Integrated Design Project V2.0

In the integrated design project (IDP) teams work in teams of 6 to develop an autonomous robotic system to solve a problem inspired by a real-world challenge. These will required the development of hardware, electronics and sensing and the accompanying control and software systems. Over 4 weeks teams develop a robot and at the end of the project there is a competition to assess the performance of the teams robots.

The lab lasts for four weeks, with three timetabled timetabled sessions:

- Thursday 9-11
- Monday 11-1
- Tuesday 9-11 (first week only!)
- Wednesday 9-11

The EIETL is open from 8am-5pm, and can be used during these times. The Dyson centre is also available for use, however there is only technician support (which limits when some equipment in the Dyson centre) for limited periods. It is expected per week you spend twice the scheduled time on this project. You must use your university card to sign in for the lab before the five past the hour official start of the project.

For design acceptance or functional demonstration outside of core IDP hours, the EIETL technicans can perform this (as long as they are not busy with other lab) in the following hours:

- Morning: 9:00 -11:30
- Afternoon: 14:00 - 16:00

The full timetable of events and deadlines is given below in the schedule and deadlines section.

Aims & Objectives

The key aim of the project is to develop an understanding of systems design and integration and also how project management and team work skills to design and manufacture a system. In particular, this involves:

• appreciate the nature of systems design.
• appreciate the importance of co-ordinated teamwork and project management.
• apply and integrate the engineering principles taught in Part I.
• understand how to produce detailed design proposals.
• gain experience of building and testing a system once it has been designed.

Within this, we will also encourage the use of rapid-prototyping techniques. When rapid manufacturing techniques are used to quickly develop, integrate and then test systems. This allows for multiple of iterations of systems to be developed.

Task and Team Allocation

Each IDP cohort has a different task and rules set. A challenge set will be produced for each group, and the current (and existing challenges can be found here):

- Michaelmas 2018, M2 Task

With the team allocations give here:

- Michaelmas 2018 Team Allocations

If you have any questions about the task, please use the forum in the Moodle VLE in the first place, or email Josie Hughes (jaeh2).

Project Management

Team work is key to the success of this project. Teams should elect one team leader during the first session. This is an *integrated* design project. Therefore, the main key elements (mechanics, electronics and software) cannot be considered in isolation, and for successful integration teams members can not just be aware of one of these elements. However, it may be useful to loosely assign two team members to each of these areas, with the understanding that communication and inter-disciplinary work is required. Additionally, the project may require adgile distribution of the work force, for example with a greater focus on mechanical first to get a chassis built to enable successful integration.

There is a project management session at 2pm first thursday. Make sure you attend this session.

Resources

Full resources including getting started guides and a list of parts can be found on the resources page here.

Assessment

The assessment of the course has a number of different components. These are summarised below and the weighting and deadline given. The weeks of the deadline correspond to the weeks into the project:

Assessment	Weighting	Deadline
Initial Presentation (Group)	5%	Week 1, Tuesday
Initial Report (Group)	5%	Week 1, Wednesday
Design Assessment (Group)	10% [max 5% is deadline missed]	Week 2, Wednesday
Functional Demonstration (Group)	10%	Week 3, Wednesday
Competition Performance (Group)	20%	Week 4, Wednesday
Final Presentation	20%	Week 4, Wednesday
Final Report	20%	Week 5, Monday

Detailed requirements and examples of the materials which must be submitted can be found here.

Schedule & Deadlines

The following table summarises the key activities and deadlines at each session. The weeks refer to the number of week of the project - thus is you are doing the project in the second half of the term Week 1 will correspond to Week 5.

Week	Day	Activity	Deadline
Week 1	Thursday	**9:00:** Introduction Session, *EIETL Projector* **14:00:** Project Management Lecture	
	Monday	**11:30:** Workshop Introduction (Teams 1-6), *Dyson Centre* **11:30:** Software Introduction (All teams), LR3B **11:30:** Electrical Introduction (All teams), *EIETL Projector* **12:00:** Laser Cutter Introduction (Teams 1-4, 1 person per team), *Dyson Centre* **12:15:** Workshop Introduction (Teams 7-12), *Dyson Centre* **14:00:** Laser Cutter Introduction (Teams 5-8, 1 person per team), *Dyson Centre*	
	Tuesday		**First Presentation,** find the timetable and room allocation here
	Wednesday	**12:00:** Laser Cutter Introduction (Teams 9-12, Dyson Centre)	
Week 2	Thursday	*Feedback on 1st Report returned to teams*	
	Monday		
	Wednesday		**Deadline for Design Acceptance**
Week 3	Thursday	System Integration Presentation. Quick 5 min update to present the integration progress/challenges	
	Monday		
	Wednesday		**Functional Demonstration Deadline**
Week 4	Thursday		
	Monday		
	Wednesday	AM: Last scheduled session	** 2pm: Final Presentation & Competition**
Week 5	Monday		** Final Report Deadline. Submit on Moodle.**

Contact

Should you have any questions or concerns during the project please in the first instance see a demonstrator who will be there at each lab session, the EIETL

Technical Team, or email Dave Patterson (dip26) or Josie Hughes (jaeh2).