstration – 1st June 2019.** **Final Team & Individual Report – 17th June 2019.**	

Table 1 Timetable for the TDPS course.

3. Assessments

3.1 Formative (not graded) assessments

Towards the middle of the semester you will be asked to discuss your progress with your supervisor. In your teams, you will be asked to show your laboratory notebook. This formative assignment will act as the first draft of your final report. You will discuss this assignment in week 5 soon after the session entitled 'Laboratory Notebooks'. We suggest that this draft notebook should be around 1500 words.

3.2 Summative (graded) assessment

The summative assessment is a portfolio of work consisting of the following components:

%	Assessment Type	When	Details
10	Laboratory Notebook	Week 8	Initial design and responsibilities. Lab notebooks and progress will be discussed with the teams in week 5. Teams will need to upload their notebooks in week 8.
15	Final demonstration	Week 14	In week 13, all teams will be required to upload their 20 minute PPT presentations and demos (videos) online for the two tracks. Early in week 14, we will inform the teams which of the two tracks they will be demonstrating during the competition.
25	Final team presentation	Week 14	30 minute oral team presentations (20 minute PPT + 10 minutes Q&As).
25 + 25	**Final team Report + Personal Contributions**	**Week 17**	**Joint team report. Students can divide the report into chapters, with each student underlining their contributions to the project. Alternatively, students can indicate their personal contributions to the overall project in the footnotes of each page.**

Table 2 Assessment calendar for the TDPS course.

The mark schemes that will be used for assessing these summative assessments are provided in the Appendix section of this handbook.

3.3 Minimum Requirement for Award of Credits

Students must attend the lectures, submit all assignments, attend 90% of the timetabled meetings with the team supervisor, take part in all presentations, contribute to all team reports, and maintain a laboratory notebook that shows a satisfactory level of contribution to the project.

3.4 Referencing

In order to meet the prepare your final report for this course you will need to refer to relevant literature using a recognised referencing system. We prefer the use of the IEEE or the Harvard style referencing system (i.e. 'name, date'). However, the use of an alternative referencing system will not be penalised. If you are not used to using the IEEE style referencing system then you may find the following guide useful.

https://www.bath.ac.uk/publications/library-guides-to-citing-referencing/attachments/ieee-style-guide.pdf

3.5 Good Cause: illness, or adverse circumstances affecting attendance or assessment

If, for any reason, you find yourself missing work, missing classes, falling behind or potentially missing an assessment deadline then please consult with your peer group tutor or the Programme Director as soon as possible. Attendance and assessment submissions both form

part of the minimum requirement for the award of credits on the TDPS course, so it is vitally important to keep the programme team informed if illness or adverse circumstances affect your attendance or performance. Make sure you inform us ***before*** any assignment deadlines to ensure there is still time to deal with any problem effectively.

If you are unable to submit assessed work on time it is your responsibility to lodge any relevant Good Cause claim via MyCampus. The course coordinator may be able to provide advice, *but the provision of advice does not constitute formal submission of a Good Cause claim*. For more information please see the University's Code of Assessment: http://www.gla.ac.uk/myglasgow/senateoffice/policies/calendar/calendar2017-18/feesandgeneral/assessmentandacademicappeals/reg16/

3.6 Late Submission of Coursework

As outlined in the Assessment Agreement above, late submission of coursework is generally not accepted unless Good Cause is established. If you are unable to submit assessed work on time it is your responsibility to lodge any relevant Good Cause claim via MyCampus. The course coordinator or the course admin team may be able to provide advice, ***but the provision of advice does not constitute formal submission of a Good Cause claim***. For more information please see the University's policy on late submission of assessed work.

For more information, please see the University's policy on late submission of assessed work within the Code of Assessment, which can be accessed here:

https://www.gla.ac.uk/media/media_124293_en.pdf

4. Task Descriptions

For the 2019 semester, your team project involves the design and development of a rover that must achieve the tasks highlighted below:

4.1 Patio 1

The tasks that are required to be completed in Patio 1 are shown in the schematic diagram shown in figure 1. Further details are provided in the sections below.

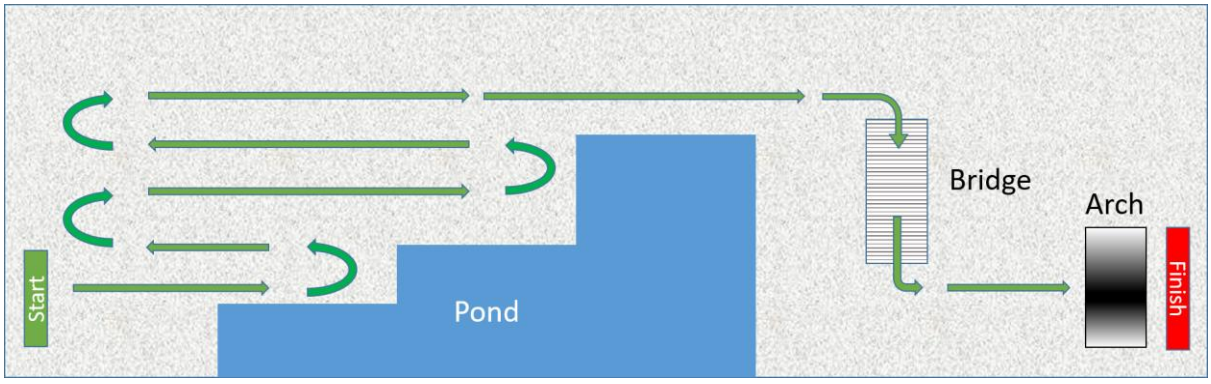

Figure 1 Schematic diagram of the tasks required to be completed in Patio 1.

4.1.1 Task 1

This involves instructing your rover to follow the path indicated in the figures below. The rover should start somewhere near the arrow indicated in figure 1a and should stop somewhere within the blue line indicated in figure 1b.

Figure 1 Starting and ending positions for Task 1.

4.1.2 Task 2

Find the bridge and cross on top of it. The location of the bridge is shown in figure 2. Furthermore, the dimensions of the bridge are shown in figure 3.

Figure 2 Location of the bridge for Task 2 in Patio 1.

As shown in figure 3a, the bridge consists of a wire mesh. Moreover, the bridge is approximately 0.45 m in width and 2.2 m in length, which includes the dimensions of the ramps that will be used for the rover to roll up and roll off the bridge, as shown in figure 3b.

Figure 3 Shape and dimensions of the bridge for Task 2 in Patio 1.

4.1.3 Task 3

The objective of this task is for your rover to find the gate, go through it and stop. The gate is shown in figure 4. Further details will be provided during the lecture and in the lecture slides.

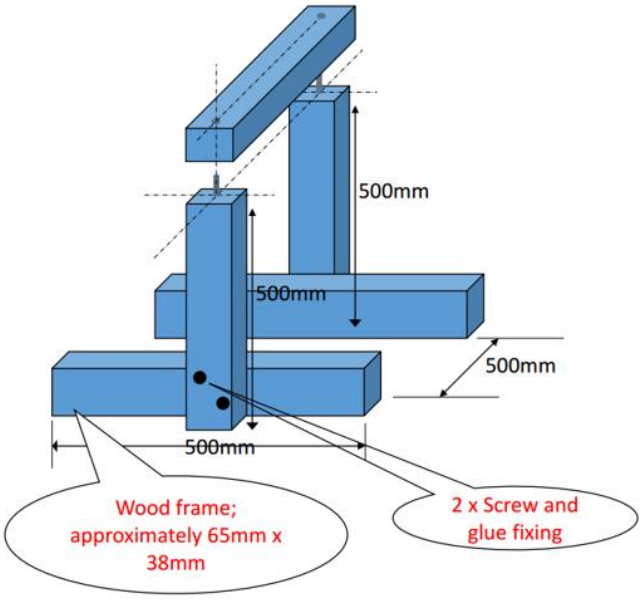

Figure 4 Shape and dimensions of the arch for task 3.

4.2 Patio 2

A schematic diagram of Patio 2 is shown in figure 5. The rover will be required to complete three tasks.

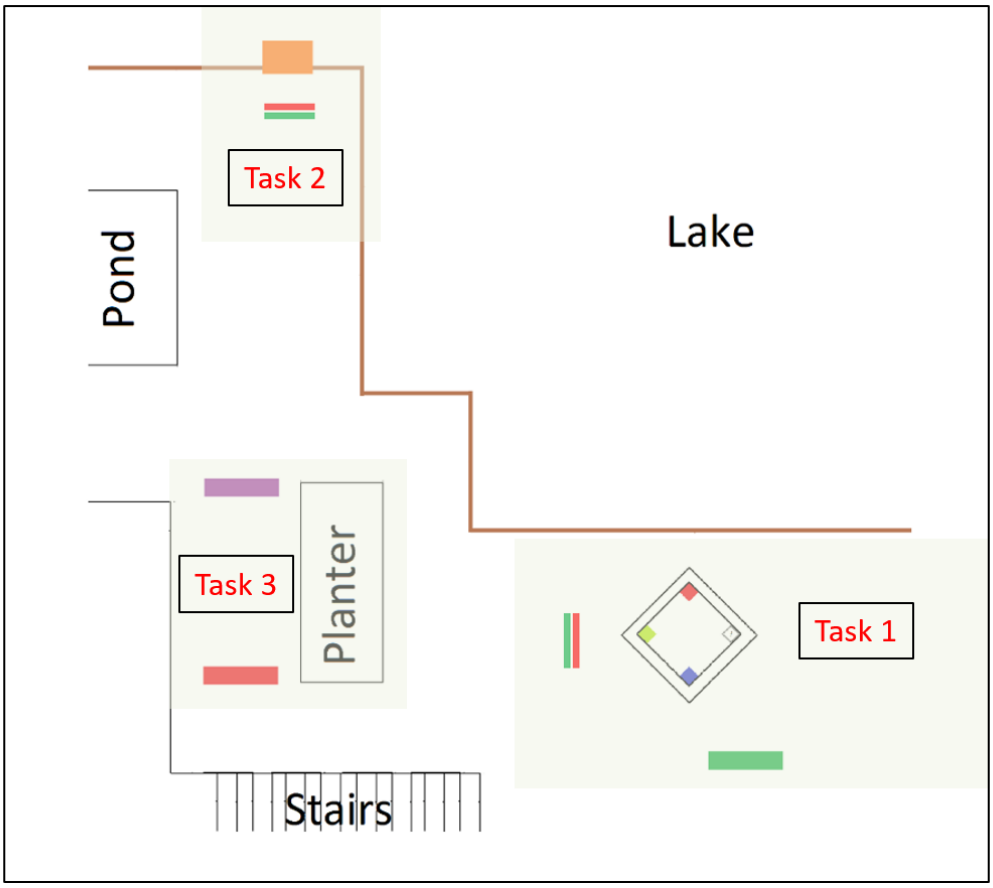

Figure 5 Schematic diagram of patio 2.

4.2.1 Task 1

Starting from the green line shown in figure 5, your rover should demonstrate that it can correctly identify colours. Once it has detected a particular colour, it should automatically move in a specific direction. Further instructions and details will be provided in the lecture slides.

4.2.2 Task 2

Your rover should automatically move from the red line in task 1 to the green line in task 2. In this task, your rover should demonstrate that can carry and release an item of your choice into the lake.

4.2.3 Task 3

When the rover enters the planter area (near the purple line shown in figure 5), it should stop and transmit a message to a laptop. The transmitted message should be a radio signal at 433 MHz. Moreover, the message must include the following details:

- Your team number.
- Your team member names.
- Time of day (24-hour clock).

4.3 General Rules

1. The maximum cost of the project is **1000 RMB**.
   - You are free to design and implement a rover of your choice that accomplishes the tasks in this project. All parts should be listed in the bill of materials, which should be an appendix in the final report. Excellent projects will provide full justification for the choice of components used.
2. The race for team robots to complete and demonstrate the tasks will be held on **2019-06-01**. It will begin promptly at **9am** and will end no later than 3pm in the afternoon.
   - Each team will train and program their robot to complete tasks on both Patios. However, during the demo day you are only required to demonstrate your completion of the tasks from only one of the Patios. The selection of Patio number and order of exhibition will be randomly decided.
   - You are required to prepare a short video that demonstrates your execution of the tasks on the other Patio in a separate presentation. The length of the video should not be **longer than 2 minutes**.
   - All teams should be prepared to demonstrate their robots at 9am and at other times when their team is called later in the day.
   - Teams should have the batteries that were provided at the beginning of the semester fully charged before 9am. Use of power packs to supplement or replace the battery will not be allowed.
3. Each team will have **one** opportunity to complete the tasks on their assigned Patio. Additional opportunities to complete the tasks on a particular patio may be allowed if time permits. However, there is **no guarantee** that this will be allowed.
   - **Each team will be allocated 12 minutes** per run on an assigned Patio for the team's robot to complete all the tasks.
   - Every effort will be made to announce when a team should begin a run on their assigned patio, but it is the team's responsibility to check their scheduled demonstration time and be ready at the starting point of the first task. A team that fails to begin the run within the 5-minute window will be given a score of 0 for the first (and possibly only) run on that course.
4. The robot must run using a program that has been previously downloaded to a microcontroller on board the rover. Instructions cannot be transmitted real-time to the rover.
5. A total of two beacons can be used by the rover to assist it with navigation.
   - Teams can propose any beacon design. The cost for the beacons should be included in the budget and bill of materials for the project.
   - Beacons should be carefully positioned before the start of the run and cannot be moved afterwards.
6. There are three tasks to be completed on each Patio. Each task carries a maximum of 10 marks.

- You will receive 10 full marks for the first task only if you complete it in the first run. You will be penalized by one mark for every external interference, touch or restart.
- To receive full marks for the second and third tasks, the transition from one task to another should be programmed (without any external interference). You will be penalized for any repositioning or restart (minus one mark for each external interference, touch or restart).

7. Electricals systems and all connections to circuit components and subsystems must be rugged and reliable.
   - Wires should be soldered onto PCBs, V-board, punchboard or screwed into terminal blocks on PCBs,.., etc. Breadboard circuits are not allowed.
8. A fuse and ON-OFF switch should be placed between the battery and the rest of the rover. The fuse should be sized appropriately so that it will not be damaged during normal operation.
9. Each team is expected to design a motor driver circuit and the PCB on which this circuit is constructed.

5. Expense Claims and Purchasing Orders

UESTC will be responsible for purchasing and reimbursing the items required for assembling your rovers. The budget for each team project is 1000 RMB. Teams should submit their request for components to Dr Lili Ma. Please follow the procedures below for expense requests and claims:

- **If the price for EACH item is less than 500 RMB:** Students can purchase these items first, then ask Dr. Lili Ma or her assistant to reimburse the student's expense claim using the appropriate invoices.
- **If the price of ANY item(s) is more than 500 RMB**: Student should contact Dr. Lili Ma for approval first, who will issue a purchasing order request and will purchase the necessary item(s) on behalf of the teams.

Please contact Dr. Lili Ma (lilima@uestc.edu.cn) for all matters regarding purchasing procedures.

6. Laboratory Notebooks

For this course, you will need to keep a detailed notebook. There are two types of laboratory notebooks: electronic and paper-based. Should you decide to use an electronic version, then you are advised to use one of the well-known software packages such as Benchling, SciNote, RSpace, OneNote or LabArchives. Otherwise, you are advised to keep a hardback notebook, which you will need to purchase on your own. It should be kept intact – do not tear pages out (which you may feel you need to because you have carried out untidy work) or miss out pages in lieu of not completing what you have set out to do. The pages should be numbered and an index introduced on the first page of the book. You should record *everything* you have done or thought about during your project. This includes for example ideas, sketches, equation developments, calculations, plots, summaries of reports that you have read (including full details of the source of the report), records of meetings with supervisors or other individuals from whom you are seeking advice etc.

7. Safety, Risk and Resources Assessment

Your supervisor will instruct you about any significant safety hazards associated with your project and where appropriate, you are required to complete a risk assessment in conjunction with him/her. Safety advice can be obtained from your supervisor or the UESTC lab technician. In general, you must adhere to the safe working practices followed in the School. ***A basic rule is that you must never carry out any potentially hazardous activity when you are alone.*** In discussion with your supervisor, the resources required to complete the project should also be provided. Further information can be obtained from the Student's Safety Handbook, which can be found here: https://www.gla.ac.uk/media/media_392787_en.pdf

8. Plagiarism

All assignments must be submitted with a copy of the Standard University Declaration of Originality Form that is signed by the student. A copy of this form can be found here:

http://www.gla.ac.uk/media/media_106239_en.docx

The primary purpose of the form is to remind students of the University's policy on plagiarism when they are working on and submitting assignments.

9. Intellectual Property

The policy on intellectual property rights of students at the University of Glasgow will be applied for all Glasgow College UESTC final year projects. Students generally own the intellectual property that they develop during the course of their studies unless intellectual property ownership is governed in some way by a third party agreement. For example, final year projects that are sponsored by a company or is funded by a research grant may require the student to transfer his or her rights to another entity. However, a requirement to do so will be disclosed to students at the time of project selection and allocation. Information about this policy can be found here:

http://www.gla.ac.uk/services/rsio/ipcommercialisation/inventors/intellectualpropertymanagement/ownershipofip/#Students.

10. Teaching Team

Teaching and supervision team consists of three members of staff:

- Dr. Rami Ghannam (rami.ghannam@glasgow.ac.uk)
- Dr. Julien Le Kernec (Julien.lekernec@glasgow.ac.uk)
- Dr. Imran Ansari (Imran.Ansari@glasgow.ac.uk

Appendix

The mark schemes that will be used for the assessment of the course components is shown in figures A.1 to A.5.

Category	Proficient (4-5)	Developing (2-3)	Basic (0-1)	Score
Organisation	• All pages are numbered and dated. • Each experiment or key argument contains title, purpose and brief procedure. • The key arguments are expressed fluently. • Observations, recorded data and calculations are present. • All information recorded in pen not pencil. • Complete table of contents.	• Most pages are numbered and dated. • Some of the key arguments are missing one or two of the following: title, purpose, brief procedure or reference to lab manual. • Recorded data and observations are incomplete in some areas. • Some of the information is recorded in pencil. • Table of contents missing some experiments or key arguments.	• Most pages are not numbered and dated. • Most of the experiments are missing several of the following: title, purpose, brief procedure or reference to lab manual. • Recorded data and observations are incomplete in most areas or not present. • All information is recorded in pencil. • Most experiments are not recorded in table of contents.	
Content	• All data and workings are recorded completely. • All data is recorded and neatly presented with units to the correct number of significant figures. • All calculations and observations are included and neatly presented with details including units and significant figures.	• Workings and observations are not complete and missing important details. • Data is recorded, but is not presented neatly or some are missing units or the correct number of significant figures. • Findings and observations are included, but are not presented neatly or missing details.	• Workings and observations are mostly missing. • All data is not recorded and not neatly presented with missing units and have incorrect number of significant figures. • Calculations and observations are not included or are very sparse with no units and are incorrect.	
Analysis	• Data is explicitly analysed, methods of analysis are described with appropriate detail. • Calculations are presented neatly. • Graphs and images are properly labelled, scaled and annotated. • Sources of error are explored and considered when evaluating data.	• Data analysis is implied and methods of analysis are not described or properly used. • Calculations are sometimes not complete. • Graphs and images are included, but are not properly labelled, scaled and annotated. • Sources of error are explored, but they are inadequate or incomplete.	• Data analysis is not included. • Calculations are missing. • Graphs and images are missing or grossly incorrect. • Sources of error are not explored.	
Commentary and Conclusions	• Results are explicitly interpreted and compared with literature data. • Conclusion is written in coherent manner. • Discussion of any limitations and any problems encountered, explaining how they could be overcome and how they contributed to the results.	• Results are interpreted but interpretation is sometimes missing. • The key arguments are expressed well. • Some understanding shown and key arguments agree with the presented data.	• Conclusions are not logical and/or do not agree with data presented. • Conclusions are written in non-coherent manner with many spelling and grammatical errors.	

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Team:

Total: /20

Assessor:

Figure A.1 Mark scheme for the Laboratory Notebook.

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TDPS Live Demonstration Assessment Matrix

Rover competition (To be completed by UoG staff only.)

Team No	Task-1			Task-2			Task-3			Total
	No. of Restarts	External interference	Completed task/Marks	No. of Restarts	External interference	Completed task/Marks	No. of Restarts	External interference	Completed task/Marks	
	Comment:			Comment:			Comment:			
	Comment:			Comment:			Comment:			
	Comment:			Comment:			Comment:			

Figure A.2 Mark scheme for the Live Demonstration.

Assessment Matrix for Team Design Projects

Oral Presentation (To be completed by staff only) (**worth 25%**)

Grade Range (Highest to Lowest)	A1, A2, A3, A4,A5	B1, B2, B3	C1, C2, C3	D1, D2, D3	E1, E2, E3	F1, F2, F3	G1, G2, H	Grade Awarded
Descriptor	Excellent	Very Good	Good	Satisfactory	Weak	Poor	G: Very Poor H: No Attainment	
Delivery (individual) (Weighting = 1)	*Confident, clear and unhesitating delivery. Held attention of audience. Easy to follow arguments.*	*Was confident but perhaps a few minor flaws (such as hesitation, talking too fast etc).*	*Perhaps slightly lacking in confidence or possibly not speaking quite clearly enough.*	*Overall a reasonable delivery, but there were issues regarding clarity, or fluency.*	*A hesitant or unclear delivery made understanding the presentation difficult.*	*Hesitant, unclear, monotonous, hard to maintain attention. Difficult to follow argument.*	*No fluency or clarity. Too many basic errors, e.g. mumbling or talking to screen.*	
Response to Questions (I) (individual) (Weighting = 2)	*Answered all questions clearly and confidently. Gave the impression of having an excellent grasp of the subject.*	*Answered all questions competently. Has clearly developed a very good understanding of the subject*	*Answered most questions well enough to conclude that the student has a developed a good understanding of the subject.*	*Gave some good answers but also some poor ones. Evidence of reasonable understanding of the subject.*	*Answered the majority of the questions poorly suggesting a lack of knowledge in the subject.*	*Gave some superficial answers, but appears to have very little understanding of the subject.*	*Unable to give any sort of competent answer to any question.*	
Structure (Group) (Weighting = 1)	*Structure of the presentation makes understanding the technical arguments exceptionally clear.*	*A very well structured presentation with everything where it should be to provide clarity.*	*Overall a well structured presentation but perhaps one or two slides are misplaced.*	*Some elements of the presentation are not clear as the structure is slightly confused.*	*A badly structured presentation giving a confused picture of the project making it difficult to follow arguments.*	*Although there is some structure to the presentation it is very confused and it is almost impossible to follow.*	*No discernable attempt at a logical structure.*	
Slides (Group) (Weighting = 1)	*Exceptionally clear slides. Simple design, large enough font, not too much material on slides. A professional quality presentation.*	*Clear slides but perhaps the occasional flaw (font size, colour scheme etc), but overall impressive presentation.*	*There may be a number of errors, on the slides but overall still clear and flaws do not detract significantly from content.*	*Consistent errors on many slides but not of a significant nature. A reasonable effort but flaws have detracted from presentation.*	*Significantly flawed slides. Basic errors such as small font size, too much content on slides, over-elaborate design.*	*Not only are slides poor, but they make it difficult to follow argument.*	*Very poor slides, basic errors on every slide. Impossible to follow technical argument.*	
Technical Content (Group) (Weighting = 2)	*There is a good quantity of high level technical content in the presentation.*	*Overall, the content is sufficient to give the audience a clear account of a challenging technical task.*	*The presentation has a good level of technical content with only a small amount of superfluous information.*	*There is some irrelevant non- pertinent material, but overall the technical content is satisfactory.*	*The presentation has only limited technical content with too much general background information.*	*The technical content is relatively low in terms of level and quantity.*	*Superfluous or possibly no relevant technical content evident.*	

Team Number: _____ Team Name: _____ Marker Name: _____

Figure A.3 Mark scheme for the Oral Presentation.

Assessment Matrix for Team Design Projects

Final Team Report (To be completed by staff only.) (**worth 25%**)

Grade Range (Highest to Lowest)	A1, A2, A3, A4, A5	B1, B2, B3	C1, C2, C3	D1, D2, D3	E1, E2, E3	F1, F2, F3	G1, G2, H	Grade Awarded
Descriptor	Excellent	Very Good	Good	Satisfactory	Weak	Poor	G: Very Poor H: No Attainment	
Writing (Weighting = 1)	*Exceptionally clear, precise and concise English. Excellent spelling &grammar, few typos.*	*Clear and well written, easy to understand, and mostly free of errors.*	*Most of the text is clear and easily understood. There are some issues with grammar and spelling.*	*The text can be understood, but some elements are not entirely clear. A sizeable volume of errors is noticeable.*	*Hard to understand much of the text. Significant spelling errors and grammatical flaws.*	*The volume and nature of the grammatical errors, combined with poor writing makes this report difficult to read.*	*Unintelligible. Impossible to read due to exceptionally poor use of English.*	
Literature Survey (Weighting = 1)	*Exemplary range of references used and discussed in great depth, indicating comprehensive background reading.*	*An appropriate range of relevant references used and discussed suggesting substantial background reading.*	*Sufficient references used and discussed to indicate a good level of background reading.*	*Perhaps just enough references used and discussed to suggest some background reading was undertaken. Too many "www" references.*	*Too few relevant references used and discussed and possibly an over reliance on www sources indicating insufficient background work.*	*Only a few references used and discussed and majority are irrelevant. Little evidence of background reading.*	*Very few (or no) references used or discussed. No evidence of any background reading.*	
Technical Content & Quality of Analysis (Weighting = 3)	*Well informed and authoritative discussion and a comprehensive analysis of a significantly complex technical problem.*	*Clear and reasoned arguments backed up with a significant analysis indicating a very good grasp of a difficult technical problem.*	*Arguments presented are of a reasonable technical level, supported by a good quality analysis, and have been well considered and clearly stated.*	*The arguments presented are of reasonable technical depth, supported by some analysis and show a satisfactory understanding.*	*Only limited critical discussion of the technical problem studied. Little analysis or a low level of analysis. Suggests limited understanding of problem.*	*Very little evidence of critical discussion of technical work or results. Superficial understanding of problem. Minimal analysis included.*	*The lack of quality of the technical argument suggests that the student has very little understanding of the problem. No analysis.*	
Presentation & Figures (Weighting = 1)	*Professional standard of presentation. All illustrations are well formatted and presented.*	*A clear and consistent presentation style making it easy to read. Most of the figures are clear and well presented.*	*There are some minor flaws in the presentation and the clarity of the figures, but overall a well presented report.*	*A number of basic errors present – inconsistent use of styles, margins etc. Figures are satisfactory.*	*Significant flaws in the presentation detracting from the overall impression of the report. Flawed figures, e.g. badly drawn and untidy,*	*Unacceptable presentation: untidy and inconsistent use of styles. Figures are messy and unclear.*	*A messy report, e.g. no evidence of any effective effort on the quality of the presentation. Report is hard to follow due to unclear figures.*	
Organisation & Structure (Weighting = 1)	*Structure is entirely correct and in accordance with instructions. All contributions can be clearly identified.*	*A well organised report with all sections logically placed enhancing understanding of work. All contributions can be clearly identified.*	*A report which is sufficiently well organised to make reading the report easy. All contributions can be clearly identified.*	*There may be some issues with the structure, but these do not detract from overall quality. Contributions cannot be identified.*	*There are flaws in the way the report is structured which damages the overall quality of the report. Contributions cannot be identified.*	*Serious flaws in structure which makes it difficult to read and understand the report. Contributions cannot be identified.*	*No discernable structure. Illogical placement of sections. Impossible to follow argument.*	

Team Number: _____ Examiner Name: _____

Figure A.4 Mark scheme for the final Team Report.

Assessment Matrix for Team Design Projects

Final Individual Report (To be completed by staff only.) **(worth 25%)**

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Grade Range (Highest to Lowest)	**A1, A2, A3, A4, A5**	**B1, B2, B3**	**C1, C2, C3**	**D1, D2, D3**	**E1, E2, E3**	**F1, F2, F3**	**G1, G2, H**	**Grade Awarded**
Descriptor	Excellent	Very Good	Good	Satisfactory	Weak	Poor	G: Very Poor H: No Attainment	
Writing *(Weighting = 1)*	*Exceptionally clear, precise and concise English. Excellent spelling &grammar, few typos.*	*Clear and well written, easy to understand, and mostly free of errors.*	*Most of the text is clear and easily understood. There are some issues with grammar and spelling.*	*The text can be understood, but some elements are not entirely clear. A sizeable volume of errors is noticeable.*	*Hard to understand much of the text. Significant spelling errors and grammatical flaws.*	*The volume and nature of the grammatical errors, combined with poor writing makes this report difficult to read.*	*Unintelligible. Impossible to read due to exceptionally poor use of English.*	
Literature Survey *(Weighting = 1)*	*Exemplary range of references used and discussed in great depth, indicating comprehensive background reading.*	*An appropriate range of relevant references used and discussed suggesting substantial background reading.*	*Sufficient references used and discussed to indicate a good level of background reading.*	*Perhaps just enough references used and discussed to suggest some background reading was undertaken. Too many "www" references.*	*Too few relevant references used and discussed and possibly an over reliance on www sources indicating insufficient background work.*	*Only a few references used and discussed and majority are irrelevant. Little evidence of background reading.*	*Very few (or no) references used or discussed. No evidence of any background reading.*	
Technical Content & Quality of Analysis *(Weighting = 3)*	*Well informed and authoritative discussion and a comprehensive analysis of a significantly complex technical problem.*	*Clear and reasoned arguments backed up with a significant analysis indicating a very good grasp of a difficult technical problem.*	*Arguments presented are of a reasonable technical level, supported by a good quality analysis, and have been well considered and clearly stated.*	*The arguments presented are of reasonable technical depth, supported by some analysis and show a satisfactory understanding.*	*Only limited critical discussion of the technical problem studied. Little analysis or a low level of analysis. Suggests limited understanding of problem.*	*Very little evidence of critical discussion of technical work or results. Superficial understanding of problem. Minimal analysis included.*	*The lack of quality of the technical argument suggests that the student has very little understanding of the problem. No analysis.*	
Presentation & Figures *(Weighting = 1)*	*Professional standard of presentation. All illustrations are well formatted and presented.*	*A clear and consistent presentation style making it easy to read. Most of the figures are clear and well presented.*	*There are some minor flaws in the presentation and the clarity of the figures, but overall a well presented report.*	*A number of basic errors present – inconsistent use of styles, margins etc. Figures are satisfactory.*	*Significant flaws in the presentation detracting from the overall impression of the report. Flawed figures, e.g. badly drawn and untidy,*	*Unacceptable presentation: untidy and inconsistent use of styles. Figures are messy and unclear.*	*A messy report, e.g. no evidence of any effective effort on the quality of the presentation. Report is hard to follow due to unclear figures.*	
Organisation & Structure *(Weighting = 1)*	*Structure is entirely correct and in accordance with instructions. All contributions can be clearly identified.*	*A well organised report with all sections logically placed enhancing understanding of work. All contributions can be clearly identified.*	*A report which is sufficiently well organised to make reading the report easy. All contributions can be clearly identified.*	*There may be some issues with the structure, but these do not detract from overall quality. Contributions cannot be identified.*	*There are flaws in the way the report is structured which damages the overall quality of the report. Contributions cannot be identified.*	*Serious flaws in structure which makes it difficult to read and understand the report. Contributions cannot be identified.*	*No discernable structure. Illogical placement of sections. Impossible to follow argument.*	

Student Name: _____ Student GUID: _____ Team Number: _____ Examiner Name: _____

Figure A.5 Mark scheme for the final Individual Report.