



D2.3 Improved Design Courses

EXECUTIVE SUMMARY

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Abbreviations and Acronyms

EACEA	Education, Audiovisual and Culture Executive Agency
EC	European Commission
EU	European Union
GA	Grant Agreement
HEI	Higher Education Institution
ICT	Information and Communication Technologies
PC	Project Coordinator
WP	Work Package
AFM	Administrative and financial manager
PC	Project Coordinator
SC	Steering Committee



1 Improved Design Courses: Overview

1.1 Introduction

The DESINNO project will contribute to the modernization and internationalization of Indian HEIs by the development of improved university courses that will comply with certain content and pedagogical approaches, by following state of the art methodologies in design thinking, sustainability, design research, and social innovation. Improvement of existing design courses is an inherent part of the DESINNO project and will further the project's aims in two key ways: maximizing the utilization of the new centres and contributing to the internationalization of the target HEIs.

1.1.1 Maximizing the Utilization of the New Centres

Each of the centres established by the DESINNO project will have a design lab with top of the range equipment and software for new product development and prototyping. These centres will also provide links with industrial partners for the setup of joint interventions, will facilitate the setup of sponsor projects, will ease the collaboration between industrial partners and universities for new product development, internships and other activities related to education and research. Incorporating the resources and pedagogical opportunities offered by these centres into the courses offered by the target HEIs is integral to the sustainability of the project's outcomes.

1.1.2 Contributing to the Internationalization of the Target HEIs

Drawing on best-practice from relevant programmes across the EU, the enhanced courses will offer world-class pedagogical approaches suited to an internationally recognised programme of excellence. They will also comply to the European Credit Transfer System (ECTS) format, which aims to make national education systems more comparable internationally by ensuring that learning is based on defined learning outcomes and their associated workload.ⁱ Thus, the improved courses will offer students greater flexibility of study programmes and open up opportunities for international pedagogical partnerships.

1.2 Outcomes

Drawing on the National Research Reports, the EU Best Practice Database, the Cross-Country Research Report, and the Courses Materials Reports authored as part of WP1, D2.3, Improved Design Courses, will consider the importance of the design sector for the economy of India, the training needs for experts, and the most appropriate pedagogical approach for training and development of improved design courses in order to develop the courses selected into internationally-recognised programmes demonstrating best-practice in Design pedagogy.

Each course will contain all the necessary material (text, slides, exercises, evaluation method) in digital form. The courses will be accredited according to the European Credit Transfer and Accumulation System (ECTS) and will be assessed by the students and this feedback will be used for improvements. All the produced material will be available through the online platform for registered users.



1.3 Methodology

Building on D1.3 – EU Best Practice Database – the first section of this document focusses on specific programmes offered by European institutions in the fields of Product Design, Service Design, and Digital Design, analysing how the courses are structured, their pedagogical approach, relevant affiliations or accreditations, connections with industry, and any other relevant details, in order to learn from best-practice at these institutions and ensure an international focus for the improved courses.

The second half of the document develops the work of D1.5 – Courses Materials Report – in order to outline the specific improvements to the existing courses that will be made. This section includes pedagogical materials such as an improved syllabus, tutor guidance, and resource overview. The process of developing these courses was founded on collaboration and the Brunel team worked closely with each Indian partner institute to ensure that the proposed changes were appropriate for the specific educational context and drew on local knowledge. Project partners at the University of the Aegean and POLIMI who delivered relevant capacity building programmes were also asked to review the proposed course syllabuses and to contribute to the guidance materials.

Sections of these new programmes have already been rolled out at some of the Indian institutions and have been well-received by the staff and students engaging with the material. Evaluation activities will be undertaken to ensure that the improved courses continue to meet the needs of staff and students.



2 Existing Models: Examples of Best Practice

2.1 Introduction

Section two of this document offers an overview of courses identified as representing best-practice in the fields of product design, service design, and digital design, in order to provide a benchmark for the improved courses at the Indian partner institutions.

2.2 Product Design

2.2.1 BSc Product Design & Technology, Loughborough University, UK

<https://www.lboro.ac.uk/study/undergraduate/courses/a-z/product-design-and-technology/>

BSc Product Design & Technology at Loughborough University can be taken as a three-year programme, or a four-year programme with a placement year in industry. The programme is accredited by the Institute of Engineering Designers (IED). Teaching takes place via a range of methods including lectures, seminars, tutorials, group work, supervision, workshops, laboratory work, and practical sessions. Students are assessed in a variety of methods including projects, case studies, workshop/lab logbooks, sketchbooks, development folios, mid and hi-fidelity physical and digital prototypes, presentation boards, research and design reports, in class and online tests, verbal presentations.

The first two years of the programme provide students with a grounding in the knowledge and skills of product design, via practical and skills-based modules: year one covers the foundations of design practice, while year two builds upon this with modules supporting product design futuring. In their second year, students also have the opportunity to select an elective module in order to begin specialising based on their particular interests [see green shaded modules in Table 1].

In their final year students apply their knowledge and skills via a year-long major project, which spans both semesters. Students also have the opportunity to apply the knowledge developed in their first two year via an integrated mechanical and digital electronic systems module.

*Table 1 Curriculum Map & Module Options: Product Design & Technology
BSc Loughborough University*

Product Design and Technology BSc - Loughborough University			
	Year One	Year Two	Year Three
Semester One	Design at SDCA	Design for Manufacture	Final Year
	Analogue and Digital Electronics	Applied Mechanics, Materials, and Sustainability	Final Year Design Practice
	Understanding People	Design Communication	Applied Mechatronics
	Fundamental Mechanics for Product Designers		
Semester Two	Prototyping for Manufacture	Design Practice for Product Designers	Final Year Design Practice
	Electronics, Programming and Interfacing	Creative Embedded Systems for Design	Live Projects
	Augmented Reality Prototyping	Integrated Digital Product Design	Business and Entrepreneurship for Designers
	Digital Fabrication Technology for Product Designers	Sustainable Design	Design for Mobility
		Advanced Additive Manufacturing	Ergonomics & Human Factors
		Design for Mobility	Inclusive Design
		Ergonomics & Human Factors	Business and Entrepreneurship: Business Planning
		Inclusive Design	Machine Learning
			Languages

If students elect to take a placement year, they will spend a minimum 45 weeks with either a single company or with three separate companies in different placements. Companies hosting placements in the past have included: Adidas, BAE Systems, IBM, Lego, L'Oreal, Nissan, PDD, Priestman Goode, Reckitt Beckiser, Unilever, and Walt Disney Company. Students undertaking placements in the past have occasionally had their “ideas patented and developed into real life products and services”.ⁱⁱ Some students have gone on to work for their placement provider after they graduate and occasionally companies elect to sponsor the student’s final year of study. Undertaking the placement route awards students an additional qualification: a Diploma in Professional Studies (DPS).

The programme also offers a study abroad option: in the third year of their programme students study for one semester at a partner university as part of the Erasmus+ Exchange Programme and subsequently undertake a six-month placement. This route also results in an additional qualification: students who complete the study abroad programme will gain a Diploma in International Studies (DIntS).

2.2.2 MEng Design Engineering, Imperial College, London, UK

<https://www.imperial.ac.uk/design-engineering/study/meng/>

This four-year programme focusses on the design of advanced products, services, experiences, and systems across the fields of both Engineering and Design. The MEng in Design Engineering is accredited by the IED, the Institution of Engineering and Technology (IET), and the Institution of Mechanical Engineers (IMechE). In addition to the Masters-level qualification, students will receive Associateship of the City and Guilds of London Institute (ACGI).

The programme focusses particularly on the project-based learning, with students incrementally combining engineering and design skills with business knowledge in sequential projects [see Table 2]. Assessments take a variety of formats including projects, labs, presentations, reports, and written exams. In the first year coursework accounts for 40% of the assessment, rising to 75% in the fourth year. Examinations make up 50% of assessments in the first year, but this decreases to 10% in the third year; there are no examinations in the final year.

For the first two years all modules are compulsory, with the introduction of electives in the third and fourth year. Modules are designed to develop student expertise across a five core themes: Physical Engineering, Engineering Analysis, Electromechanical Engineering, Enterprise and Professional Practice, Design Engineering Projects.

Third year elective modules include:

- Audio Experience Design
- Digital Product Design Engineering
- Design Psychology
- Advanced Industrial Design

Fourth year elective modules include:

- Sensing and the Internet of Things



- Robotics Research Project
- Design for Additive Manufacture

Students are also able to choose to take elective modules run by other Engineering programmes at Imperial College.

Table 2 Curriculum Map: MEng Design Engineering

MEng Design Engineering			
	Term One	Term Two	Term Three
Year One	Production and Materials		
	Computing	Solid Mechanics 1	Electronics 1
	Engineering Mathematics		Computing 2
	Introduction to Design Engineering	Human Centred Design Engineering	
Year Two	Gizmo: Physical Computing		
	Electronics 2	Finite Element Analysis	Data Science
	Solid Mechanics 2	Thermofluids	Working in Organisations
	Sustainable Design Engineering	Industrial Design Engineering	
Year Three	Robotics		Industry Placement - Pt.1
	Optimisation	Elective	
	Innovation and Entrepreneurship	I-Explore	
	Design Engineering Futures - Group Working		
Year Four	Elective	Elective	Industry Placement - Pt.2
Industry Placement - Pt.2	Elective	Elective	
Enterprise Roll Out			
Master's Project			

In the six months from March – September in their third/fourth year, students undertake an industry placement. Companies hosting placements in previous years have included: ABB Robotics, Apple, Bepak, Better Future Factory, Coutts, Fitch, Google X, Microsoft Lift, Mind Music Labs, Q-Bot, RHEON Labs, TGO, UN Studio, and 3M. The final project – the Enterprise Roll Out module – focuses on equipping students with the knowledge and skills they will need to develop viable enterprises and to bring new products to market.ⁱⁱⁱ

The School run the Design Engineering Selected Innovation Recognition (DESIRE) scheme, in which assessments with a design engineering output can be nominated for the DESIRE award by their module leader.

2.2.3 MA Collaborative and Industrial Design, Aalto University, Finland

<https://www.aalto.fi/en/study-options/masters-programme-in-collaborative-and-industrial-design>

The Masters programme in Collaborative and Industrial Design at Aalto University is a two-year programme that focuses on the role of design in society and design entrepreneurship. It has a project-based curriculum and is divided up into major and minor studies [see fig.1].^{iv}

Table 3 Curriculum Overview: MA Collaborative and Industrial Design

MA Collaborative and Industrial Design		
Advanced Major Studies 60 ECTS 50%	Thesis 30 ECTS 25%	Elective Studies 30 ECTS 25%

The major studies include a range of course options [see Table 3].

Table 4 Major Options: MA Collaborative and Industrial Design

MA Collaborative and Industrial Design			
Compulsory		Elective	
Joint Studies in the Department of Design (90 ECTS)	Compulsory Major Studies (48 ECTS)	Optional Major Studies (20-30 ECTS)	Optional Major Studies: Studies with Varying and Personalized Content (0-10 ECTS)
Introduction (2 ECTS)	User Inspired Design Knowing (5 ECTS)	Emerging Designs (10 ECTS)	Internship (2-10 ECTS)
Design Culture Now (4 ECTS)	User Inspired Design Making (5 ECTS)	From Concepts to Designs (10 ECTS)	Workshops (2-10 ECTS)
Design Research (4 ECTS)	Interaction Design (5 ECTS)	Design for Social Change – Strategy (5 ECTS)	Projects (2-10 ECTS)
Thesis Plan Orientation (2 ECTS)	Master’s Thesis (30 ECTS)	Design for Social Change – Co-design (5 ECTS)	Literature Assignment (2-10 ECTS)
		Design Strategy and Entrepreneurship (10 ECTS)	

Students are permitted to take minor studies or individual modules from other programmes within the university, or from other Finnish institutions. They also have the option to participate in an international student exchange programme or to undertake an internship.

2.2.4 Product Design: Points to Consider

- Assessment types: focus on project-based learning. The Enterprise Roll Out module at Imperial is a particularly interesting example as it treats entrepreneurship as an integral element of product design.
- Industry placements: role of industry in student expertise. Consider role of placement, how to embed in programme, how to recognise the additional skills developed as part of the placement (e.g. as in with a Diploma in Professional Studies).
- Accreditation: how are programmes accredited and how do they ensure compliance with accreditator’s requirements whilst also providing innovative content.
- Awards and recognition: Imperial’s DESIRE award helps to celebrate design engineering outputs. Perhaps an award could be created that links with work produced in the new

centres. Sponsored by an industry partner, these awards would help raise the profiles of the centres and to foster a relationship between students and industry.

2.3 Service Design

2.3.1 MA Service Design, The Royal College of Art

<https://www.rca.ac.uk/study/programme-finder/service-design-ma/>

The RCA MA Service Design has achieved international recognition as a leading force in the development of service design. The two-year programme explores the range of cultural, technological and systemic issues facing organisations such as businesses and governments, in order to develop new services. Based around experiential components, students undertake individual and group projects within the wider scheme of work, with lectures, master-classes, and workshops developing the knowledge and skills that students will need in their final year projects.

The programme is structured around six units of twenty credits each (N.B, these are not ECTS).^v The first year of the programme is most intensive, with structured learning for the programmes spread throughout the first five terms of the project. All modules are delivered as half or full day sessions. Classroom modules are made available electronically for student self-study. Students will receive between 200-250 hours of lectures and seminar activity. Guest lectures from prominent designers and industry partners are a key component of the programme.

Table 5 MA Service Design: Curriculum Map

Term 1		Term 2		Term 3		Term 4			Term 5		Term 6
Unit 1		Unit 2				Unit 3		Unit 4	Unit 5	Unit 6	
Project 1	Grand Challenge CHS		Project 2 (Pt.1)	Project 2 (Pt.2)		Project 3			Final Project		

The units cover the following subjects:

- Unit 1: Service Design Foundation Programme (20 Credits)
- Unit 2: Design Entrepreneurship (20 Credits)
- Unit 3: Design Research and Advanced Methods (20 Credits)
- Unit 4: Design Management and Platform Design (20 Credits)
- Unit 5: Social Innovation and Future Services (20 Credits)
- Unit 6: Implementing and Deploying Services at Scale Including the Materiality of Experience and Services (20 Credits)

Students on the programme have access to the College's workshops, which offer spaces for woodworking, metalworking, plastics and resins. It is possible to book bench spaces. Computer-driven subtractive milling equipment is available, as well as additive rapid prototyping.

The Service Design Department at the Royal College of Art opened in 2011 and it draws together the RCA's design practice with innovation in digital technologies from the Department of Computing at Imperial College and business management disciplines from the Business School at Imperial. The Service Studio-Lab hosted at RCA represents an interesting model of collaboration, with HE partners

from Imperial College, London and industry with Sainsbury’s; the Lab’s mission is provided in Appendix 2.

Examples of student work: <https://2020.rca.ac.uk/programmes/service-design-ma>.

2.3.2 M.Des Design Innovation & Service Design, The Glasgow School of Art, UK

<http://www.gsa.ac.uk/study/graduate-degrees/design-innovation-service-design/>

This one-year Masters programme teaches Service Design as a means of applying service design processes to complex problems and live projects provide students with an in-depth experience of design innovation with private and public sector organisations. The programme utilises external Service Design professionals in teaching contexts.

Teaching predominantly takes place in a studio environment and students have access to the School’s technical resources and other facilities. Alongside self-directed learning, lectures and seminars provide students with both theoretical and historical knowledge, as well as insight into specific issues underpinning practical studio work. Design workshops and studio sessions provide the opportunity to test out concepts from lectures and seminars, and activities range from IT sessions offering training in specific software to practical modelling classes in which prototypes are designed and iterated. Leading academics and industry figures also lead masterclasses.^{vi}

The Glasgow School of Art runs a two-week intensive workshop as part of its Winter School initiative, which provides students with the opportunity to work alongside visiting faculty from partner institutions, such as Audencia University and Koln International School of Design. The intensive research work undertaken at the Winter School aims to prepare students for their Studio 2 project.

Assessment on the programme takes a variety of forms including individual and group visual and project material, which reflects the programme’s emphasis on collaborative studio working and individual exploration and analysis. The programme also requires some written work and engagement with theoretical positions and discourses.

Table 6 Curriculum Map: MDes Design Innovation & Service Design

MDes. Design Innovation & Service Design		
Stage One	Stage Two	Stage Three
Core Research Methods (20 credits)	PG Elective (20 credits)	Master’s Research Project (60 credits)
Parallel Project (40 credits)	Studio 2 - Service Design (40 credits)	

2.3.3 MA Service Design, University of the Arts London, UK

<https://www.arts.ac.uk/subjects/business-and-management-and-science/postgraduate/ma-service-design-lcc>

The University of the Arts London’s MA Service Design runs for 45 weeks from September – December (15 months) over four terms, with students required to commit 40 hours per week to their studies.



Term one provides students with a detailed knowledge of the theory and skills in service design, as well as collaboration, team-work, research methods and design innovation. The first term has a user focus and projects are based in the present or the near future. Term two focusses on systems and projects are situated in the future. Teaching and learning activities provide a critical view of the role of the designer in society, introducing larger system-level projects in multidisciplinary teams. In term three, students begin an original design research project in their own area of interest. The project is developed in term four through a series of presentations, exhibitions, and design outputs across a variety of physical and digital media.

Table 7 Curriculum Map: MA Service Design

Term 1	Term 2		Term 3		Term 4
Ways of working (20 credits)	User-Centred Project (40 credits)	Collaborative Unit (20 credits)	Design Futures (20 credits)	Proposal Development (20 credits)	Major Project (60 credits)

Teaching takes place across a combination of lectures, seminars, workshops, masterclasses, feedback sessions with external experts, tutorials, and technical sessions. The programme also offers students professional development workshops that focus on soft skills, which are facilitated by staff and guest speakers.

Assessments take a range of forms including: practical projects, critical reports, presentations, written reflections, essays, research proposals, portfolio of evidence.

2.3.4 Service Design Points to Consider

- Guest speakers & links with industry: incorporate sessions from external speakers where possible to provide students with insights from outside the academy.
- Online/blended learning: with the theoretical aspects of service design there is scope for online delivery of some content and engaging students via a blended approach.
- The model of the Service Studio Lab hosted at RCS is worthy of consideration, as it is a collaboration between two different types of institution – an arts focussed design programme and an engineering programme – as well as an industry partner. Are there opportunities to develop similar collaborations with the new centres?
- Intensive workshops or bootcamps: the Winter School at GSA is another point for consideration, as it is an intensive training activity which prepares students for their project work. Utilising the new centres for bootcamps or extended workshops designed to develop specific skills or competencies would potentially enable a greater range of students to be reached via the centres.

2.4 HCI Design

2.4.1 Human Computer Interaction MSc, University College London

<https://www.ucl.ac.uk/prospective-students/graduate/taught-degrees/human-computer-interaction-msc>

This one-year interdisciplinary MSc that combines engineering, behavioural sciences, and design. The programme combines research with practical and professional elements.

The programme consists of two compulsory 30-credit core modules, four 15-credit optional modules and a 60-credit research project. In the first term, students study compulsory modules: Interaction Science (30 credits) and Interaction Design (30 credits).^{vii} Interaction Science is designed to introduce students to the necessary theory for understanding human behaviour in relation to HCI and to enable students to develop both the conceptual and practical skills they will need to undertake research in this area.^{viii} Assessment for the Interaction Science module is made up of two, equally weighted pieces of coursework: Understanding Existing HCI Research, and HCI Research Methods. The Interaction Design module aims to introduce students to human-centred design processes and corresponding assessment and evaluation methods in order to empower them to choose and apply relevant methods.^{ix} The module focuses on equipping students with practical and theoretical skills needed to design, prototype and evaluate novel interactive systems. Assessment for Interaction Design is made up of 50% Group Project and 50% Portfolio.

Optional modules on the programme run in the second term. They include:

- Accessibility and Assistive Technologies
- Affective Interaction
- Future Interfaces
- Human Factors for Digital Health
- Serious and Persuasive Games
- Physical Computing and Prototyping
- User-Centred Data Visualization

The third term is dedicated to the MSc project, in which students conduct research into an area of human-computer interaction, supervised by a member of UCLIC staff. Students have the choice of a wide range of themes and research questions and work closely with their supervisor to choose and deliver their project. The programme has a track-record of launching projects that have gone on to form publications at leading international conferences.

2.4.2. Human-Computer Interaction Design MSc, City, University of London

https://www.city.ac.uk/prospective-students/courses/postgraduate/human-computer-interaction-design?utm_medium=print&utm_source=postgraduate%20prospectus&utm_campaign=postgraduate%20prospectus

The MSc in Human-Computer Interaction Design at City, University of London combines theory and practice to empower students to create engaging user experiences. When taken as a full-time



programme it lasts twelve months, but this is extended to fifteen months if the student elects to take an optional internship. Students taking an internship are supported by staff from the Professional Liaison Unit, as well as by their Academic Supervisor.

The programme's stated aims are as follows:

- Develop students' understanding of fundamental principles of Human-Computer Interaction, usability and user experience
- Apply techniques and methods appropriate in a user-centred design process
- Create designs for a wide variety of interactive systems and types of users
- Evaluate designs for interactive systems
- Demonstrate research skills appropriate to HCI
- Promote innovation that rest on users as the core for socio-technical systems^x

The programme is based around seven compulsory modules:

- Inclusive Design
- Understanding User Interactions
- Evaluating Interactive Systems
- Interaction Design
- Research Methods and Professional Issues
- Information Architecture
- Creativity in Design
- Students also select one optional module from the following list:
- Web Application
- Data Visualisation
- Readings in Human Computer Interaction

Modules are taught via lectures and tutorials, with lectures introducing concepts and tutorials providing the opportunity for students to apply the concepts in small, interactive exercises and in practical work in supervised tutorials. Students are also required to engage in self-directed study outside of classes, which involves reading, undertaking reflective exercises, and preparing for assessments. Online tools are used to support student learning, which encourage engagement via discussion forums and the dissemination of material relevant to student learning.

In their final term, students undertake a self-directed project, in which they identify a problem or requirement, justify its importance, develop a methodology or approach for exploring it, put the methodology into practice, analyse its outcomes, and evaluate its significance.

2.4.3. BA (Hons) User Experience Design

<https://www.arts.ac.uk/subjects/animation-interactive-film-and-sound/undergraduate/ba-hons-user-experience-design-lcc>

This Bachelor of Arts degree lasts three years and is a practice-led programme, which has a rigorous approach to research. The programme teaches students to use code, data, and other digital



materials, alongside more traditional design methods in order to realise their creative ambitions. Students are empowered to design, prototype and build user interfaces, data visualisations, responsive installation pieces and other user-driven interactive experiences. The programme offers students the opportunity to explore emerging technologies such as extended reality, wearable technology, digital fabrication and AI within a design context.

In their first year, students on the programme undertake four core modules, designed to introduce them to the main issues in User Experience Design:

- Introduction to User Experience Design
- Information Visualisation and Typography
- Animation and Coding for the Web
- Contextual & Theoretical Studies

The second year builds on the knowledge and skills that students acquire in their first year, with a particular focus on studio-based learning:

- Interactive Data Visualisation Studio
- UX/UI Studio
- Contextual & Theoretical Studies 2
- Professional Practice

Assessment takes a range of formats including a portfolio of work, prepared writing, crits and presentations.

The programme offers two pathway options in the third year: Route A involves an 8,000-10,000 word piece of written work, while Route B combines a 4,000-5,000 word piece of written work plus a Competition Project. Both routes take the Digital Design Portfolio, which involves developing design responses to a variety of challenges and briefs via a number of self-initiated projects. The final portfolios are online and public-facing, enabling students to position themselves within the field and develop their identity as designers. Both routes also take the Major Design Studio module, which involves the creation and production of a self-directed major project, which forms a central part of students' design portfolio and is generally displayed at the graduate exhibition.

Both routes also take Contextual and Theoretical Studies, but the credit value varies by route. This third incarnation of the module offers students more agency to apply the knowledge they have acquired about visual culture and critical theory in order to realise a self-determined piece of written work. Students undertaking Route B will undertake an additional design competition project in which they select from a variety of design award scheme briefs and other calls for entry to established arts festivals or residencies.

Stand-out features of the programme include the marrying of the discipline of information design to the practice of interface design, which recognizes the interdependence of these two design aspects. Another important component is that the programme empowers students to develop sustainable skills



via its use of open platforms, which enables students to benefit from the shared digital commons throughout their professional lives.^{xi}

2.5. HCI Considerations

- Online portfolio of work utilised in the BA (Hons) User Experience Design is worthy of consideration, as it enables students to showcase their work online and share it with would-be employers.
- Opportunities for internships and placements, as well as connections with industry are important components of these programmes.
- Utilising real-world activities, such as briefs from award schemes and established arts festivals or residencies, helps to prepare students for industry and encourages them to think beyond their studies.
- The use of open source software and the grounding in relevant skills helps to ensure that students have a sustainable learning experience, which they can draw on throughout their future career.
- The incorporation of behavioural science could be a valuable conceptual and theoretical framework for approaching the study of HCI.



3. Existing Courses

In D1.5, the Courses Materials Report, we analysed existing courses at IIIT-D, RIMT University, and WUD. The report identifies key areas for curriculum improvement based on the key issues identified in D1.2 National Research Report and the analysis of the existing curriculums. The UK Professional Standards Framework (UKPSF) for Teaching and Supporting Learning in Higher Education developed by the Higher Education Academy or HEA (2011) was used as a framework to analyse the existing curricula of the partner institutes. The analysis utilised the three dimensions identified by the UKPSF:

1. Areas of Activity
2. Core Knowledge
3. Professional Values

Key findings from this analysis underpin the improved courses as outlined in this document. A recurring observation in the analysis undertaken was of the benefit of incorporating more problem-based learning into the curricula, which on the one hand reflects best-practice in Design education and on the other also allows for courses to take full advantage of the new Design and Innovation Centres. Another element of the improved courses which emerged as a key point in the analysis of existing courses is the engagement of stakeholders and industry partners. The improved courses below provide further opportunities for students to engage with professionals beyond the university, thereby contributing to students' employability and preparing them for the world of work.



4. Courses Identified for Improvement: IIIT-Delhi

4.1. HCI Design

4.1.1. HCI Design: Course Overview

Human-Computer Interaction (HCI) is an existing course at IIIT-D. The course was already well-structured. Hence, the improvement focuses on exploring how to integrate other skills and knowledge that could be useful for year 1 students. Research-informed design practice with strong focus on User Centred Design (UCD) could encourage students to develop in-depth understanding of all stakeholders involved. Thus, this proposal will show how human-centred design research practice could be explicitly integrated into the course.

Course Syllabus

Course Code: DES1xx	Course Title: Intro to HCI	Co-Ordinator: TBC	Credits: 4	ECTS Value: 5
Academic Year/Level: Year 1	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

This course will provide a theoretical and practical understanding of HCI design including concepts of User Centred Design (UCD) and design thinking, usability, interfaces, rapid prototyping, and evaluation. This is a project-based course where students can work on either software or hardware projects. The course will introduce the students to relevant theories and tools as well as help them develop essential skills required.

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- LO1: Discuss and distinguish concepts of human computer interaction, user experience design and design thinking (knowledge and understanding)
- LO2: Apply user centred design principles and techniques for gathering data, rapid prototyping as well as conveying design concepts (cognitive/thinking skills)
- LO3: Objectively assess usefulness and usability of their designs with reference to user centred design principles (cognitive/thinking skills)
- LO4: Employ user centred design research to inform the ideation, prototyping and evaluation of original design concepts (cognitive/thinking skills)
- LO5: Work constructively in a team to plan, create and communicate design ideas to different stakeholders (other skills and attributes)

Note: Since this course is designed for Year 1, it should focus on develop a competent level of understanding and cognitive skills.

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The course aims to deliver a blended learning experience with emphasis on studio-based practical activities. Hence, all lectures will be followed by labs/workshops/tutorials, held in the new Design and Innovation Centre. In this way, the students will have opportunities to practice what they have learned in classed while the knowledge is still fresh in their minds. The course will also encourage research-informed design practice with strong focus on user centred design research to ensure the in-depth understanding of all key stakeholders involved.

Study hours: 150 hours in total, broken down as follows:

- Teaching = 39 hours (1 hour of lecture and 2 hours of labs/workshop per week over a period of 13 weeks)
- Assessment = 6 hours (3 hours for group presentation assessment and 3 hours for individual assessment)
- Self-study = 105 hours (e.g. group work and individual study)

Weekly Plan		
Week no.	Possible Topics for Lecture	Possible Activities for Labs
1	Introduction to the Course Introduction to UCD principles and design thinking	Link theory to practice Turn UCD principles into criteria for evaluating design Find a design and evaluating according the UCD criteria
2	History of HCI	Form a team of 5 members Select a project around the theme of HCI and time
3	Theories and Research Mehtods of HCI	Develop a research plan for the group project
4	Understanding User Experience - 1 (Introduction to participatory design: PD tools and techniques)	Start the research Apply PD tools, e.g. pluralistic walkthrough, to support research
5	Understanding User Experience - 2 (Introduction to usability design tools and techniques)	Continue the research Apply usability tools, e.g. heuristic evaluation, to support research
6	PACT Framework	Continue the research Apply PACT Framework and Affinity Diagram to bring all research findings together
7	Group Project Presentation	Present ideas

8	Foundations and Concepts Of Interaction, Critical Design Fiction	Create personas and scenarios
9	Storyboards and Information Architecture	Generate storyboards and information architecture
10	Prototyping Techniques - Low	Develop wireframes - low
11	Prototyping Techniques - Mid	Refine wireframes - medium
12	Prototyping Techniques - High	Finalise prototype (e.g. Arduino)
13	Prototyping Evaluation	Prototype Evaluation

Note: 5 ETCS = 150 hours of study (independent and taught)

Partner and external committees:

The course will take advantage of a newly formed design and innovation centre to reach out for potential business partners that could set industrial brief(s) for students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this course:

- **Formative assessment** – During the lab sessions, students will be given a task that is related to the summative assessment. They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback.
- **Summative assessment:**
 - **Research Project** – Students will be put together in teams of 5 members to work on their chosen briefs around the HCI theme. The students are expected plan and carry out user centred design research to develop insights. (week 1 – 7)
 - **Design Project** – Each team is expected to develop an original design solution based on the research results gathered by their team. Tutorials and peer reviews will be organised on a weekly basis. (week 8 – 13)

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Type of Evaluation	% Contribution in Grade
Research Project	40 (group presentation)
Design Project	60 (design package)

Note: Group are self-selected. Students will form teams of 5 members.

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

If you are late by more than 5 minutes or absent without prior notification and Institute validated proof to the instructor, you will be marked absent for that day. We will send you back if you are late. We will not provide make-up activities or accept late submissions in any scenario except Institute validated leave. In such cases, it is your responsibility to schedule a make-up activity no later than 1 week of the date of your return to the institute.

Learning Resources:

Reading and required materials

Interaction Design: Beyond Human-Computer Interaction (4th Edition) by Jenny Preece, Helen Sharp, Yvonne Rogers (Wiley)

Bibliography:

Reading and required materials

Interaction Design: Beyond Human-Computer Interaction (4th Edition) by Jenny Preece, Helen Sharp, Yvonne Rogers (Wiley)

Websites:

Reading and required materials

To be completed by IIIT-D

Assessment schedule:

A breakdown of each assignment and exam, scores, and percentages for each grade level.

To be completed by IIIT-D

Class Calendar:

Dates for class topics, homework, readings, other assignments, and exams

To be completed by IIIT-D



5. RIMT University

5.1. Product Design

5.1.1. Product Design: Course Overview

RIMT has identified the ‘*Bachelor of Technology Product Design*’ as the programme that they would like to improve. The new physical product design course could be introduced as a new elective course or combined with one of the existing courses as follows:

- BTMX-405 Product Innovation with Mechatronics
- BTMX-406 Strategic Design & Management
- BTMX-604 Design & Critical Thinking
- BTMX-707 Major Project with Business Plan

Key features of this new course based on the Courses Materials Report and benchmarking exercise are:

- Focus on **critical and advanced understanding** since this course is designed for year 2 students of undergraduate programmes and above;
- Deliver a **blended learning experience** with emphasis on **studio-based practical activities**, which is one of good practices identified through benchmarking exercise;
- Encourage research-informed design practice with strong focus on **human-centred design research** to ensure the in-depth understanding of all key stakeholders;
- Embed **strategic thinking** and **business management** content into the course to ensure that the students appreciate strategic roles of service design in an organisation (both for-profit and not-for-profit).

Course Syllabus

Course Code: xxxxxx	Course Title: Integrated Product Design	Co-Ordinator: TBC	Credits: 4	ECTS Value: 5
Academic Year/Level: UG Year 2 or above	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

The course covers the whole product design process, **integrating** all aspects relevant to product development – technology, business management and design methods. The goal is to develop **T-shape** designers. The horizontal part of the “T” is referred a breadth of knowledge across different aspects of the product development, whilst the vertical part of the “T” suggests that designers should remain committed to their professional expertise. The programme aims to build on

designers' core skills and broaden their knowledge into other areas. The subjects delivered under this programme can be grouped into three areas:

1. Professional practice (e.g. research-informed process)
2. Strategic design (e.g. business management and branding)
3. Technical design (e.g. design for manufacturing)

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- LO1: Demonstrate an advanced understanding of the design process including well-established and emerging design practices (knowledge and understanding)
- LO2: Select and apply appropriate design tools approaches to create integrated solutions combining knowledge from various fields, e.g. business management and design for manufacturing (cognitive/thinking skills)
- LO3: Independently plan, execute and manage relevant research required to identify strategic directions for design (cognitive/thinking skills)
- LO4: Skilfully produce high-quality craft-based design outcomes based on the research results with suitable visualisation techniques to communicate ideas to a wide range of audience including non-design disciplines (cognitive/thinking skills)
- LO5: Critically discuss and evaluate the effectiveness of product design in a given organisation with regard to wider contemporary issues, such as social, economic, technological and political factors (cognitive/thinking skills)
- LO6: Develop a plausible strategic plan to implement proposed design solutions including a business model and other relevant aspects (cognitive/thinking skills)
- LO7: Work constructively in a team to plan, create and communicate service design ideas to different stakeholders (other skills and attributes)

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The course aims to deliver a blended learning experience with emphasis on studio-based practical activities. Hence, all lectures will be followed by labs/tutorials, thereby capitalising on the new Design and Innovation Centre and embedding it into campus life. In this way, the students will have opportunities to practice what they have learned in class while the knowledge is still fresh in their minds. The course will also encourage research-informed design practice with strong link to business management.

The structure of the course follows that of the Double Diamonds, which contains four main stages, namely Discover, Define, Develop and Deliver. The first two stages focus on exploring and framing question(s), while the latter stages concentrate on creating and realising solution(s). Hence, the



first half of the course will focus on the research while the second half will concentrate on the design development.

The coursework aims to demonstrate how design could contribute to core functions of businesses, e.g. brands and business models. Thus, the students are expected to select an organisation (for-profit or not-for-profit) and critically analyse it in order to 1) understand the essence of its brand and 2) identify areas where design could make a difference strategically. The students are expected to develop plausible design solutions from a technical point of view as well as business models to show suitable routes to market.

Weekly Plan		
Week no.	Possible Topics for Lecture	Possible Activities for Labs/Tutorials
1	Introduction to Design Process	Launch a design project
2	Introduction to Design Research	Form teams & select organisations
3	Well-Established Research Tools	Create a research plan
4	Emerging Design Research Tools	Review the research plan
5	Strategic Design Management	Conduct the research
5	Branding & Design Touchpoints	Analyse the chosen organisation
6	Data Analysis	Review the analytical results
7	Data Synthesis	Present the research outcomes (brand essence & opportunities for design)
8	Design Fiction & Conceptualisation	Create concepts
9	Visualisation	Review and select design concepts
10	Design for Manufacturing (1)	Develop detailed design
11	Design for Manufacturing (2)	Select suitable materials & processes
12	Costing & Business Model	Develop a business plan

Note: One semester is roughly divided into 12 weeks (2 hours of lecturing per week followed by 2 hours of workshops/labs/tutorials); 5 ETCS = 150 hours of study (independent and taught)

Partner and external committees:



The course will take advantage of the newly formed design and innovation centre to reach out for potential business partners that could set industrial brief(s) for students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this course:

- **Formative assessment** – During the lab sessions, students will be given a task that is related to the summative assessment. They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback.
- **Summative assessment:**
 - **Group Assignment** – Students will be put together in teams to work on a brief (which could be set by a course co-ordinator or an external partner from the industries). The students are expected to work collaboratively during the research stage, namely creating a research plan, designing research instruments, collecting data and analysing data to extract key insights (week 1 – 6). The group will present their results as a team in week 7.
 - **Individual Assignment** – Each student is expected to carry out their own design work individually based on the research results gathered by their team. Tutorials and peer reviews will be organised on a weekly basis. (week 7 – 12)

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Type of Evaluation	% Contribution in Grade
Group assignment	40% (group presentation)
Individual assignment	60% (individual design project)

Note: Group are self-selected. Students will form teams of 4 or 5 members.

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

75% attendance is minimum (Further details to be completed by RIMT)

Learning Resources:

Reading and required materials

- <https://www.designcouncil.org.uk>
- <https://www.ideo.com/pages/design-thinking>
- <https://www.designkit.org/methods>
- <https://danskdesigncenter.dk/en/toolbox>
- <https://dschool.stanford.edu/resources>

Bibliography:



Reading and required materials**Essential Reading**

- Kumar, V. (2013) *101 design methods: a structured approach for driving innovation in your organization*. Hoboken: Wiley.

Other Recommended Reading

- Borja de Mozota, B. (2003) *Design management: using design to build brand value and corporate innovation*. New York: Allworth Press.
- Cooper, R. and Press, M. (1995) *The design agenda: a guide to successful design management*. Chichester: Wiley.
- Delft University of Technology (2013) *Delft design guide: design methods*. Amsterdam: BIS Publishers.
- Keeley, L., Pikkell, R., Quinn, B. and Walters, H. (2013) *Ten types of innovation: the discipline of building breakthroughs*. Hoboken: John Wiley & Sons Inc.
- Laurel, B. (2003) *Design research: methods and perspectives*. Cambridge: MIT Press.
- Lidwell, W., Holden, K. and Butler, J. (2010) *Universal principles of design: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design*. Beverly: Rockport.
- Martin, B. and Hanington, B. (2012) *Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions*. Beverly: Rockport Publishers.
- Milton, A. and Rodgers, P. (2013) *Research methods for product design*. London: Laurence King Publishing.
- Pine II, J. and Gilmore, J. (1999) *The Experience Economy*. Boston: Harvard Business Review Press.
- Press, M. and Cooper, R. (2003) *The design experience: The role of design and designers in the twenty-first century*. Aldershot: Ashgate Publishing.

Websites:**Reading and required materials**

To be completed by RIMT

Assessment schedule:**A breakdown of each assignment and exam, scores, and percentages for each grade level.**

To be completed by RIMT

Class Calendar:**Dates for class topics, homework, readings, other assignments, and exams**

To be completed by RIMT



6. World University of Design

6.1. Service Design

6.1.1. Service Design: Course Overview

WUD identified their Service Design course as one to be developed. Based on the Courses Materials report and the benchmarking exercise, this course will be enhanced by taking full advantage of the new Design and Innovation Centre, and by making a clearer link between this and other courses. It will also engage with aspects of entrepreneurship and business management, as well as stakeholder engagement.

Key features of this new course are:

- Focus on **critical and advanced understanding** since this course is designed for year 4 students of undergraduate programmes and year 2 of master programmes;
- Deliver a **blended learning experience** with emphasis on **studio-based practical activities**, which is one of good practices identified through benchmarking exercise;
- Encourage research-informed design practice with strong focus on **human-centred design research** to ensure the in-depth understanding of all key stakeholders;
- Embed **strategic thinking** and business management content into the course to ensure that the students appreciate strategic roles of service design in an organisation (both for-profit and not-for-profit).

Course Syllabus

Course Code: xxxxxx	Course Title: Service Design	Co-Ordinator: TBC	Credits: 4	ECTS Value: 5
Academic Year/Level: UG Year 4 PG Year 2	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

Service design is a branch of design that focuses on creating new services or improving existing ones to make them more useful, usable, desirable for clients and efficient as well as effective for organisations. Thus, the course aims to introduce the students to service design principles and methodologies including relevant tools/techniques that enable them to develop 1) a critical understanding of physical and digital services and their strategic roles in for-profit and not-for-profit organisations, as well as 2) skills required to innovate and improve services with considerations to contemporary issues.

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- LO1: Demonstrate an advanced understanding of service design principles and the role of physical and digital service design in for-profit and not-for-profit organisations in relation to other business functions, such as brand, marketing, business development and innovation – (knowledge and understanding)
- LO2: Critically discuss and evaluate the effectiveness of service design in a given organisation with regard to wider contemporary issues, such as social, economic, technological and political factors (cognitive/thinking skills)
- LO3: Effectively apply service design methodologies including relevant tools and techniques to analyse the given situation and synthesise suitable outcomes with respect to available technologies and other resources, e.g. financial and human resources (cognitive/thinking skills)
- LO4: Independently plan, execute and manage relevant research required to identify stakeholders’ requirements and correctly reference information sources (cognitive/thinking skills)
- LO5: Skilfully produce high-quality service design outcomes based on the research results with suitable visualisation techniques to communicate design ideas to a wide range of audience including non-design disciplines (cognitive/thinking skills)
- LO6: Develop a plausible strategic plan to implement service design solutions including a business model and other relevant aspects (cognitive/thinking skills)
- LO7: Work constructively in a team to plan, create and communicate service design ideas to different stakeholders (cognitive/thinking/soft/transferable skills)

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The course aims to deliver a blended learning experience with emphasis on studio-based practical activities. Hence, all lectures will be followed by labs/tutorials. In this way, the students will have opportunities to practice what they have learned in classed while the knowledge is still fresh in their minds. The course will also encourage research-informed design practice with strong focus on human-centred design research to ensure the in-depth understanding of all key stakeholders involved.

Contact hours: 50 hours

- Teaching = 48 hours (3 hours lectures and 3 labs per week over a period of 8 weeks)
- Assessment = 2 hours (e.g. group presentation assessment)

Weekly Plan		
Week no.	Possible Topics for Lecture	Possible Activities for Labs
1	Service Design Principles & Methodologies Service Design Theories Service Design Thinking	Launch a brief Form teams
2	Human-centred design research (1)	Design research planning



	Tools for collecting data, e.g. customer journey maps	
3	Human-centred design research (2) Tools for analysing data, e.g. personas and scenarios	Research instrument design
4	Human-centred design research (3) Tools for synthesising data, e.g. storyboard	Extract principal findings
5	Service Design Ideation Tools for visualising ideas, e.g. service blueprint	Idea Generation (physical and digital)
6	Detailed Design Development Tools for visualising ideas, e.g. service prototyping and role play	Prototyping and testing
7	Implementation Strategic planning Business model	Business model canvas
8	Measuring effectiveness Evaluation tools (e.g. SERVQUAL)	Project appraisal & peer-review

Note: 5 ETCS = 150 hours; 50 contact hours and 100 hours of self-study, including project work, preparation of presentations etc.

Partner and external committees:

The course will take advantage of the newly formed design and innovation centre to reach out for potential business partners that could set industrial brief(s) for students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this course:

Formative assessment

- During the lab sessions, students will be given a task that is related to the summative assessment. They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback.

Summative assessment:

- Group Assignment – Students will be put together in teams to work on a brief (which could be set by a course co-ordinator or an external partner from the industries). The students are expected to work collaboratively during the research stage, namely creating a research plan, designing research instruments, collecting data and analysing data to extract key insights. (week 1 – 4)

- Individual Assignment – Each student is expected to carry out their own design work individually based on the research results gathered by their team. Tutorials and peer reviews will be organised on a weekly basis. (week 5 – 8)

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Type of Evaluation	% Contribution in Grade
Group assignment	40 (group presentation)
Individual assignment	60 (individual project)

Note: Group are self-selected. Students will form teams of 4 or 5 members.

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

75% attendance is minimum (Further details to be completed by WUD)

Learning Resources:

Reading and required materials

- <https://servicedesigntools.org>
- <https://www.servicedesigntoolkit.org/>
- <https://www.service-design-network.org/>
- <https://www.interaction-design.org/>

Online resources from the Design Council, UK:

- <https://www.designcouncil.org.uk/news-opinion/video-what-service-design>
- <https://www.designcouncil.org.uk/resources/guide/design-methods-developing-services>
- https://www.designcouncil.org.uk/sites/default/files/asset/document/DesignCouncil_Design%20methods%20for%20developing%20services.pdf

Bibliography:

Reading and required materials

Essential Reading

- Stickdorn, M. and Schneider, J. (2013) This is Service Design Thinking. Amsterdam: BIS Publisher.

Other Recommended Reading

- Downe, L. (2020) Good Services: How to Design Services That Work. Amsterdam: BIS Publisher.



- Polaine, A. Løvlie, L and Reason, B. (2013) Service Design: From Insight to Implementation. Brooklyn: Rosenfeld Media.
- Pine II, J. and Gilmore, J. (1999) The Experience Economy. Boston: Harvard Business Review Press.
- Moritz, S. (2005) Service Design: Practical access to an evolving field. London: Köin International School of Design.
- Press, M. and Cooper, R. (2003) The design experience: The role of design and designers in the twenty-first century. Aldershot: Ashgate Publishing.
- Reason, B. Løvlie, L and Flu, M. (2015) Service Design for Business: A Practical Guide to Optimizing the Customer Experience. Hoboken: John Wiley & Sons.
- Schmitt, B (1999) Experiential Marketing: How to Get Customers to Sense – Feel – Think – Act – Relate to Your Company. New York: The Free Press.
- Stickdorn, M., Hormess, M., Lawrence, A. and Schneider, J. (2016) This Is Service Design Doing: Using Research and Customer Journey Maps to Create Successful Services: Applying Service Design Thinking in the Real World. O'Reilly Media.

Websites:

Reading and required materials

To be completed by WUD

Assessment schedule:

A breakdown of each assignment and exam, scores, and percentages for each grade level.

To be completed by WUD

Class Calendar:

Dates for class topics, homework, readings, other assignments, and exams

To be completed by WUD



7. Evaluation

A robust system of evaluation has been put in place for these new courses. After drawing up the initial syllabus proposal, based on information about the course specification and wider institutional context, this syllabus was reviewed by corresponding staff at each Indian institute. After they have approved the syllabus, the tutor guidance was developed accordingly. The two documents (syllabus and tutor guidance) were shared with all project partners for further comments and suggestions. Where courses corresponded with specific capacity building programmes (e.g. Service Design and HCI), both documents were also sent to the teaching teams, who were invited to add relevant information and to provide further feedback/comments.

The proposed courses have all been peer-reviewed by the project members and teaching teams at the relevant Indian institute. A further round of review and evaluation will be undertaken, which will measure the success of the improved courses against the following criteria:

- Internationalisation
- Modernisation of the curricula
- New skills for faculty
- New skills for students
- Stakeholder engagement and collaboration opportunities

The courses will be subject to relevant review and evaluation activities that are in operation at each institution. Examples of the student module evaluation forms, which will be utilised in the evaluation of the module can be found in Appendix 3. The DESINNO team also plans to engage directly with staff and students involved in the first iteration of these courses to garner feedback from them in order to continue to develop and improve these courses.



8. Appendix 1: Benchmarking Further Details

8.1. Programme Learning Outcomes

8.1.1. MEng Design Engineering

Code	Primary Theme	Programme Level Learning Outcomes
K1	Core Engineering	Develop solutions to challenges in the engineering sciences of mechanics, materials, thermodynamics, computing, and electrical & electronic systems.
K2	Creativity & Design	Integrate principles and methodologies of creativity, human factors, morphology, embodiment, user interaction, experience, and sustainability into their projects.
K3	Enterprise	Apply methodologies and methods in innovation, business systems, enterprise configuration and stakeholder experience in relation to design engineering.
K4	Integrated Design Engineering	Employ an integrated design engineering approach to systems design and engineering, design for manufacture and design engineering processes.
S1	Skills in Design Engineering Methods	Select appropriate concepts, methods, techniques, tools and technologies associated with design engineering and apply with high levels of skill and imagination.
S2	Contextual Evaluation & Impact Analysis	Evaluate context and systems that are complex or ambiguous with appropriate design engineering methods and approaches, assessing their potential social, environmental, technological and economic impact.
S3	Prototyping	Build prototypes of innovative products, services, and systems that enable effective evaluation, iteration, and communication at a range of scales and levels of technical complexity.
S4	Design Engineering Mindsets	Synthesize new knowledge understanding and skills in effective ways in the contexts of design engineering practice, research and personal development.
A1	Reflection	Reflect critically on own work and peer review, to identify strengths and areas that need improvement.
A2	Communications	Communicate effectively through oral presentations, graphical representations, and written reports.
A3	Team Working	Demonstrate individual responsibilities of managing and contributing in effective and diverse teams.
A4	Professional Identity	Analyse global professional contexts to define an evolving individual professional identity and environment in which they seek to operate.

8.1.2. MA Collaborative and Industrial Design

The Collaborative and Industrial Design programme (CoID) focuses on design innovation. It enables in-depth understanding of design's role in society, and provides students with advanced skills to work as designers in various business domains, as entrepreneurs, or in public-sector. It extends industrial design into interaction design, service design, co-design and other emerging fields where design activities can enhance the quality of the environment and people's lives. Students learn empathic, critical, strategic and technical skills needed in design innovation processes and practices. They are also encouraged to explore roles unforeseen in design and design industry.

Over the duration of the programme, the students will develop an understanding of design in relation to innovation and contemporary culture, be it local or global, private or public. The students will also develop an extensive ability to design, lead design projects, and collaborate with non-designers, and thus become able to shape change in communities and companies.^{xii}

8.1.3. MA Service Design, RCA

Code	Programme Level Learning Outcomes
Able to:	A. Intellectual Engagement
A1	Develop innovative ideas that challenge the understanding of the current practice and shape the emerging discipline of service design.
A2	Demonstrate an advanced understanding of historical and contemporary debate with regard to the design of artefacts, infrastructure, organisation and services and how these relate one to another and to their own practice.
A3	Demonstrate an advanced understanding of the principles and methods of service design and apply them effectively to your own practice and the emergent discipline of service design.
A4	Understand the underlying nature of services and systems and their influence on user experience, and the spaces for service innovation and design.
A5	Translate abstract service proposition and user experience related issues into tangible design proposals.
A6	Undertake intellectual and creative research to understand and contribute to the resolution of issues associated with the emergence of this new discipline and its interaction with other disciplines beyond that of design.
Able to:	B. Technical Skills
B1	Demonstrate the application of service design techniques to public service provision, consumer and business service with a special focus on the fields of health and wellbeing, energy and the environment.
B2	Apply the concept of value creation in services, and understand how to design quality into services, and the measurement and management of service experience.
B3	Understand the role and importance of service architecture, and how this relates to the value of services to customers, and to the service provider.
B4	Understand how factors such as organisational culture, skills, technological enablement, infrastructure and commercial constraints enable or inhibit service innovation, and know how to take these into account in the design and deployment of service propositions.
B5	Understand the concepts and characteristics of business model innovation in the provision of services including the role of social enterprise, and develop appropriate and viable business models for the service propositions you create.
Able to:	C. Professional Development
C1	Develop independence by taking responsibility for directing your own studies through setting goals and managing time and resources effectively.
C2	Define your professional identity through self-reflection and an understanding of how service design practice and the profession create value for industry, the public sector, and the users and communities they serve
C3	Develop collaborative skills by participating as an active, thoughtful and responsible member of a community of different disciplines, academic and business cultures.
C4	Develop your commercial skills so that you can engage professionally with potential clients, are able to articulate the value of your services to their business needs in terms of your business proposals, and deliver effectively against them.
C5	Understand the societal, ethical, environmental and business context for any service innovation and take these into account in your overall professional practice.

8.2. Other Relevant Resources

8.2.1. RCA's Service Studio Lab Mission

The Royal College of Art's Service Studio-Lab mission is to:

- Research new methods and tools for designing public services, blending inclusive design methods with innovation in business models and digital technology, as well as researching the role and importance of service design in public sector policy formulation following our involvement with UK Government Cabinet Office and Civil Service
- Provide a laboratory environment for simulation and modelling of new services (SIMLab) as well as exploiting safe environments for prototyping and piloting services (LivingLab)
- Generate unique IP relating to Service Platforms that can be exploited by Public Sector and Third Sector Organisations
- Develop and deliver knowledge transfer programmes for service commissioners and service providers in service design as well as provide digital resources for e-learning and online tools for service design practitioners

- Support the incubation of new social enterprises to deliver public services through InnovationRCA

9. Appendix: Other Improved Courses

9.1. Introduction

In addition to the core courses detailed above, the DESINNO partners have also collaborated to create improved versions of other courses at WUD. These courses are also focussed on internationalisation and utilising the new Design Innovation Centres. They will be incorporated into WUD's programme in the 2021-22 academic year and will be evaluated in the same way as the core courses detailed above.

9.2. Craft Design for WUD

9.2.1. Craft Design: Course Overview

Key features based on the benchmarking exercise:

- Focusing on **critical and advanced understanding** since this course is designed for year 3 students of undergraduate programmes (semester 5) and year 2 of master programmes (semester 3 of MDes course)
- Delivering a blended learning experience with emphasis on **hands-on practical activities** (e.g. drawing and model making).
- According to the comparison with other craft design programmes (namely BA 3D Design and Craft at University of Brighton and BA Design Crafts at De Montfort University), topics such as **Design Culture, Making, Craft Materials and Process** and **Personal Development Planning (PDP)** are key features of the programmes.
- Subsequently, **reflective practice**, which supports PDP, should also be integrated.
- Embed **empathy for artisans** and **traditional practice** into the course to ensure that students appreciate the role of craft in the society, especially its cultural value.

Course Syllabus

Course Code: xxxxxx	Course Title: Craft-based Design	Co-Ordinator: TBC	Credits: 4	ECTS Value: 5
Academic Year/Level: UG Year 3 PG Year 2	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

'Craft is about making with meaning.' Ekta Kaul, textile artist, Craft Council, UK

Artists, makers and craftsmen generally described craft as a way to express themselves and tell stories of person, place, history/heritage and/or society. Hence, craft has a strong link with personal development as well as cultural issues. Craft-based design will help students develop their own styles and/or personal traits, as well as enable them to develop skills required to express

themselves through making, such as drawing, model making, materials and processes. It also aims to help students develop appreciation for the role of artisans and traditional practice in the society, and explore how to support them further.

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- LO1: Demonstrate an advanced understanding of role, scope and process of design intervention in craft (knowledge and understanding)
- LO2: Apply craft-based design approaches to create user centric design incorporating personal requirements (e.g. traits, habits, preferences and personality) and traditional practice (cognitive/thinking skills)
- LO3: Independently plan, execute and manage relevant research required to identify opportunities for craft-based products (cognitive/thinking skills)
- LO4: Skilfully produce high-quality craft-based design outcomes based on the research results with suitable visualisation techniques (cognitive/thinking skills)
- LO5: Critically discuss the role of design in supporting grassroots economy and nurturing traditional practice (cognitive/thinking skills)
- LO6: Reflect on personal development experiences obtained through hands-on activities and the engagement with artisans (cognitive/thinking skills)
- LO7: Work constructively in a team to plan, create and communicate service design ideas to different stakeholders (other skills and attributes)

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The course could be described as an ‘*experience-based learning*’ where students learn through the reflection on hands-on practical experience¹. Hence, the emphasis will be placed on hands-on practical activities (e.g. field trips and design projects) followed by reflective practice. The course will also encourage students to develop an appreciation for the role of artisans and traditional practice in the society.

The course could follow the co-design process and/or consider adopting the structure of Fixperts (<https://fixing.education/fixperts>). Fixperts which is a not-for-profit international learning programme that “*challenges young people to use their imagination and skills to create ingenious solutions to everyday problems for a real person.*” In this way, the structure could involve asking students to 1) identify artisan(s) that they want to co-design with; 2) work with them to develop a design brief; 3) co-design and produce the solution using traditional techniques; 4) share their experience with worldwide audience by uploading videos onto the Fixperts website (<https://fixing.education/films>); and 5) reflect on their experience and discuss how the engagement with artisans and traditional

practice has helped their personal development. As a result, students are expected to apply reflective practice by recording main lessons from each task in a logbook and reflect upon them.

Since the emphasis is on '*learning through experience*', the key topics (such as design culture, role of design in grassroots economy, making, materials and processes) will be delivered through interactive seminars/tutorials rather than formal lectures.

Contact hours: 25 hours

- Teaching = 21 hours (3 hours per week)
- Assessment = 4 hours (2 hours for interim assessment; 2 hours for final assessment)

Weekly Plan		
Week no.	Hands-on Practical Activities	Reflective Practice
1	Introduction to craft-based design Principles of craft-based design Relevant co-design tools	Create an initial personal development plan – <i>what do you aim to achieve through this course?</i>
2 (Unit I)	On-site research with artisans (1) Capturing good practices Identifying future opportunities	Record main lessons learned from guided field trip – <i>what was the most valuable lesson that you gain the field trip?</i>
3 (Unit II)	On-site research with artisans (2) Framing questions Defining a suitable design intervention	Reflect on main lessons learned – <i>could focus on the question framing process</i>
4 (Unit III)	Interim Research Documentation Brief and design specification Interim personal development plan	
5 (Unit IV)	Ideate and prototype solutions with artisans Co-design the solutions Learn traditional techniques to create prototypes	Reflect on main lessons learned – <i>could focus on the co-design process</i>
6 (Unit IV)	Finalise and evaluate solutions with artisans	Reflect on main lessons learned – <i>could focus on the evaluation process</i>
7	Final Documentation Summary of the whole project (group) Fixperts videos (group) Reflective report including the personal development plan (individual) Logbook (individual)	

Note: 5 ETCS = 150 hours of study (independent and taught)

Since the work including short video production, these videos could be shown to all members of students in the university.

Partner and external committees:

This course will make a good use existing network with artisans. It will also take advantage of a newly formed design and innovation centre to prototype and showcase the solutions to the wider audience who may be interested in investing in these craft-based products. The collaborations within the course could lead interesting use of digital fabrication technology to manufacture craft products.

One of the goals of this course is to create a win-win situation. Students will benefit from an opportunity to appreciate, learn, collaborate and propagate traditional practices from artisans while artisans can get new ideas and new knowledge (such as the design process and market research) from the students. This knowledge exchange could be done through field visits as well as inviting artisans to take part in the interim presentation and final submission. In this way, they could learn different approaches and gain valuable market/user research from design students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this course:

- **Formative assessment** – Students are expected to keep records of everything they learn in this course in a logbook (including their personal development plan). They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback and submit it at the end of the course.
- **Summative assessment:**
 - **Group Assignment** – Students will be put together in teams to work on a co-design project with artisan(s). The students are expected to work collaboratively throughout the co-design process (e.g. framing the questions, defining design interventions, co-creating and producing the prototypes). The submission include:
 - Interim documentation
 - Final documentation
 - Final design package
 - Fixperts video
 - **Individual Assignment** – Each student is expected to submit
 - Logbook recording main lessons learned every week
 - Final reflective report including the final personal development plan

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Assessment Plan



Type of Evaluation	% Contribution in Grade
Continuous Evaluation	40 (group)
End of term examination	40 (group) – Jury Evaluation
Logbook	10 (individual)
Reflective report	10 (individual) – including PDP

Note: Group are self-selected. Students will form teams of 4 or 5 members.

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

75% attendance is minimum (Further details to be completed by WUD)

Learning Resources:

Reading and required materials

Unit I: Craft research

- Research on a particular craft
- Understanding its material, manufacturing process, techniques
- Understanding its strength and weaknesses
- Understanding how the craft can be adapted into a contemporary product

Unit II: Project I : Design a product through design intervention

- Opportunity mapping
- Defining user segment
- Understanding market needs through market research
- Understanding economics of design intervention for a craft
- Design brief
- Ideation and concept generation
- Iterations according to manufacturing practice
- Final sketches, drawings, 3d model
- Prototype

Unit III: User research

- User research – background, culture, socio economic status, profession, family structure, behaviour, traits, likes and dislikes, habits, etc.
- Selecting / finding a product / product range to design for the user
- Understanding user`s requirement and brief
- Creating design brief

Unit IV: Project 2 - Design of a user centric product

- Ideation and concept generation

- Iterations and refinements
- Detailed drawings
- Final sketches, 3d rendered sketches, 3d model
- Materials, textures, finishes, manufacturing processes
- Prototype

Bibliography:*Reading and required materials*

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Websites:*Reading and required materials*

To be completed by WUD

Assessment schedule:*A breakdown of each assignment and exam, scores, and percentages for each grade level.*

To be completed by WUD

Class Calendar:*Dates for class topics, homework, readings, other assignments, and exams*

To be completed by WUD

Note: The experience-based learning model was initiated by David Kolb's. According to the model, the learning cycle can be divided into four stages: concrete experience, reflective observation, abstract conceptualization and active experimentation. A learner learns by experiencing a new

phenomenon, reflecting upon that experience, conceptualising what they have experienced into new knowledge and then applying what they have learned to acquire further knowledge.

9.3. Experiential Space Design for WUD

9.3.1. Experiential Space Design: Course Overview

The proposed changes were inspired by BA (Hons) Design for Branded Spaces and MA Narrative Environments, University of the Arts London (UAL). The former focuses on equip their students with “professional skills and knowledge to design **multi-sensory spaces, immersive experiences,** installations and creative events for commercial and cultural brands”, whilst the latter concentrates on helping organisations “**communicate their stories** through the physical environment”. These key words (namely multisensory, immersive experiences and storytelling) will be the key features of the proposed course.

Course Syllabus

Course Code: xxxxxx	Course Title: Experiential Space Design	Co-Ordinator: TBC	Credits: 4	ECTS Value: 5
Academic Year/Level: UG Year 2	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

Spatial (or space) design is an emerging design concept and methodology that bring together the established knowledge in the fields of architecture, interior design, landscape design and other related areas. It explores relationships between space and people. Thus, experiential space design will cover a number of creative skills required to shape up customers’ experiences through physical environment.

As a result, this course aims to equip students with the knowledge and skills to deliver multi-sensory, immersive experiences through physical environments (which could be creative installations, exhibitions and/or temporary events). It also intends to introduce emerging technologies that could enhance spatial experiences of various stakeholders involved. Live projects with industrial partners will be the key feature of the course, as they will enable students to explore how to communicate the stories of these organisations to their target audience through the physical environment in a meaningful way.

The course will begin by introducing students to the concept of experiential design and how it could be applied to physical environments. Next, it will discuss how experience of different stakeholders could be enhanced further through appropriate applications of emerging technologies. It will also introduce relevant tools/techniques that enable students to design multi-sensory, immersive spatial experiences.

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- LO1: Demonstrate an advanced understanding of role and process of multi-sensory, immersive experience design in the context of physical environment (knowledge and understanding)
- LO2: Critically discuss and evaluate relationships between emerging technologies and multi-sensory, immersive spatial experiences (cognitive/thinking skills)
- LO3: Independently plan, execute and manage relevant research required to identify stakeholders’ practical and emotional requirements and correctly reference information sources (cognitive/thinking skills)
- LO4: Competently apply multi-sensory experience design principles to create a spatial design that match practical and emotional requirements of different stakeholders (cognitive/thinking skills)
- LO5: Skilfully produce high-quality spatial design outcomes based on the research results with suitable visualisation techniques (cognitive/thinking skills)
- LO6: Work constructively in a team to plan, create and communicate spatial design ideas to different stakeholders (other skills and attributes)

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The module aims to deliver a **blended learning experience** with emphasis on **studio-based** practical activities. Hence, all lectures will be followed by studio work. In this way, the students will have opportunities to practice what they have learned in classed while the knowledge is still fresh in their minds. The module will also encourage research-informed design practice with strong focus on experiential design to ensure the in-depth understanding of all key stakeholders involved.

Contact hours: 30 hours

Teaching = 30 hours (6 hours lecture per week; over a period of 5 weeks)

- 2-hour lecture per week (10 hours in total)
- 4-hour studio work per week (20 hours in total)

Self-studying 120 hours

Weekly Plan		
Week no.	Possible Topics for Lecture	Possible Activities for Studio Work
1	Introduction to experience design <ul style="list-style-type: none"> • Multi-sensory design • Immersive experiences 	<ul style="list-style-type: none"> • Form teams • Introduce the brief(s) from industrial partner(s)

	<ul style="list-style-type: none"> • Relevant tools/frameworks • Case studies 	<ul style="list-style-type: none"> • Students will apply relevant tools/frameworks to analyse the current experience provided by industrial partner(s) and identify areas for future improvement
2	<p>Introduction to spatial design</p> <ul style="list-style-type: none"> • Spatial design theories • Spatial design methodology • Relevant tools/frameworks • Case studies 	<ul style="list-style-type: none"> • Discuss relationships between multi-sensory experience design and spatial design • Students will investigate issues that they have identified further with a focus on spatial design and built environments
3	<p>Storytelling & Narrative Environments</p> <ul style="list-style-type: none"> • Principles of storytelling • Customer journey map • Case studies 	<ul style="list-style-type: none"> • Initial concept development which includes: <ul style="list-style-type: none"> ○ User profiling ○ Desirable user experience ○ Customer journey map ○ Design ideas
4	<p>Introduction to emerging technologies (1)</p> <ul style="list-style-type: none"> • Technologies to support interaction: such as interactive displays • Case studies 	<ul style="list-style-type: none"> • Design development which includes: <ul style="list-style-type: none"> ○ Refined design ideas ○ Key design touchpoints ○ Storyboards
5	<p>Introduction to emerging technologies (2)</p> <ul style="list-style-type: none"> • Technologies to support immersive experience: such as AR, VR and MR • Case studies 	<ul style="list-style-type: none"> • Design development which includes: <ul style="list-style-type: none"> ○ Final design ○ USP narrative ○ Material selection
6		Group Assessment

Note: Due to a short timeframe, group projects might be more appropriate than individual projects. Last week could be used for group assessment, e.g. team presentation. However, the structure could be modified slightly to suit individual projects

Partner and external committees:

The module will take advantage of a newly formed design and innovation centre to reach out for potential business partners that could set industrial brief(s) for students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this module:

- **Formative assessment** – During the studio sessions, students will be given a task that is related to the summative assessment. They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback.
- **Summative assessment** – Live Projects: Students will be put together in teams to work on a brief (which could be set by external partners from the industries). The students are expected to work collaboratively during the research stage, namely creating a research plan, designing research instruments, collecting data and analysing data to extract key insights. Each student is expected to contribute in terms of design work based on the research results gathered by their team.

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Assessment Plan	
Type of Evaluation	% Contribution in Grade
Continuous Evaluation	50 (group)
Final Evaluation	50 (group)

Note: Group could be self-selected or allocated by the tutor(s).

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

80% attendance is minimum (Further details to be completed by WUD)

Learning Resources:

Reading and required materials

Experiential space design will cover a number of creative fields – for example:

- UX Design: <https://www.interaction-design.org/literature/topics/ux-design>
- Spatial Design: <https://www.architecture.com/knowledge-and-resources>
- Emotional Design: <https://www.interaction-design.org/literature/topics/emotional-design>

Online magazine for case studies: <https://www.dezeen.com/interiors/>

Bibliography:

Reading and required materials

- Dawar, N. and Bendale, N. (2019) Marketing in the Age of Alexa. *Harvard Business Review*, May-June 2019, p. 80 – 86.
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Websites:

Reading and required materials

To be completed by WUD

Assessment schedule:

A breakdown of each assignment and exam, scores, and percentages for each grade level.

To be completed by WUD

Class Calendar:

Dates for class topics, homework, readings, other assignments, and exams

To be completed by WUD

9.4. Systems Design for WUD

9.4.1. Systems Design: Course Overview

The proposed changes were inspired by a few short courses:



- “*Design and Prototype Embedded Computer Systems*”, which was developed by the Open University and delivered through a digital platform (<https://www.futurelearn.com/courses/embedded-systems>).
- “*Systems Design*”, which was created and delivered by University College London or UCL (<https://www.ucl.ac.uk/short-courses/search-courses/systems-design>). It aims to develop an appreciation of the design process within systems engineering lifecycle.

The existing module titled “*System Design*” at Brunel Design School was also used as a benchmark. MSc Systems Thinking Practice programme at Cranfield University provides a useful list of topics – they have been divided into different levels as shown below.

Beginner & Intermediate Levels	Advanced Level
Fundamental of Systems Thinking	Philosophy and Theory of Systems Thinking
Systems Thinking and Exploitation	Systems Leadership & Organisation Behaviours
Introduction to Systems Methods	Architecting Enterprise
Systems Research Methods	Requisite Variety for Organisation
System Practice	System Thinking for Social Change
Formal Representation of Systems	Complex Systems

Since this is a short course (6-week contact hours), the syllabus will focus on topics that are suitable for the beginners and intermediate level only.

Course Syllabus

Course Code: xxxxxx	Course Title: Systems Design	Co-Ordinator: TBC	Credits: 	ECTS Value: 5
Academic Year/Level: BDes Semester 7 MDes Semester 3	Pre-requisites: N/A	Additional tutors: TBC	Department & Programme:	

Course description & basic information:

Relationship to the discipline, scope and major themes of course content. Summary of the basic routines and learning activities for the course.

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. It is the process of defining, developing and designing systems which satisfies the specific needs and requirements of a business or organisation.

As a result, this course will introduce students to the concept of systems design and equip them with skills required to:

1. define the element of a system, such as research skills and mapping techniques
2. design and visualise the systems with suitable tools/techniques, such as flowchart
3. build prototypes and test the systems with appropriate medium

4. refine and finalise the systems

Learning goals/objectives and outcomes:

Explanation of why students should take this course, how it could be relevant to them, how it could help them now and in the future.

Upon the completion on this course, the student should be able to:

- **LO1:** Demonstrate an understanding of complex systems design (knowledge and understanding)
- **LO2:** Identify elements of a given system and critically evaluate their interrelationships (cognitive/thinking skills)
- **LO3:** Competently apply relevant tools/technique to frame the systems boundary – cognitive (thinking) skills
- **LO4:** Independently carry out the development of system design starting from capturing requirements down to evaluating and refining the solution – cognitive (thinking) skills
- **LO5:** Conduct academic research to support the development of system design and correctly reference information sources – other skills and attributes

Course programme / Sequencing learning modules

Descriptions and directions for each type of learning modules and style, quiz, exam, and related assessment activities.

The module aims to deliver a blended learning experience with emphasis on studio-based practical activities. Hence, all lectures will be followed by studio work. In this way, the students will have opportunities to practice what they have learned in classed while the knowledge is still fresh in their minds. The module will also encourage research-informed design practice with strong focus on experiential design to ensure the in-depth understanding of all key stakeholders involved.

Contact hours: 30 hours

- Teaching = 30 hours (6 hours lecture per week; over a period of 5 weeks)
 - 2-hour lecture per week (10 hours in total)
 - 4-hour studio work per week (20 hours in total)
- Self-studying 120 hours
- Total number of hours = 150

Weekly Plan		
Week no.	Possible Topics for Lecture	Possible Activities for Studio Work
1	Fundamental of Systems Thinking Concept of systems design System design thinking	<ul style="list-style-type: none"> • Facilitate group discussion about the concept of system thinking
2	Introduction to Systems Methods (1) – <i>system design process</i> Case studies & examples	<ul style="list-style-type: none"> • Brief the assignment • Help students identify suitable research tools that

		<ul style="list-style-type: none"> could be used to capture user requirements of complex systems
3	Introduction to Systems Methods (2) – <i>systems research methods</i> Introduce relevant tools for planning , e.g. iceberg model, flow chart and functional analysis Introduce relevant tools for capturing user requirements	<ul style="list-style-type: none"> Get students to apply some of tools to 1) breakdown the tasks into smaller elements, 2) map out the structure of the project and 3) plan how to conduct research to capture requirements and frame the system boundary
4	Introduction to Systems Methods (3) – <i>formal representation of systems</i> Introduce relevant tools for visualising ideas, e.g. Entity Relationship (ER) diagram, storyboarding and information architecture	<ul style="list-style-type: none"> Organise an internal review Ask students to present the research findings and analytical results (e.g. problem statement) Get students to start applying visualising tools to develop ideas and new concepts
5	Introduction to Systems Methods (4) – <i>systems practice & evaluation</i> Introduce relevant tools for evaluation , e.g. concept evaluation	<ul style="list-style-type: none"> Support the assignment Ask students to present their design concepts Get students to develop criteria for evaluating their design Facilitate a peer-review to help them to learn from their peers
6	Exploitation of Systems Thinking	<ul style="list-style-type: none"> Support the assignment Help students refine their ideas and finalise their design
7		<ul style="list-style-type: none"> Organise an external review (which might include team presentation and jury)

Note: Due to a short timeframe, group projects might be more appropriate than individual projects. Last week could be used for group assessment, e.g. team presentation. However, the structure could be modified slightly to suit individual projects

Partner and external committees:

The module will take advantage of a newly formed design and innovation centre to reach out for potential business partners that could set industrial brief(s) for students.

Assignments and Assessments:

Description of assignments and their evaluation criteria.

A range of assessment methods are used in this module:

- **Formative assessment** – During the studio sessions, students will be given a task that is related to the summative assessment. They will receive formative feedback on a weekly basis. They are expected to revise their work according to the feedback.
- **Summative assessment** – Students will be put together in teams to work on a brief (which could be set by external partners from the industries). They are expected to work collaboratively from capturing requirements down to evaluating and refining the solution.

Evaluation:

Percentages allocated to exams, assignments, homework, and class participation.

Assessment Plan	
Type of Evaluation	% Contribution in Grade
Continuous Evaluation	50 (group – internal review)
Final Evaluation	50 (group – external review)

Note: Group could be self-selected or allocated by the tutor(s).

Attendance and Course Policies:

Explanation of how students are expected to participate in the class, how they should prepare, and how the instructor will assess their participation.

80% attendance is minimum (Further details to be completed by WUD)

Learning Resources:

Reading and required materials

- <https://www.appliedsystemsthinking.com/resources.html>
- <https://untools.co/systems-thinking>
- <https://www.open.edu/openlearn/money-management/management/leadership-and-management/managing/introducing-systems-thinking>
- <https://www.open.edu/openlearn/science-maths-technology/computing-ict/systems-thinking-and-practice/content-section-0?active-tab=description-tab>
- <https://thesystemsthinker.com/>

Bibliography:

Reading and required materials

- Checkland, P. (1999) *Systems Thinking, Systems Practice: Includes a 30-Year Retrospective*. Wiley
- Goodman, M. (2002) Hopkinton, MA: Innovation Associates Organizational Learning.
- Hawryszkiewicz, I. (2000) *Introduction to Systems Analysis and Design* (5th edn). Pearson.
- Maier, M. (2009) *The Art of Systems Architecting* (3rd edn). CRC Press.
- Levin, M. (2015) *Modular System Design and Evaluation*. Springer.



- Vesselov, S. and Davis, T. (2019) *Building Design Systems: Unify User Experiences through a Shared Design Language*. Apress.
- Whitten, J. and Bentley, L. (2005) *Systems Analysis and Design Methods* (7th edn). McGraw-Hill Education.

Websites:

Reading and required materials

To be completed by WUD

Assessment schedule:

A breakdown of each assignment and exam, scores, and percentages for each grade level.

To be completed by WUD

Class Calendar:

Dates for class topics, homework, readings, other assignments, and exams

To be completed by WUD

- i https://ec.europa.eu/education/resources-and-tools/european-credit-transfer-and-accumulation-system-ects_en
- ii <https://www.lboro.ac.uk/study/undergraduate/courses/a-z/product-design-and-technology/>
- iii <https://www.imperial.ac.uk/design-engineering/study/meng/modules/year-4/enterprise-roll-out/>
- iv <https://into.aalto.fi/display/encoim/Advanced+Studies+2020-2022>
- v https://rca-media2.rca.ac.uk/documents/MA_Service_Design_Programme_Specification_2020_21.pdf
- vi <https://www.gsa.ac.uk/media/1813943/mdes-in-design-innovation-all-named-awards-2020-21-capf.pdf>
- vii In line with the UK FHEQ, one UCL credit equates to 10 notional learning hours. Credits can be converted to the European Credit Transfer System (ECTS) using this formula: 1 FHEQ credit = 0.5 ECTS credits = 10 notional learning hours.
- viii <https://www.ucl.ac.uk/module-catalogue/modules/interaction-science/PSYC0101>
- ix <https://www.ucl.ac.uk/module-catalogue/modules/interaction-design/PSYC0097>
- x https://www.city.ac.uk/_data/assets/pdf_file/0004/571729/PSHCID-MSc-Human-Computer-Interaction-Design.pdf
- xi https://www.arts.ac.uk/_data/assets/pdf_file/0031/257359/BA-Hons-User-Experience-Design-Programme_Specification-20.21.pdf
- xii <https://into.aalto.fi/display/encoim/Curriculum+2020-2022>

