

BARCELONA

Become a key change maker in the process of leading our cities towards a sustainable future with IAAC's Master in City & Technology



MASTER IN

CITY & TECHNOLOGY

BARCELONA

Directed by:
Areti Markopoulou

MASTER IN CITY & TECHNOLOGY

iaac.net iaacblog.com Instagram @iaac_mact



WHAT?

The Master in City & Technology is a unique programme oriented towards redefining the analysis, planning, and design of twenty-first-century cities and beyond. The program offers expertise in the design of digitally enhanced, ecological and human-centered urban environments by intersecting the disciplines of urbanism and data science.

MHA3

The digital revolution coupled with the unforeseen environmental, economic and social challenges that our world and cities face today, urge the practices of urban design and planning to rethink many of the traditions and bases upon which they have operated over the past decades. We believe that when we train urbanists, architects, engineers, computer scientists and technologists in the same arena, placing them in one single team, we have the potential to radically transform the urban and built environment.

This programme focuses on training the new professionals that will be able to accelerate urban innovation through the use of big data and digital technologies while following the principles of human-centered, ecological and intelligent design.







MHO?

For architects, urbanists, designers, data and computer scientists that want to become urban technologists and lead the future of urban environments.

Are you passionate about combining design and data science in order to lead the positive transformation of cities? Do you want to work together with multidisciplinary experts, industries and city administrations on real case studies for the acceleration of urban innovation and intelligent design?

Then the Master in City & Technology is made for you!

PROFESSIONAL OPPORTUNITIES

The Master in City & Technology structure links our students to an interconnected network of professionals, companies, academic and research centers, giving them the direct opportunity to be professionally integrated into both the public and private sectors in fields related to urban design & planning, urban intelligence and urban analytics. Furthermore, with the support of IAAC, students will have the possibility to create their own practises in the abovementioned fields.

This programme offers the following different formats:

MASTER IN CITY & TECHNOLOGY

MASTER IN CITY & TECHNOLOGY + THESIS PROJECT



MASTER IN CITY & TECHNOLOGY

The Master in City & Technology is accredited by the School of Professional and Executive Development at the Polytechnic University of Catalonia – European Higher Education Area (EHEA)

Credits: 75 ECTS

Direction: Areti Markopoulou

Duration: 9 Months

From October 2020 to June 2021 // Full time – Classes are only held in the afternoons to permit part-time jobs in the morning,

Language: English

Admission: Architects, Urbanists, Designers, Computer Scientists, Engineers, Data Scientists, Entrepreneurs.

MASTER IN CITY & TECHNOLOGY + THESIS PROJECT

The Master in City & Technology + Thesis Project is accredited by the School of Professional and Executive Development at the Polytechnic University of Catalonia – European Higher Education Area (EHEA)

Credits: 120 ECTS

Direction: Areti Markopoulou

Duration: 18 Months

From October 2020 to June 2022 // Full time – Classes are only held in the afternoons to permit

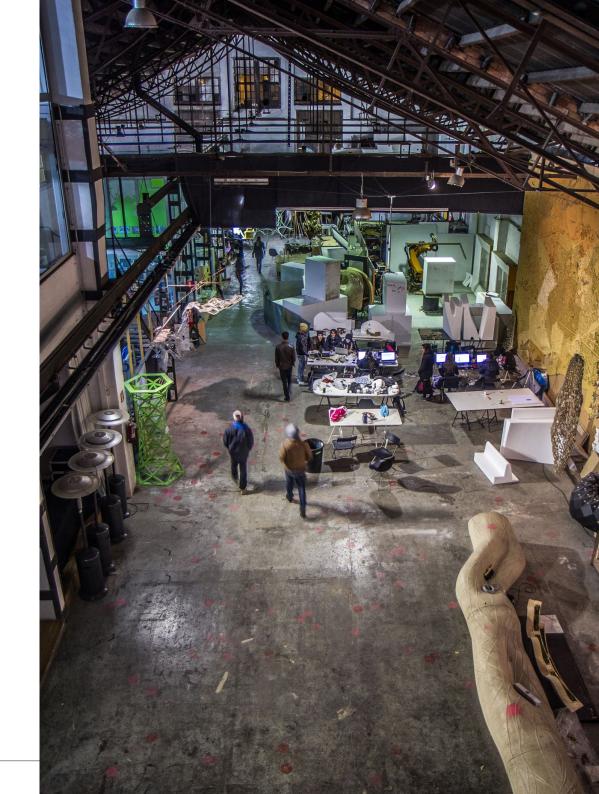
part-time jobs in the morning,

Language: English

Admission: Architects, Urbanists, Designers, Computer Scientists, Engineers, Data Scientists, Entrepreneurs. The Institute for Advanced Architecture of Catalonia (IAAC) is an international centre for research, education, production and outreach, with the mission of envisioning the future habitat of our society and building it in the present.

Based in Barcelona, the Institute offers multidisciplinary programmes that explore international urban and territorial phenomena, with an emphasis on the opportunities that arise from the emergent territories, and the cultural, economic and social values that architecture can contribute to today's society.

WELCOME TO THE INSTITUTE FOR ADVANCED ARCHITECTURE OF CATALONIA



TECHNOLOGY

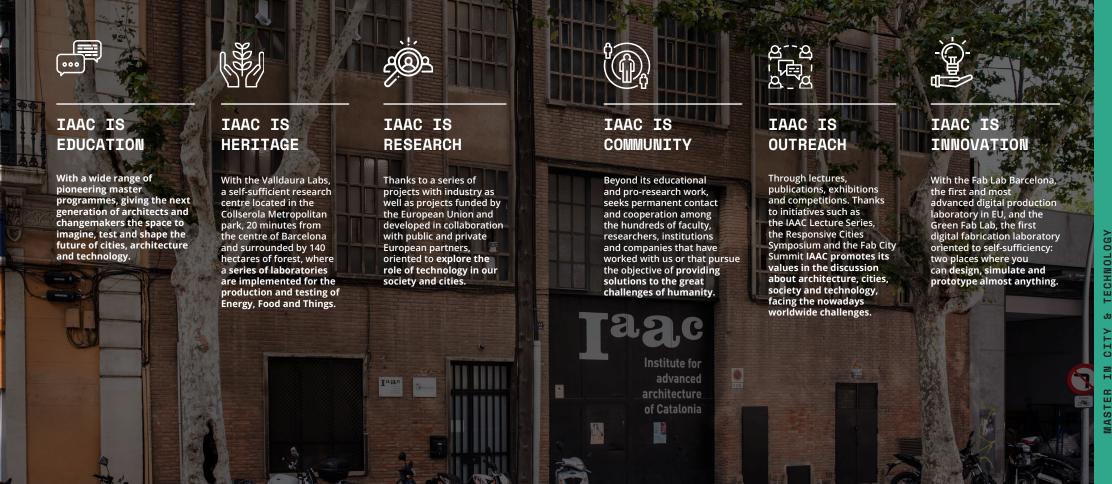
IAAC THE INSTITUTE FOR ADVANCED **ARCHITECTURE** OF CATALONIA

IAAC sets out to take Research and Development to architecture and urbanism, and create multidisciplinary **knowledge networks.** To this end, the Institute works in collaboration with several cities and regions, industrial groups, research centres, including the City Council of Barcelona, the Collserola Natural Park, the Massachusetts Institute of Technology (MIT), the City Intelligence Lab of AIT, as well as diverse companies among which CISCO, Endesa, BuroHappold Engineering, Carlo Ratti Associati, MVRDV and many others.

In collaboration with these entities, the Institute develops various research programmes that bring together experts in different disciplines such as architecture, engineering, ecology, computer science and other fields of investigation.

IAAC is a globally renowned centre of international reference, welcoming students and researchers from over 60 different countries.

With a Masters Fab Lab, an AR/VR Lab, a Materials Lab, a Robotics Lab, and it's own Data Repository, IAAC offers high end infrastructure for the development of applied research projects.



IAAC is located in the Poblenou neighbourhood of Barcelona, in the recently created district known as 22@, an international reference for companies and institutions oriented toward the knowledge society. In the 22@, cutting-edge firms, universities, research and training centres are integrated with different agents of promotion that facilitate interaction and communication among them.

The neighbourhood is close to the historic centre and the seafront, and features some of the most iconic landmarks of the city such as the Agbar Tower and the Design Hub building. The ongoing projects of the Plaça de les Glòries and the Sagrera APT station are also making it one of the most dynamic enclaves in the city.





PUJADES CAMPUS

IAAC is housed in two old factory buildings, with 4.000 m2 of space for research, production and dissemination of architecture.

The space itself is a declaration of principles, embodying an experimental and productive approach to architecture.

The IAAC Pujades Campus premises include the Fab Lab Barcelona, an architecture and design-oriented digital fabrication laboratory, and a second Fabrication Laboratory, entirely dedicated to the development of IAAC students projects.





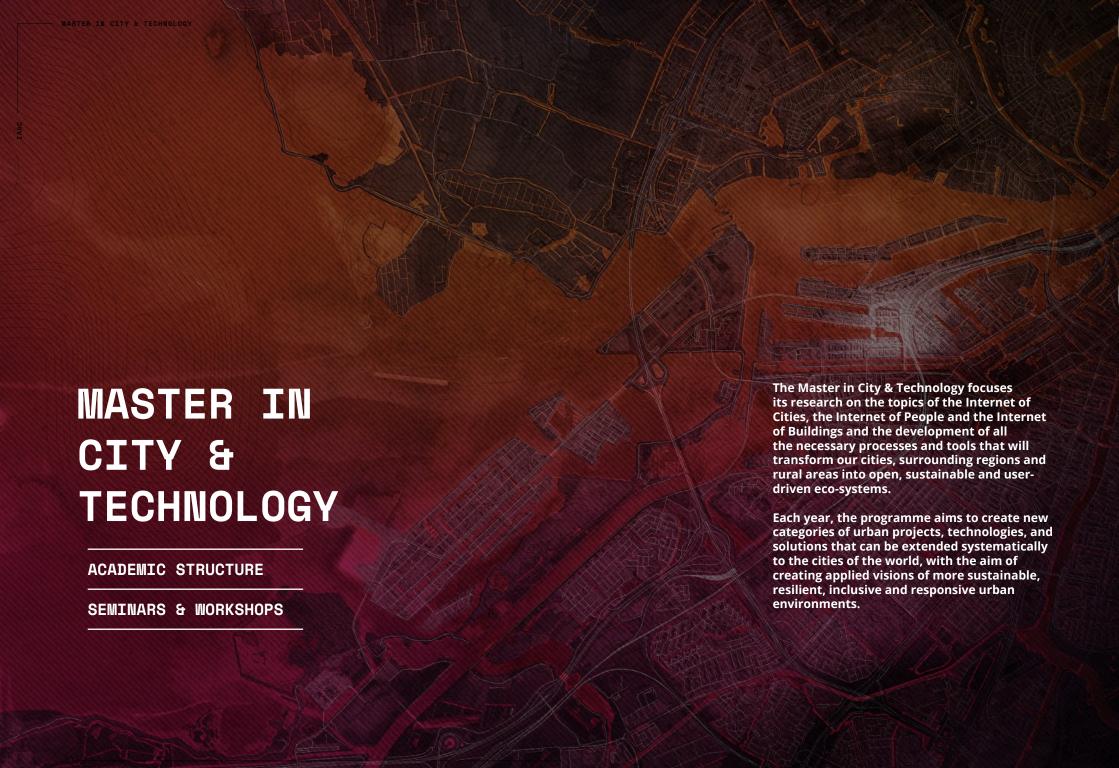
VALLDAURA CAMPUS

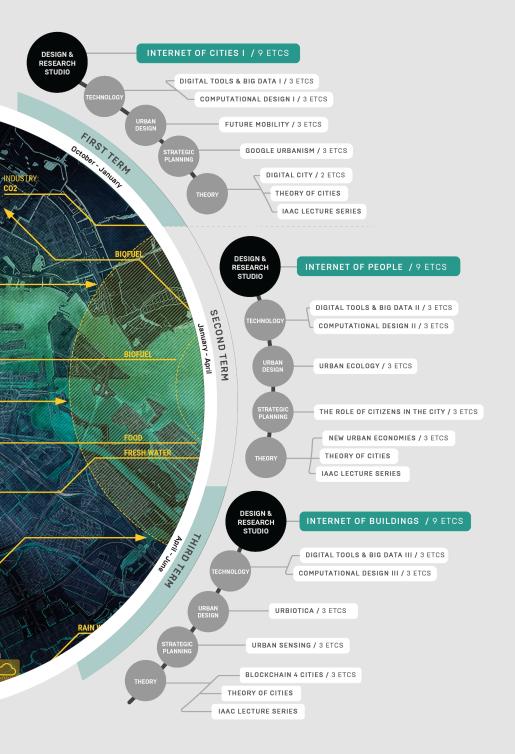
Valldaura Labs is IAAC's second campus located in the Collserola Park, the green heart of Barcelona's Metropolitan Area.

The campus is a 140 hectares park and testing ground for innovation, that features the latest technologies in the fields of energy, information and fabrication.

The core of this innovative project developed by IAAC is a series of laboratories that work to set a new benchmark for self-sufficiency.

The Valldaura Labs premises include the Green Fab Lab, a fabrication laboratory oriented towards self-sufficient and productive solutions. The Food Lab and the Energy Lab, allowing students to research the specifics of the production of key elements involved in self-sufficiency.





1ST TERM INTERNET OF CITIES

Duration: 3 months - from October to December

The first term (Internet of Cities) focuses on the development of strategies, analytics, and planning proposals for urban regeneration, new urban metabolisms, future mobility, and public space transformation. It is structured by a Design Studio and five complementary obligatory Seminars. Students will be introduced to principles of strategic planning, urban design, and theory of cities, as well as new tools for coding, cartography, urban analytics, and computational design.

2ND TERM INTERNET OF PEOPLE

Duration: 3 months - from January to March

The second term (Internet of People) is structured by one Design Studio and five complementary obligatory Seminars. Students will continue developing technical skills in data analytics and computational design, as well as being introduced to urban ecological design and novel processes for citizen participation in the development of sustainable, open and user-driven urban environments.

3RD TERM INTERNET OF BUILDINGS

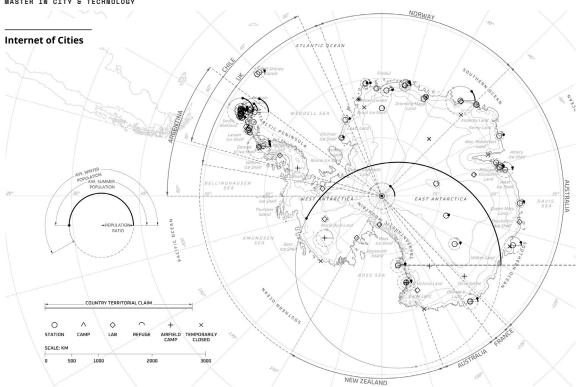
Duration: 3 months - from April to June

The third term (Internet of Buildings) is focused on the design and development of hyperconnected building typologies for new urban infrastructure, including new resourcemanagement tools such as the Blockchain. It is structured by a Design Studio and five complementary obligatory Seminars. Students will continue developing technical skills in data analytics, urban simulations, and computational design, as well as being introduced to new projects for the design of intelligent buildings, the infrastructure of services, user interaction and technologies of information.

Throughout all three terms, the Master in City & Technology students will attend transversal theoretical courses which aim to bring them in direct contact with the front running professionals of this multidisciplinary field. Through masterclasses and lectures, they will be presented to the challenges and learnings of professionally engaging in real case applications. All classes throughout all the terms are mandatory.

TS - Theory of Cities (2 ECTS)

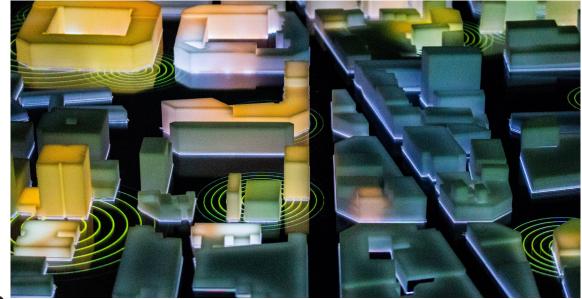
IAAC Lecture Series (2 ECTS)



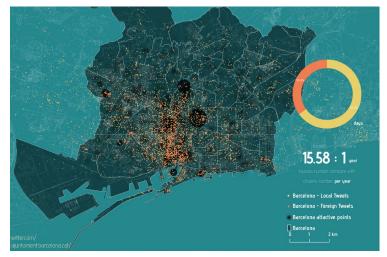
DESIGN RESEARCH STUDIOS

The Design Studios of the Master in City & Technology are focused on developing and applying the general learnings of the Master's on three projects (one per term). During the Design Research Studios, students are asked to extensively develop urban interventions through a deep understanding of urban theory, a sophisticated application of technology, a holistic strategy, and an innovative design.

Internet of Buildings



Internet of People



TECHNOLOGY SEMINARS

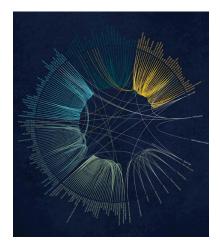
The Master in City & Technology seminars are oriented towards training students on the latest tools for computational design, urban simulation, and data science. Throughout the three terms, students will attend seminars on programming, dynamic mapping, big data analytics, and visualization, as well as parametric urban design.

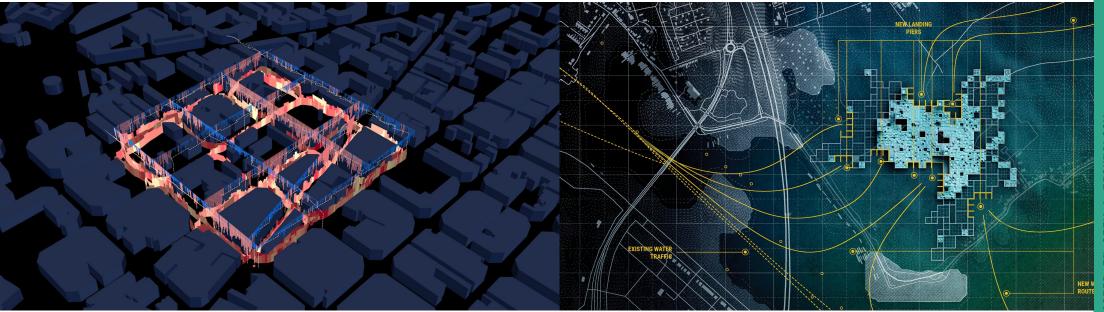


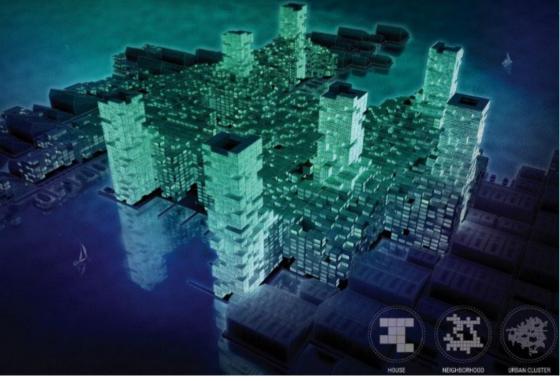
Terms I, II & III

THEORY SEMINARS

The Master in City & Technology Theory seminars are oriented towards the theoretical study of the fields of urbanism and technology. Students will attend seminars and masterclasses on the research and practise-based context of urban technologies, economics, social entrepreneurship and the blockchain, as well as the fundamental models of information networks, urban design and urban production models.



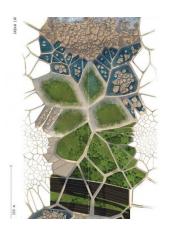






URBAN DESIGN SEMINARS

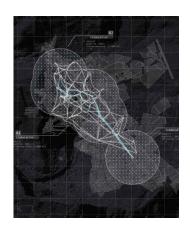
The Master in City & Technology Urban Design seminars are oriented towards training students on rethinking the design, planning, and management for the future public space, mobility and urban infrastructure. Students will learn how to apply data science principles and tools, as well as how to use computational design, cartography, and dynamic mapping as innovative tools that challenge traditional approaches to urban design.

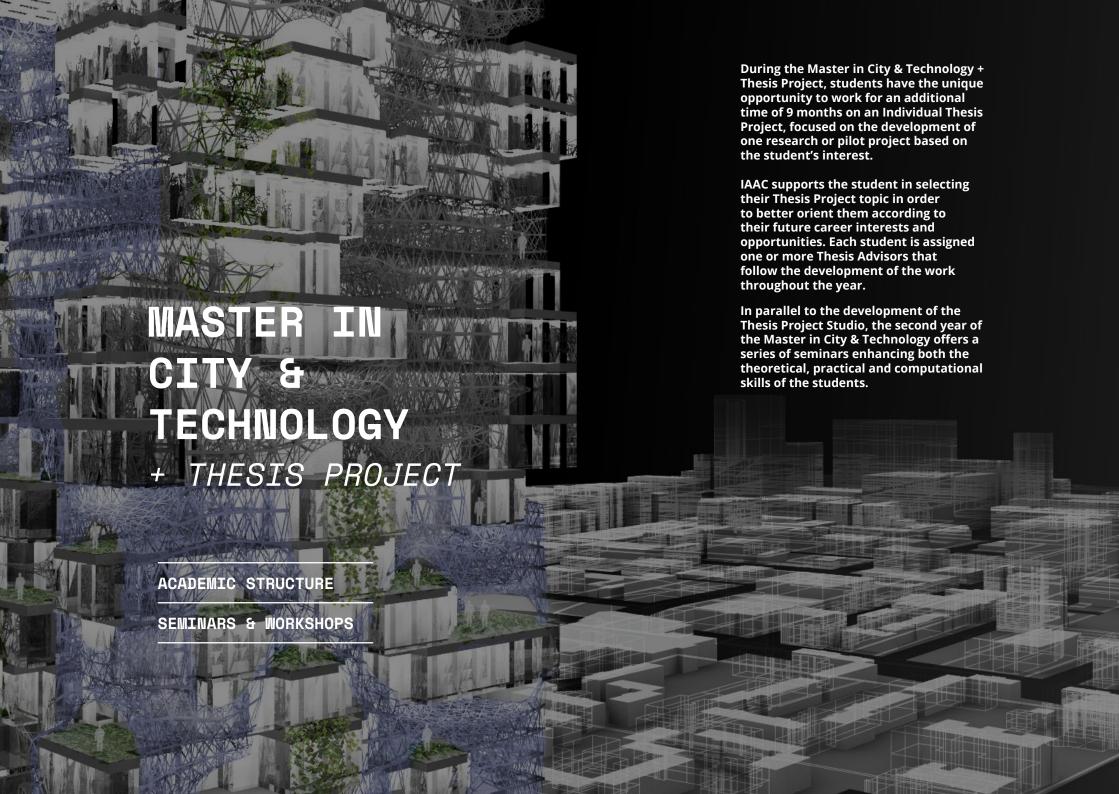


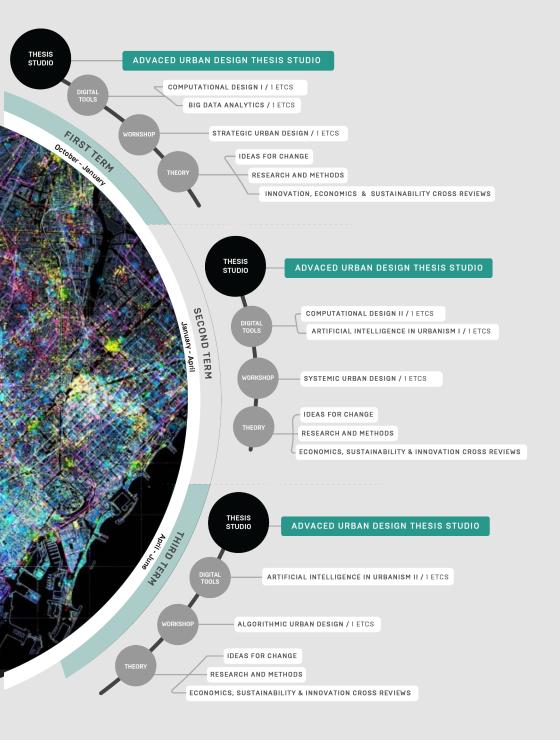
Terms I, II & III

STRATEGIC PLANNING SEMINARS

The Master in City & Technology Strategic Planning seminars are oriented towards training students on developing and applying big data urban strategies based on principles of human-centered, ecological and digitally enhanced design. In addition, students will be introduced to tools for urban sensing and scanning for the generation of real-time data three-dimensional plans.







Throughout all three terms, the Master in City & Technology + Thesis Development students will attend transversal sessions which bring them in direct contact with their thesis advisor(s) as well as front running professionals in the fields of research and development, innovation, strategic planning, economics, and sustainability. All classes throughout all the terms are mandatory.

Advanced Urban Design Thesis Studio (30 ECTS)

Research & Methods (3 ECTS)

Ideas for Change (3 ECTS)

Economics, Sustainability & Innovation Cross-Reviews (1 ECTS)

FIRST TERM

In parallel to the Thesis Project Studio sessions and the Theory Seminars, the first term consists of two complementary obligatory Seminars and one workshop. Students will be introduced to strategic urban design principles, as well as new tools for urban analytics, programming, and computational design.

Duration: 3 months - from October to December

SECOND TERM

Duration: 3 months - from December to March

In parallel to the Thesis Project Studio sessions and the Theory Seminars, the second term consists of two complementary obligatory Seminars and one workshop. Students will attend advanced classes of computational design and will be introduced to systemic urban design principles, as well as to the theory and initial applications of artificial intelligence into urban environments.

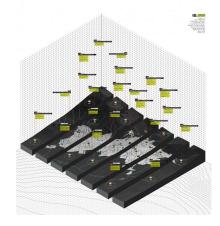
THIRD TERM

Duration: 3 months - from April to June

In parallel to the Thesis Project Studio sessions and the Theory Seminars, the third term consists of one complimentary obligatory Seminar and one workshop. Students will be introduced to digital urban design principles, as well as to advanced applications of artificial intelligence in urban planning and urban design.

THESIS STUDIO

The Thesis Studio of the Master in City & Technology + Thesis Project is focused on the development of the students' thesis which constitutes the main body of research for the second year. During the Thesis Studio sessions students, advisors and experts work together for 9 months on the development of one research or pilot project. The projects focus on creating design proposals for the urban environment, through research related to big data, nature-based solutions, urban densification, new infrastructure as well as territories and landscapes.



Terms I, II & III

DIGITAL TOOLS SEMINARS

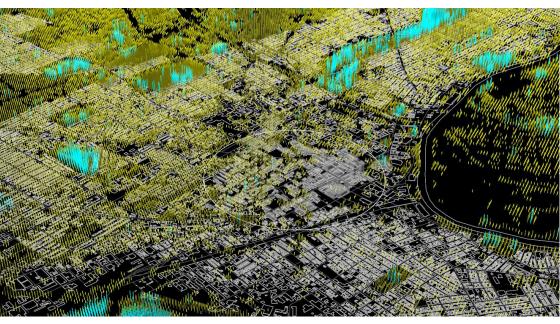
The Master in City & Technology + Thesis Project Digital Tools seminars are oriented towards creating novel methodologies for the application of computational design and data science in urbanism. Throughout the three terms, students will attend seminars on big data analytics, urban simulations, artificial intelligence and machine learning during which they will develop projects related to sustainability.



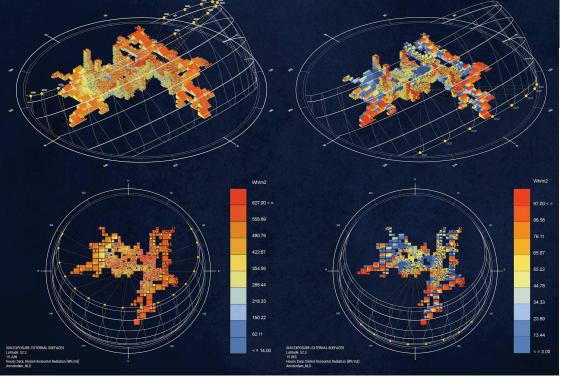


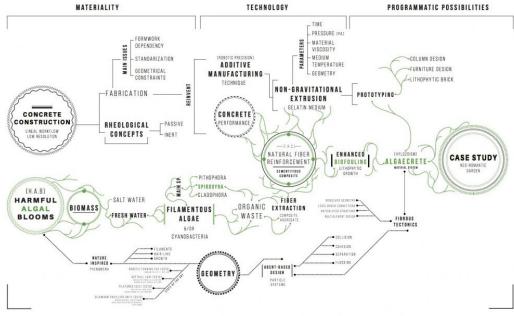






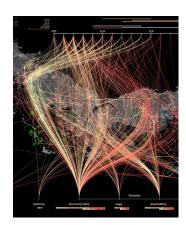






WORKSHOPS

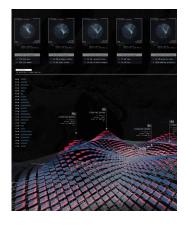
During the Master in City & Technology + Thesis Project Workshops students have the unique opportunity to interact with experts and professionals in the fields of strategic, systemic and algorithmic urban design. The aim of these short and intensive workshops is to provide the students with external inputs that help them further develop their thesis by focusing on designing through different lenses of investigation.



Terms I, II & III

THEORY SEMINARS

The Master in City & Technology + Thesis Project Theory seminars are oriented towards providing students with the necessary theoretical tools for the structuring of their thesis. Students will attend seminars and cross reviews related to research methodology, innovation, economics, sustainability and citizen engagement.



MASTER IN CITY & TECHNOLOGY

MASTER IN CITY & TECHNOLOGY FACULTY



Directed by: **Dr. Areti Markopoulou**

Areti Markopoulou is a Greek architect, researcher and urban technologist working at the intersection between architecture and digital technologies. She is the Academic Director at IAAC in Barcelona, where she also leads the Advanced Architecture Group, a multidisciplinary research group exploring how design and science can positively impact and transform the present and future of our built spaces, the way we live and interact. Her research and practice seek to redefine architecture as a performative "body" beyond traditional notions of static materiality, approximate data, or standardized manufacturing.

Head of Studies: Dr. Mathilde Marengo

Coordinated by: Alex Mademochoritis

SEMINAR FACULTY

Dr. Diego Pajarito

Data Science and Cartography

Rodrigo Aguirre

Computational Design

Nicolay Boyadjiev

Urbanism and Digital Platform Economy (Strelka)

Willy Müller

Urban Design (IAAC Urban Science Lab)

Dr. Jordi Vivaldi

Urban Design and Theory

Dr. Kathrin DiPaola

Strategic Planning and Anthropology (Business Sweden)

Julius Streifeneder

Architecture and Systemic Design (Urban Standards)

Francesca Arcuri

Mobility and Transportation (Mobility in Chain)

Sebastiano Scacchetti

Mobility and Transportation (BuroHappold Engineering)

Aldo Sollazzo

Urban Sensing and Robotics (Noumena)

Eugenio Bettucchi

Parametric Urban Design (Noumena)

Angelos Chronis

Artificial Intelligence in Urbanism (City Intelligence Lab - AIT)

Prof. Manuel Gausa

Urbanism and Theory

José Luis de Vicente

Digital Culture, Innovation and New Media Art (Sonar+D)

Dr. Gonzalo Delacámara

Economics and Social Entrepreneurship (IMDEA Agua)

Dr. Lluisa Marsal

Blockchain Technologies (Blockchain Catalunya Association)

Dr. Mara Balestrini

Innovation, Strategic Planning and Project Management (Ideas for Change)

STUDIO FACULTY

Dr. Areti Markopoulou

Design Research Studio Leader - Responsive Cities

Dr. Mathilde Marengo

Design Research Studio Leader - Architecture & Urbanism

Edouard Cabay

Design Research Studio Leader - Dynamic Mapping (Appareil)

Luis Falcon

Design Research Studio Leader - Big Data Analytics (InAtlas)

GUEST FACULTY

Winy Maas

MVRDV & TU Delft - The Why Factory

Carlo Ratti

Carlo Ratti Associati & MIT Senseable City Lab

Eduardo Rico

Space Syntax UCL & Architectural Association

GUEST FACULTY - THEORY

Albert Canigueral - Ouishare

Marcella Del Signore - New York Institute of Technology

Dr. Lydia Kallipoliti - Cooper Union

Enric Ruiz Geli - Cloud9

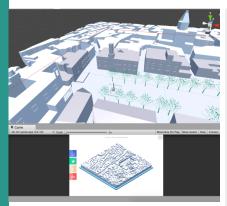
Tomas Diez - IAAC / Fab City

Guillem Camprodon - Fab Lab Barcelona / Smart Citizen

Emma Costa - Bayern Innovativ

Paul Poinet - Speckle

PREVIOUS PROJECTS









SUPERBARRIO

SuperBARRIO is a project on technologically enhanced participatory design processes for urban planning and design. Initially developed by MaCT students the project's impact attracted the interest of both industry and European commission from which it received funding for further implementation in different European cities.

SuperBARRIO uses gamification strategies to engage the citizens in the design of the urban space as well as to collect data about their needs & desires. It is a tool for for architects, urban planners, and decision makers.

As an open-source online tool, SuperBARRIO widens the potential audience of participatory design processes, overcoming the limits of conventional methodologies.



INTERNET OF BUILDINGS

How can future smart buildings contribute to urban resilience and sustainability?

The Internet of Buildings is a project which aims to create new typologies of buildings, by redefining their role as single nodes in a larger network of communication and exchange of data, energy, goods, and resources. Through the design of new building protocols and typologies the project additionally explores novel urban simulation tools. For this reasons, interactive physical models are developed to visualize the impact of Internet of Buildings on an area of 28 blocks located in Barcelona's district of Sant-Marti. The projects develops new designs and strategies on how the Internet of Buildings can be used to:

Filter atmospheric pollution

Re-program office spaces into housing

Recycle waste

Improve the comfort levels of public space

THE GREEN DIP

How can we transform urban environments in organisms that can produce resources, filter air or manage waste and contamination? What would the impact be on the health and the life of its citizens?

How much would it cost to maintain such infrastructure? Could we use them as energy-generating systems?

The Green Dip workshop is a collaborative effort between IAAC's Master in City & Technology and The Why Factory. During this intense 7 day workshop the Master in City & Technology students, with the guidance of The Why Factory, produced visions of 7 cities that have been completely redefined by the implementation of new productive systems that question the existing contaminating and consuming nature of our built environment.

For each of these cities, the Master in City & Technology researchers developed challenging simulations related to the cost and benefits of nature-based solutions in cities as well as the collection of data related to each city and system such as energy production, soil retention, or water among others.



INDUSTRY

INATLAS

inAtlas is a Big Data and Location Analytics company that offers strategic business solutions. It has created a proprietary technology that increases the speed of geospatial data processing. Since 2010, it has designed and developed customized tools for private companies like Heineken, Northgate, Prisa Radio, Informa D&B, among others; and public governments like those of the Barcelona City or Santa Cruz de Tenerife City.



MOBILITY IN CHAIN

MIC is an international transport planning firm founded on the belief that mobility influences the way we live and the quality of our lives and was created with the ambition of improving the quality of our lives through a profound understanding of how we move. In line with previous professional experience, the MIC team is strongly focused on international work, providing transport consultancy to developers, master planners and public bodies all around the world. MIC introduces a new innovative and sustainable vision for mobility, a vision that is based upon understanding the need of the client and focused on both functional matters and urban quality.



URBAN STANDARDS

Urban Standards is a specialist in finding new ways of value creation through the systemic integration of technologies, services, and partners in urban real estate. We develop and assess solutions for mobility/transport service providers, real estate developers, and cities that match future needs and create new user experiences.



BCN AGENCIA DE ECOLOGIA URBANA

Implementing projects aimed at domestic and international public institutions, foundations, organizations, and companies by applying a systemic approach for reorienting the management of cities towards a more sustainable model, contributing solutions for mobility, energy, waste, urban planning, water, biodiversity, and social cohesion.



MCRIT

MCRIT counts on a multidisciplinary staff of consultants specialized on strategic, urban and regional development, with a particular focus on infrastructure and transportation planning. To support these work activities, MCRIT develops advanced information, forecast, evaluation and communication systems.



CARLO RATTI ASSOCIATI

Carlo Ratti Associati is an international design and innovation office based in Torino, Italy, with branches in the United States and the UK. Drawing on Carlo Ratti's research at the Massachusetts Institute of Technology Senseable City Lab, the office is currently involved in many projects across the globe, embracing every scale of intervention – from furniture to urban planning. The work of the practice merges design with cutting-edge digital technologies, so as to contribute to the creation of an architecture "that senses and responds".

CARLO RATTI ASSOCIATI

URBAN C:LAB - BUROHAPPOLD ENGINEERING

BuroHappold Engineering is an international, integrated engineering consultancy operating in 23 locations worldwide, with 60 partners and over 1700 employees including some of the world's leading consulting engineers. For over 40 years we've been building our reputation for delivering creative, value led building and city solutions for an ever-changing world.



IDEAS FOR CHANGE

Ideas for Change is a consulting and research company that works in the intersection between innovation, strategy, and design. We have pioneered research on collaborative strategies and exponential growth; we've also consulted for big and small size clients looking to transition to more contributive and open models while sustaining competitiveness. Our in-house innovation projects have been recognized and used to drive innovation worldwide.



RESEARCH & ACADEMIA

THE WHY FACTORY

The Why Factory (T?F) is a global think-tank and research institute, run by MVRDV and Delft University of Technology and led by professor Winy Maas. It explores possibilities for the development of our cities by focusing on the production of models and visualizations for cities of the future. Education and research of The Why Factory are combined in a research lab and platform that aims to analyze, theorize and construct future cities.



CITY INTELLIGENCE LAB - AUSTRIAN INSTITUTE OF TECHNOLOGY.

The City Intelligence Lab (CIL) is an interactive digital platform to explore novel forms and techniques for the urban development practice of the future. As incubator for intelligent solutions the lab fosters the co-creation of digital urban planning workflows and processes, applying augmented reality and interactive design interfaces to create simulations, generative design and artificial intelligence solutions. The CIL is past of the Digital Resilient Cities Competence Unit anchored in the Center for Energy of the AIT Austrian Institute of Technology.



EUROPEAN PROJECTS

KAAU - KNOWLEDGE ALLIANCE FOR ADVANCED URBANISM

KAAU group works for the sensitive integration of ICT in cities, taking into consideration cultural heritage, environmental and social dimension issues. This project aims to promote an innovative understanding of "Advanced Urbanism" that requires changing the traditional design and urban planning practices towards more open, collaborative and interdisciplinary practices.



URBINAT

URBiNAT focuses on the regeneration and integration of deprived districts in urban development through innovative Nature-Based Solutions (NBS) – an Urban Inclusive Nature – ensuring sustainability and mobilizing driving forces for social cohesion.



ACTIVE PUBLIC SPACE

Active Public Space (APS) is an initiative focused on the transformation of city public spaces into active and dynamic ones by fostering people's interaction with flows of energy, materials, services, and finances in order to catalyze sustainable economic development, resilience and high quality of life.



PUBLIC PLAY SPACE

Public Play Space promotes innovative and creative practices for the co-design of inclusive, cohesive and sustainable public spaces, through the use of games and digital technologies, in a transnational and European perspective, fostering the process of placemaking.



CREATIVE FOOD CYCLE

Creative Food Cycles enhances innovative and creative practices between food, architecture, and conviviality in a transnational and European perspective. New devices and rituals in urban food production, distribution, consumption, and disposition are designed and implemented, for extended and training and audience development, fostering the exchange of ideas and creatives in Europe. The approach merges new ways of design and digital interaction in a transdisciplinary way, exploring cultural, social, and economic innovations accelerated through the activities.



BUILD SOLUTIONS

BUILD solutions aim to offer an educational program engaging students, teachers and researchers and providing them with the necessary entrepreneurial skills and connections to bring intelligent living solutions for cities to the market, investigating biological systems, creating prototypes based on information technology and digital manufacturing, business plans and working with accelerators. Solutions which in turn can help us overcome the challenges posed by rapid urbanization.



