

## MEng 4<sup>th</sup> Year Group Project Handbook 2019/20 - B30UD, B30UE

This handbook describes the requirements, and the dates for deliverables, for 2019/20 MEng 4<sup>th</sup> Year Group Projects. The projects take place over two semesters and provides each student with useful preparation for the 5<sup>th</sup> year industrial placement. Each project group will ideally include 3 students. Only in exceptional cases we will allow for groups of other numbers. In order to allocate the students to a group and to a project title one of the following paths should be followed:

- 1) The students can form a group themselves and agree with a supervisor on a project topic, either from the list that is provided by the MEng4 Group Project Coordinator (Dr. Mustafa Suphi Erden) or another topic, which is not necessarily announced in that list. In that case, the students should inform the coordinator about the title of their project and the supervisor, with an e-mail copied to all the students and the supervisor.
- 2) The students can individually indicate in order of priority their first four choices of project titles among the provided list to the MEng4 Group Project coordinator (Dr. Mustafa Suphi Erden, [m.s.erden@hw.ac.uk](mailto:m.s.erden@hw.ac.uk)) by e-mail, and the coordinator allocates those students to groups and to a project title according to their preferences.

The students should perform one of the above, ideally before the semester starts, but latest within the First Week of the semester and all students should have been allocated to a group and to a project title latest within the Second Week of the semester.

Students should meet regularly (typically each week) with their academic supervisor. Each group has a nominated minute taker of discussion points and actions agreed. Groups should plan to give formal presentations (half an hour long, with slides) to their academic supervisors around week 6 of each semester. These will not be assessed in the sense of contributing marks for the course but academic supervisors are required to give you feedback. Both the academic supervisor and a second reader mark reports at the end of each semester, and a poster at the end of semester two. Second readers are encouraged to attend the week-six presentations.

The nature of the projects will vary from one instance to another. But in general terms

**Semester one** (B30UD 15 credits) is primarily investigative research with some initial practical work. The Preliminary Design Review (PDR) should be written jointly by the group and each student will receive the same mark for this.

**Semester two** (B30UE 30 credits) is practical group project work that will be assessed in terms of a number of different joint and individual submissions.

In semester one, students will be required to attend a presentation given by Kirsty Thomson from the library concerning aspects of research and report writing.

## Project Allocation

	Students		Supervisor	Second Reader	Project Title
Group 1	Evtimov	Edmon	Keith Brown	Donald Reay	Development of an Autonomous System for a Formula Student Style Car
	Franchi	Valerio			
	Hamilton	Craig			
Group 2	Berry	Jack	George Goussetis	Mustafa Suphi Erden	Development of a full radio communication system
	Laird	Ryan			
	Marrocco	Jake			
Group 3	Dempster	Cameron M	Marc Desmulliez	Mauro Dragone	3D Printing, embedded sensors and software, and IoT
	Mcnicol	Campbell E			
	McNicol	Rory C			
	Swanson	Grant M			
Group 4	Yeo	Yin May	Mauro Dragone	Mustafa Suphi Erden	Robotic Cleaning of Household Stuff
	Gladwell	David R			
	Swift	Alexander			
	Tether	Niko S			
Group 5	Crosher	Ellen N	Mauro Dragone	George Goussetis	Social robot for social club for elderly people
	Johnson	Ben			
	Reid	Anna			
Group 6	Judzentyte	Karolina	Mauro Dragone	Marc Desmulliez	Robotic Mobility Aid
	Ramil Brick	Elisa S			
	Rayssiguie	Esther			
Group 7	Preston	Oliver C	Donald Reay	Mauro Dragone	NXP Cup
	Rattray	Steven J			
	Singleton	Megan			
Group 8	Obrien	Conor F	Yves Wiaux	Mauro Dragone	Deep Neural Networks for imaging in radio astronomy
	Shaw	Andrew J			
Group 9	Galbraith	Ross	Mustafa Suphi Erden	Keith Brown	Proximity Control of a Robot End-Effector to Trace an Unknown Surface with a Fixed Gap – Sensor Development and Robot Control
	Smith	Connor K			
Group 10	Ghomashchi	Darius	Mustafa Suphi Erden	Yves Wiaux	Machine Learning for Detection of Change of Action (Needle Placement to Suturing to Knot Tying) in a Laparoscopy Video Streams
	Mackenzie	Beth K			
	Muir	Christopher			

## Project timetable (Semester One)

Week	Activity/Deliverable	Marks (B30UD) (TENTATIVE)
1/2	Introductory Meeting Project timetable is explained to students and supervisors.	
3	Project Groups and Topics Identified	
6-8	Plenary Meeting Students present to the supervisor and the second reader.	Formative feedback
14 December 20, 23:59.	Submit PDR – one report from each group Marked by the supervisor and the second reader. To be submitted on Vision through Turnitin.	100% (50%+50%)

## Project timetable (Semester Two)

Week (Approximate)	Activity/Deliverable	Marks (B30UE) (TENTATIVE)
6-8	Plenary Meeting Students present to the supervisor and the second reader.	Formative feedback
10	Individual Presentation Marked by the second reader.	10%
14	Individual Student Assessment Marked by the supervisor.	25%
18 May 13th	Poster Presentation Held at same time as BEng poster presentations. Marked by the second reader.	15%
19 May 22 <sup>nd</sup> , 23:59	Final Report – JOINTLY written by each group Vision-Turnitin submission. Marked by the supervisor and the second reader.	50% (25%+25%)

## Preliminary Design Review (PDR) - document specification guidelines

Semester 1 MEng 4 <sup>th</sup> Year Group Project B30UD (15 credits)
Preliminary Design Review (PDR)
Marked by the supervisor and second reader.
<p><b>Section A: Literature Review</b></p> <p>(a) <b>Introduction</b> - [ approx. 500 Words (~1 page) joint contribution ]</p> <p>(b) <b>Literature Review</b> – [approx. 4000 Words (~8 pages) individual contribution from each group member]</p> <p>Each student's area of work should be clearly stated at the start. Overview should relate to state-of-art in the topic. Emphasis should be one of constructive criticism filtered by their designated contribution in the group. References should include journal and conference papers and possibly book, but also data sheets, application notes, white papers, etc. as appropriate. Each individual is expected to have read at least 10-15 journal and conference papers on their individual topic and cited these in their part. Subtitles or the content of the review of each individual might include:</p> <ol style="list-style-type: none"> <li>1) Research question for which the review is performed,</li> <li>2) Related literature, reviewed only for their relation to the indicated research question (do not summarize the papers you read and do not include their parts that are irrelevant to your research question). Your review should not read as a parade of summaries of papers, but as a discussion of content of papers around sub-questions of interest for your research questions.</li> </ol>

- 3) A critical consideration and comparison of the most relevant literature (5-8 papers) from the point of view of usefulness to address the research questions,
- 4) A table of comparison that shows the most relevant papers and indicates how much they are relevant to the research question considering a few (3-5) aspects/features of the research question.

### Section B: Project Integration

(a) **Responsibility Matrix** – [ 1 page joint contribution ]

Table or diagram illustrating each student's contribution within the overall context of the project.

(b) **Project Integration** – [approx. 3000 Words (~8 pages with illustrations) individual contribution from each group member] Individual student's contribution to the overall group project, planning, preliminary proof of concept investigation, figures, future work.

### Section C: Project Risks and their Mitigation

(a) **Overview** - [approx. 400 Words (~1 page) joint contribution ]

(b) **Risk assessment and Mitigation** - [approx. 500 Words (~1 page) individual contribution from each group member]

Each student assesses risks to project from non completion of their part of the project.

Each student should suggest ways of dealing with those risks.

Be aware that the "risk" here refers to the theoretical, conceptual, algorithmic, computational, practical risks that relate to the assumptions and expectations made in the start of the project and that might turn to be false or challenging and might impede the successful completion of the project. It does not refer to the health-and-safety issues, unless this is a factor that relates to the completion of the project.

**Appendix: Lessons Learned** [approx. 250 Words (2 pages with feedback form table) individual contribution from each group member]

Each student includes their completed feedback form for the 'soft skills' workshop attended.

Word counts and page lengths suggested above are flexible and are **for guidance only!!!**

**Submit electronic copy to Vision.**

## Individual Presentation Guideline

Semester 2 MEng 4 <sup>th</sup> Year Group Project B30UE (30 credits)
Individual Presentation (~10 minutes presentation, ~10-15 slides)
Marked by the second reader (10%).
<p>A guiding list of Goals of the Individual Presentation and how these can be addressed are given below. Each project and each individual work is different; therefore, consider this list just as a guide and adapt it to your own case as you find appropriate.</p> <p>The students should:</p> <ol style="list-style-type: none"> <li>1) Demonstrate that the student has a good understanding of the aims of the overall project. <ul style="list-style-type: none"> <li>➔ Give a concise summary of the project motivation, goals, and major methods (~1-2 slides)</li> </ul> </li> <li>2) Clarify the part of workload for which the individual student is responsible. <ul style="list-style-type: none"> <li>➔ State to which of the project goals you contribute. (~1 slide)</li> <li>➔ State your own individual objectives. (~1 slide)</li> </ul> </li> <li>3) Explain the methods the students has been adapting to address the individual goals. <ul style="list-style-type: none"> <li>➔ Explain the methods you follow for each of the individual objectives (~3-5 slides)</li> </ul> </li> <li>4) Demonstrate and explain the results the student has individually achieved up to that moment. <ul style="list-style-type: none"> <li>➔ Show tangible results as it applies (quantitative results, measures, numbers, figures, photos of the system, a physical demonstrator, etc.) (~3-5 slides)</li> </ul> </li> <li>5) Discuss how the results of the individual work have been or have the potential to be integrated to the overall project. <ul style="list-style-type: none"> <li>➔ Show where your output inputs to the work of others (~1 slide)</li> </ul> </li> <li>6) Present a work plan for the remaining time.</li> </ol>

- ➔ Indicate what is achieved and what is still to be done. (~1 slide)
- ➔ Show a Gantt Chart for the future plan. (~1 slide)

## Final Group Report - document specification

Semester 2 MEng 4 <sup>th</sup> Year Group Project B30UE (30 credits)
Final Group Report
Marked by the supervisor and the second reader (25%+25%).
<p><b>Guideline for Contents (just a guideline, please adapt and modify according to your project specific needs):</b></p> <p><b>Chapter 1: <u>Introduction</u> [approx. 2000 Words (~5 pages with illustrations)]</b>  Introduction connecting with semester 1.</p> <ul style="list-style-type: none"> <li>➔ Motivation: Why this project is important? How it can change things and/or doing things for humans?</li> <li>➔ Research question: State the research question that summarizes the overall aim of the project in one or two sentences.</li> <li>➔ Objectives: Give a list of objectives (~4-6 items) of the project targeted to address the research question.</li> </ul> <p><b>Chapter 2: <u>Background Theory</u> [ approx. 2000 Words (~5 pages with illustrations) ]</b>  Developed from literature review in semester 1</p> <ul style="list-style-type: none"> <li>➔ Background: Give examples of methods and results from the literature that relate to the research question and objectives. How people have been approaching these problems, what kind of results and technologies have they developed?</li> <li>➔ Inspirations from the literature: State the most important parameters, performance criteria, features, and similar concepts you found in literature and might be related/applicable to your project. Best practice is to construct a table showing those.</li> </ul> <p><b>Chapter 3: <u>Methods, Design, and Implementation</u> [ approx. 8000 Words (~20 pages with illustrations) ]</b></p> <ul style="list-style-type: none"> <li>➔ Methods: Explain the methods you have followed/applied during the project to address your objectives. Give theoretical and technical background to the extent that is related to the application in your project. Do not repeat the text-book knowledge just for sake of repetition!</li> <li>➔ Application/Adaptation to the Project: Explain in detail how you applied the methods, how you adapted them in your project. Your project specific applications constitute the most important information.</li> <li>➔ Explain the paths to the success in your project. Explain the failures, only if they are related to achieve or to explain the success story. No need to loose time and space to detail the failed ordinary attempts and trials.</li> <li>➔ Explain measures and ways of verification and validation in order to test to what degree your methods address the objectives.</li> </ul> <p><b>Chapter 4: <u>Results, Verification, Validation</u> [ approx. 4000 Words (~10 pages with illustrations) ]</b>  Critical evaluation/appraisal of results/outcomes</p> <ul style="list-style-type: none"> <li>➔ Results: Show and demonstrate the results you obtained by application of your methods.</li> <li>➔ Give quantitative results in terms of numbers, tabulated measures, graphs, and figures. In places where you cannot generate quantitative data, use images, snapshots and/or other means to show or demonstrate the outcome of your work.</li> <li>➔ Give clear measures of how you verify your output product. Be quantitative as much as you can. Demonstrate with these measures that your objectives are fulfilled.</li> <li>➔ Discussion: Give a discussion of these results. Discuss to what degree you could fulfil the objectives. Discuss what the quantitative measure you present mean in a high-level narrative.</li> </ul>

Connect your results to your initial high-level motivation at the beginning. Discuss how things could have been made better.

**Chapter 5: Conclusions and Future Work [ approx. 1200 Words (~3 pages) ]**

- ➔ Conclusion: Highlight the successes of the project. State the fulfilled objectives. State the importance of having achieved these objectives. State the very key contributions/novelties you had in comparison to the existing literature in order to achieve these objectives. What did make achievement of these objectives possible?
- ➔ Based on your discussion of how things could have been made better, suggest future work, alternative methods and/or paths to follow to make your output even better.

**Appendices**

*Word counts and page lengths suggested above are flexible and are **for guidance only!!!** Suggested chapter titles may be modified to reflect nature of project.*

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## Poster Presentation - document specification

Semester 2 MEng 4 <sup>th</sup> Year Group Project B30UE (30 credits)
Poster
Marked by the second reader (15%).
<b>Guideline for Posters (just a guideline, please adapt and modify according to your project specific needs):</b>
<b>Content</b> <ul style="list-style-type: none"><li>➔ Motivation</li><li>➔ Research question</li><li>➔ Objectives</li><li>➔ Methods</li><li>➔ Results</li><li>➔ Conclusion: Highlight the novelties and successes of the project</li></ul>
<b>Key Style Aspects</b> <ul style="list-style-type: none"><li>➔ A poster is something to <b>look at</b>, not something to read.</li><li>➔ Should be visually attractive and appealing. One passing by could not help stopping, looking at, and getting the main and well formulated single message.</li><li>➔ Use minimal amount of text. Avoid paragraphs. Try not to use full sentences. Use bullet point lists of phrases. Use visual ways of explanation, such as with block diagrams and flowcharts.</li><li>➔ Show visual results: figures, graphs, photos.</li><li>➔ Highlight the successes.</li><li>➔ In your presentation of the poster, <b>build an overall story that shows how important this project is and how valuable the results are.</b></li></ul>
<i>Suggested section titles may be modified to reflect nature of project.</i>