

Cambridge Engineering Thinking + PBL

2024 Course Syllabus



PBL Track: Innovating Immersion: Designing and Developing a Cutting-Edge Personal Device and Software Experience


I. Course Information

Course Dates	22nd January - 4th February 2023
Course Duration	2 Weeks
Course Hours	40 hours in total It includes a total of 24 hours of Lectures and Supervisions delivered by Cambridge professors and experts in both Foundation Module and PBL modules, 16 hours of Group workshops and practical sessions.
Pre-requisites	A background in basic statistics is required for the course. Programming experience is helpful but not necessary.
Assessment	Assessed individually and in groups through group projects
Skills Trained	Problem solving, design thinking, project planning, teamwork, presentation, communication
Materials Required	Internet connection and devices for writing, interacting with online templates such as Google Docs, researching a project and preparing for a final group presentation

II. Course Description

‘Systems that work do not just happen – they have to be planned, designed and built.’ So said the Royal Academy of Engineering in 2007. To maximise success in an increasingly complex world, employing design thinking and systems thinking is even more important now than it was then. We often hear calls for ‘systems thinking’ and a ‘systems approach’, but how can this be done? This course will teach students to follow a method for systems thinking that has been employed successfully in many domains, including in the world of healthcare systems design and at government and policy level.

Embark on an enthralling exploration of system design, presented through a nuanced, application-driven lens. Delve into the foundational tenets that govern this vast domain, setting the stage for deeper engagement. As we transition from elemental constructs to sophisticated methodologies, participants will be invited to immerse themselves in carefully curated Project-Based Learning (PBL) scenarios. These hands-on experiences aim to cultivate and crystallize the design ideologies inherent to the field.



To culminate this transformative learning experience, students will channel their newfound knowledge and insights into a capstone project— an opportunity to showcase, reflect, and innovate on the principles imbibed throughout this enlightening journey.

III. Goals & Objectives

The course will introduce the concept of design thinking and a systems approach through four perspectives: systems, design, risk and people. It is anticipated that many principles learned will be useful for the rest of the students’ lives as it will help students to learn a method for design that can be used to help create future systems in a wide range of domains.

Fourfold Insight: Dive deep into the realms of:


 **Systems:** Understanding the intricate web of interconnectivity.

 **Design:** Crafting solutions with elegance and functionality.


 **Risk:** Foreseeing and mitigating potential pitfalls.

 **People:** Centering the human element in all endeavors.

Timeless Takeaways:

 Equip yourself with principles that transcend time, and remain pertinent throughout your life's journey.

Universal Application:

 Master a design methodology, not just for the present, but to mold and shape the systems of the future across diverse domains.

IV. PBL in Innovating Immersion: Designing and Developing a Cutting-Edge Personal Device and Software Experience

Objective:

Design a next-generation personal device integrating both the latest in ergonomic hardware design and immersive software experiences to address an identified gap in the current personal device market.



Description:

Next-generational personal device is an ever-evolving field, bridging the gap between technology and immersive experiences. In this PBL module, participants are tasked with conceptualizing, designing, and developing a state-of-the-art personal device for example VR headset, wearable device, or smartphone along with accompanying software tailored to enhance user immersion and satisfaction. Participants will navigate challenges inherent to hardware design, software innovation, and market placement strategies.

Key Components & Milestones:

1. Market Analysis & Gap Identification
2. Ergonomic Hardware Design
3. Software Exploration & Ideation
4. Prototyping & Initial Testing
5. User Feedback & Iterative Refinement
6. Integration & Compatibility Assurance
7. Final Testing & Market Launch Simulation

Outcome:

Upon the completion of this intricate PBL journey, participants will be well-versed in the multifaceted challenges and opportunities inherent to personal device and software design. With a prototype in hand and software to showcase, they will be prepared to influence and shape the future trajectory of immersive technology experiences.

V. More information

Assessment

Learning will be assessed through small group presentations at the end of the course. Each individual will be expected to present within their group presentation time. The quality of the presentation will be assessed by the instructor. Teams will need to demonstrate how they have used a systems approach to plan or design an improvement. The emphasis will be on the process they have followed rather than the quality of the finished product.

Format

The course will take place in a face-to-face format, interspersed by self-directed group work, to prepare for the assessed presentation.

Reading List

Readings will be provided to students prior to the course.