Royal College of Art
Postgraduate Art and Design

Imperial College London

Programme Specification

1. General information

Programme title:	MA/MSc Innovation Design Engineering
Award:	MA (RCA) + MSc (ICL)
Mode of study (FT/PT)	Full Time
Exit award:	PG Diploma
Qualification Framework level:	Level 7
School/Department or equivalent:	RCA School of Design and ICL Dyson School of Design Engineering
Campus location(s):	RCA Battersea and Kensington; ICL South Kensington
Total UK credits:	360 credits
Total ECTS:	180 credits
Partner(s) *(if applicable)*:	Royal College of Art (RCA) and Imperial College London (ICL)
Type of partnership *(if applicable)*:	Double degree award
Date valid from/to	September 2025-26

2. Programme Philosophy

Innovation Design Engineering (IDE) is about creating a new type of innovator, one who will be a global leader in the integration of design, engineering, science and enterprise, and distinctively positioned to tackle the volatile, uncertain, complex and ambiguous challenges society and the planet face. IDE is about transformation: transformation of the individual into a fiercely curious, open-minded, empathic, analytical and motivated individual who can lead teams to produce transformative results; transformation of the practices that transcend disciplinary boundaries through the utilisation of highly creative, practical and iterative processes; and transformation of the understanding of how past, present and future contextual factors can help identify issues and opportunities as a basis for generating outputs that will create lasting impact for humanity and the planet.

The programme's transdisciplinary approach to innovation combines the skills and cultures of two internationally renowned but very different organisations: a predominantly technical university (Imperial College London) and a college of art and design (Royal College of Art). The result is the rigour and precision of science, technology and engineering in combination with the inspirational and creative aspects of design.

The programme fosters a collaborative approach involving transdisciplinary team working and encourages collaboration with industry and a wide range of stakeholders in innovation ecosystems. IDE is also about nurturing a supportive, empathic culture - the IDE family – not only whilst on the programme, but through its extensive alumni network. Graduates head into diverse creative careers as consultants, innovators, entrepreneurs, researchers, freelancers or within corporations.

3. Educational Aims and Outcomes of the Programme

Programme aims

- *Aim 1:* Facilitate agency, collaboration and leadership for transformational change
- *Aim 2:* Develop professional skills and confidence driven by curiosity, flexibility, purpose, ethics, openness, empathy, respect and rigour.
- *Aim 3:* Critically appraise past, present and future contextual factors as a basis for innovation
- *Aim 4:* Identify issues and opportunities to create lasting impact for humanity and the planet
- *Aim 5:* Deploy transdisciplinary practices to enhance innovation with a distinctive combination of engineering, design and enterprise
- *Aim 6:* Utilise highly creative, practical and iterative processes in design and engineering to deliver social, economic and environmental benefits

What will I be expected to achieve?

Upon successful completion of the programme, you will be expected to meet the requirements of both the RCA and ICL College-wide Learning Outcomes and your programme-specific Learning Outcomes.

RCA College-Wide Learning Outcomes

- Interrogate and articulate the intentions of your work in relation to the critical and conceptual context of your field(s) of study;
- Independently plan and produce work that is informed by developments at the forefront of your field(s) of study;
- Evaluate and critique the principles and methods of research in your field(s) of study, and apply these principles to your creative, professional and/or scholarly practice;
- Demonstrate originality in how you translate knowledge into practice;
- Communicate your creative, professional and/or scholarly practice to a non-specialist audience;
- Critically reflect on the likely public impact of your creative, professional and/or scholarly practice, and on your responsibilities as a practitioner;
- Define your professional ambitions and identify the challenges involved in meeting them.

ICL College-Wide Learning Outcomes

The Imperial College-Wide Learning Outcomes (otherwise known as the Graduate Attributes) are a set of core competencies to which we aspire in all our degree programmes. Our aim for our graduates is that you will:

- Demonstrate deep conceptual understanding of their chosen discipline
- Work effectively in multi-cultural, international teams and across disciplinary boundaries
- Approach challenges with curiosity, critical thinking and creativity
- Innovatively apply their skills to tackling complex real-world problems
- Understand and value different cultures and perspectives
- Have developed into independent learners with high self-efficacy
- Display a strong sense of personal and professional identity

Find out more about ICL's commitment to offering all of our students a world-leading, rigorous, evidence-based, inclusive educational experience embedded in a vibrant research environment, by visiting the Learning and Teaching Strategy webpages: https://www.imperial.ac.uk/learning-and-teaching-strategy/

Programme-Specific Learning Outcomes

Upon successful completion of the programme you will be able to:

1. HUMANITIES: Develop work which has been deeply informed by evaluation of systemic global, social, cultural, environmental and ethical factors.
2. ENGINEERING PROCESSES: Select appropriate concepts, methods, techniques, tools and technologies associated with design engineering and apply with high levels of skill and imagination within diverse innovation challenges.
3. ENTERPRISE & VALUE: Adopt, apply and integrate practices in innovation, entrepreneurship, business and project management to add value and to evidence the potential to create impact.
4. GROUNDED INSIGHT: Deploy and integrate research methods from the fields of engineering, design and humanities to support the exploration and validation of design engineering project topics.
5. PROTOTYPING & TESTING: Carry out prototyping and experimentation at all stages of innovation in products, services, and systems to enable effective evaluation, iteration and communication at a range of scales and levels of technical complexity.
6. FUTURES: Analyse and synthesise data and ideas responding to social, environmental and technological futures.
7. CREATIVE ENGINEERING & DESIGN: Integrate creative processes within a diverse range of design engineering projects through exploration, analysis, evaluation, definition, experimentation, development and delivery of distinctive outcomes.
8. SCIENCE & TECHNOLOGY: Develop innovation in response to challenges, exploiting the engineering sciences of mechanics, materials, thermodynamics, computing, and electrical & electronic systems.
9. DIALOGUE & COMMUNICATION: Communicate effectively through dialogue and oral, graphical, video, physical and written media with diverse audiences.
10. CREATIVE COLLABORATION: Effectively implement a transdisciplinary and teamworking approach to diverse contextual challenges and opportunities.
11. LEADERSHIP: Exemplify agency and leadership in transformational learning, development and project planning at micro, meso and macro scales.
12. CULTIVATING PURPOSE: Analyse and position themselves in evolving global professional contexts identifying a personal professional identity and related pathways.

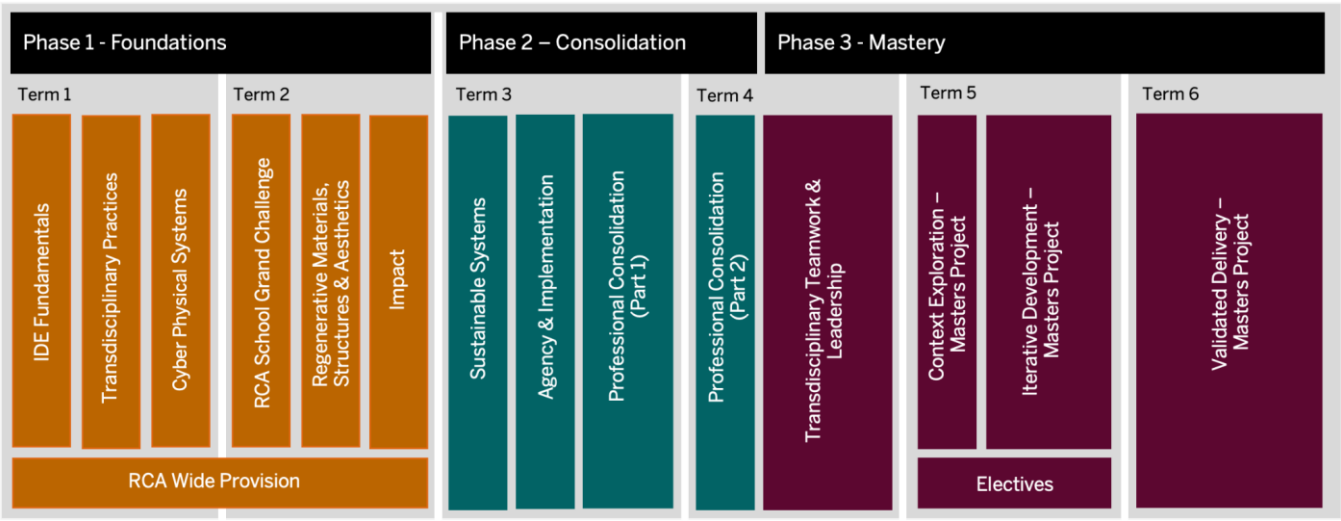
The primary themes for the Programme Learning Outcomes are indicated with capitals. The outcomes are distilled descriptors of complex and comprehensive combinations of specific knowledge, intellectual and technical skills and personal-professional attributes. They encompass significant concepts and themes which are integral to the distinctiveness of the programme. Students are provided with a glossary of terms and further explanations during introductory sessions.

These outcomes describe qualities which are expected to be developed continuously through the two years of the programme and *mastered* by the completion of the programme. You will be able to demonstrate *development* of all the outcomes by the completion of all units in Phase 1 and the first two units of Phase 2. Eligibility for a PGDiploma exit award is achieved by passing 120 UK credits in the first year of the programme and demonstration of *development* of learning outcomes 1, 2, 4, 5, 7, 8, 9, 10.

4. What will I learn?

The two-year IDE programme consists of three phases, each characterising the overall nature of the content and learning at each phase. **Phase 1: *Foundations*** (terms 1-2) is concerned with students gaining confidence and exploring the IDE transdisciplinary landscape and toolbox building. **Phase 2: *Consolidation*** (terms 3-4) is during the summer term, the transition period and beginning of the autumn term with students working independently, developing their individual and professional agency. **Phase 3: *Mastery*** (terms 4-6) is the final period for students to develop significant agency in their own areas of interest and emerging professional pathways, creating a substantial springboard into next steps for ventures, research and careers - and lasting impact.

Curriculum Map



Programme Structure

Phase	Unit Title	Term	Credit Value *(CATS)*	Institution	Core or Elective?	Outcome (award contribution)
1	IDE Fundamentals	1	15	RCA/ICL	Core	Pass/Fail
1	Transdisciplinary Practices	1	15	RCA/ICL	Core	Pass/Fail
1	Cyber Physical Systems	1	15	ICL	Core	Pass/Fail
1	RCA Wide Provision	1-2	30	RCA	Core	Pass/Fail
1	RCA School of Design Grand Challenge	2	15	RCA	Core	Pass/Fail
1	Regenerative Materials, Structures & aesthetics	2	15	ICL/RCA	Core	Pass/Fail
1	Impact	2	15	ICL	Core	Pass/Fail
2	Sustainable systems	3	15	ICL	Core	Pass/Fail
2	Agency & Implementation	3	15	RCA/ICL	Core	Pass/Fail
2	Professional Consolidation (part 1)	3	30	RCA/ICL	Core	Pass/Fail
2	Professional Consolidation (part 2)	4	15	RCA	Core	Pass/Fail
3	Transdisciplinary teamwork & leadership	4	45	RCA/ICL	Core	Grade (30%)

3	Context Exploration – Masters Project	5	15	RCA/ICL	Core	Grade (10%)
3	Iterative Development – Masters Project	5	30	RCA/ICL	Core	Grade (20%)
3	Elective	5	15	ICL	Core	Pass/Fail
3	Validated Delivery – Masters Project	6	60	RCA/ICL	Core	Grade (40 %)

The programme phases and units are further described as follows:

Phase 1

Phase 1 is made up of a series of units. Each of these units focuses on a particular aspect of innovation, design and engineering and involves practice, as well as research activities within the development of products, services, systems, campaigns and experiences, and in exploring broader societal challenges.

In each unit, you will undertake a design-led project to a brief - sometimes set and sometimes of your own devising. Emphasis is placed on generating imaginative ideas, development and validation through testing prototypes, simulation and gaining feedback from expert stakeholders such as potential end users, designers, engineers and entrepreneurs.

Phase 1 Units	Description
IDE Fundamentals	Introduction to, and confidence building through project-based learning in the key differentiating IDE concepts.
Transdisciplinary Practices	Exploration and critique of how skills, mindsets, knowledge and practices from different disciplines can be combined to form new holistic practices to enhance innovation.
Cyber Physical Systems	An investigation into how physical computing, connected systems, big data and machine learning are being used to tackle complex problems. A foundational course assuming elementary or no prior knowledge which develops understanding and confidence in associated subjects including mechanical design, control & feedback systems, electronics, programming and machine learning.
Regenerative Materials, Structures & Aesthetics	An investigation of materials and their materiality in terms of their behaviours, capabilities and environmental impact through critical analysis and experimentation.
Impact	Exploration and evaluation of how context (including cultural, geographic, social and economic) can frame and highlight opportunities for innovation and impact through a collaborative contextual study project with external stakeholders.

Phase 2

Phase 2 comprises two units and is about professional consolidation. During phase 2 you will develop your individual and professional agency, identity and pathways through

engagement with organisations, your own ventures or within research fields. Phase 2 culminates in you defining and planning your team and individual projects for Phase 3.

Phase 2 Units	Description
Sustainable Systems	Develops understanding and skills in systems level approaches to innovation and transitioning products, services and systems to circular and regenerative outcomes. This also involves developing capabilities in utilising expert networks for transdisciplinary practice.
Agency and Implementation	Focuses on developing agency and vision in scoping, planning and design in an area of individual interest and focus together with developing a design concept with associated emergent specialist skills to high levels of practical resolution including testing and validation.
Professional consolidation (part 1)	Development and consolidation of external experience relating to professional pathways in organisations, own ventures or research fields.
Professional consolidation (part 2)	Development of personal-professional agency to define and plan individual and team-based directions for Phase 3.

Phase 3

Phase 3 includes a series of units to strengthen your professional agency, leadership, knowledge and skills. Phase 3 includes a team-based project, individual projects and an elective module. The elective modules enable you to develop specialisms in particular areas of interest to you. The thematic areas you choose to explore in your team and individual projects can be diverse and are supported by a broad range of expert tutors.

Phase 3 Units	Description
Transdisciplinary teamwork & leadership	The creation of innovation design engineering value with validated potential impact through effective team working in a defined area of contextual need or opportunity.
Context Exploration– Masters Project	Self-directed project that identifies and investigates a context for study through a process of planning, primary and secondary research to discover important issues and opportunities for innovation design engineering.
Iterative Development – Masters Project	Self-directed project that builds on the issues and opportunities uncovered in 'Context Exploration'. Focuses on synthesis and evaluation of innovation design engineering opportunities, followed by iterative creation and evaluation of a range of ideas, concepts and embodiments with key stakeholders in terms of their potential impact from social, cultural, economic, ethical and environmental perspectives.
Electives – Dyson School of Design Engineering ICL	You will have an opportunity to take an elective from a portfolio of specialist subject modules offered by the Dyson School of Design Engineering at ICL. You will select a subject in consultation and with approval from programme tutors during Phase 2. The elective choice provides the opportunity to deepen or expand specialist knowledge, for example to complement

	the direction of the Master's project. This first iteration of this updated programme will offer the following options: ….*Audio Experience Design:* An introduction to audio technology and perception, which will include acoustics (architectural and musical), digital signal processing, audio recording techniques (microphones, DAC/ADC, etc.), audio reproduction techniques (speakers design, etc.) 3D sound synthesis and reproduction, and psychoacoustics. *Advanced Industrial Design.* In this unit you will work on developing and building core industrial design skills and knowledge. This elective also aims to develop skills, knowledge and understanding of the potential of generative design, both in the tools for designing and in the emerging applications in IoT systems and experiences. *Design of visual systems.* Modern engineering systems rely heavily on image and video data to inform decision making. Self-driving algorithms in vehicles and robots are just some examples. This elective aims to provide overall knowledge and understand of the human visual system, and the technology available for design engineers to acquire, analyse, interpret and exploit visual information gathered with modern electronic components. Apart from the usual lectures and tutorials, the elective is accompanied by a series of practical exercises that help to teaching the course materials with real-life problems. *Design for additive manufacturing.* Additive manufacturing enables the creation of complex 3D geometries not possible with traditional manufacturing, allowing the creation of new types of object with unique material and structural properties. This elective provides students with the platform needed to solve future industry challenges, get the most out of 3D printing technology and ultimately find the optimal design solution. We will explore advanced CAD plugins for manufacture, optimisation and generative design purposes. You will have an interest in 3D printing and advanced manufacturing methodologies and the desire to become industry experts or academic researchers in this exciting area. *Designing interventions for behavioural change.* This elective will develop your competence in scoping, analysing and developing creative interventions for behaviour change. For example wearables to improve health, products for more sustainable consumption and policy to improve tech-enabled business models. You will be exposed to several creative behavioural frameworks that can be applied to the development of (digital and physical) product, service, event, policy and organisational interventions. Next, you will work as a

	team to analyse and develop an intervention of your own. Learning is enhanced through interactive workshops and discussions complemented by individual and group learning activities to translate your understanding into real-world contexts. *Economics and Finance for Systems Design.* In this unit you will be provided with an applied skillset to assess the financial viability of a product or system of your choice, find the best performing designs, and build-in flexibility to deal pro-actively with risk and uncertainty. This elective focuses on core principles in micro-economics, accounting, finance, uncertainty modelling, and decision-making - emphasising hands-on applications through the analysis of a wide range of real-world systems. *Games and mechanisms*. Many design engineering problems involve interaction among agents within a system. Such interactions can be seen as games. Consequently, the elective aims at giving relevant basics to the students to analyse interaction within systems as games. It introduces the principles to describe agents and the type of games they are involved in. It then digs into alternative forms of games, e.g., non-cooperative, cooperative and population games. The necessary mathematical tools to analyse these games are introduced. Finally, you are introduced to mechanism design, in order to steer agents in a game towards a certain outcome. ....*Machine learning for design engineers*. Machine learning, as a topic, needs no introduction. The world is now full of examples of applications in which machine learning algorithms have transformed our lives. The basic objective is to de-mystify the topic, and expose students, in an accessible manner, to both the basics of machine learning, and to some of its most important methods. Along the way we shall reveal some of machine learnings' best kept secrets. By the end of the course students will be familiar with the basics of machine learning, have experienced some of its popular methods, and applied some of its best-known algorithms in a lab setting.
Validated Delivery – Masters Project	Self-directed project that builds on the insights gained from the 'Iterative Development'. Focuses on the iterative design, development and evaluation of the proposed innovation with key stakeholders for validation, communication and diffusion

5. How will I learn?

The programme takes an experiential approach to learning with project-based learning as the main context for developing knowledge, skills and honing attitudes and values required for innovation through design engineering. You will learn through a variety of teaching typologies which include briefings, lectures, workshops, demonstrations, independent study, gateway presentations,

seminars, critiques, peer reviews, exhibitions, technical instruction, and group and individual tutorials with staff from both institutions.

In tune with the nature of innovation and transdisciplinary practice in professional contexts, you will often work in teams, and in units such as transdisciplinary leadership & authority in Phase 3, your evolving skills and knowledge in managing and leading team-based activity is an integral part of the learning outcomes.

Each unit will comprise of one or more projects. Learning will be assessed in each unit through formative and summative assessment. The formative assessment will provide you with feedback on the strengths and weaknesses of your work to date and recommend strategies for improving learning to enhance the outcome of the summative assessment. Examples of learning support and feedback include:

Personal Tutorials: You will be assigned a personal tutor when you enrol on the programme, who you can contact primarily, if you are in need of pastoral assistance. One tutorial a term is designated to allow you to reflect on your progress as well as challenges in your studies and any challenges faced outside of the RCA and ICL.

Group and Joint Tutorials: You will review your work-in-progress with a variety of staff and Visiting Tutors in tutorials, typically 1 to 1 or small group interactions. In IDE2 you will also have Progress Review Tutorials. These sessions are work reviews so it is expected that you will attend with your work, which may include research results, sketches, prototypes, simulations.

Peer review and learning: Reviewing each other's work and supporting each other with skills development is strongly encouraged. Taking place during informal and formal activities such as Progress Review Tutorials in a studio environment this is one of the most powerful ways you will learn.

Lectures: Lectures cover a range of subjects in innovation, design and engineering. These sessions augment the intense creative and developmental demands of the project-based units. The programme runs a series of practice and research-related lectures and talks by staff, visiting tutors and guest experts.

Gateways: At key points (gateways) in a unit, you will present your work to others in the year group plus selected staff and visiting tutors. Verbal feedback is given during the reviews and written feedback (and grades for assessments) is made available after the event.

Seminars: Seminars are structured presentation and discussion events that are facilitated by staff and, on occasions, special guests. These sessions are based on peer interaction and review with tutor guidance and are an excellent chance to see where your work lies in relation to your classmates. They are a safe and relaxed place to test new ideas, admit mistakes, demonstrate excellence, and share anything relevant as well as take advantage of the serendipitous nature of innovation.

Overall Workload
Your overall workload consists of face-to-face sessions (contact time) and independent learning. Contact time includes teaching, technical support, assessment, and provision of guidance and feedback. While your actual contact hours may vary between the different units you undertake during the two years, the two years of study (360 UK credits) equates to 3600 learning hours (including contact time and independent learning). On average, contact time will cover approximately 25% of your overall learning hours, and therefore you will spend approximately 75% of your time on independent study.

Does this programme include:	
A Work in Progress (WiP) show?	Yes
A Final/Graduation Show?	Yes

**Please note that all provision for Shows must be agreed with ILTS prior to publication of the programme specification.*

6. Assessment and feedback

Regulations
Regulations for assessment and progression are managed by the RCA. Please refer to the RCA for details.

Unit assessment
Your progress is reviewed on a continuous basis through summative assessment of each unit of study. Summative assessment is designed to assess your performance and enable you to pass or fail a unit of study, and therefore accumulate credits. In units which count toward your final MSc attainment you will also be given a grade to indicate your level of performance. Information regarding individual assessments will be included in the Unit Descriptors, and will be available to you at the beginning of the academic year. For each unit, you will be assessed against the learning outcomes of that unit and receive feedback on your submissions (typically within three weeks of assessment completion) including both verbal and written feedback to support your development. A variety of assessment methods are used throughout the programme including individual and group coursework, written reports, portfolios, oral presentations, viva voce, videos and demonstrations. In addition to summative assessment points, in each of the units we will give formative feedback throughout the learning. This type of feedback is designed to help you improve and do not count towards your grades or progression. During formative feedback points, we expect you to keep notes of comments and verbal feedback, providing an aid to reflective learning. Informal feedback may also occur in peer reviews and on an ad-hoc basis with a range of visiting tutors from the wider colleges or industry. More information on assessment types can be found on the ICL website.

Additional Assessments/Programme Requirements
If your programme has additional requirements for successful completion (eg. Professional, Statutory, Regulatory Body (PSRB) requirements), please include full details here. The IDE programme is subject to the quality assurance procedures of both the Royal College of Art and Imperial College London. You will be assessed by both institutions and must meet the programme requirements of both institutions.

7. What award can I get?

MA & MSc Innovation Design Engineering
In order to qualify for an MA in Innovation Design Engineering from the Royal College of Art and a MSc in Innovation Design Engineering from Imperial College London, students will be expected to earn 360 UK credits across the units delivered (180 UK credits for the MA and 180 UK credits for the MSc).

The RCA is responsible for the issue of the pass list for the MA award and the issue of MA award certificates. ICL is responsible for the issue of the pass list for the MSc and the issue of the MSc award certificates.

PG Dip Innovation Design Engineering
In order to qualify for a Postgraduate Diploma in Innovation Design Engineering as a shared award from the Royal College of Art and Imperial College London, students will be required to earn 120 UK credits across the units delivered in the first year of the programme.