

ITALY

Study Abroad - Short Term Summer Course Sustainable Green Infrastructure for the Urban Environment (ENGR)



Po River, Torino

Quick Facts

Program Dates: May 23 - June 7, 2015

Class Eligibility: UMD students from any discipline who are second semester sophomores, juniors, seniors, or graduate students are eligible.

Prerequisites: None

Academics: ENCE489N Special Problems in Civil Engineering, 3 credits.

Application: <http://ter.ps/italyengr>

Program fee: \$3,000 (includes tuition, health insurance, housing, registration, public transport, other)

Program Director

Dr. Dimitrios Goulias

Associate Professor
University of Maryland

Course Description



University of Torino

Introduction

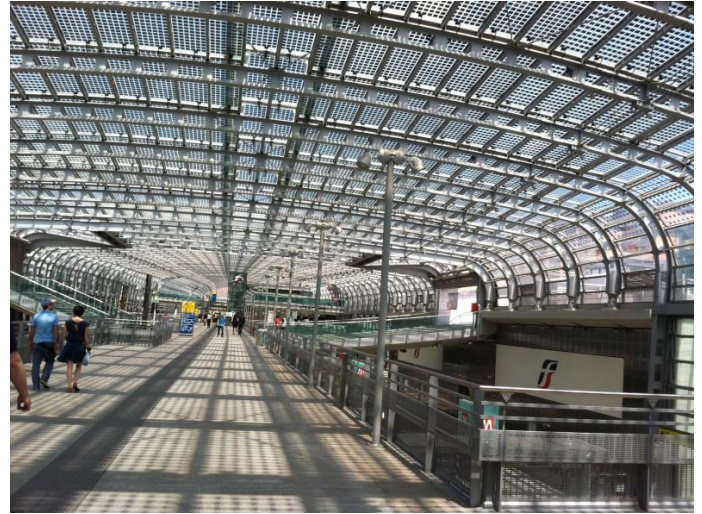
Cities represent a dynamic and living environment that allow experimentation in combining sustainable technical solutions and social decisions aimed at increasing the quality of life with better built environment, improving aesthetics and attractiveness of the urban living. Environmentally sound and sustainable technologies are increasingly needed in urban design, both in terms of renovating the existing infrastructure as well as developing new urban districts. However, the urgency to promote and implement sustainable “solutions” in cities present risks associated with “technocratic” or overly prescriptive approaches that inadequately articulate or address key challenges, (e.g., attention to the local and social identity, cultural traditions, and ways of living). Successful design for quality urban development involves multidisciplinary teaming of specialists.

Strict environmental requirements for cities in Europe and the US often demand low impact development (LID) solutions that involve the use of pervious surfaces/LID for (i) ground and building roof green areas (“green wash”) and (ii) porous pavements and parking lots. Such alternatives are used for addressing both environmental/water runoff and contamination issues, as well as green aesthetics surrounding and related to the civil infrastructure (pavements, buildings, bridges). Thus, the development of design strategies for green infrastructure is explored around the world as the means of restoring existing urban places, enhancing new urban areas, and overall improving the quality of living spaces. Such strategies involve multidisciplinary teams of experts since they integrate and address the surround environment, economic decisions, societal needs as well as local culture.

Theoretical Framework

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Lectures



Porta Susa Train Station, Torino.

This study abroad course will expose students to the theoretical framework, concepts and techniques required to develop green infrastructure solutions for alternative urban environments, complex spatial systems encompassing mobility, environment, energy, and social well-being. The course will deal with the identification of a set of qualitative/quantitative indicators for a possible new generation of urban street design methodologies. The course will first address with key faculty experts speakers from the US and Italy, the principles of technical, cultural and social approaches used in the design of sustainable green urban infrastructure, including among other:

- Alternative design scenarios to the “traditional” approach of streets;
- Role of urban history and social fabric on the design of urban (green) space;
- Technological alternatives for environmental sustainability, and aesthetics of urban street design;
- Thermal comfort in outdoor living spaces and the role of green surfaces;
- Communication alternatives for sharing values and perception of urban living;
- Hydrological concepts related to runoff in urban areas;
- Urban street design principles (functional/ capacity and level of service, safety, geometric issues/ alignment and cross sectional organization of road elements);
- Effects of vegetation as buffers on air quality and air pollution, public health and physical activities, linkage to indoor environmental quality, building energy and ventilation requirements;
- Street design with collaborative creation, visualization and exploration of environmental information acquired by human senses and the use of electronic data;
- Innovative pavement material alternatives for porous surfaces and contaminants’ control (porous asphalt mixtures and pervious concrete for traffic lane pavements and parking lots, granular surfaces);
- Recycled and reclaimed materials for roadway rehabilitation.

Case Studies

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Site Visits



Mole Antonelliana, Torino

The study abroad students from the University of Maryland will team up with students from the Politecnico di Torino to examine and develop “green” alternative solutions for various urban scenarios. The students will be grouped in multidisciplinary working teams involving disciplines such as, civil engineering (materials/ structures), transportation, environmental, urban studies, architecture, other. The faculty involved in the course will identify alternative case studies in the Municipality of Torino with the following characteristics:

- case study in a dense urbanized area;
- case study in low density urbanized area;
- case study for new urban district.

The following site visits are included in the course:

- Location of three case studies, Torino;
- Fiat Lingoto Industrial Building and Roof Top Test Track, Torino;
- Porta Susa Metro Station, Torino;
- University of Torino - Foster Building, Torino;
- Valentino Royal Castle - Politecnico di Torino;
- National Auto Museum Building, Torino;
- Mole Antonelliana, Torino;
- Other historic buildings, Torino;
- Leonardo da Vinci Science & Technology Museum, Milano.

Course Schedule



Piazza Vittorio Veneto, Torino.

- May 14, 2015: Pre-departure meeting/ orientation and travel information.
- May 23, 2015 Departure from US.
- May 24, 2015 Arrival at Torino and housing at Politecnico di Torino dormitories.
On-site orientation & welcome reception dinner (evening).
- May 25, 2015 Lectures: Theoretical framework for developing green infrastructure alternatives for urban environments.
- May 26, 2015 Lectures: Theoretical framework for developing green infrastructure alternatives for urban environments.
- May 27, 2015 Lectures: Theoretical framework for developing green infrastructure alternatives for urban environments.
- May 28, 2015 Lectures: Theoretical framework for developing green infrastructure alternatives for urban environments.
- May 29, 2015 Round table discussion on working in teams & alternative case studies.
- May 30, 2015 Site visits (morning): locations of alternative case studies,
(afternoon) cultural and civil engineering marvels – Torino.
- May 31, 2015 Site visits: Cultural and Civil engineering marvels - Milano.
- June 1, 2015 Lectures on examples of green infrastructure alternatives;
- June 2, 2015 Development of design alternative projects for the selected case studies by the multidisciplinary teams of students.
- June 3, 2015 Development of design alternative projects for the selected case studies by the multidisciplinary teams of students.
- June 4, 2015 Development of design alternative projects for the selected case studies by the multidisciplinary teams of students.
- June 5, 2015 Presentations of final design projects by the student teams.
- June 6, 2015 Concluding remarks & Farewell dinner event (evening)
- June 7, 2015 Return to the US.

Instructors
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Course Location



Course Location: Valentino Royal Castle, Politecnico di Torino.

University of Maryland

Department of Civil and Environmental Engineering.

- Dr. Dimitrios Goulias, Associate Professor. (Program Director).

Politecnico di Torino

Department of Architecture and Design, (DAD).

- Dr. Alessandro Mazzotta, Assistant Professor.
- Dr. Sergio Pace, Associate Professor.
- Dr. Paolo Mellano, Professor.

Department of Civil, Environmental, and Infrastructure Engineering, (DIATI).

- Dr. Marco Bassani, Associate Professor.
- Dr. Pierluigi Claps, Professor.

University of Michigan

Water Resources and Environmental Engineering, College of Engineering, Environmental Health Sciences, School of Public Health.

- Dr. Stuart Batterman, Professor.

University of Torino

Department of Agricultural Sciences, Forestry and Food (DISAFA):

- Marco Devecchi,

Other

The course will involve additional lecturers from participating institutions and the industry.

Course Location & Access

Students will be housed at the dormitories of the Politecnico di Torino and will be using lecture rooms, the library and laboratory facilities. The coursework will take place at the Valentino Royal Castle of Politecnico di Torino, where the Department of Architecture and Design, DAD, resides.

Learning Objectives

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Outcomes



Parade at Piazza San Carlo, Torino.

Learning Objectives

Students in this course will:

- gain knowledge on the principles of developing green infrastructure design alternatives through a multidisciplinary approach;
- be exposed to the complex and multi-disciplinary analysis required for such projects and account for the physical characteristics of the space, the historic and cultural identity of urban areas, as well as the environmental aspects;
- be exposed to and learn of the set of qualitative and quantitative indicators useful for the definition of environmental and social qualities used in the “new generation” of green infrastructure design;
- experience the development and design of Sustainable Green Infrastructure alternatives in real urban case studies;

Learning Outcomes

By the end of the course, students should have attained competency (ABET) in the following areas:

- participatory decision making within a multidisciplinary team;
- creating and administering design alternatives based on community needs assessment, and cultural identity;
- creating and analyzing multiple design alternatives;
- determining appropriate techniques and methods to be used in solving societal needs mingled with engineering and environmental principles;
- determining metrics for a design project;
- recognizing and dealing with different perspectives and cultural identities when working in international teams.

Program Assessment

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Participation



Fireworks at Piazza Vittorio Veneto, Torino.

Participation

The students will be working in multidisciplinary teams and the theoretical framework principles needed to conduct their design projects will be provided during the lectures. Students are expected to: i) attend all of the lecture and site visit sessions associated with this course; ii) actively participate in the design project developed by each team.

Program Assessment

1. Post lectures exam (20%)

The exams will assess: (i) student knowledge of the principles of developing green infrastructure design alternatives; (ii) their ability to recognize the complex and multi-disciplinary analysis required for such projects; (iii) their knowledge and ability to identify the set of qualitative and quantitative indicators for the design of “new generation” green infrastructure.

2. Course and team participation (30%)

This component will assess the interest, participation and interaction of each student in the different phases of this study abroad course (lectures, project design of case studies, site visits).

3. Design Project Report and Presentation (50%)

Each student and team will be assessed based on the level of performance in regards to the following list of outcomes:

- participatory decision making within a multidisciplinary team;
- ability to create and administer design alternatives based on community needs assessment, and cultural identity;
- ability to create and analyze multiple design alternatives;
- ability to determine appropriate techniques and methods to be used in solving societal needs mingled with engineering and environmental principles;
- ability to define evaluation metrics for the design project;
- ability to recognize and consider different perspectives and cultural identities when working in international teams.