Master Metropolitan Analysis, Design and Engineering

MADE Programme Booklet

MSc MADE

TU Delft

WAGENINGEN UNIVERSITY & RESEARCH

MSc MADE

Master Metropolitan Analysis, Design and Engineering

Wageningen University & Research (WUR) | Delft University of Technology (TUD)

Degree
Master of Science
Joint degree
Wageningen University & Research (WUR) and Delft University of Technology (TUD)

Credits
120 ECTS, 24 months

Language
English

Location
Amsterdam

Start
September

Contact
mmd.msc@wur.nl

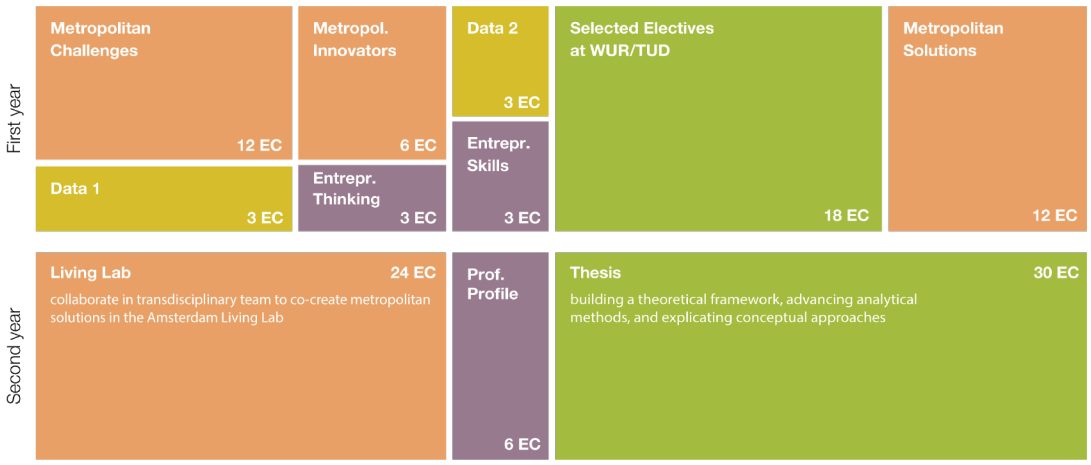
Handbook MSc MADE

This handbook provides information on all courses that are part of the MSc MADE programme.

Please note that this programme is offered at the Amsterdam Institute for Advanced Metropolitan Solutions in Amsterdam. Students who are not studying the master MADE but who would like to participate in any of the courses that are part of this programme should contact the course coordinator prior to registration.

Note: the calendar and the system of periods differ from WUR and TUD. Contact your study advisor if you have any questions about this.

Below, the outline of the MSc MADE programme is presented:



This master is a cooperation between:

WAGENINGEN UNIVERSITY & RESEARCH

TU Delft

AMS Amsterdam Institute for Advanced Metropolitan Solutions

MSc MADE

ECTS
12

Course Coordinators
dr. ir. BJM van Vliet (WUR)
dr. R.O.V. Cardoso (TUD)

Lecturer(s)
dr. ir. BJM van Vliet (WUR)
dr. R.O.V. Cardoso (TUD)
M. van der Knaap (WUR)

Teaching method	Hours
Lecture	24
Tutorial	28
Practical	80
Group Work	25
Excursion	8

Examination:

Group mini-lectures/ theme days	20%
Weekly short assignments, individual	40%
Group paper	25%
Group knowledge clip	15%

YMS-30812 Metropolitan Challenges

In this course on metropolitan challenges, students are introduced to various typologies of metropolises throughout the world, with the city of Amsterdam as a real life example. The course covers all aspects of what makes a metropolis. It gives an historical-critical overview, with reasons for the existence and emergence of cities, and the social, environmental and technological challenges they face today. The metropolis is approached as a web of interrelated socio-technical systems in which professionals are challenged to integrate knowledge from multiple disciplines as well as analytical, design and engineering skills. The course presents a range of conceptual views on technologies and practices in the spheres of urban mobility, water, housing, health and well-being, food, waste and energy. Students learn and develop different concepts related to contemporary urban practices, and elaborate on them by means of field observations, organizing debates, lecturing, and producing written accounts and videos. Learning activities in this course include lectures, studio research work in teams, field study and excursions in Amsterdam (by executing observations, interviews with stakeholders, and other methods presented in the course), as well as presentations and peer evaluations.

Activities:

The 'Metropolitan Challenges' course consists of three distinct, but strongly related stages: a 1-week introductory period on metropolitan history, governance and research approaches, a 5-week period in which the MADE themes are studied separately from a multidisciplinary perspective, and a third period of 4 weeks in which an integrated, interdisciplinary metropolitan challenge is analysed and presented.

Teaching methods used in the course:

· lectures, including student and guest lectures;

· tutorials & peer review meetings;

· excursions;

· group work to prepare weekly student lectures and activities, paper writing, video and knowledge clip production.

"We are committed to making cities and regions better places to live and work. Understanding their challenges related to water, health, transport, energy, food and waste is fundamental to start thinking about how to solve them."

- Lecturer

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Course Coordinator
dr. J. Urbano (TUD)
Lecturer(s)
dr. J. Urbano (TUD)

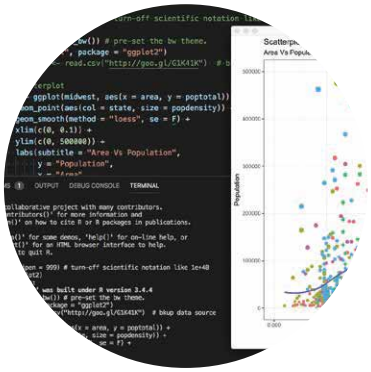
Teaching method	Hours
Lecture	8
Tutorial	7
Practical	12
Individual Paper	1

YMS-31303 Metropolitan Data 1

Data-driven methods have had a positive impact on many domains and research fields. This course prepares students to acquire, process, model, analyze, and understand complex metropolitan phenomena thanks to data-driven studies. The first part of the course focuses on properly designing data-driven studies to ask the right questions in the right way. The second part introduces students to techniques for exploration and basic analysis of data to provide rough answers to such questions. In the third part, students are introduced to more advance statistical modeling techniques for the purposes of understanding complex phenomena through data, or making reliable predictions.

Activities:

The core of the course consists of 8 lectures and 6 related labs. Starting from week 1, students form groups and work on a project to analyze a real- world dataset and make predictions about it. There are two submissions for the project, accompanied by a short presentation to the class. In this way, students will be able to understand the main concepts of data-driven studies in order to gain new insights from data, but also apply concepts of data collection, processing, exploration and analysis in the context of real-world metropolitan data.



"Students will see the positive impact that data science (or data-driven science) methods have on many different domains and research field, by acquiring, processing, analyzing and communicating about a range of data." - Course Coordinator

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Course Coordinator
dr.ir. CPG Driessen (WUR)
dr. R.C. Rocco (TUD)
Lecturer(s)
dr.ir. CPG Driessen (WUR)
dr. R.C. Rocco (TUD)

Teaching method	Hours
Lecture	16
Tutorial	28
Group Work	10
Individual Paper	1

YMS-30306 Metropolitan Innovators

The innovators course enables students to use, contrast, discuss and integrate the many contemporary methodological and conceptual approaches to engage with metropolitan problems and potential solutions. Contemporary metropolitan regions face a variety of complex challenges that concern large numbers of stakeholders. Metropolitan challenges often have several dimensions: cultural, political, technical and aesthetic, to cite but a few. Those challenges cannot be addressed by planners, engineers and designers alone, as they require engagement with a multiplicity of perspectives necessary to understand and tackle all the dimensions involved. For any actor working to contribute to advanced metropolitan solutions, it becomes crucial to be able to understand, communicate and to co-operate with other actors in order to integrate their knowledge about issues at hand and to understand different (and often conflicting) objectives. Awareness of this context, as well as the implicit and explicit values and cultural norms operating in a specific place, are essential to achieve suitable solutions. The course includes meta-discussions, namely on the value and role of urban theories in metropolitan innovation commonly present in different communities of knowledge and in large groups of people working together.

Activities:

The course consists of lectures, guest lectures, group discussions and a range of exercises to critically and creatively engage with different approaches for metropolitan issues.
Students will be asked to select a particular metropolitan issue in which a clear socio-technical system can be identified. They will develop short evaluations of each issue using the frameworks presented: socio- technical, ecosystems and spatial justice. Before and after classes, students are mentored in their essay writing.

Other Activities:
· peer reviewed exercises;
· group work leading to presentations ;
· role playing and other games ;
· drawing and sketching (brainstorming, mind mapping, actor mapping, life stories);
· movies and clips for discussion;
· one or two significant field trips.

"Imagining the unexpected effects of interventions is as important as responding to these creatively and responsibly."

- Course Coordinator

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Course Coordinator
dr. LJL Ploum (WUR)
dr. J.D. Lomas (TUD)
Lecturer(s)
dr. LJL Ploum (WUR)
dr. J.D. Lomas (TUD)

Teaching method	Hours
Tutorial	24
Group Work	60

Examination:

Home assignments	45%
Reflection group process	70%

YMS-31803 Entrepreneurial Thinking

In this course, students develop an awareness of what it takes to engage in entrepreneurial projects and ventures and start thinking about their own entrepreneurial competencies. Entrepreneurship may be manifested by various groups: individuals that are actively engaged in a new start-up, by business developers who are engaged in new venture development within established organizations, policy makers that are initiating new movements or academics that want create more impact with their research. What they have in common is that they all face complex, interdisciplinary working environments which are spiced with ambiguity and uncertainty. Entrepreneurial thinking and developing an entrepreneurial mind-set helps in tackling such challenges. One of the principles of this course is that everyone has a unique entrepreneurial starting point: experiences, capacities and prior knowledge differ. Secondly, work environment differ in the way they afford and/or stimulate entrepreneurial thinking and acting. You are introduced to various theoretical models and methodologies to analyse entrepreneurial thinking, -action and –behaviour. The lectures, practical entrepreneurship tools, feedback sessions and working on several cases will help you discover your position towards entrepreneurship.

Activities:

During the course, several learning activities will take place, all contributing to your development as an entrepreneurial professional.
· lectures introducing key entrepreneurship topics (opportunity identification, effectuation, multiple value creation, teams;
· guest lectures of entrepreneurial professionals from different work contexts;
· working on cases to understand and apply entrepreneurship theory;
· feedback sessions to assess and reflect on progress and development of your own entrepreneurial mind-set;
· literviewing an entrepreneurial professional with peer.

“Capture the unfolding entrepreneurial mind-set among students by engaging them in entrepreneurial scenarios and games.”

- Course Coordinator

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Course Coordinator
ir. C Vreugdenhil (WUR)

Lecturer(s)
dr.ir. R van Lammeren (WUR)
ir. C Vreugdenhil (WUR)

Teaching method	Hours
Lecture	8
Tutorial	8
Practical	24
Group Work	28

Examination:

Individual exam	40%
Group report	60%

YMS-31403 Metropolitan Data 2

The Metropolitan Data II course links the Big Data Analysis topics as learned in Metropolitan Data I to specific geodata gathering, handling and visualizing concepts. We do so because multi modal data that can be used in Metropolitan studies do have specific location components. Especially geometric properties of the many metropolitan phenomena will be explicitly discussed in such a way that it opens the window of opportunities to apply the variety of analysis, synthesis and visualisation options. The many processes in a Metropolitan environment are not at all directly connected to each other, except that they all have in common to take place in the same time and space continuum. It shows that the spatial dimension of geodata is somehow linked to a temporal dimension. In this course we challenge you to make use of this window of opportunities to address a Metropolitan study topic by combining geodata resources, processing steps and visualization approaches. The course intends to make you aware of the integrative strengths and weaknesses of geo-information regarding metropolitan solutions given living lab settings and entrepreneurial skills.

Activities:

This course consists of two stages. In the first stage the different geo-information concepts are discussed and practiced by following lectures, online materials and computer practical. The second stage is performing a small project where students get more experience in working through all steps of the geo-information cycle in an entrepreneurial skills case.

"The strength of GIS is that it enables cross-disciplinary approaches of challenges through the dimensions of space and time."

- Course Coordinator

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Course Coordinator
dr. LJL Ploum (WUR)
dr. J.D. Lomas (TUD)
Lecturer(s)
dr. LJL Ploum (WUR)
dr. J.D. Lomas (TUD)

Teaching method	Hours
Tutorial	24
Group Work	60

Examination:

Entrepreneurial pitch	20%
Background report	80%

YMS-31903 Entrepreneurial Skills

This course is directly connected to a real-life metropolitan challenge and builds on Entrepreneurial Thinking. You will develop and test a solution that addresses the challenge and work on the development of this solution with the help of several entrepreneurship tools. These tools (business model canvas, value proposition canvas, prototyping, etc.) will be discussed during the lectures and help you strengthen your ideas. Questions to be answered are: What is the value of your idea (people, profit, planet)? Is the solution/plan feasible? Which stakeholders are involved and what are their needs, desires and conditions? What is the socio-spatial impact of the solution? Is the solution sustainable?

Activities:

During the course, several learning activities will take place, all contributing to your development as a professional.
· masterclasses;
· group work;
· interviews with informants, users and customers;
· site visits to university-based incubators;
· progress meetings/coaching session with relevant stakeholders and experts;
· final presentation session.essions to assess and reflect on progress and development of your own entrepreneurial mind-set.

"Working in a multidisciplinary team to develop a strategy to implement a technology not yet applied on a large scale, proved to be very engaging. During the project several organizations were positive about our idea and entrepreneurial mindset. This, combined with winning the best pitch of the day, is a great reward for our work together!"
- Student

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Electives

In this part of the programme students tap into the knowledge from courses at WUR, the TUD or another university and design their own learning plan. The elective period offers students a way to deepen their interests and anticipate the changing contexts and issues at play in the metropolitan regions. Students follow elective courses which are linked to the specific interdisciplinary and transdisciplinary MADE domains, such as mobility, climate resilience, water, urban intelligence, food and circularity. The study advisor (studyadvice.mmd@wur.nl) assists the students in making choices in this process.

As MSc MADE students you can take part in courses at WUR and TUD to obtain 18 ECTS of elective credits. But you can also explore what other universities have to offer. You can design your own differentiation package in line with your own interests and ambitions.

"It helped me to think about which themes from MSc MADE interested me the most and if I wanted to deepen my knowledge or look for courses that would broaden my view. After establishing this I started looking for specific courses."

- Student

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Course Coordinators
dr.ir. KBM Peters (WUR)
dr. Y. Chen (TUD)
Lecturer(s)
dr.ir. KBM Peters (WUR)
dr. Y. Chen (TUD)

Teaching method	Hours
Field Practical	76
Group Work	182
Practical	50

Examination:

Group end products	50%
Group performance and individual reflection	50%

YMS-60312 Metropolitan Solutions

In this course, students put their acquired skills into practice for the first time. In multidisciplinary themes they work on an AMS themed issue in a metropolitan region commissioned by a client from the private or public sector. Based on the briefing and terms of reference (TOR) received from the client, students develop a consultancy or project plan, including a preliminary problem definition and analysis and a plan for data generation and analysis. This leads to the 'Metropolitan Solution', a socio-technical design-related project and/or strategy in response to a clients request. The course builds on the courses Metropolitan Challenges and Metropolitan Innovators: The solution operates within the larger metropolitan system, while interrelating actors and entities. An applied training course (follow up of skills learning processes) in, for example, project management and leadership, scenario planning, innovation management, group dynamics and teamwork, multi-actor settings and intercultural communication is offered. Moreover, lectures will provide students with additional background information to tackle the issue at play in their case. Every student is expected to contribute his / her own knowledge and expertise to the group assignment and to reflect on this.

Activities:

· start with a presentation of possible cases by the clients / commissioner and let students apply for a case and a position. Students are then assigned to a case and can start with the project; each case has about 4-5 teams;

· prepare a proposal - assessment of the commissioner's terms of reference;

· guidance is provided by coaches on a weekly basis, helping with the process and methods as well as with the content;

· the course ends with a presentation to the clients in a parallel or plenary session;

· students collect data in the field

· reflection on personal development is an important part of the course

· depending on the commissioned assignments, in addition to a report and presentation students also produce a product for the commissioning client. This can vary from a design, map, infographic, video, or dataset, to a model, or prototype.

"You will be trained in project management, group dynamic, team work and personal competences."
- Course Coordinator

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ECTS
24

Course Coordinators
dr. JM Wreyford, MSc (WUR)

Examination:

Product	20%
Visualization	10%
Documentary	10%
Final Report	35%
Individual Reflection Report	15%
Individual Performance	10%

YMS-70324 Amsterdam Living Laboratory

In the final year of the MSc MADE programme, students engage in a Living Lab project. This project gives students the chance to operate in a real-life problem-solving setting. Students will select from a variety of predefined case challenges related to urban sustainability in Amsterdam. These cases are developed and presented by AMS partner organizations who will also act as the primary stakeholders throughout the project.

Over the course students will work in groups to define the case problem, develop solutions, and present their products. Students will spend part of their week working with the case owners, coaches, and within their groups. The aim is to co-creatively develop an innovative product or process that helps the partner organization get closer to urban sustainability. In the final month of the course, students will prepare a report, deliver a masterclass, as well as organize and participate in an exhibition at AMS Institute to showcase their Living Lab project results.

Within the groups, students are expected to collaborate but can also specialize in certain themes or take specific roles within the process. Students are asked to collaboratively give shape to their projects while also working with the case-owners, coaches, and other stakeholders in the case. The course both challenges the design and engineering expertise of the students and allows them to shape the process to fit their own personal learning objectives.

YMS-70324 Amsterdam Living Laboratory

Activities:

Week 1 – Initiate

- Introduction to the course and concept
- Meet and greet event with case owners
- Group and case assignment

Week 2, 3, 4, 5 – Plan Development

- Input session and workshops
- Increased familiarity with the Living Lab concepts
- Prepare a Living Lab plan and roadmap
- Present the state of the case and incorporate feedback

Week 6, 7, 8, 9 - Explore

- Work on self-defined activities
- Organize team meetings, coach meetings, case owner meetings, and co-creation sessions
- Attend input sessions and check-ins

Week 10 – Refine

- Present the state of the case via a presentation
- Refine the plan via a written summary

Week 11, 12, 13, 14 – Implement

- Further develop the case and the proposed product
- Continue with meetings and co-creation sessions
- Attend check-in and input sessions

Week 15, 16 – Disseminate

- Finalize and present the process and product via a visual representation, short documentary, and report
- Academically and personally reflect on the impact of the process and product

"You design a solution to a metropolitan challenge in the Amsterdam region. As an end result, you will contribute to urban sustainability in Amsterdam."

- Course Coordinator

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ECTS
6

Course Coordinators
dr. J Willet, MSc (WUR)

Teaching method	Hours
Group Work	56
Individual Paper	56
Tutorial	56

Examination:
T.B.A. in course guide

YMS-32306 Professional Profile

The professional profile course runs as a reflexive learning activity after the Living Lab and before the Thesis in the second year of the MADE program. The course connects the Amsterdam Living Lab course (YMS70324) and the Thesis (YMS-80330). Students reflect on the interrelation of research, policy and entrepreneurship, the processes within these domains, and their contribution for society as well as for science.
Through interactive sessions and workshops, students receive input and feedback from fellow participants and experienced trainers. Students work on a domain specific assignment, such as a PhD proposal, a governance arrangement, a policy paper or an abstract representation of a firm or (non)governmental organization. In addition these domain assignment are linked to career development skills.
The course integrates the results of the Thesis and the Living Lab and applies academic and entrepreneurial skills, creatively adding to innovation, and identifying opportunities and challenges that go hand-in hand with organizing, marketing and financing new initiatives, including business ventures and start-ups related to metropolitan challenges of today.

Work forms used in the course:
· workshops on selected skills;
· peer-to-peer sessions;
· networking.

"An innovative educational setup in which students are stimulated to work on open ended projects in real life settings."

- Programme Director

YMS-80330 MSc Thesis Metropolitan Analysis, Design and Engineering

ECTS
30

Course Coordinators
A.J. van Oosten, MSc

Examination:

Research Competence	40%
Thesis Report	40%
Presentation	10%
Oral Defence	10%

The MSc thesis enables the student to put their acquired knowledge and skills into practice by individually and independently conducting a research project in the field of the programme. Within the MSc MADE thesis process (30 ECTS), you will either choose from a provided thesis topic list or you will come up with your own thesis topic. The three different thesis types are: thesis regular, thesis at an organization in the Netherlands or thesis abroad.

Characteristics of a MADE Thesis
A MADE Thesis has some characteristics which differ from many theses in other MSc programmes. Students working on a MADE Thesis:
1. focus on a sustainability challenge
2. in a metropolitan context
3. combining multiple research methodologies
4. integrating analysis, design and engineering (at least two out of three)
5. creating interdisciplinary impact from different perspectives
6. providing applicable recommendations / researching in a real-life context
7. are supervised by both a TU Delft and a WUR scientific staff member
8. acting as an active member of the AMS community
9. define their own scope / are independent researchers

Activities

The thesis programme starts with six kick-off weeks with input sessions on different topics, e.g. how to write a research proposal, research methodology, expectation management and academic writing. During this period you orient on thesis topics and thesis supervisors. Halfway the thesis kick-start weeks, you will formalize your topic and supervisor team with the thesis agreement form. This phase ends by writing and uploading your thesis proposal. After submitting your full thesis proposal, you start designing and executing your research. During that process, you will have meetings with your supervisors, there is the option to form a thesis buddy group with fellow students, and/or be a member of a thesis ring with AMS researchers. You will also join peer reflection sessions and there are options to join the writing labs of TUD and WUR.
Six weeks before your presentation and defence you will have a go/no go session with your supervisors. One week before that, you hand in a 80% version of your thesis to your supervisors. Five working days before your thesis defence, you hand in your final thesis. The final presentation and defence will end your thesis work and result in a thesis assessment.

"By facing real life challenges, I have a better perspective on the different stakeholders invovled as well as the technical aspects required to reach an innovative solution."

- Student

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