

Postgraduate MSc Program "Wood Based Building Design for Sustainable Urban Development"

In cooperation with
Dresden University of Technology and the Polytechnic of Turin

Preamble

Since termination of the course "Timber Construction" at the Swiss Federal Institute of Technology Lausanne, postgraduate education in the field of timber building design has practically ceased to exist. With respect to the present curricula in the field of architecture and building science, it would be inadequate to organize a specialized program aimed solely at undergraduate students. Moreover, there is a dedicated interest from the wood building industry for postgraduate education and, in order to efficiently promote wood as a building material, the subject matter should focus on urban zones and their surroundings. The main concept of this MSc Program was awarded the "Schweighofer-Prize" in 2005, which aims to distinguish outstanding innovative achievements focusing on wood and the related value chain.

The expertise of the collaborating institutes in the framework of this course can be described as follows:

- *TU Wien, Institut für Architekturwissenschaften (Tragwerksplanung und Ingenieurholzbau - ITI)*

Research activities of ITI focus on multi-storey buildings consisting of renewable construction materials. Application of natural materials to dwellings in heavily populated urban centers is considered to be an indispensable aim for the sustainable development of cities. Beyond the environmental angle, the adaptation of building systems according to the specific criteria of an aging society is hereby a main subject of investigation.

- *TU Dresden, Lehrstuhl für Ingenieurholzbau und baukonstruktives Entwerfen*

This institute covers the field of wood mechanics and is engaged in the development of high performance wood-based material. In order to widen the use of wood as a construction material, the mechanical properties and modification of wood composites, fibers and textiles are intensively studied. Such hybrid material technologies are considered to be effective in providing reliable building components that satisfy both contemporary urban and environmental requirements.

- *Politecnico di Torino, Dipartimento di Progettazione Architettonica e di Disegno Industriale*

The team of Turin - consisting of architects, historians, structural and material engineers, wood technologists and dendrochronologists - is specialized in the restoration of historic timber structures. Given the increasing deterioration of existing buildings, this field will shoulder an important responsibility for our future urban life. Especially in urban centers, the architectural heritage requires advanced technical intervention in order to maintain healthy urban functionality.

1) Course Goal

The MSc Program provides the participants with basic scientific knowledge for research, as well as the necessary skills to manage the design and construction of wood-based building projects. It will also educate them to better exploit the adaptable qualities of wood as a result of better technological and economical mastery of the material. Yet the postgraduate course, which is mainly focused on the technical side of the art of timber construction, does not neglect the interdependence between architectural, technical and socio-economical aspects. Alumni of the Master Program are expected to have acquired the skills needed to direct the design and construction of major timber buildings in an urban context. Finally, the development of timber building systems and wood-based materials on the basis of such proficiency must be regarded as a valuable supplementary qualification.

2) Target Group

Promoting the use of renewable materials in the context of cities as large building markets is a key issue for realizing ecologically sustainable buildings in the future. It must furthermore be noted that a renewed world-wide interest in sustainable building has created an increasing demand for professionals competent in both the scientific and technical aspects of timber construction. This course program thus targets qualified graduates in the domains of architecture, urban planning and civil engineering.

3) Admission Requirements

3.1) Admitted candidates must have either an appropriate academic degree or other qualification that can be regarded as an equivalent thereof (for example "Ueberholz"-course - UFG Linz). Such a prerequisite is met by individuals who either engage in activities similar to those of a university graduate or have relevant professional experience (5 years).

3.2) Admission to this MSc Program is at the discretion of the Dean for Continuing Education of the Vienna University of Technology, based on recommendation by the academic director.

4) Lecturers

The locations of the three collaborating universities delineate a "triangle" around important forestry regions: Thüringen Forest, Erz Mountains, Bohemian Forests and the Alps. Specialists from each region will be invited to support the communication between students and the regional forestry and wood-products industries. Due to this three-pole organization and collaboration with local practitioners, the program is likely to reflect the different industrial contexts specific to these regions.

5) Teaching Materials

Each lecturer prepares teaching material by way of study documents containing notes and other material on the subjects taught. These presentations and lecture notes shall be presented in a uniform design and provided to the students free of charge.

6) Language of Instruction

English; German (if necessary).

7) Course Locations

The Master Program will be held in the following locations: Vienna, Dresden and Turin.

8) Course Term

The course program takes four semesters with a total of 40 semester hours (equivalent to 120 ECTS), yielding a sum of 600 hours of academic work. Considering the acquired skills and professional experience of the participants, one semester hour thus corresponds to three ECTS.

9) Curriculum (see also Appendix 1)

In order to achieve high-level teaching with international outlook, this MSc Program is organized by the alliance of three institutions. The first year of the program is divided into three modules in accordance with each institution's specific field of expertise:

- Wood-based Materials and Building Technology (TU Dresden)
- Restoration and Refurbishment (Politecnico di Torino)
- Wood-based Multi-storey Buildings (TU Wien)

Students who successfully complete the first year are expected to conclude the second year of their studies with a thesis project. In order to obtain exploitable results, these projects are guided by experts stemming from the wood industry. Accepting members of various external organizations in the examination committee will reinforce the reciprocity between fields of expertise and the function of the university as a public research institution.

10) Quality Control

Tuition quality-control is carried out by means of:

- Evaluation of course modules by students;
- Assessment of evaluation results by the academic director;
- Syllabus revision according to ongoing market observation;
- Submittal of a course report by the academic director to the Dean for Continuing Education of the Vienna University of Technology, at the end of each semester.

11) Examination Procedure

11.1) Admission to examinations requires prior admission to the Master Program.

11.2) Written examinations take place in the form of term papers which are submitted to the course lecturers and must prove the students' ability to apply the conveyed subject matter within their personal working environment.

11.3) Term papers rated as failed are followed by a supplementary oral examination.

11.4) Examinations can be repeated a maximum of three times, but no later than four semesters after finishing the Master Program.

11.5) After positive examination results in all module subjects and a positive thesis review have been achieved, the MSc Program is completed by a final examination. This final assessment is oral and requires the student to defend his/her master thesis to an examination committee consisting of three members.

11.6) Decisions on crediting previous coursework, study units, etc. are made by the Dean for Continuing Education based on the recommendations of the academic director (§78 UG 2002 applies in a general manner).

12) Tuition Fee

The tuition fee for the entire program is € 10,000. The modules 1-4 may be booked individually for a single fee of € 4,000 each. For participants who have booked one module, the tuition for the three remaining modules will be reduced to € 9,000.

13) Final Degree

The degree awarded to graduates by the Vienna University of Technology is

"Master of Science" (MSc).

Appendix 1: Detailed Curriculum

MODULE 1 “Wood based Materials and Building Technology”

Lectures / Exercises	Weekly Hours: 8	ECTS Points: 24
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- Introduction; History of Wood-based Technology; Forestry Resources; Wood Anatomy; Wood-based Material Survey, Physical and Mechanical Properties of Wood and Wood-based Products; Concept and Design of Joints.

MODULE 2 “Restoration and Refurbishment of Wood-based Buildings”

Lectures / Exercises	Weekly Hours: 8	ECTS Points: 24
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- Introduction; History of Timber Architecture; Restoration and Refurbishment Theory; Policy and Building Regulations; Technical Interventions and Diagnostics; Adaptation of Historical Buildings.

MODULE 3 “Wood-based Multi-storey Buildings”

Lectures / Exercises	Weekly Hours: 8	ECTS Points: 24
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- Introduction; History of Town-planning; Criteria and Regulations for Safe Urban Dwellings; Financial and Technical Management; Public Awareness and Ecological Impact; Building Physics; Structural Design; Envelope Systems; Fire Protection; Production and Assembly.

MODULE 4 “Research Preparation”

Lectures / Tutorials	Weekly Hours: 6	ECTS Points: 18
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- Presentation of recent research topics; Determination and planning of research directions; Initiation of personal research work

MODULE 5 “Research Seminar and Thesis”

Tutorials / Project	Weekly Hours: 10	ECTS Points: 30
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- Research Seminar
- The master thesis is written with the assistance of a supervisor, preferably relating to the participant's professional activity and focusing on the feasibility of applying new developments in practice.