School of Engineering, Computing and Mathematics

Project Handbook 2024-25

PROJ300 BEng (Hons)

MEng\BEng ELECTRICAL & ELECTRONIC ENGINEERING
MEng\BEng ROBOTICS

Contents

1 General Project Information

All final year students are required to undertake a major individual project that is an independent investigation bringing together the skills acquired on the programme.

The final year project is the culmination of the degree – it gives students a chance to demonstrate all they have learned. The project module is quite different from other modules. Although students are supervised, the onus is on the student to define the problem boundaries, to investigate viable solutions, and to present the results in writing, verbally and in action. Apart from an initial briefing session there are no formal lectures to attend. Teaching consists of regular individual/small group meetings to discuss progress. For assessment, students submit reports of their progress and final results, and give in-person presentations and demonstrations of their work.

The project measures the students' ability to:

- design, engineer and evaluate quality systems
- research their chosen subject area
- make good decisions
- overcome unforeseen problems
- work within constraints of limited resources
- work to a professional code of conduct
- communicate technical concepts both orally and in writing.

To be successful, students need to plan, estimate, and manage their time and energy. These pages explain what is expected of both students and supervisors, and how projects will be assessed.

The current Project Policy incorporates a Project Management System and Assessment Process that provides a Quality-Assured Project Module and a Quality Learning Experience.

Projects will vary considerably, with some developing into research types whilst others may follow established procedures. However, there is always one common factor – the standard. Prior to commencement and as part of the quality-assurance process, all projects require the approval of the Pre-Project Approval Panel or its delegate, normally the Supervisor.

Project practical activity will take place in the project laboratory suite on the third floor of the Smeaton Building, which consists of a large general open-planned area plus specialist laboratories, well-supported by computing facilities. The facilities, formally timetabled for the equivalent of 1 day per week, are normally available from February (the start of the second term) to the end of term **(1st May 2025).**

The project, being a major component of both the final year assessment and the overall degree award, can and will absorb much time and effort, but please keep the effort in proportion and ensure that your other studies in the final year do not suffer!

1.1 Project Selection

The onus is on the student to select a topic and, after approval, is his/her responsibility to liaise regularly with the supervisor and to meet deadlines and other requirements. It is assumed that the general area of the project will lie within the enrolled discipline of the individual. However, when selecting a "good" project the following aspects need to be carefully considered:

- business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics when selecting and planning their project.
- the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct
- project management requirements to achieve engineering objectives. All students are require to produce a Gantt chart to aid their understanding of the timing and are asked to produce staged objectives /deliverables.
- the commercial, economic and social context of your project (£100 spend from school)
- sustainable development
- finally, you need to think about how you will test and demonstrate your project.

1.2 Supervisors

Supervisors are normally academic staff members, but external co-supervisors may be appropriate in some cases. The role of the supervisor is to help in the formulation of the project, to provide guidance throughout the duration of the project and ultimately to be the principal assessor.

NOTE**:** Academics do not necessarily restrict themselves to supervision of proposals in their specialist areas.

Since there is a limit on how many projects each member of staff is expected to supervise, there is no guarantee that you will get the Supervisor of your choice.

Project supervisor styles will vary considerably, and it is important that the student is aware of the supervisor's modus operandi when engaging in dialogue with prospective/assigned supervisors. The onus is on the student to ensure regular contact and setup meetings. The expectation is that your supervisor will meet with you at least every three weeks to discuss project progress. Initially, they will assess whether your

project ideas are suitable, and can help you improve them where needed. Another crucial role that supervisors fulfil is to read and comment on Table of Contents of draft versions of the reports. Given that your supervisor also examines these reports, it is in your interests to take advantage of this.

It is not possible to produce a successful project based solely on a period of intense activity immediately before the final deadline, as you may be tempted (ill-advisedly) to do for other modules. You should work consistently and effectively throughout the duration of the project. It is often worthwhile writing drafts of the final report while carrying out the work — it is easier to write up the system design just after you have finished it than to write about it months later.

To keep within the deadlines you will have to make regular progress and remember where your time has gone. To help you to do this you should record your project-related activity in a logbook. The logbook is a weekly record of work you have engaged in to meet your objectives. You should start the log right at the beginning of the year, and include records of meetings with your supervisor. The complete logbook will be assessed at the end of the project along with your report.

1.3 Projects' Manager (Paul Davey)

The Projects' Manager, supported by the Projects' Committee, has overall responsibility for the management of the project modules and will assist in matching students to supervisors together with provision of general advice on all aspects of projects. All matters relating to the specific project should however be referred to the supervisor.

2 Selection Process

It is in the interest of the 'Stage 2' student to act sooner, rather than later, to maximise choice of supervisor. General guidelines are:-

1 In trying to formulate a project proposal(s), either based on personal interests, academic staff interests or industrial placement suggestions:-

- consider your personal interests
- consider industrial placement suggestions, if appropriate
- look at possible suggestions on the web-site Teams – Project Ideas
- look at the past-projects index on the web-site Virtual Showcase for School of Engineering, Computing and Mathematics - University of Plymouth
- locate relevant information from text books and journal articles
- look at details of academic staff areas of interest on the web-site
- try to match potential supervisors from the information provided
- look at academic staff e-mail and phone contact details

- contact possible supervisors by email/phone/visit to discuss ideas
- feel free to contact the projects' manager for any advice

2 By **5pm Friday, 11th October 2024** , submit online:-

- Initial Proposal.

- Your supervisor's name
- Working title — the working title should be a good indication of what your project is about. The working title will be used in choosing examiners for your project. You can change the title for your final report. If you change the topic, you should change the working title to reflect this and inform the project coordinator of the change. You should only change the topic by agreement with your supervisor.

If you have not found a supervisor by this deadline, submit the proposal(s) anyway. The onus will then be on the Projects' Manager to assign a supervisor, but be aware that the best option is for you find an appropriate supervisor in the first place!

3 By **5pm Friday, 25th October 2024** , submit online:-

- Final Proposal (Word template provided under 'Resources')
- Gantt Chart {Work Plan} (Links on methods of creation provided under 'Resources')

Note that hard copies of these documents should be available in your Log Book, as well as Appendices in your Final Report

4 All registered final-stage students will be expected to attend the project induction and supporting lectures

5. Give a progress demonstration to your supervisor by 6th Week of the project

3 Final Proposal Form

Student	Name	eg Joe BLOGGS
	Registration Number	On Swipe Card
Programme		eg BEng (Hons) EEE
Module Code		PROJ 300
Proposer		Self / Supervisor / Industry
Supervisor		If known
Proposal Title		Please limit to **Max** of 10 words

Aim:

Aims describe purpose and intention and include a description of your motivations for undertaking this particular topic

This will contain the detailed actions of how your Objective will be achieved. Your text should be augmented with some form of Block Diagram – as the saying goes “a picture tells a thousand words”!

One to two pages will suffice.

Objectives:

Objectives relate to the expected outcomes of the project. You should break these down into 'primary objectives' which you guarantee to achieve and 'extensions' which will only be implemented if time allows. The primary objectives should be clearly specified, but the extensions may be vaguer. Do not be afraid to specify more extensions than you will be able to implement.

The goal intended to be attained (and which is believed to be attainable)

Include **at least four staged deliverables** as agreed with your Project Supervisor.
The staged deliverables do not have to be linear in complexity and difficulty and therefore completion of the stages deliverables will not guarantee a mark and should only be used as a guide on the degree of project completion.

You should discuss what you need to achieve

1. What constitutes a PASS (40%)

2. What constitutes a 2:2 MARK (50%)
3. What constitutes a 2:1 MARK (60%)
4. What constitutes a FIRST CLASS MARK (70%)

(Note that your starting position must be **clearly** stated, particularly in relation to any software or hardware, and due reference made to it in your final report).

- Relevance — write a short paragraph to explain how this project relates to your degree course.
- Resources required — it is your responsibility to make sure that the resources you need are available or can be purchased from your budget. Do not expect the department to buy additional things you need. (If you are going to use something not normally supported by the department you will need to obtain approval from your supervisor.)
- Detailed bibliography of background reading.
- List of other students doing related projects (if applicable).
- Interim log, indicating meetings with supervisor and material consulted so far.

Gantt Chart

Indicating how the project will be broken down into component tasks, with an estimate of time to complete each task and the timestamps for the associated deliverables.

4 Project Induction,

All final-stage project modules are timetabled to attend this meeting, which will be held in **SMB303**. The Project manager will give an overview of all aspects of the project management, emphasising the need for students to embrace the web-site and take full responsibility for driving the project.

A particular point to note here is your formal laboratory provision. Your timetables show a full-day project period during the week, entitled *Prioritised Allocation*. You are strongly encouraged to utilise this time in whatever way is appropriate to drive your project forward; should it be in the laboratory then staff will endeavour to guarantee a space for you.

Bearing in mind that the time-commitment required for a satisfactory conclusion of the module is of the order of two days a week, you will need to augment your timetabled activity with casual usage of the facilities. Note that there will be some, very limited, times when certain areas will not be available (details will be held at the Project Store hatch) but every effort will be made to accommodate you.

4.1 Code of Practice

This code of practice is supplementary to, and does not replace Statutory, University or Faculty policies and codes of practice.

- A professional approach will be expected at all times.
- Please ensure that all items on loan are returned promptly at the specified times to make them available to other students.
- Clear away your work area at the end of each period leaving it clean and tidy.
- Should any difficulty be encountered with availability of equipment or other facilities discuss this with the technical team and a solution will be sought.
- Remember we all have a duty to consider our own safety but also that of others.
- **Read the Health and Safety instructions carefully before starting work and act upon all instructions**

4.2 Project considerations

The following considerations are a requirement of the IET for all project work

- Management Techniques – project proposal, work plan
- Health and Safety – Risk assessment
- Commercial Risk evaluation – see section 4.7
- Legal Requirements (what are legal restrictions of use)
- Intellectual Property (what IP will you use / generate)
- Environmental Impact (sustainability, recycling, end of life)
- Ethical conduct (how does your project affect other people)
- Social Context
- Product Safety & Liability
- Internationalisation – Global Market

4.3 Health & Safety.

In the first days of the project, students are required to become familiar with the Health and Safety regulation of work environment contained in the Laboratory Handbook. You should ensure that you:

- take part in a Health and Safety induction at the company and any subsequent briefing
- are aware of the action to be taken in case of an emergency
- have familiarised yourself with the layout of the building, the location of fire fighting appliances and how they work, position of emergency exits, position of telephones and first aid arrangements
- have knowledge of any specific health and safety requirements if you are required to work off-site or out of normal working hours
- report any accidents or incidents in accordance with Industrial Project provider's requirements

4.3.1 General

I. Students are **Not Permitted** to work in hardware laboratories or project areas alone or unsupervised.
II. Students are **Not Permitted** to operate any distribution switches, breakers, earth-leakage trips or distribution panels.
III. It is **Not Permitted** to Smoke or consume Food or Beverages in any laboratory.
IV. Books, Clothing, Bags etc. must be placed in the storage facilities provided, or in laboratories where this is not available, clear of gangways and bench tops.
V. Do not switch on or operate equipment until you have been authorised to do so.
VI. If you are not sure about the safe operation of any equipment that you need to use inform a member of staff before commencing work.
VII. It is a requirement that you complete a **Risk Assessment** before you commence any non defined activities.
VIII. You are reminded to take note of all safety and guidance notices and to read the University and Faculty Health and Safety Policies, available via staff or student portals.

4.3.2 Electrical Safety

I. All ring main supplies are protected by independent earth leakage trips. Supplies disconnected due to a fault or any other reason **Must Be Report to the Technical Staff** who will ensure any faults are cleared and the area is safe before reinstating the supply.
II. **Emergency Stop** buttons are provided in all laboratories and will isolate all supplies within that laboratory. **Students Must Never** attempt to release an emergency stop button after it has been activated; you should inform a member of staff immediately.
III. 12V/24V dc supplies derived from a high capacity source can supply very high currents. Care must be taken to ensure that they are not subject to short circuits. A suitable fuse should be connected in circuit close to one of the terminals for protection.
IV. All portable mains equipment is required to be tested for electrical safety before use in the University; a pass is indicated by a green **Tested for Electrical Safety** label. If there is any doubt as to the safety of any piece of equipment do not use it, report it immediately to a member of technical staff.
V. **All mains equipment, including personal equipment, brought in for use in the University must have a correctly wired and fused plug and be subjected to a Portable Appliance Test by the UOP Estates Department prior to its use**. Information regarding the testing of personal mains equipment by the estates department is available from the technical manager.

4.3.3 Student's Projects

For the purpose of reducing risk of electric shock to yourself and others, students working with voltages in excess of 50 volts dc or 35.4 volts peak ac are to inform the Senior Technician for the area. A risk assessment will be made and a code of safe working will be implemented.

Students must have any hardware they have constructed examined and tested before connection if they contain any of the following:

I. Mains circuitry
II. Voltages above 50 volts DC or 35.4 Volts AC Peak
III. Any computer interfacing.

4.4 Health & Safety Guidance Notes

4.4.1 Soldering

Soldering irons MUST be placed in their stands when not being used. Wipe Soldering iron tips on a cleaning pad to clean them, the practice of flicking or tapping the iron to remove excess solder is not only bad practice but is Highly Dangerous and will not be tolerated.

The solder wire used in our laboratories contains a colophony free flux to help prevent occupational asthma; however, if you suffer from any respiratory problems, which may be aggravated by solder fumes, you are advised to discuss this with the technical staff before commencing soldering operations. If you feel any breathing discomfort or are otherwise affected by the soldering process, stop immediately and inform a member of staff. Fume displacement filters are available for areas which do not have fume extraction. Do not bring in your own solder to use in the University. If the soldering iron bit requires replacement contact a member of technical staff. Most solders contain lead; always wash your hands after soldering.

4.4.2 Cutting Component Leads/Wire

Take care to ensure that clippings do not fly from the cutters towards yourself or others. Either place a hand above the cutters to contain the off cut or direct the off cut downwards. Safety glasses are available.

4.4.3 Aerosol Sprays / Chemicals

The use of aerosol sprays and other chemicals in laboratories is discouraged. All chemicals used within the University are required to be assessed under COSHH (Chemicals & Other Substances Hazardous to Health) regulations and therefore need to be identified, assessed and recorded **Before They are Purchased or Used on the Premises**. If the use of a chemical or aerosols is unavoidable the supervising technician must be informed, and appropriate precautions taken.

4.4.4 Hot Air Guns

These guns are used for heat shrink sleeve etc. they generate high temperature airflow and must be used with care. Under no circumstances should they be left

unattended while still running and care should be taken with their stowage when hot.

4.4.5 Knives/Sharps

Knives, and in particular, scalpels must be used with care and not left unguarded. **Do Not Dispose of Broken or Blunt Blades in Wastepaper Baskets**; return them to the store for safe disposal.

4.4.6 Hot Glue Gun

The molten glue reaches a high temperature and can cause serious burns. The gun when switched on but not in use must be placed in a safe position with a suitable drip mat.

4.4.7 Fuses

Appropriately rated fuses are placed in circuits for safety purposes. Students should not replace fuses in equipment unless instructed to do so by a member of staff.

4.4.8 High Capacity Batteries

A 66AH 12 V lead acid battery could pass 500 amps through a short across its terminals.
The terminals of batteries must be insulated, and an appropriate fuse fitted as near as possible to a terminal of the battery for protection.
Batteries should be handed to the project stores technician for disposal, not disposed of in the wastepaper bins.

4.4.9 Protective Earth (P.E.)

All Class 1 mains equipment must be effectively earthed. On no account should a protective earth be removed from any equipment. NB. A guidance sheet “Construction Techniques for Mains Powered Projects” is available via the student portal.

4.4.10 Manufacturing of Mechanical Items Drilling of PCBs

The manufacturing and machining of all mechanical components and the drilling of PCBs is to take place in the Mechanical Workshop. All safety procedures regarding the use of machines or other equipment in the workshop are to be followed. The technician in charge is to be informed and give permission before you start work.

4.4.10 Robots

Other than during timetabled periods when the area is supervised by the named member of staff; access to the Robots in the Collaborative Robotics Area is controlled by the technical team. On no account should a robot be switched on without the specific authorisation of the technician responsible, who will first ensure that you are conversant with all safety and operating procedures. If you have not already been trained in these, you will need to arrange a mutually agreed time for this to take place.

4.5 Risk Assessment Form

Risk Assessment Form (Word template provided under 'Resources')
Risk assessment forms can be obtained from your SPMS site.
ALL STUDENTS MUST COMPLETE A RISK ASSESSMENT FORM FOR THEIR PROJECT AND HAVE IT SIGNED BY THEIR SUPERVISOR

4.6 Ethical Guidelines

Every student should have a discussion with their supervisor about the ethical implications of their research. This discussion should take place early on in the project. There will be three possible outcomes of this discussion:

- no ethical review or ethical compliance form required.
- ethical compliance form required; or
- ethical review required.

If your project involves the collection of data from human participants (and/or use of already collected data from human participants), then you will need either an ethical compliance form or an ethical review. Please read the School's research governance guidance for projects and discuss what form of ethical approval you require with your supervisor.
PLEASE NOTE: following the compliance procedure and/or obtaining ethical clearance are essential; failure to do so when necessary, will have serious consequences for the admissibility of a project.

Beside typical Health and Safety issues as described previously you need to be aware that the following aspects have also potential health and safety implications:

- Religious aspects
- Sexual harassment
- Racism
- Cultural difficulties

4.7 Commercial Risks

A good project should consider and document the following considerations as part of the management strategy:

- **Economic Risk** - Commercial viability: does the project make overall commercial sense (Financial Risk)
- **Input supply risks:** can raw materials or other inputs be obtained at the projected costs
- **Revenue risks**: will its operating revenues be as projected (Competition or comfort Risk) The economy is constantly changing as the markets fluctuate. ...
- **Construction risks**: can the project be built on time and on budget
- **Operating risks:** is the project capable of operating at the projected performance level and cost
- **Compliance Risk.** ...Customer satisfaction

- **Reputation Risk**. ... negative publicity
- **Security and Fraud Risk.** ...Data & cyber liability risks
- ***Force majeure* risks**: how can the project cope with *force majeure (COVID 20)*

4.8 Student Budgets

- Students are responsible for keeping their expenditure within their set budget.
- You are responsible for the repayment in full, inclusive of VAT, for all expenditure above your set budget.
- Expenditure above the set budget limit will only be allowed after the Project Laboratory Store receives a **Request to Exceed Budget** form, available from the store. This must have the signed approval of your supervisor and a declaration of who will pay any excess amount.
- Student budgets will be set annually.
- **All Purchases Must Be Made via the Project Laboratory Ordering System**. We cannot refund expenditure made via any other means without prior authority of the CE Technical Manager.
- Unwanted or incorrectly purchased items cannot be returned for credit if there is no fault by the supplier. It is your responsibility to check the accuracy of your order.
- All items procured using Faculty monies are deemed to be the property of the Faculty of Technology and are required to be returned at the end of the exercise unless other arrangements have been made.

4.9 Completed Projects – End of Module

Students may if they wish and with the approval of their Project Supervisor, and other interested parties retain their project. This is subject to all outstanding monies owing to the University being paid as outlined below.

In some circumstances the Faculty may wish to retain the student's project for its own purposes.

The stores personnel will issue the appropriate payment slip, which students should take to the University Cash Office, for a receipt to be affixed after payment.

On the return of the payment slip with attached receipt, the project store records will show the transfer of the project to the student. It is advised that the project should remain unaltered until all assessment marks are ratified.

5 Project Timescale

You should submit a number of written documents throughout the project. The deadlines for these and timings of other project activities are listed below:

Final Year Project

Research
Logbook (using Class Notebook)

Initial Project Proposal	**5pm Friday, 11th October 2024**

Discussion with Supervisor (agree deliverables, arrange meeting schedule)

Final Project Proposal	**5pm Friday, 25th October 2024**
Gantt Chart	**5pm Friday, 25th October 2024**

Discussion with Supervisor

- Health and Safety
- Commercial Risk evaluation
- Legal Requirements
- Intellectual Property
- Environmental Impact
- Ethical conduct
- Social Context
- Product Safety & Liability
- Internationalisation – Global Market

Risk Assessment Form (signed by Supervisor) - before you can spend budget
Background Research
Order required Components / Resources
SEMESTER 2 - OFFICIAL PROJECT START : Work Begins
Discussion with Supervisor
Deliverable 1 complete
Deliverable 2 complete

Progress Demonstration -	10%	**4pm Wednesday, 26th February 2025**

EASTER VACATION
Discussion with Supervisor
Deliverable 3 complete
Deliverable 4 complete
Discussion with Supervisor

Poster		**1pm Friday 4th April 2025**
Video		**1pm Friday 4th April 2025**
Vivas	30%	**5pm Wednesday 30st April 2025**
Project Showcase		**Thursday 1st May 2025**
Report	30%	**4pm Monday, 28th April 2025**

Celebrate

5.1 All-Year Calendar (Note these dates are preliminary and so may change)

University Week No	Dates	Activity	Explanatory Notes
1		Stage-3 Project Induction	
2			
3			
4		Initial Proposal	**5pm Friday, 11th October 2024**
5			
6		Final Proposal + Gantt Chart	**5pm Friday, 25th October 2024**
7			
8			
9			
10			
11			
12		Christmas Vacation	
13			
14			
15		REVISION\ EXAMS	
16		REVISION\ EXAMS	
17		OFFICIAL PROJECT START	27th Jan
18			
19			
20			
21			
22		Progress Demonstration	**4pm Wednesday, 26st February 2025**
23			
24		Easter Vacation	25th March – 15th April
25			
26			
27			
28			
29		Submit Project Report	**4pm Monday, 28th April 2025**
		Project Vivas	**5pm Wednesday 30th April 2025**
		Project Showcase	**Thursday 1nd May 2025**

6 Log Book

Function	♦ a chronological record of the work carried out Essential: Date & Sign Off each and every entry **Note**: reliable laboratory records can be an important factor in any patent dispute
Objective	♦ information source that will be the basis of the project and interim reports ♦ provide information such that the work is repeatable under the same conditions ♦ provide full information such that others may repeat or verify the work ♦ record of all results and observations
Presentation	♦ well organised to minimise search time ♦ legible and factually complete (including circuits, equipment, drawings) ♦ hand-written or typed entries ♦ page numbering from front & back (helps to reduce the possibility of a successful challenge to the logbook's validity) ♦ cut & permanently paste data
Monitoring	♦ It is important that progress and logbook entries are regularly monitored ♦ It is suggested that there should be a minimum of 6 entries (signed by your supervisor) in the logbook record form
Assessment	♦ the logbook contributes to the overall mark as per the assessment schedule
Format	On-line logbook using OneNote logbook
from back	♦ prepare and paste the project report plan ♦ create a reference section: list references fully as encountered ♦ create a bibliography section: list material resourced / researched ♦ create a data sheet section: list data sheets and source ♦ insert copies or extracts of data sheets as appropriate ♦ create a technical /concepts section that clearly lists material that may be useful when preparing the report. It may be useful to categorise it ⇒ *completely relevant* to the objectives and must go in the report ⇒ *borderline* that might be of some interest and may be an appendix ⇒ **interesting** but may not be essential to the report ♦ create an appendix section

NB: It is the responsibility of the student to ensure that the Logbook is inspected and signed at regular intervals

Shaded dates on the All-Year Calendar represent *suggested* meetings (minimum) with Supervisor, during which Log Book is checked and signed, together with **mandatory** signings on Open Day by Supervisor and 2nd Marker.

7 Project Progress Demonstration

Projects in industry progress increasingly rapidly from the initial project definition phase, through feasibility and initial system specification to working demonstrators ('A' and 'B' models) through to final production.

The student has 6 weeks from the start of the term in which to develop the project to the point at which one is able to demonstrate a working 'A' model to the supervisor. **This demonstration will be assessed by the supervisor and will contribute 10% to the overall project mark.**

The 'A' model will clearly not be the completed project. Full functionality is not expected, but it should 'prove the principle' either by simulation or some working elements of the final design.

It is essential to place a high priority on the project in this initial phase so that the progress in relation to the work plan can be explained and be shown to be on track to reach the final objective. This will require due consideration of lead times for components etc early on in the process. Plan well and work hard now to guarantee success at the end of the project. A good mark in this assessment will indicate being on track, a poor mark will mean that one must work considerably harder to do well!

A synopsis of the demonstration should be clearly entered in the log book.
It is mandatory for students to support the demonstration with a Powerpoint presentation, from which Supervisors will provide constructive feedback on their presentation skills. (max 8 pages).

The %age assessment will be based upon:

- **Project management to date** (30% weighting)
  - ***{None, Poor, Good, Excellent}***

(Working to the plan, considering the key requirements, keeping supervisor informed, logbook complete)

- **Effort & initiative** (30% weighting)
  - ***{None, Poor, Good, Excellent}***

(Taking responsibility for the project and driving it forward under own initiative, ordered components, on track with Gantt chart)

- **Progress demonstrated** (40% weighting)
  - ***{None, Poor, Average, V.Good, Outstanding}***

(What has been achieved and whether it would persuade the customer to fund the 'B' mode, 1st and 2nd staged objectives achieved)

8 Project Showcase (Open Day) Background

Historical

A 1986 survey, "Engineering Design Education on Undergraduate Degree Course" carried out on behalf of the Fellowship of Engineering (now The Royal Academy of Engineering) reported the desirability for an exhibition of final year design projects. At the same time the report was critical of the lack or limited scope of available exhibitions.

SoCEM, University of Plymouth

In 1988, the then Department of Communication & Electronic Engineering established a Project Open-Day that supported the final-year project of the BEng (Hons) degree. The success of this programme over a decade was such as to utilise it for all final-stage undergraduate project activity; separate BEng & BSc Projects' Open-Days followed. Coincident with the creation of a purpose-built project/teaching laboratory suite in 2004, a combined Projects' Open-Day emerged and now takes place in the final week before the Easter break. (NB As part of the Assessment process, *all students will have two independent vivas* in the days immediately preceding the Open Day.)

The Projects' Open-Day affords:-

- final year students the opportunity to display the design, analytic, measurement / test, production, communication and presentation skills that have been developed in their programmes of study
- a forum for the various external examiners to interview final year students and assess the overall quality and standards of project activity in the final year undergraduate programmes
- industrial placement sponsors the opportunity to follow the progress of 'their' students and in some cases the projects that they sponsor
- an opportunity for industry to meet the next cohort of engineering graduates informally or as part of their recruitment process
- an opportunity to offer potential undergraduates from local and regional schools an additional visit to the School, complementing the existing and well established programme of recruitment open days
- careers officers the venue to renew/establish contact with the School
- penultimate stage students an opportunity to look at and discuss final-year projects with students who have just completed the process

9 Report

9.1 Report Planning

Project Report Plan Objective:

The project report plan should help the student to focus on the actual content at an early stage. The proposed sections/sub-sections* will assist in selection, preparation & storage of material for the 'final' document. The individual nature of projects/programmes may require alternative/additional main categories.

*the student will have to create one's own sub-sections.

The check (✓) column will assist the student in keeping track of progress

Report Plan (Not Definitive!)

Main Sections	Sub-Sections	Check
Title Page		□
Summary/Abstract		
Acknowledgements		
Contents		
Introduction		
Design Brief		
Testing Methods		
Project Management		
Conclusions		
References		
Bibliography		
Appendices	Project Proposal	
	Work Plan	
	Costings	
	Etc	
	Etc	

9.2 Report Format

Front	Cover Title, Programme and Student No		
Length	60 Pages		Not including Table of Content or Appendices
Binding	Spine		
Printing	Paper		white A4 **ONLINE SUBMISSION ONLY**
	Sides		single sided
Page Layout	Margins *left* *right* *top* *bottom*		 40mm / 1.57″ 15mm / 0.59″ 15mm / 0.59″ 15mm / 0.59″
Text	Word-Processing		Microsoft Word
	font *style* *size*		Arial regular 12 (normal text) : 16 (headings)
	Line Spacing *main text* footnotes “quotations”		1.5 1.0 1.0
	Justify		**Left** and **Right** margins
	Style		English, third person, past tense
	Headings		decimal notation 1. Main Heading 1.1 Lesser Heading 1.1.1 Small Heading
	Avoid abbreviations		&, etc., e.g. , i.e., jargon, slang only use abbreviations (& acronyms) if the text already contains the full version followed by the abbreviation in brackets. e.g..Silicon Controlled Rectifier (SCR)
	Units		SI
Pages	New Pages Avoid		start major sections on new pages. new paragraphs and sub sections near the page end
	Numbering *position* style		page bottom centre **Roman** – up to Introduction (i, ii, iii) **Arabic** – from Introduction (1, 2, 3)
Non Text	Illustrations graphs and diagrams tables (plates) Ensure Avoid		number consecutively in one sequence with title **under.** clearly reference in text LABEL: Figure #, title TEXT: Fig. # LABEL: Table (Plate) #, title TEXT: Table (Plate) # illustrations near to and **after** their first text reference placing illustrations as appendices
Checking	Spellcheck *Ensure*		**English** selection

9.3 Report Style

	Function	Comments
Report	To convince the reader ♦ of background research carried out ♦ of topic knowledge in the wider context ♦ of your understanding of the project ♦ of the work that has been carried out ♦ of the achievements *v* the objectives	Avoid Waffle **Avoid** stating what went wrong (this should be in the logbook) unless it is significant to the project
Format	SoCAM guidelines	See previous page
Title Page	Content Title	Use Template ♦ informative with keywords identified with topic ♦ restrict if possible to a single line ♦ do not be over ambitious / misleading
Summary Page	a miniaturised **(single side A4)** version of the full version report emphasising the most important conclusions, findings and recommendations. This is not an easy task !	♦ reminder of what has already been read ♦ useful to those who don't need full report ♦ the use of summaries in industry is increasing ♦ list keywords
Acknowledgements	to all who have provided assistance and support, such as:-	♦ industry / manufacturers / distributors ♦ Academic staff ♦ library / media services ♦ fellow students
Contents list Text Illustrations	to guide the reader to sections / sub-sections of interest -not common practice to index a report – -	♦ clear and logical format ♦ section and sub-section titles **must** match text ♦ **Include** section / sub section page numbers ♦ table numbers, title and page number, then ♦ figure numbers, title and page number, then ♦ plate numbers, title and page number
Introduction **I**dentify main issues **N**eed for the project **T**itle of project **R**ange of investigation **O**bjectives	sets the scene by providing a statement of the purpose of the study / project and the problem being investigated.	♦ provide project aims, objectives and background ♦ **objective :** purpose or goal ♦ **aim :** how to reach the objective ♦ **background:** concise review of related work -historical & current thinking re the topic- ♦ the contribution of the project to the topic ♦ brief overview of the investigation process ♦ an evaluation of any recent reported results

Major Sections	to show what has been achieved and its relation to the original objectives	concepts, results and evaluation including ♦ project objective and specification ♦ design philosophy / selection ♦ actual design ♦ hardware /software / equipment resources ♦ procedure / work done as accurate as possible ♦ identify important steps to be able to replicate, verify, extend or be taken over ♦ data /results (raw data in appendices) ♦ detail project costings
Finale	the chance to show one's understanding and interpretation of the work carried out	♦ compare practice with theory ♦ compare experimental results with each other
Discussion	demonstrate reasoned thinking	**Essential:** clear and logical content ♦ discuss work done and reviewed wrt objectives ♦ speculate re causes and effects ♦ comment on trends and changes ♦ analyse and state implications ♦ analyse and explain errors **Essential:** pre- plan items for discussion **Avoid:** repeating results section
Conclusions	summarise the findings re the objectives - derive directly from results -	♦ short and to the point ♦ state what is important (findings / implications) ♦ explain why results are valid ♦ indicate limitations / gaps
Recommendations	suggest future research - derive directly from conclusions -	♦ state separately and number ♦ alternative approaches
Finale	A Difficult Task!	You May Combine Them
Citations	readers can access original sources	check validity of interpretations / conclusions
References	confined to sources mentioned in text	♦ sources of reference should be fully listed and described in full **(refer to page 18)**
Bibliography	to provide a list of all works and sources that have been read or consulted	♦ not necessarily a full list of all relevant material (refer to page 18)

Appendices	to present important information that is not included in and essential to the main text	♦ start each appendix on a new page ♦ **essential** that appendices are active i.e. referred to in main text ♦ **avoid** repetition of material in main text ♦ **avoid** inclusion of unnecessary data sheets **(to give bulk)**
Draft Report	**Recommended** to optimise/ enhance a record of the work that will be available for general inspection for 5 years	**Essential:** discuss review of the draft report with supervisor(s)
Citations	System	Style
Text	Harvard System (name-and-date system)	♦ authors name (year of publication) Smith (1996) Smith and Jones (1997) both names always included Smith, Jones and Green (1998) all names included the first time the reference is cited, thereafter Smith et al. (1998) if more than one with the same year Smith (1996a) Smith (1996b)
	Numerical - Index System	♦ authors name (reference number) Smith (4) ♦ style for multiple authors as Harvard
Full References	Harvard System Numerical - Index System	in alphabetical order of authors names in numerical order but reposition date
References	Format	Examples
Journal Reference	authors surnames, initials. year, contribution title, *journal title*, ***volume number***, *page numbers*.	Harvard: Jeunhomme, L., Pochelle, J.P.and Raffy.J. (1978). Wavelength dependence of model dispersion in graded index optical fibres. *Electronics Letters, **14**, pp.364-366.* Numerical Index: 1 Jeunhomme, L., Pochelle, J.P.and Raffy.J. Wavelength dependence of model dispersion in graded index optical Fibres. *Electronics Letters,* 1978, **14**, pp.364-366
Book Reference	authors surnames, initials, year, *book title,* edition number,	Shepherd, W., Hulley, L.N. and Liang, D.T.W. (1995).

	publisher, page or chapter numbers.	*Power Electronics and Motor Control.* Second Edition. Cambridge University Press. Chapter 12.
On-line Reference	Using Internet Browser, quoting full web address of specific referenced material(s).	http://computer.howstuffworks.com/computer-memory.htm

9.5 Report Title Page

Title

by

Name

insert title & name using same font & remove frame border

A report submitted to the University of Plymouth

in partial fulfilment for the degree of

BEng(Hons) ----------
insert award using same font & remove frame border

May 2020

9.6 Summary Page

The Rise and Fall of
Plymouth Argyle
Flingel Bunt

Name
insert title & name using same font & remove frame border

Summary

[Copy Summary from Report & attach to this cover]

10 Assessment

			Weighting	% Mark
Execution	***Supervisor's* Assessment of :-**			
	management	project proposal, work plan, log book and communications	0.05	0
	motivation	progress demonstration	0.1	0
		effort & inventiveness	0.1	0
	achievement	design content; use of CAD/software/pcb; quality of hardware/software; test & measurement	0.15	0
		Execution Total	**0.4**	**0.00**

Vivas	***Supervisor's* Assessment of :-**			
	technical & presentation skills		0.3	**0**
	***2nd Marker's* Assessment of :-**			
	technical & presentation skills		0.3	
		Average Viva Total	**0.3**	

Report	***Supervisor's* Assessment of :-**			
	structure & presentation		0.05	0
	business plan, background		0.05	0
	concepts, theoretical content		0.05	0
	design, justification & testing		0.1	0
	results, conclusion, critical evaluation		0.05	0
		Supervisor's Report Total	0.3	**0.00**
	***2nd Marker's* Assessment of :-**			
	structure & presentation		0.05	
	business plan, background		0.05	
	concepts, theoretical content		0.05	
	design, justification & testing		0.1	
	results, conclusion, critical evaluation		0.05	
		2nd Marker's Report Total	0.3	
		Average Report Total	**0.3**	**0.00**

Supervisor	
Execution	***NB*** The **final** *Progress* mark could lie between 50% and 100% of the **initial** mark, dependant on subsequent progress**.** **Initial** *Progress* mark was **%**
Viva	
Report	

2nd Marker	
Viva	
Report	

2nd Marker's signature

Date	/ / 2024

10.2 Progress Assessment

Name	
Module Code	

Element	Sub Elements	Max Mark	Actual Mark	Comments
project management to date	Working to the plan, considering the key requirements, keeping supervisor informed	30		
effort & initiative	Taking responsibility for the project and driving it forward under own initiative	30		
progress demonstrated	What has been achieved and whether it would persuade the customer to fund the 'B' model	40		
	Progress Total	100		General Comments

Supervisor:	
Date :	/ / 2024

NB The *Progress* mark constitutes **10%** of the *Overall* mark

10.3 Demo / Viva Assessment

Name	
Module Code	

Element	Sub Elements	Max Mark	Actual Mark	Comments
technical knowledge & understanding	re project re the project topic in the wider context	60		
presentation skills	oral, poster, use of log book	40		
	Viva Total	100		General Comments

# circle as appropriate	
Assessor:	#Sup *or* #2nd M
Name:	
Date :	/ / 2024

NB Each *Viva* mark constitutes **30**% of the *Overall* mark

10.4 Execution Assessment

Name	
Module Code	

Element	Sub Elements	Max Mark	Actual Mark	Comments
management (5% of Overall)	project proposal, work plan, log book and communications	100		
motivation (20% of Overall)	project demonstration	100		
	effort & inventiveness	100		
achievement (15% of Overall)	design content; use of CAD/software/pcb; quality of hardware/software; test & measurement	100		

General Comments

Supervisor:	
Date :	/ / 2023

NB The *Execution* assessment constitutes **40**% of the *Overall* mark

10.5 Report Assessment

Name	
Module Code	

Element	Sub Elements	Max Mark	Actual Mark	Comments
structure & presentation (5% of Overall)	clarity & use of English; abstract; appendices; references; bibliography; acknowledgements; diagrams, photos, tables, graphs; conclusion	100		
theoretical content (5% of Overall)	report objective; relevant material research; awareness in the wider context	100		
concepts, design & testing (15% of Overall)	achievements *v* objectives; results/interpretation; clear evidence and discussion of work done	100		

General Comments

# circle as appropriate	
Assessor:	#Sup *or* #2nd M
Name:	
Date :	/ / 2023

NB The average *Report* assessment constitutes **30**% of the *Overall* mark

10.6 Marking Rubric

Mark (%)	Classification	Criteria
90+	Exceptional 1st	A truly **Exceptional** project on a substantial and demanding plan of work with very high level of originality and initiative. The project outcomes (system, theory, empirical evaluation) should be essentially faultless, well-structured and carefully tested, proved or rigorously evaluated. There should be full achievement of objectives and evidence of original thought. The project objectives must be very demanding and there should be a wide range of cogently justified project extensions. The report should be superbly organised and presented and lucidly written. The quality of the research and report should be equally high. The work should be of publishable quality in a peer-reviewed national conference. Patentable, Completely novel approach or new results
80-89	Outstanding 1st	An **Outstanding** project displaying a high level of originality, initiative, independence and thoughtfulness in conception. The project outcomes (system, theory, empirical evaluation) should be essentially faultless, well-structured and carefully tested, proved or rigorously evaluated. There should be full achievement of demanding objectives and evidence of original thought. The report should be well organised and presented and clearly written. surpassed all stated objectives and demonstrate outstanding technical flair. Creative approach. No wasted time. Continually thinking of ways to improve progress.
70-79	Excellent 1st	An **Excellent** project displaying originality, initiative, independence and in conception. Students will show an understanding of all aspects of the project material, producing work without significant error or omission. Project objectives should be reasonably demanding and fully achieved. The report should display excellent organisational and presentational skills, and contain a thorough evaluation and objective critical reflection. Project should deliver all stated objectives with detailed understanding of all aspects. Excellent awareness of context of the project. Very little wasted time.
60-69	Very Good 2:1	The project should meets all or nearly all stated objectives .Clear demonstration of technical competence and sensible planning. The project's primary objectives are somewhat demanding and should be substantially achieved to a reasonable standard. Students will show an understanding of the technical and professional issues involved. The presentation and organisation of the report should be clear. A well planned and executed project, written up with clarity. Evidence of care and application in design, execution and reporting. Alternatively, evidence of an original and demanding project but one presented without the completeness of those gaining marks at the higher bands. Within this Band, the lower mark is awarded to projects which meet many but not all of these criteria, and the higher mark is awarded to projects which meet all of these criteria, and which also meet some but not all criteria for a first.
50-59	Good 2:2	The project should be competent in most respects. The project objectives may not be very demanding but should be achieved to a reasonable standard. The

		presentation and organisation of the report should be reasonably clear. There may be some signs of weakness, but overall the grasp of the topic should be sound. A reasonably well constructed and executed project, but one which indicates a lack of attention to key features (e.g. planning, design, rationale, conducting the research, testing, data analysis, critical insight, write-up). Within this Band, the lower mark is awarded to projects in which there is a lack of attention to many of these key features, and the higher mark is awarded to projects in which there is a lack of attention to relatively few of these key features.
40-49	Fair 3rd	Meets base objective, reasonable levels of skill demonstrated, but with clear shortcomings. Understands risk assessment. The project will indicate a basic understanding of the methods to be used and how to organise and present the work in the report, but will not have gone beyond this, and there may well be signs of confusion about more complex material. There should be fair work towards the project objectives and the final report must clearly represent a development of the interim report. A project reporting a basic description of the methodology used to address the problem, and some analysis of the results. However, the project is problematic in terms of key features of the process (e.g. planning, design, rationale, conducting the research, testing, data analysis, critical insight, write-up). Within this Band, the lower mark is awarded to those projects that are problematic in terms of most of these key features, and the higher mark is awarded to projects that are problematic in terms of relatively few of these key features.
30-39	Poor Marginal Fail	Some work towards the project objectives, but significant issues are likely to be neglected. There may be significant errors or misconceptions in the project. The final report may represent little progress with respect to the interim report. The project is likely to have substantial shortcomings in crucial features of the design, execution and research process (e.g. planning, design, execution, rationale, conducting the research, data analysis, critical insight, write-up).
20-29	Fail	The project may contain some correct and relevant material, but most issues are neglected or are covered incorrectly. There should be some signs of appreciation of the project requirements.
0 -19		Very little or nothing that is correct and relevant and there is no real appreciation of the project requirements.

11. What makes a good project?

- Planning – define realistic goals
- Communications, keep your supervisor informed of your progress
- Good note-keeping (logbook). Justifying all your engineering decisions / choices. WHY?
- Consistent work
- Testing
- HAVE FUN