

# **Sustainable Policy & Practice in Vienna**

## **Study Abroad Program (Spring 2018) for UTokyo Undergraduate Students**

### **1. Overview and Program Objectives:**

Vienna is a global city pioneering in the fields of urban waste and energy efficient architecture and a host to many leading international institutes in the field of sustainable policy and research. This study abroad program consists of five introductory level modules on sustainable policy and practice in Vienna. Upon completion of this study abroad program, participants will develop a strong understanding of concepts and issues in urban sustainability, the economic history of sustainable development, sustainability governance, and science and diplomacy through leading international institutions in Vienna. This course will be an excellent opportunity for participants to expand their awareness of sustainability challenges while also sharpening their communication and writing skills to influence and engage in relevant debates and actions on pressing global sustainability challenges.

### **Program contains 5 modules (For details see attached syllabus):**

- I. Sustainable Waste Management (TU-Wien)
- II. Sustainable Building Design: principles of energy and resource efficiency (TU-Wien)
- III. Economic History of Sustainable Development (WU)
- IV. Sustainable Development, Global Governance, and Science and Diplomacy (IIASA)
- V. Sustainable Policy & Practice Field Visits

### **2. Collaborating institution(s) and professors/academic staff:**

- Vienna University of Technology (TU-Wien)
- Vienna University of Business and economics (WU)
- International Institute for Applied Systems Analysis (IIASA)
- Logistical and administrative support: INNES Institute Vienna

### **3. Dates:**

- **Deadline for submission of application form:** 18 December 2017
- **Notification of selection results:** 22 December 2017
- **Program Dates:** 2 – 17 March 2018
  - March 2<sup>nd</sup>: Arrival VIE airport
  - March 3<sup>rd</sup> – 4<sup>th</sup>: City tour and excursions
  - March 6<sup>th</sup> – 16<sup>th</sup>: Lessons
  - March 17<sup>th</sup>: Departure from VIE airport

#### 4. **Costs:**

- Tuition Fee: 1,380 EUR (minimum number of 4 participants, max. number 10 students)
- Suggested accommodation: 350€ for two weeks at OEAD dorms.

**We regret that the GLP-GEfIL Program will not be able to offer scholarships for this program to non-GEfIL students.**

**5. Eligibility:** This program requires no prerequisites. The lectures, discussion and presentations of this program are conducted primarily in English; therefore participants must be fully motivated and possess sufficient proficiency in English.

#### 6. **Application Guidelines and Selection Process**

- The application form can be downloaded from our website <http://www.glp.u-tokyo.ac.jp/>
- The completed and signed form can be send as a PDF file to the GLP Office at [glp-gefil.adm@gs.mail.u-tokyo.ac.jp](mailto:glp-gefil.adm@gs.mail.u-tokyo.ac.jp) or submitted in person to the GLP Office, UTokyo, Hongo Campus, Dai-2 Honbu-to, Room 119.
- The selection will be conducted by the GLP Office, and will be based on the application form, motivational statement and English proficiency score.

#### 7. **Contacts for Inquiries Regarding this Program**

Assistant Prof. Ali Kharrazi, GLP-GEfIL Program, Center for the Development of Global Leadership Education, The University of Tokyo, [ali.kharrazi@mail.u-tokyo.ac.jp](mailto:ali.kharrazi@mail.u-tokyo.ac.jp)  
For general inquiries, please contact the GLP Office:  
[glp-gefil.adm@gs.mail.u-tokyo.ac.jp](mailto:glp-gefil.adm@gs.mail.u-tokyo.ac.jp)

#### 8. **Excursions:**

- The Volksgarten and Burggarten
- Stadtpark
- Hofburg Palace
- The United Nations and Vienna International Center
- Schloss Schonbrunn
- Belvedere Museum

**9. Accommodation in Vienna:** There are many options for accommodations such as hotels and hostels in central Vienna for students. A highly recommended option for students

is the centrally located OEAD dormitories (1020 Wien, Molkereistrasse 1). Single rooms at this dormitory are for EUR 350 for two weeks (special discount).  
[https://housing.oead.at/de/unterkuenfte/detailansicht-de/details?view=application&object\\_id=24](https://housing.oead.at/de/unterkuenfte/detailansicht-de/details?view=application&object_id=24)

## Detailed Course Syllabi:

### I. Sustainable Waste Management

- **Number of hours:** 5 hours
- **Lecturer(s):** by **Prof. Bartl, Prof. Spadiut, Prof. Winter** (Vienna University of Technology)
- **Area keywords:** urban waste management, waste-to-energy, recycling policy

**Prof. Bartl:** In 2008, the EU launched the waste framework directives prioritizing waste treatment in all EU member countries through a waste hierarchy. “Waste prevention” has been given a top priority followed by “preparation for reuse”, “recycling”, and “recovery”. Disposal is the least favorable option and should be avoided. Based on this policy some EU countries have made significant progress in waste management and the fraction of disposable solid waste has gone towards zero. However, several EU countries lag behind and depend on waste disposal. Despite this unbalanced development in waste management, the European Commission has further proposed the Circular Economy Package (CEP). The CEP goes beyond waste management and takes into account the whole supply chain. It covers the full lifecycle from production and consumption to waste management and the market for secondary raw materials. The CEP tackles climate change and environmental pollution while boosting job creation, economic growth, investment and social fairness.

**Prof. Spadiut:** Extremophilic organisms are a potentially valuable resource for the development of novel bioprocesses. They can act as a source for stable enzymes and unique biomaterials and are capable of carrying out microbial processes and biotransformations under extremely hostile conditions. Extreme-thermoacidophilic members of the well-characterized genus *Sulfolobus* are outstanding in their ability to thrive at both high temperatures and low pH. Besides being a native source of high value-added products like extremozymes, extreme thermo-acidophiles are predestined for the task of sustainably converting lignocellulosic biomass into value-added products due to their resilience towards harsh process conditions and their hemicellulolytic and cellulolytic properties. The combination of broad substrate specificity, lack of carbon catabolite repression, expression of polymer-degrading enzymes and extreme growth conditions make *Sulfolobus* spp. promising candidates for biorefinery applications. Following this approach, waste streams of the chemical and pulp and paper industry can be converted into value-added products. These processes would greatly benefit from the increased substrate solubility due to high temperatures and low pH. The availability of genetic tools and a broad variety of different strains are the basis for an application of *Sulfolobus* spp. in the biorefinery – however, the challenge of realizing competitive bioprocess remains.

**Prof. Winter:** Sustainable waste management will be shown with the waste management of the city of Vienna as an example. Vienna with about 1.8 million inhabitants is very active in waste sorting and waste collection and recycling. Municipal solid waste is incinerated at 4 sites using grate furnace and fluidized bed combustion technology. For hazardous waste, rotary kilns are used. These three technologies will be shortly presented and their characteristics will be discussed. Highly effective cleaning of the flue gas is of high importance. The ashes are treated and landfilled or stored underground in special landfills for hazardous waste. Ongoing research projects look for alternative utilization routes for fly ashes and bottom ash. The concept of urban mining will be addressed.

- **Assessment:**

- Option A: To complete this module, students are required to submit an individual 2,000 word essay (approximately 4 pages). A list of essay topics will be decided by the lecturer. Essay topic can be suggested by students but their suitability needs to be evaluated by the lecturer. Essays must be referenced and follow correct English grammar and spelling.
- Option B: To complete this module, students may deliver a group presentation on related topic, not more than 20 minutes. In addition, the group presentation must be accompanied by a one page extended abstract of the presentation.
- Option C: To complete this module, students may submit a proposal or conceptual design inspired by the topics of this module.

## II. Sustainable Building Design: principles of energy and resource efficiency

- **Number of hours:** 5 hours  
**Lecturer(s):** Dr. Iva Kovacic + Meliha Honic, Vienna University of Technology (TU-WIEN)
- **Area keywords:** Integrated Planning, BIM, embodied and operational, material passport, LCA
- **Objectives:** By completing this course the students will learn the main objectives of sustainable built environment, which is based on economic perspectives, e.g., life cycle costs and benefits; ecological perspectives, e.g., reduction of emissions, energy, and resource efficiency; and socio-cultural perspectives, e.g., monument protection, accessibility, and affordability. Thereby, design and optimization methods will be introduced, such as integrated planning, building information modeling and life cycle assessment; as well as optimization of life cycle of built environment. Students will be introduced to policy instruments such as energy certificates, material passport, and building typologies such as passive and plus energy houses.
- **Detailed Syllabus:**
  1. Introduction
    - Sustainable built environment
    - Challenges and Design Aims

2. Design Methods
  - Integrated Planning and Building Information Modeling
  - Life Cycle Analysis and Optimization
  - Computational Simulation and Prediction Tools
  - Building Certificates
3. Energy and Resources Efficiency
  - Integrated Life Cycle Analysis: Embodied and Operational Energy
  - Embodied Energy – Resources Efficiency
  - Operational Energy – Energy Efficiency Technologies, Building Typologies
  - User Behavior
  - Refurbishment Strategies
  - Material Passport and Energy Certificate/Simulation
4. Best Practices
  - INFO\_Interdisciplinary Research for Energy Efficient Production
  - ReCoRe\_Resources Conserving Renovation
  - Life Cycle Analysis of Passive Housing Block in Loden Aral

- **Assessment:**

- Option A: To complete this module, students are required to submit an individual 1,500 word essay (approximately 3 pages). A list of essay topics will be decided by the lecturer. Essay topic can be suggested by students but their suitability needs to be evaluated by the lecturer. Essays must be referenced and follow correct English grammar and spelling.
- Option B: To complete this module, students may deliver a group presentation on related topic, not more than 20 minutes. In addition, the group presentation must be accompanied by a one page extended abstract of the presentation.
- Option C: To complete this module, students may submit a proposal or conceptual design inspired by the topics of this module.

### III. Economic History of Sustainable Development

- **Number of hours:** 5 hours
- **Lecturer(s):** Dr. Carmen Gruber, Vienna University of Business and Economics (WU)
- **Area keywords:** economic history, sustainable development, global governance, global economy
- **Learning objectives:** This course surveys global economic history and introduces the methodologies of the discipline. By completing this course, students will draw upon significant historical economic material & time-series data relevant to the process of industrialization, globalization, natural resource usage, and sustainable development. The emphasis of this course will be on questions related to economic growth and natural resource depletion.

- **Detailed Syllabus:**

1. Introduction
  - a. What is economic history? Why do we study it?
  - b. What is development? What has this meant over time?
    - i. How do we measure development?
2. Great Divergence
  - a. The start of modern economic growth and development in the west, but not in the rest
  - b. Different theories of what is required for modern economic growth
    - i. Geography
    - ii. Culture
    - iii. Institutions
    - iv. Technology/Innovation
  - c. Britain vs. China vs. Japan
3. Development today—different than in the past?
  - a. History of imperialism and outside intervention
  - b. Aid vs. trade
    - i. The West and the Chinese Approach
4. Development theories over time
  - a. Marx
  - b. Akamatsu
  - c. Schumpeter
  - d. Modernization theory
  - e. Dependency theory
  - f. Amartya Sen

- **Assessment:**

This module is assessed through mini-assignments. These include:

- Historical maps: students will be assigned historical maps and asked to draw how they think development patterns have changed.
- Students are assigned different country groups and asked which elements of the great divergence theories might be most relevant to those countries
- Students will be assigned reading material, from historically significant and current topic, and asked to lead discussions on their assigned reading materials.
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#### IV. Sustainable Development, Global Governance, and Science and Diplomacy

- Number of hours: 5 hours
- **Lecturer(s):** Dr. Ali Kharrazi, UTokyo, Center for the Development of Global Leadership Education.
- **Area keywords:** Sustainable Development Goals, global policy and governance of sustainable development goals, and topics on science diplomacy
- **Learning objectives:** This course is design to introduce students to the wide array of policy-oriented research into global problems that are too large or too complex to be solved by a single country or academic discipline. By completing this course, students

will gain an understanding of sustainable development goals, different facets of science and diplomacy, policy oriented interdisciplinary research, and global governance strategies. Students will have the opportunity to become familiar with research by different IIASA groups, including the Advanced Systems Analysis, Ecosystems Service Management, Risk and Resilience, and Energy groups.

- **Detailed Syllabus:**
  1. Complex Global Human Challenges
    - 1.1. Millennium Development Goals
    - 1.2. Sustainable Development Goals
  2. History of Science and Diplomacy
    - 2.1. Ancient and medieval cases
    - 2.2. Post world water international framework
    - 2.3. Postmodern and future frameworks
  3. History of IIASA
    - 3.1. Advanced Systems Analysis,
    - 3.2. Ecosystems Service Management
    - 3.3. Risk and Resilience,
    - 3.4. Energy
  4. New directions for global sustainable governance
    - 4.1. The future of the citizen scientist
    - 4.2. Big-data science and new governance frameworks
    - 4.3. Sustainable accounting approaches
  
- **Assessment:** To complete this module, students may deliver a group presentation on related topic, not more than 20 minutes. In addition, the group presentation must be accompanied by a one page extended abstract of the presentation. The presentation topic should focus on a global sustainability challenge and proposals for tackling this challenge through science and diplomacy.

## V. Sustainable Policy & Practice Field Visits

- Number of hours: 5~7 hours
  
- **Innovative Sustainability Practice in Vienna:**
  - Urban waste treatment plant in Spittelau (Sustainable Urban Waste)
  - Erste Bank Campus Westbahnhof (Energy Efficiency & Sustainable Building Design)
  
- **International institutions focusing on sustainable developmental**
  - **ADA**, Austrian Development Agency (Sustainable Development & Global Governance)
  - **UNIDO**, United Nations Industrial Development Organization (Economic History of Sustainable Development and Sustainable Development & Global Governance)

- **IAEA**, International Atomic Energy Agency, Sustainable Energy Planning
- **OFID**, OPEC Fund for International Development (Sustainable Development & Global Governance)
  
- **Assessment:** To complete this module, students are required to submit an individual 1,000 word essay (approximately 2 pages). This essay should focus as a self-reflection of the field visits taken by the students. Specifically, students should aim to answer which visit they found most inspiring and why? Essays must be referenced and follow correct English grammar and spelling.