



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2021/22
IN
ENVIRONMENTAL CHANGE AND GLOBAL SUSTAINABILITY
(Classe LM-75)
Immatricolati dall'a.a. 2020/21

HEADING

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|--|---|
| Degree classification - Denomination and code: | LM-75 |
| Degree title: | Dottore Magistrale |
| Curricula currently available: | Environmental Systems: Management and Sustainability / Technological Processes and Environmental Sustainability |
| Length of course: | 2 years |
| Credits required for admission: | 180 |
| Total number of credits required to complete programme: | 120 |
| Course years currently available: | 1st , 2nd |
| Access procedures: | open, subject to entry requirements |
| Course code: | F6B |

PERSONS/ROLES

Head of Study Programme

Prof. Maurizio Maugeri

Tutors - Faculty

Prof. Maurizio Maugeri - Academic guidance tutor and Study plan tutor

Dott. Jacopo Bacenetti - Erasmus and International mobility tutor

Prof. Marco Parolini - Laboratory, seminar and workshop tutor

Prof. Stefano Trasatti - Internship tutor

Degree Course website

<https://ecgs.cdl.unimi.it/en>

<https://www.unimi.it/en/education/faculties-and-schools/science-and-technology/environmental-science-and-policies>

ECGS Secretariat

Email: ecgs@unimi.it

International Students Office - Welcome Desk

Milan - Via S. Sofia, 9/1 see this page: <https://www.unimi.it/en/international/coming-abroad/international-students-office-welcome-desk>
<https://www.unimi.it/en/international/coming-abroad/international-students-office-welcome-desk>

Student administrative office

Milan - Via Celoria 18 Tel. 0250325032 <https://www.unimi.it/it/node/360> <https://www.unimi.it/it/node/359>

link to degree course regulations

<https://www.unimi.it/it/corsi/corsi-di-laurea/environmental-change-and-global-sustainability-ecgs>

CHARACTERISTICS OF DEGREE PROGRAMME

Introduction

The Master degree in Environmental Change and Global Sustainability (ECGS) is an internationally oriented high-quality program designed to provide students with both an excellent academic background and an operational attitude. The degree guarantees a promising outlook for a future professional career in today's challenging fields of sustainability and environmental management.

The Master degree is comprised of teaching and other educational activities for a total of 120 ECTS credits and is entirely taught in English.

General and specific learning objectives

Environmental change plays a central role in modern societies, to the point that a sustainable management of the

environment currently represents one of the most important open challenges for humanity. Addressing this challenge requires a multidisciplinary approach that overcomes the usual boundaries of scientific disciplines. In this context, the Master program in Environmental Change and Global Sustainability (ECGS) provides advanced expertise in the hard- and life-science components of environmental studies as well as in their economic- and social-science components. The general goal is to train students to tackle environmental change and sustainability in a multidisciplinary perspective. Students will therefore be provided with both a solid knowledge of the dynamics of the different components of the environment and a deep understanding of the tools required to promote its sustainable management and protection.

The Master degree in Environmental Change and Global Sustainability represents a novelty in the Italian university system, not only for its marked multidisciplinary approach, but also for being taught entirely in English.

Expected learning outcomes

In the spirit of harmonization of education within the European Union, graduates from this Master program are expected to achieve the following standards according to the so-called Dublin Descriptors:

A. Knowledge and understanding

Graduates will gain advanced theoretical knowledge and expertise in the following fields: Mathematics and Statistics; Chemistry, Physics, Earth Sciences and Engineering; Life Sciences; Economics and the Social Sciences.

As to Mathematics and Statistics, the courses offered include: i) Quantitative Methods; ii) Statistical Methods in Environmental Studies. These courses will strengthen the students' familiarity with this subject-area, providing them with knowledge and skills that will help them to understand the mathematical and statistical methods which are used in many of the courses of the Master program. Moreover, they will allow students to get acquainted with many software packages that are currently used in environmental sciences.

As to Chemistry, Physics, Earth Sciences and Engineering, the courses offered include: i) Chemistry of Natural Processes and Technologies for the Environment; ii) Geodiversity: Theory and Applications; iii) Climate Change: Impact and Adaptation; iv) Georesources and Sustainability; v) Environmental Geochemistry; vi) Recycle and life cycle assessment (LCA) of products and processes; vii) Ecosustainable Materials and Processes. The knowledge and skills acquired in this area range from environmental chemistry to environmental physics; from the many aspects of the earth sciences that are relevant to the environmental issue to a number of engineering topics that are useful for a better management of the environment. The knowledge and skills acquired in this area will be very important to allow students to face the environmental issue with a quantitative approach.

As to Life Sciences, the courses offered include: i) Biodiversity Dynamics and Conservation; ii) Approaches to the Study of Ecological Systems; iii) Climate Change: Impact and Adaptation; iv) Economic Botany and Zoology; v) Ecosystem Functioning and Services; vi) Bioresource and Pollution Control Technology; vii) Waste Management and Sustainability; viii) Food Industry Design, Technology and Innovation; ix) Multilevel Effects of Environmental Contamination; x) Methods in Ecotoxicology; xi) Environmental Change and Public Health. The knowledge and skills acquired in this area will first provide students an advanced understanding of:

- the dynamics regulating biodiversity and the problems connected to its conservation;
- the dynamics regulating ecological systems and the services they can provide.

Then advanced knowledge and understanding of multilevel effects of environmental contamination will be provided, ranging from the cellular scale to living beings and ecosystems, with particular emphasis on adverse effect on humans. Moreover, advanced knowledge and understanding of the economic relevance of plants and animals in a quickly changing environmental context will be provided.

Finally, students will get acquainted with several technologies relevant for environmental protection and sustainable development.

As to Economics and the Social Sciences, the courses offered include: i) Environmental Economics and Policy; ii) Statistical Methods in Environmental Studies; iii) Agricultural and Natural Resource Economics and Policy; iv) Applied Environmental and Resource Economics; v) Sustainable Development; vi) Environmental Law; vii) Green Procurement; viii) Sustainability Accounting and Management; ix) Ecosustainable Materials and Processes.

The knowledge and skills acquired in this area will first provide students an advanced understanding of:

- the principles of environmental economics, with a focus on policy applications;
- the principles underlying the determination of the economic value of agricultural and natural resources and the models employable for evaluating the environmental impact of economic activities and assessing the effectiveness of adaptation and mitigation policies.

Then advanced knowledge and understanding of sustainable development will be provided and students will be trained to evaluate sustainability at firm level and to plan the introduction and use of sustainable materials and processes.

Finally, students will get acquainted with Environmental Law that will be examined at both a national and an international level.

B. Applying knowledge and understanding

Graduates will be able to apply the knowledge and skills acquired in the Master program to:

- properly adopt the scientific method and apply it to analyse, control and manage complex environmental problems;
- set up models, make use of quantitative tools and develop appropriate methods of analysis to investigate and understand complex environmental contexts and to propose solutions for their sustainable management;
- face all topics related to environmental protection as well as to environmental monitoring and management taking into account the issue of sustainability and considering the ethical implications of activities affecting the environment;

- consider the different spatial scales related to environmental issue, ranging from the local level to the global scale;
- set up and manage initiatives linked to environmental monitoring, control and remediation in every social and economic context;
- set up environmental impact studies as well as strategic environmental assessments and environmental risk assessments;
- contribute to plan climate change mitigation and adaption initiatives;
- promote sustainability and contribute to strengthen social awareness on environmental issues.

C. Making judgments

The Master program will grant its graduates the ability to make judgments and to critically investigate the effects and effectiveness of the actions and decisions related to the environment, including their ethical implications. The multidisciplinary approach of this program is designed to foster the development of independent judgment and critical thinking capabilities by offering students the opportunity to compare methodological approaches in different disciplines.

D. Communication Skills

ECGS graduates will be able to effectually present and communicate the results of their work (projects, reports, documents, analytical studies, research papers, etc.) within companies and institutional bodies, at both a national and an international level. They will be able to state and defend their positions and opinions and to communicate clearly and effectively in both written and oral forms, as well as to set up cooperative relationships and collaborative work within groups. The ability to competently communicate in the workplace is primarily gained through the presentation and discussion of case studies, a practice that is compulsory for several courses and during the final dissertation.

E. Learning skills

ECGS graduates will learn how to develop and improve their learning skills through the access to and the consultation of the scientific literature, databases and other online information, and by analysing data using econometric and statistical tools. The Master degree in Environmental Change and Global Sustainability also provides its students with the methodological skills and the knowledge foundations that make it possible for graduates to continue their studies in doctoral programs. Master students will also have the opportunity to attend the other activities organised by the Department of Environmental Science and Policy, such as applied laboratories, seminars, and workshops, so as to improve their ability to understand scientific challenges and develop new topics of research.

Professional profile and employment opportunities

The main peculiar quality of ECGS graduates is their ability to tackle environmental change and sustainability in a multidisciplinary perspective. This ability benefits of advanced expertise in the hard- and life-science components of environmental studies as well as in their economic- and social-science components. In this context, five professional profiles ECGS graduates can achieve are listed below:

1. Environmental manager in agro-food, energy and green economy companies as well as in other companies in the industrial and service sectors;
2. Environmental specialist in the public administration as well as in local governments;
3. Environmental specialist in supra and international bodies as well as in national and international non-governmental organizations.
4. Specialist in environmental impact studies and strategic environmental assessments;
5. Specialist in environmental analysis and monitoring.

Further employment opportunities of ECGS graduates concern research positions at universities and research institutions as well as teaching at the secondary school level.

Pre-requisites for admission

Pre-requisites for admission and assessment requires

Eligibility to the Master program in Environmental Change and Global Sustainability presupposes to possess suitable curricular qualifications and to have an adequate personal preparation, to be verified by means of an interview.

As to the curricular qualifications, the ECGS program can be accessed by graduates holding an Italian three-year laurea (BA) degree (ex D.M. 270/2004 or ex D.M. 509/1999) in either the class L-32 Scienze per l'ambiente e la natura (ex D.M. 270/2004) or the class L-27 Scienze e tecnologie per l'ambiente e la natura (ex D.M 509/1999).

The ECGS programme can also be accessed by graduates holding an Italian three-year laurea (BA) degree, obtained in classes different from the above-mentioned ones, provided they have earned at least 60 ECTS (European Credit Transfer System) credits for having attended courses in the scientific-disciplinary sectors belonging to at least two of the following sets, of which at least 15 in the scientific-disciplinary sectors belonging to the first set and at least 12 in the scientific-disciplinary sectors belonging to the second set.

1. computer science, mathematics, and statistics (INF/01, MAT/01-/09, SECS-S/01, SECS-S/06);
2. chemistry, physics and Earth sciences (CHIM/01-/03, CHIM/06, CHIM/12, FIS/01, FIS/06-/07, GEO/01-/02, GEO/04-/05, GEO/10-/12);
3. life sciences (AGR/02-/03, AGR/05, AGR/08-/10, AGR/13, AGR/15, BIO/01-/07, BIO/09-/13);
4. economic and social sciences (AGR/01, ING-IND/35, IUS/01, IUS/04, IUS/09, IUS/13, SECS-P/01-/02, SPS/04, SPS/07, SPS/10).

Students with foreign qualifications obtained from international Universities subscribing to both the European system for acknowledging university qualifications and the ECTS system for assigning university credits can also enter the ECGS

program, provided that they hold first-level degrees accepted as equivalent to Italian laurea degrees by the members of a Committee appointed by the ECGS program Council, who will also ascertain that the international applicants meet curricular requirements in disciplines similar to those belonging to the scientific-disciplinary sectors listed above.

Finally, students with foreign qualifications obtained from international Universities not subscribing to the European system for acknowledging university qualifications and the ECTS system for assigning university credits can also enter the ECGS program, provided that they hold first-level degrees accepted as equivalent to Italian laurea degrees by a Committee appointed by the ECGS program Council, and that the same Committee verifies that the international applicants meet curricular requirements similar to those required of the applicants holding qualifications awarded by Italian Universities.

Moreover, in all the above cases, knowledge of the English language is required at level B2 or higher, according to the classification provided by the Common European Framework of Reference for Languages (CEFR). The qualifications recognised by the University of Milan, with the corresponding CEFR levels, can be found at: <https://www.unimi.it/en/study/language-proficiency/placement-tests-and-english-courses/english-entry-tests>.

Native English speakers and graduates from university first-level programmes entirely taught in English are exempted from producing any such language qualification.

Students without a documented B2 level may be accepted on condition that their level of English proficiency, assessed during the interview, is evidently good.

In entrance, optional training activities are provided to facilitate the integration of students from different first level degrees and from different universities (see the programme website at: <https://ecgs.cdl.unimi.it/en>).

- Practical instructions

Applicants, both foreign and Italian holding a bachelor's degree or expecting to obtain it by December 31st, 2021, must apply for admission to the ECGS program from March 1st to August 27th, 2021.

Programme structure

The first year of the ECGS Master program is built on eight required courses. Two of these courses (one in either semester) aim at strengthening students' familiarity with the mathematical and statistical topics that are used in many of the courses of the Master program. The other ones concern the six disciplinary areas that a Master program in class LM-75 (Scienze e tecnologie per l'ambiente e il territorio) must include in Italy.

The first three of these six courses are in the first semester and concern biological, ecological and economical disciplinary areas; the other three are in the second semester and concern the disciplinary areas of chemistry, earth sciences and agronomic sciences. Each of these courses allows the students to obtain eight ECTS credits, whereas either one of the two courses of the mathematical and statistical area allows the students to obtain six ECTS credits.

Therefore the first year of the ECGS Master program allows the students to obtain 60 ECTS credits. All in all, lectures and classes cover globally 512 hours.

Compulsory attendance

Attendance is strongly recommended.

Curricula

In the second year of the ECGS Master program, students have to select one of the following two curricula:

A: Environmental Systems: Management and Sustainability;

B: Technological Processes and Environmental Sustainability.

Then three courses must be selected from those associated to the chosen curriculum. These courses allow the students to obtain 18 ECTS credits, whereas further 12 ECTS credits are obtained from other two elective courses to be chosen among those offered by all the Master programmes of Milan University, with the only restriction that the study plan must be approved by a Committee appointed by the ECGS program Council. The second year of the ECGS Master program is completed by an internship or a placement period (worth 9 ECTS credits) and by the final dissertation (worth 21 ECTS credits). Over the second year, lectures and classes globally cover 240 hours.

Study plan definition and submission for approval

Students have to submit their study plans in the first year of course. Consult the website: <https://www.unimi.it/en/study/bachelor-and-master-study/following-your-programme-study/plan-study>

Lecture timetable

The first Semester starts on September 27, 2021 and ends on January 21, 2022

The second Semester starts on February 28, 2022 and ends on June 17, 2022

The timetable will be available at <https://www.unimi.it/en/node/128/>

Testing and assessment procedures

Each course is followed by an exam, usually in the form of a written or oral test (or a combination of the two). Exam grades are calculated on a 30-point scale, 18/30 is the minimum passing grade.

Credits for a course are only granted upon passing the corresponding exam.

Procedures for exam registration and admittance

Exam sessions are scheduled during recess at the end of each semester. For each course, 6 tests are scheduled per academic year.

Campus

Lecture rooms and laboratories are located in the “Città Studi” campus, mostly in the University buildings of Via Celoria, 20

Degree programme final exam

The Master degree in Environmental Change and Global Sustainability ends with a final exam worth 21 ECTS credits. This exam consists of the preparation and public discussion of an original thesis drawn up by each graduating student under the guidance of a thesis supervisor. The thesis must be written and discussed in English.

Criteria for admission to degree course final exam

To be admitted to the final exam students must have earned 99 ECTS credits.

EXPERIENCE OF STUDY ABROAD AS PART OF THE DEGREE PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.

The agreements entered into by the University with over 300 universities from the 27 EU member countries and other Extra-EU countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

In line with the nature of the ECGS programme, international mobility is highly encouraged.

Students enrolled in the programme may spend a study period abroad under the ERASMUS+ program (they can take courses, take exams, prepare theses, carry out research), obtaining recognition for their academic career from that educational experience.

Erasmus+ also provides Placements, that is, the opportunity for a traineeship in companies and other organisations abroad. The new Erasmus+ program provides the following new study and placement opportunities: a) up to 12 months abroad (study periods and placements); b) placements, including those for new graduates (within 12 months of completing a degree). Students who have already spent a period abroad under the Erasmus+ programme may still apply for an Erasmus+ educational or placement activity. Yet, the months previously spent abroad concur to the attainment of the overall maximum of 12 months for each Erasmus+ study cycle.

How to participate in Erasmus mobility programs

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.

Ad hoc commissions will evaluate:

- Academic career
- the candidate's proposed study programme abroad
- his/her foreign language proficiency
- the reasons behind his/her application

Call for applications and informative meetings

The public selection generally begins around February each year with the publication of a call for applications specifying the destinations, with the respective programme duration (from 2/3 to 12 months), requirements and online application deadline.

Every year, before the deadline for the call, the University organizes informative meetings to illustrate opportunities and rules for participation to students.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which is supplemented by the University funding for disadvantaged students.

Language courses

Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University.

Learn more at <https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus>

For assistance, please contact:
International Mobility Office

Via Santa Sofia 9 (second floor)
 Tel. 02 503 13501-12589-13495-13502
 Contacts: InformaStudenti mobility.out@unimi.it
 Student Desk booking through InformaStudenti

ADMISSION CRITERIA: 1ST YEAR OPEN, SUBJECT TO ENTRY REQUIREMENTS

Application and enrolment information and procedures

- Admission interviews:

Interview dates will be published on the course's official website: <https://ecgs.cdl.unimi.it/en>

Links to enrolment information and procedures

<https://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/enrolment-masters-programme>

Practical instructions

Candidates residing in Italy and foreign candidates residing abroad, who are graduates (holding a BA degree) from non-Italian universities must submit their applications (<https://www.unimi.it/en/node/92/>)

Admission interview:

International candidates, as well as Italian residents, may be interviewed via Skype. The scheduled dates for online interviews will be published on the ECGS website.

Detailed information on the application procedures is available on the ECGS course website.

The aim of the individual interviews is to ascertain the candidates' motivation, as well as their background knowledge, their abilities and competences in the key areas of the ECGS programme.

Please consult the degree course web site for further information and updates (<https://ecgs.cdl.unimi.it/en>).

N° of places reserved to non-EU students resident abroad

30

| 1st COURSE YEAR Core/compulsory courses/activities common to all curricula | | | | |
|---|---|----------------------|------|-------------------|
| Scheduling | Learning activity | Module/teaching unit | Ects | Sector |
| 1 semester | Approaches to the Study of Ecological Systems | | 8 | BIO/07 |
| 1 semester | Biodiversity dynamics and conservation | | 8 | BIO/05 |
| 1 semester | Environmental Economics and Policy | | 8 | SECS-P/01 |
| 1 semester | Quantitative Methods | | 6 | MAT/08 |
| 2 semester | Agricultural and Natural Resource Economics and Policy | | 8 | AGR/01 |
| 2 semester | Chemistry of Natural Processes and Technologies for the Environment | | 8 | CHIM/07, CHIM/06 |
| 2 semester | Geodiversity: Theory and Applications | | 8 | GEO/04 |
| 2 semester | Statistical Methods in Environmental Studies | | 6 | MED/01, SECS-P/05 |
| Total number of compulsory credits/ects | | | 60 | |
| 2nd COURSE YEAR Core/compulsory courses/activities common to all curricula | | | | |
| Scheduling | Learning activity | Module/teaching unit | Ects | Sector |
| | Final dissertation | | 21 | ND |
| Total number of compulsory credits/ects | | | 21 | |
| Elective courses common to all curricula | | | | |
| In the 2nd year 9 ECTS credits must be acquired for Internship and Placement | | | | |
| Internship and Placement credits can be spent: | | | | |
| Within an external internship; | | | | |
| Within an internal internship; | | | | |
| Within the Multidisciplinary Laboratory of Environmental Change and Global Sustainability organised by ECGS Master. | | | | |
| Open choice courses: 12 CFU | | | | |

LIST OF CURRENTLY AVAILABLE CURRICULA

Environmental Systems: Management and Sustainability Course years currently available: 1st, 2nd
 Technological Processes and Environmental Sustainability Course years currently available: 1st, 2nd

CURRICULUM: [F6B-A] Environmental Systems: Management and Sustainability

| 2nd COURSE YEAR Elective courses Curriculum-specific elective courses for Environmental Systems: Management and Sustainability | | | | |
|---|--|--|---|--------|
| Choose three courses from: | | | | |
| 1 semester | Applied Environmental and Resource Economics | | 6 | AGR/01 |

| | | | | |
|------------|--|--|---|-------------------|
| 1 semester | Climate Change: Impact and Adaptation | | 6 | FIS/06, AGR/02 |
| 1 semester | Economic Botany and Zoology | | 6 | BIO/05, BIO/04 |
| 1 semester | Ecosystem Functioning and Services | | 6 | BIO/07 |
| 1 semester | Environmental Law | | 6 | IUS/10 |
| 1 semester | Georesources and Sustainability | | 6 | GEO/09 |
| 1 semester | Green procurement | | 6 | IUS/10 |
| 2 semester | Sustainability Accounting and Management | | 6 | SECS-P/08 |
| 2 semester | Sustainable Development | | 6 | SECS-P/01 |

CURRICULUM: [F6B-B] Technological Processes and Environmental Sustainability

2nd COURSE YEAR Elective courses Curriculum-specific elective courses for Technological Processes and Environmental Sustainability

Choose three courses from:

| | | | | |
|------------|---|--|---|------------------------------|
| 1 semester | Bioresource and Pollution Control Technology | | 6 | AGR/09 |
| 1 semester | Ecosustainable Materials and Processes | | 6 | SECS-P/08, ING-IND/22 |
| 1 semester | Environmental Geochemistry | | 6 | GEO/08 |
| 1 semester | Multilevel Effects of Environmental Contamination | | 6 | BIO/06, BIO/05, BIO/14 |
| 1 semester | Recycle and life cycle assessment (LCA) of products and processes | | 6 | CHIM/04 |
| 1 semester | Waste Management and Sustainability | | 6 | AGR/18, AGR/10 |
| 2 semester | Environmental Change and Public Health | | 6 | MED/50, MED/04 |
| 2 semester | Food Industry Design, Technology and Innovation | | 6 | AGR/15 |
| 2 semester | Methods in Ecotoxicology | | 6 | VET/07, BIO/07 |