Technology for Social Innovation

Course Syllabus

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1. Course description / Introduction to the course

TeSI Summer School is an intensive 10 ECTS course in which students apply human-centred design methods to identify disruptive applications for cutting-edge technologies. The techologies have all been developed under the ATTRACT EU initiative with the overall objective of solving social needs. We will explore the human, technological, financial and social aspects of creating orgsansiations that can deliver these innovations to the world sustainably.

Across 4 weeks at ESADE FusionPoint Barcelona, FabLab Sant Cugat (Barcelona) and CERN IdeaSquare in Geneva (Switzerland), the diverse, multidisciplinary teams will learn the principles and practices of Design Thinking, Human-centred Innovation, Digital Fabrication and Technology Transfer through practical workshops and close coaching from experts from across Europe.

The program aims to attract students with a range of educational and social backgrounds. This is important in order to offer a richer learning experience for alumni but also to improve the quality of design and innovation outcomes, which are correlated with the diversity of life experience and voices within the team.

The goal of ATTRACT is to establish a systematic framework to transform breakthrough technologies developed for fundamental research purposes into breakthrough innovations that can be turned into sound industrial applications and provide value for society.

Student teams will work for 4 weeks on projects following a user-centred design process (Design Thinking and Lean Start-up). The student teams first identify a specific social innovation challenge they will work on, for which the chosen technology could be a potential solution. For the development of the solution, the teams receive support from the coaching team and have touch points with the scientists of the involved research centres. The teams will develop a new solution concept and present a proof-of-concept prototype and a business or non-business organisation model.

Looking forward to meeting you in class!

Ian, Sonia & Mireia

2. Learning objectives and competencies

The course helps you in developing the following competences:

1. Identifying, developing, and assessing the societal need and potential impact of novel technologies.
2. Ability to communicate clearly and argue for decisions made in an innovation project.
3. Ability to make decisions, move forward and reach consensus as a team under conditions of uncertainty, where information is incomplete or ambiguous.
4. To lead your own work in an independent, proactive manner.
5. To lead work in an explorative project which requires constant reflection and adaptation to added information acquired.
6. Ability to work and efficiently collaborate in a multidisciplinary team: understand what you and others can contribute as professional expertise.
7. Managing the relationship with the scientist you work with.

By the end of the course, you:

1. Will have developed novel ideas, moved from conceptual thinking to action, validated your ideas initially with relevant stakeholders, and understood that creating something genuinely novel requires iterative testing and development.

2. Will have gained experience in collaborating with scientists and their early stage technology, contributing to the societal value of the technology and gaining a deeper understanding of the scientific process and the "gap" between scientific research and the business world.

3. Will have used advanced 2D, 3D and electronic digital fabrication tools to prototype ideas.

3. Course format and methodological approach

Overall Approach

To meet the objectives of the course, the methodology is based on the idea of hands-on, experiential learning. This will be combined with lectures that provide framework and specific technical inputs for the work.

You will work on the project during the weeks of the course, following a project plan that you will prepare at the beginning of the course and will continuous update as the course continues. You will keep a project diary with observations and thoughts. Autonomy and self-directed teamwork is the cornerstone of the entire course. Note that this does not mean you work alone: as well as your team mates you will have the course faculty to support you.

This is a unique course in many different ways – this has important implications for the experience and learning journey for students who will particiapte. It is important that all students carefully read the points in the section below.

Project immersion
Students are required to commit to working full-time on the project for the duration of the summer school (i.e. 8 hours per day, 5 days per week over the 4 week of the course). However there will be also times where students can join visits with the other Summer School students in Barcelona.

Project Based
The program will be entirely project-based and students will be encouraged and expected to explore their chosen area of focus as deeply and broadly as they can using diverse primary and secondary research sources

Learning in context
Lectures, workshops and coaching will centre around the teams' chosen problem and technology focus area. The course structure has been created to ensure that learning activities are mapped onto the stage of the design process at which the students find themselves so that content is (as far as possible) always relevant, timely and immediately applicable

Self-directed learning and autonomy

Although there will be close and frequent support from the program faculty, the student teams have a high degree of autonomy in steering their project within the boundaries of the Design Thinking method. They will be responsible for defining and managing their work as they explore the problem, define and develop their solution and adapt their chosen ATTRACT technology to fit their target users needs.

Passion-based learning

The program faculty and support staff seek to ignite and sustain participants' passion for human-centred design and evidence-based innovation. In return, students are expecting to bring an open mind, curiosity, passion and a high level of commitment to the course.

Empathy

Materials and exercises in this course will emphasise the need for close contact with, and immersion in, the world of target users in order to build deeper empathy for users and stakeholders and a more detailed and accurate appreciation of their needs.

This empathy will motivate and sustain student teams as they search for viable, accessible and sustainable solutions for target users.

Close coaching

Since the program is relatively short the program provides frequent ad hoc coaching sessions to the students. The aim of these sessions is to identify any issues or situations that are blocking the team's progress and help them address them as quickly as possible and get back on track.

Pastoral support & Inclusivity

Throughout the program, resources and activities will be available to help students develop trusting and strong relationships with their peers. During intensive programs such as this one, issues may sometimes arise between team members. Program staff will do their best to ensure that students have access to the support and resources they may need to help them address any issues that may arise between team members. Participating in the course requires that all students agree to respect and embracing the diversity of all participants and stakeholders at all times. There is a zero tolerance policy for discrimination on the basis of age, gender, sexuality, race, religion, nationality and physical or mental diversity.

Innovation Potential

Depending on the Technology Readiness Level of the chosen technologies and the nature of the problems they are choosing to address, students may come up with innovations that are feasible within the short-to-medium term or they may come up with innovations that are only likely to become feasible once the technology has been more fully developed. The program encourages students to recognise and adapt their work according to these two possible outcomes. The prototypes they develop at the end of the course will therefore be either demonstrations of a potential near-future application of the chosen technology or more visionary explorations of a more distant reality.

Collaboration with the selected Scientists

In these couse we will have the collaboration with scientists from a research center within Attract program. An Attract technology will be introduced at the beginning of the course, as teams are formed and project topics chosen. The role of the scientists is to introduce the students to the technology/technologies they are developing. This is meant as inspiration and a jumping-off point: showing the possibilities in which technologies could be used to solve social challenges. The role of the scientists is to help the students through their exploration of the technology and its potential and limitations.

What do we expect from your participation during the course?

This is a practical course, and we expect active engagement in the project work both in and outside class, as well as during the coaching sessions. The learning happens, and central questions arise when you apply your knowledge to the project work and reflect on this experience. Since you will be working in a team, your active engagement will not only guarantee your personal learning, but also that to your peers.

The course faculty, as well as the coordinators will be available for group or individual support during the course. If needed, feel free to contact us by email to schedule an appointment or to solve any course-related question you may have.

An online learning area will be available. There you will find instructions for the course activities, communications, bibliography, etc. Slides of the sessions will also be posted there after each class.

4. Course contents

Overall structure

The course consists of three types of activities:

1. **Intensive weeks**: four weeks starting the **29th of May until the 23rd of June 2023 from 9h30 to 14h** with a 30 min. break. There are class sessions, facilitated workshops and time for teamwork on given assignments. You will be provided a detailed program in advance.

2. **Independent teamwork**: Most of this will take place during the afternoons **(14h-17h Monday-Friday)** but there may also be times where you will need to work indivudally or as a team outside of these hours.

3. **Coaching sessions:** Sessions with your coaches will happen at specific intervals during the course and there will also be opportunities on certain days for more ad hoc "office hours" coaching sessions for teams who need it.

In the following sections, we offer a more detailed outline of these main activities.

1st Week: 29th May-3th June 2023 @Esade Fusion Point (Barcelona) & CERN IdeaSquare (Switzerland)

This kick-off week focuses on getting each team started with their challenge and project work. The objective is to get an understanding of the technologies chosen for the course, meet the teams, and start the work to define the problem each team will work on. Teams will also learn about Research Centers and how they work to develop innovative technologies. On the second day, students will travel to CERN IdeaSquare in Geneva, Switzerland.

The time in Geneva comprises an exploration of the power and the passion that comes from international, cross-disciplinary collaboration - embodied by CERN and the Large Hadron Collider, the largest and most complex machine ever built by humans. At CERN IdeaSquare, the workspace on campus dedicated to explore methods of multi-disciplinary collaboration, students will deepen their understanding of the problems they are trying to solve and the ATTRACT technologies being explored. On Sunday 4th of June, students will return to Barcelona.

The class sessions and workshops include:

- Introduction to Design Thinking.
- Overview of the science and technologies involved in the course.
- How to explore the 'Problem Space'.
- Understanding Research Centers - what are they, how they work, how they create new innovations and spin-out companies.
- Identifying and understanding the market need for innovative technologies.
- Successful collaboration in multi-disciplinary teams.
- Retrospectives and continuous improvement.

2nd Week: 6th June – 9th June 2023[1] @Esade Fusion Point (Barcelona)

The second week is all about finding stakeholders, interviewing them and making sense of their needs in order to have a clear understaning of the problems you are trying to solve with the ATTRACT technologies. The class sessions and workshops include:

- Defining potential users and stakeholders.
- Tactics for outreach to potential interviewees.
- Basics of good user research.

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[1] Note that Monday June 5th its a bank holiday, so the Campus is closed, and we won't have class.

- Customer Discovery & Learning Conversations.
- Creating evidence from user research.
- Formulating problem statements to guide the project.
- Reviewing the Project Plan.

3rd Week: 12th June -16th June 2023 @FabLab & Fusion Point (Barcelona)

This week focuses on getting into the solution space, fast. We will start to match problems identified by teams with their ideas for potential applications of the chosen technology, with an emphasis on selecting innovative ideas and killing bad ones.

Teams will also learn the basics of prototyping in 2D, 3D and electronics using rapid prototyping tools – 3D design & printing, laser cutting and microcontrollers. Student will also learn how to validate ideas using prototypes and how to build a prototype that will help them learn.

At the end of this week, teams are ready to start testing their ideas.

The class sessions and workshops include:

- How to evaluate and select ideas.
- Prototyping, testing, and making sense of the results.
- Introduction to Fablab digital fabrication technologies.
- Validating solutions through experiments.
- Team feedback session.

4th Week: 19th June –23rd June 2023 @ESADE Fusion Point (Barcelona)

This final week focuses on getting the team aligned for the closure of the project: defining steps that still need to be taken, ensuring a coherent solution concept, building the finished prototype and preparing to present your proposal.

The class sessions and workshops of the final week:

- Plenty of time for dedicated teamwork.
- Time in Fablab to build the final version of your prototype.
- Workshop on communication skills: How to communicate your final proposal powerfully and clearly in English, even if it is not your first language.

Independent Weekly teamwork

Outside of the hours of class sessions (9h30 to 14h), teams carry out independent teamwork, based on the current project plan. Weekly teamwork is self-directed by the students. This requires you to take responsibility for advancing your project

work, seeking for advice needed and ensuring the continuous communication among students in your team.

Coaching

Each team will have coaching sessions with the objective to support and guide the team throughout the course. The coach will be an experienced faculty and/or practitioner working in the field of innovation.

For the coaching sessions, the teams should arrive prepared to give a short update on their project (what has happened since the last encounter, what have you learned, what doubts and questions you have, etc.). Consider the coaching session a time that the coach is dedicated to help you move forward and make most out of that time.

Final Presentations

In the final presentation, student share the output of their project work. You will receive more detailed instructions for the presentation during the course.

5. Assessment

50%	Team performance
35%	Individual performance
15%	Peer evaluation

Team performance

This dimension includes both the process the team went through while developing the outcome, as well as the outcome itself. They are inherently interlinked, as good process usually leads to good outcomes. However, we want to outline both aspects separately, because sometimes, due to uncertainties in the project and the industry environment, the project outcome may be of lower quality than the process. In these cases, the evaluation will focus on the quality of the process of the team – aspects that were within the control of the team.

When evaluating the process, we consider the team's ability to lead the project through a well-argued learning process, both in the problem- as well as in the solution space. Some of the criteria for evaluating the process of the team: Is the team aware of the choices they make in the project? Are the choices and decisions well-grounded in evidence? Is the team aware of uncertainties or assumptions that are present in the project? Does the team manage well the time

available? The process of the team is evaluated during the coaching sessions, and workshops that form part of the three days of classes.

The evaluation of the outcome is based on 1) the final solution proposed by the team, 2) final presentation of the project, and 3) the final reporting.

Each team will deliver a final presentation and final reporting of their project. The final reporting consists of a) a written report of 5000 words, b) the proof-of-concept prototype, c) a teaser video showcasing the final prototype and d) a poster/flyer. More detailed instructions and mode for delivery are provided during the course. Some of the criteria for evaluating the outcome of the project:

1. Relevance of the chosen need? Impact of the solution (how well it responds to the challenge and the identified need)? Originality of the solution?

2. Final presentation: Clarity in communicating the project's main aspects?

3. Final reporting: How well does it represent the work done in the project? How well does it take into account its audience (the case owner)? Does the report deliver a concise and logical story and sufficient evidence to back up the case?

Individual Performance

The evaluation of the individual performance in the project work consists of the coaches' evaluation of individual contribution as observed during the coaching sessions. Some of the criteria for evaluation individual participation:

- Quality of individual input into the project work
- Active involvement in the discussion during the coaching session: does the participant engage in the group discussion?
- Is the student prepared and shows evidence of participation in the project work outside of the coaching & class sessions?
- Team work: Active interaction with other team members. Does the student listen to the team mates and build on others' contribution?
- Multidisciplinary collaboration: Does the student actively and effectively bring forward their own disciplinary expertise, helping others in understanding his/her contribution and point-of view? Do the student invite students from other disciplines to explain their view, and work towards a shared understanding across disciplines?

Peer Evaluation

The project-work is a team-task. Good teamwork requires the active participation of each team member. Peer evaluation is carried out to give peers the opportunity to evaluate each others' contribution.

6. Materials

Recommended readings

- Background on the EU ATTRACT Consortium: *https://attract-eu.com*
- *The Mom Test* – Rob Fitzpatrick
- Design Thinking, Tim Brown, 2008, Harvard Business Review
- Eric Ries. The Lean Startup. *http://theleanstartup.com/*
- Steve Blank. *http://steveblank.com/* many free resources, slides, checklists, such as this helpful link *https://www.slideshare.net/zoomstra/startup-ownersmanual-founderschecklist*
- The Real Startup Book *https://kromatic.com/real*
- M.L. Patten, M. Newhart. Understanding Research Methods: An Overview of the Essentials. 10th edition, 2018. Routledge-Taylor & Francis Group
- Note on Creating a Viable Venture - A Global Perspective, Graduate School of Stanford Business, *https://hbsp.harvard.edu/tu/49f0bd6d*
- Isaacs, E. & Szymanski, M. (2013). *The Value of Rapid Ethnography* [PDF], Advancing Ethnography in Corporate Environments, Jordan, B. (Ed)., Left Coast Press, 92-107

Recommended videos

- How to build your creative confidence with David Kelley, founder of IDEO: *https://www.youtube.com/watch?v=16p9YRF0l-g*

7. Academic Team leading & designing the course

Ian Collingwood – Course Director & Lead Facilitator

Ian has spent nearly 20 years working at the intersection of technology, business and creativity. He helps organisations to put their customers at the heart of everything they do using Design Thinking, Lean Startup and other human-centred design methods.

Ian's clients include startups, accelerators, scale-ups and enterprise clients across many sectors: healthcare, pharmaceuticals, telecoms and data, manufacturing, IoT, financial services, construction, hospitality, eCommerce and recruitment. Notable clients include AbbVie Pharmaceuticals, Amazon, Suez, Orange Telecom, Vodafone, The World Bank, ING Direct, Unibail Rodamco, and the EIT InnoEnergy and InnoHealth programs.

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Since 2014 he has been a lecturer on Innovation and Creativity at ESADE and Lead Academic Collaborator for CBI (Challenge Based Innovation). Ian is also a Visiting Professor on the Master's Program for Creative Businesses at IED.

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Sonia Navarro, Attract Coordinator

Sonia holds a BEng(Hons) in communications and electronic engineering from UPC and Northumbria University (UK) and she has also completed the Esade MBA FT (2001) and Executive Education DGONG, LIS and Design Thinking programmes.

After the MBA, Sonia became the European Channel manager for one of the first start-ups in the WiFi security solutions field from their London office (with HQ in Boston based). In Esade she is now the associate director for the Executive Education courses for managers of non-governmental organisations of Esade's Institute for Social Innovation and the ecosystem architect for experiential learning at Fusion Point – where she facilitates the connection of student challenges with the ecosystem for the conception of innovation with impact.

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Mireia Sierra, TeSi Summer Program Manager

Mireia holds a BS with honors in Sociology and MSc in applied Research by the University of Barcelona. In Esade she is the Attract Academy Program Manager and Academic Collaborator at the Department of Society, Politics and Sustainabilit lecturing and doing research in sociology and social innovation fields. She is also an Associate Lecturer at the University of Barcelona teaching Sociology and Methodology.

Mireia has also been a partner at the cooperative consultancy on social innovation and SDG application for public policies. She also worked in marketing, retail and market research both national and international including three years working on an international company in Tilburg (The Netherlands). She also is very active on social movements in her local community in Barcelona.

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