European Project Semester 202425



Important information

All projects offered by the professors are related to on-going work and commercialization, students chose to accept any of the following projects will also accept the following two conditions:

Intellectual Property Rights (IPR): All intellectual property produced by students for this coursework will be the property of Nottingham Trent University due to its relationship to Industrial Partners and on-going research activities.

If you have any questions or would like to discuss any of the projects further, please do not hesitate to contact your professors.

Dr Wenjie Peng - wenjie.peng@ntu.ac.uk.

Professor Daizhong Su - daizhong.su@ntu.ac.uk.

Professor Amin Al-Habaibeh - amin.Al-Habaibeh@ntu.ac.uk



European Project Semester 202425



Briefs

- Project 1 Development of smart system for recycling used batteries
- Project 2 Wave Energy Water Tank
- Project 3 Virtual Reality Hologram



European Project Semester 202425

Project details

Project 1 - Development of smart system for recycling used batteries

The project is to develop a smart system for recycling consumers' used batteries. When batteries reach end-of-life (EoL), consumers can use the Intelligent bin for recycling, guiding them through the recycling process and managing battery products recycled online. According to battery's environmental impacts, life-time and/or residue state, the condition of the battery will be assessed. The consumer will be awarded eco-credits, which could then be used through the ecoincentive scheme (e.g. pay in discount or similar like vouchers). As a key part of the system, the intelligent bin provides the following the functions: user log-in, scanning user's QR, switching on/off the electronic lid of the bin, printing the bar-codes attached to the battery, and information communication with the data centre. The intelligent bin consists of an electronic control unit, a scanner, a printer and a bin container. The existing electronic control unit is applied to monitor and control the recycling process, utilising a micro-computer and Internet modules embedded in the control unit. The scanner is used to read the consumer's information via scanning the QR code of the consumer, and then pass the consumer's information to the control unit. The printer is to print a barcode receipt for the EoL product recycled. The bin's container is to contain the recycled products, and is equipped with other components (control unit, scanner, and printer). In addition to the intelligent bin, the system also includes power supply module (such as charger and wires), user card, and extension monitor, which are used to demonstrate the system to users. This project is part of the REBELION project supported by the European Commission Horizon Europe programme https://rebelion-project.eu/

Ideal skillsets

- Knowledge of technologies and techniques within the ICT for product development.

- Ability to conduct surveys with relevant software tools to collect feedback from users.

- Understanding of Internet, data processing and computer programming related to sustainable product development (e.g. storing the eco-credits in the user's account, notifying the user of recycling results).

- Experience in collaboration with group members in a research environment, utilising relevant research methods and techniques.

Project 2 - Wave Energy Water Tank

The project aims to explore the development of a mechanism that generates waves for the current wave energy tank available at NTU in Future Factory. In this project, the team will design and build an automated mechanism to create waves of different heights and profiles using a computerised or autonomous system. The project will also include the integration of an ultrasound sensor to capture the wave profile using a data acquisition system. The purpose of the tank is to test small-scale wave energy mechanisms in the future

Ideal skillsets

- Idea generation
- CAD design
- Metal fabrication and motor control mechanisms



European Project Semester 202425

Project details

Project 3 - Virtual Reality Hologram

The project aims to develop a larger scale Z-shaped foldable hologram to be used in the lap for on-line meetings and to demonstrate 3D CAD drawings.

Ideal skillsets

- Idea generation
- CAD design
- 3D prototyping,
- Wood joinery skills, general fabrication skills.



European Project Semester 202425

Deadline

Physical Submission / Verbal presentation

Location - ARK Old Chem Time and Date - 24.01.25 @10:00

Digital Submission :

Location - Dropbox Time and Date - 24.01.24 @10:00

Learning Outcomes

By the end of this project, you will be able to evidence the ability to:

Integrate, evaluate and apply knowledge from all aspects of their studies to the solution of a real problem.

Demonstrate motivation, initiative, analytical and critical evaluation skills, creative thinking in a project and be able to

- report upon the project in a written and oral form.

- Demonstrate project planning, monitoring, management, time management and decision making processes.

- Interact with other team members to achieve a solution to a potentially complex technological problem, making use of relevant design and development technologies.

- Apply design thinking techniques as a set of methods for identifying and solving problems.

- Demonstrate effective oral and written communication skills within teams , awareness of cross cultural/disciplinary issues, respect and the need for collaboration rather than confrontation as a means to productivity.

- Develop the ability to present project information to a wide range of technical and non-technical audiences in a range of traditional and non-traditional formats (e.g. PowerPoint, Pecha kuchas) and via different medias.

- Consider product design techniques to produce a viable solution to an industrial problem

- Determine the feasibility of selling their product by considering market, design and manufacturing information

- Demonstrate an understanding of business needs through: marketing, market analysis, decision making, risk assessment, project financing, profit and loss, break even points, costing and budgeting

Understand the principles of Production and Operations Management and Manufacturing Systems



European Project Semester 202425

Deliverables

The following deliverable should evidence your development work and final outcome in response to the design brief

As a group you are asked to produce the following deliverables

1 x A2 physical presentation board / research poster including key research, storyboard of use and visuals of your product that highlight scale

1 x project report (1500 words, template will be provided)

1 x digital Design Development Pack

Your development pack should include all relevant research, iterative sketch / development work, 3D models, test-rigs / prototypes, detailing your entire process from brief through to final design and including an evaluation of your project.

Please make sure this document is well presented. Ideally binding or within a clear presentation folder (don't forget to add a title page with your names on it)

Any physical prototypes (if produced within the project)

