TU Verkündungsblatt
Amtliche Bekanntmachungen

Herausgegeben vom Präsidenten der Technischen Universität Carolo-Wilhelmina zu Braunschweig

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Aushang

Prüfungsordnung für den Masterstudiengang „Urban and Evironmental Engineering (Stadt- und Umweltingenieurwesen)" mit dem Doppelabschluss „Mestrado em Engenharia Urbana e Ambiental (PUC-Rio)" and „Master of Science in Urban and Evironmental Engineering" der Fakultät Architektur, Bauingenieurwesen und Umweltwissenschaften

Hiermit wird die in Eilentscheidung vom Dekan für den Fakultätsrat der Fakultät Architektur, Bauingenieurwesen und Umweltwissenschaften am 26.03.2009 beschlossene und vom Präsidenten am 01.04.2009 genehmigte Prüfungsordnung für den Masterstudiengang „Urban and Evironmental Engineering (Stadt- und Umweltingenieurwesen)" mit dem Doppelabschluss „Mestrado em Engenharia Urbana e Ambiental (PUC-Rio)" and „Master of Science in Urban and Evironmental Engineering" der TU Braunschweig hochschulöffentlich bekannt gemacht.

Die Ordnung tritt am Tag nach ihrer hochschulöffentlichen Bekanntmachung, am 04.04.2009, in Kraft.

Study and examination regulations for the master´s degree program in Urban and Environmental Engineering

The master´s degree program in Urban and Environmental Engineering is an international graduate double-degree program offered by the Department of Civil Engineering at PUC-Rio, Brazil, and the Department of Architecture, Civil Engineering and Environmental Sciences, at the University of Braunschweig, Germany. The program is recommended by the accreditation agencies CAPES (Brazil) and ASIIN (Germany), awarding double master's degree recognized within Brazil and the European Union. This study and examination regulations are developed on the base of the requirements of the general study and examination regulation for post-graduate programmes of PUC Rio (2002).

Chapter I. ORGANIZATION AND ADMINISTRATION

Art. 1 - The master´s degree program in Urban and Environmental Engineering is administrated by an especially established advisory board of study affairs, which is subordinated to the general board of the Department of Civil Engineering at the PUC-Rio de Janeiro. Members of the advisory board are the head of the Department of Civil Engineering, the coordinator of the degree program, two professors who are involved in teaching and research. One of the professors is authorized by the Department of Civil Engineering at the PUC-Rio de Janeiro and the other one is authorized by the Department of Architecture, Civil Engineering and Environmental Sciences of the TU Braunschweig, the latter also appointed deputy of the coordinator of the degree program. Furthermore two representatives of the students having an advisory vote have to be affiliated to the advisory board.

Art. 2 – The advisory board is authorized

1. to extend a nomination for the staffing of the position of the coordinator of the degree program. This staffing is carried out by the head of the Department of Civil Engineering at the PUC-Rio de Janeiro in close cooperation with the project coordinator at the TU Braunschweig.
2. to establish a selection committee, consisting of three members of the teaching staff of the degree program, who select annually the new students of the course.
3. to decide after the corresponding request by the student on the acceptation of credit points coming from courses taken at other institutions.
4. to decide on proposals submitted by the coordinator in the range of post graduate studies in view of budget and financing, as well as administration and advertising of the program.
5. to admit professors to the program.
6. to determine the annual number of university places, which are provided to the candidates in the following lecture period.

Art. 3 - The coordinator of the degree program is appointed for a term of two years, which can be extended once, is authorized:

1. to call for meetings of the advisory board and to chair the meetings.
2. to initiate and to control activities in the field of teaching and research.
3. to appoint examination boards for the master thesis and to fix the date of the public defense of the thesis in accordance with the involved examination board.
4. to represent the degree program in the internal panels of PUC Rio de Janeiro and of TU Braunschweig and, furthermore, to external institutions.
5. to accept nominations for visiting professors and to bring them before the advisory board.
6. to look for co-operations with other institutions, which have the same or similar post-graduate programs in the home country and abroad.

Chapter II. STUCTURE OF STUDY

Art. 4 - The master's degree program in Urban and Environmental Engineering already implies in its title the area of specialisation – Urban and Environmental Engineering - which indicates also the central point of origin for studies and research within the program.

Art. 5 – The lessons of the degree program contain the following groups:

a) subject specified mandatory modules (basic qualifications and technical qualifications)
b) subject specified elective modules (specialized qualifications)
c) non-technical elective modules (interdisciplinary qualification).

Art. 6 – The subject specified mandatory modules are as follows:

	Crédits (Brazil)	CP (Europe)	Mandatory
Basic Qualifications		5	M
CIV2601 - Geograhical Information Systems (GIS)	2		
CIV2611 - Administration and Sociology	2		
Water and Waste Water		5	M
CIV2603 - Sanitary Engineering	2		
CIV2602 - Hydrology, Forests and NaturalResources in the Urban Context	2		

Solid Waste and Site Remediation		5	M
CIV2605 - Site Investigation and Remediation	2		
CIV2604 - Solid Waste Management	2		
Infrastucture Technologies		5	M
CIV2606 Energy	2		
CIV2612 Transport	2		
Construction and Industry		5	M
CIV2613 - Maintenance and Life Cycle Management in Infrastructure	2		
CIV2614 - Industrial Development and Sustainable Logistics	2		
Urban Development		5	M
CIV2607 - Sustainable Urban Planning	2		
CIV2615 - Case Studies and Planning Projects	2		

Art. 7 – The subject specified elective modules are:

		Credits (Brazil)	CP (Europe)	Elective
Specialized qualifications (choose 3 module of specialization	**Specialization Urban Planning**			
	CIV2608 - Sustainable Urban Planning II	3	2	E
	Written project work	1	1	E
	Specialization Environmental Technologies			
	CIV2609 - Environmental Technologies	3	2	E
	Written project work	1	1	E
	Specialization Planning and Management of Natural Resources			
	CIV2610 - Planning and Management of Natural Resources	3	2	E
	Written project work	1	1	E

Specialisation Administration and Management			
CIV 2617 - Administration and Management	3	2	E
Written project work	1	1	E

Art. 8 – The non-technical elective module (interdisciplinary qualification) can be chosen amongst courses offered in post-graduation programs at PUC of Rio de Janeiro or at other approved institution. In any case, the student needs before the registration of classes the written approval of the post-graduate advisory board. Examples for non-technical elective modules may come from the fields of languages, sociology, politics, economy, law, philosophy, among others.

Art. 9: The study structure of the master's degree course Urban and Environmental Engineering comprehends at least 39 Brazilian credit points, corresponding to 45 ECTS credit points for lessons and seminars.

a) 24 Brazilian credit points, respectively 30 ECTS credit points, out from the subject specified mandatory modules (see Art. 6);

b) 12 Brazilian credit points, respectively 10 ECTS credit points, out from the subject specified elective modules (see Art. 7);

c) 3 Brazilian credit points, respectively 5 ECTS credit points, out from the non-technical elective modules from the post-graduate programs at PUC-Rio (see Art. 8).

For the allowance of the credit points the successful pass of the lessons and examinations is a requirement. In addition to the above named credit points, the following performances are necessary for the granting of the academic degree "Master of Science in Urban and Environmental Engineering" and "Mestrado em Engenharia Urbana e Ambiental":

d) pass of the English language examination (LET3101);

e) compilation, defense and acceptance of the master thesis (URB3000).

Chapter III. GRADING OF COURSE WORK

Art. 10 – The master examination consists of examinations and the master thesis. The examination is composed of a single or several performances. The examinations are accompanying the studies. If necessary the students are supervised by the instructors. Examinations can be made by following types: written tests, oral tests, home works, written project work and oral presentations.

Art 11 – The type of examination and content of each examination and the needed pre-qualifications are described in the attachment. In the written and oral test the student has to prove that his is able to recognize a specific problem and to find a solution within a limited time and with limited resources. In the practical tests the student has to show that he is able to work with the fundamental computational programmes described in the lectures. The written project work and the home works is a written work of a specific task the student has to make by his own. The oral presentation includes a written report about the problem to be discussed and the oral presentation with following discussion.

Art. 12 – All courses required for the master's program must be graded, in a scale ranging from 0 to 10. For each semester a mean performance rate (CR) is calculated as a weighted average value from the grades of the single lectures, with weights depending on the specific credit points of the lecture according to arts 6 and 7. The CR is calculated to one decimal place.

Art 13 - All courses required for the master's program must be graded, in a scale ranging from 0 to 10. If necessary the grade can also be expressed by the following classification steps:

9.0 to 10.0	very good or A
8.0 to 8.9	good or B
6.0 to 7.9	sufficient or C
0.0 to 5.9	fail or D.

Art 14 - To fulfill the requirements for each module the student must

a) at least be present at 75 % of the given lectures,
b) reach a grade of at least 6.0 (six) or better.

Art 15 – Students are excluded from the master's degree programme if one of the following cases occurs:

a) in any semester the CR is below 6.0 (six); or
b) in two following semester the CR is smaller 7.0; or
c) the examination of the same module is failed twice.

Art 16 – Students who have been excluded from the master's degree programme cannot apply for the same programme again at PUC.

Chapter IV. DURATION OF STUDY

Art. 17 – The minimum duration of study to obtain the required number of credit points and to compile, defend and accept the master thesis is 12 months; the maximum duration of study is 24 months.

An extension of the above named duration of study is carried out in accordance to the regulations named in the study and examination regulation for post-graduate programs of PUC Rio de Janeiro.

Chapter V. SELECTION AND NUMBER OF STUDENTS

The selection of the students is made by the selection committee (Art. 2). The criteria for the selection of students is based on the record of study of the first training qualification, the curriculum vitae, job references, satisfactory knowledge of English and if necessary an interview with the candidate.

Art. 18 – The study commission establishes for each academic year the number of available places, taking into account the following conditions:

f) number of professors, who will attend to the compilation of the master's thesis;

g) number of students, who are currently compiling their master's thesis;

h) the potential to give lessons in the respective academic year.

Chapter VI. MASTER THESIS AND SUPERVISION

Art. 19 – At the end of the regular third semester of study of the master´s degree program the students have to make a suggestion for a master thesis to the advisory board. This suggestion is to be elaborated in close cooperation with the envisaged supervisor and the preliminary title, an abstract of the theme, an evaluation of the needed resources, the expected date of the defense, the area of research and keywords must be included. The inscription to the following semester in the master's degree program is only possible if the above mentioned requirements are fulfilled.

Art. 20 – For the compilation of the master thesis it is recommended to choose a Brazilian advisor, whereas a secondary supervision by a German professor is appreciated. As an exception, it is possible to work out the master thesis at the TU Braunschweig with a German professor as the main advisor. Given the international nature of the master's program, it is strongly recommended that students compile the master's thesis in

English. A mandatory extended abstract describing the main objectives, methodology, results and conclusions of the research should be included whenever the thesis is written in Portuguese.

Chapter VII. GRANTING OF THE ACADEMIC DEGREE AND CERTIFICATE

Art. 21 – Students having accomplished the requirements of the general study and examination regulation of PUC Rio de Janeiro and the specific regulations of the present master's degree program, are awarded the academic degree Mestrado em Engenharia Urbana e Ambiental (PUC-Rio) and Master of Science in Urban and Environmental Engineering (University of Braunschweig).

Art. 22 - Students having fulfilled all above mentioned requirement, excepted the approval of the master's thesis, may obtain from PUC Rio de Janeiro a certificate of advanced studies (specialization certificate), if the closely related general requirements of PUC Rio de Janeiro and of the Brazilian Ministry of Education are fulfilled.

Attachment:
Regulations concerning the examination in the specific modules

Module	Pre-qualification for examination	Content of the examination	Type of examination
Basic Qualifications	At least 75 % presence	Basic concepts of Geo-Information-Systems (GIS); Basic elements of a GIS (Hardware, software, data and human resources); Data modelling (Modelling concepts; hierarchy levels); Data management; Data analysis; Concepts for visual data presentation; Basics of: Public Sector Management; Social and economical geography; the future of work and occupation; participation in urban planning; Traffic and logistics in the 21 century; International comparative; Analysis of social structures; Participation concepts for planning processes and conflict mediation;	Written test, 120 min in each lecture; practical test
Water and Waste Water	At least 75 % presence	Basics of: Geoecology and Environmental History; landscaping and landscape protection; Urban Hydrology; fundamentals of urban runoff; modelling of water distribution and urban drainage networks, case study); Urban Groundwater management and modelling; groundwater flow and transport modelling; definition of risk/risk assessment of environmental water quality. Basis of potable water treatment, supply systems, potable water chemistry and analysis; hydraulics of sewers and siphons; Chemical and biological principles of water and waste water treatment; design of waste water treatment plants; Processes of sewage sludge treatment;	Written test, 120 min in each lecture
Solid Waste and Site Remediation	At least 75 % presence	Basics of: regulations on waste management in Europe and Latin America; types of urban solid wastes; collection systems; Treatment of Urban Solid Wastes; Construction and operations of sanitary landfills; Renewable energies from organic solid wastes; carbon credits and waste management; Analyses and	Written test, 120 min in each lecture

		Measurements in Waste Management. Basics of: Types of Contamination. Methods of Detection of Contaminations: Assessment Methods for Contaminated Sites; Fundamentals of Substance Transport and Spreading of Contaminants, Risk Assessment, Methods of Safe-guarding and Remediation. Monitoring; Process technologies in-situ and ex-situ;After-use.	
Infrastucture Technologies	At least 75 % presence	Basics of: Energy demand, future development, climate. Electrical distribution networks in Conurbations; Electrical distribution networks in districts; Gas distribution networks; Dispersed generation; Regenerative energy. Basics of: Urban and regional transport planning; Transport structure; Transport planning process; Transport analysis; Transport demand forecast; Generation of alternatives; Implementation of software in traffic planning; Road traffic management; Public transport management;	Written test, 120 min in each lecture
Construction and Industry	At least 75 % presence	Basics of: Life Cycle Management; Life Cycle Assessment; Principles of maintenance of buildings; Maintenance of a building; Life time of building components; Anamnesis – diagnostictherapy; Damage and restoration; Maintenance Management in Infastructure. Maintenance management concepts. Basics of: logistic areas; Reverse logistics; Reverse logistics and environment; Management and modelling of production and Logistics;	Written test, 120 min in each lecture
Urban Development	At least 75 % presence; written project work	Basics of: Urban development in the context of cultural history; Social area differentiation and natural area differentiation; Urban planning and infrastructure; Water balance in urban planning ;Urban climate; Urban Design;	Written test, 60 min; home work
Specialization Urban Planning	At least 75 % presence; written project work	Expansion of: cultural history; urban developement in South-America; Urban sanitation; models of participation; Integration of technical	Oral presentation, 45 min

		infrastructure; Urban development in view of climate criteria;	
Specialization Environmental Technologies	At least 75 % presence; written project work	Expansion of: planning, design and operation of plants for treatment of waste and sewage; Fundamentals of compilation and evaluation of tenders; Costs structures;	Written test, 120 min in each lecture
Specialization Planning and Management of Environmental Resources	At least 75 % presence; written project work	Expansion of: Environmental and municipal land use planning concepts; spatial analysis relevant to urban Ecology; application of science and engineering principals for a sustainability of groundwater supply; techniques of protecting water quality, nature protection and landscape conservation in the context of town planning ;	Written test, 120 min in each lecture
Specialisation Administration and Management	At least 75 % presence; written project work	Principles of: conflict and cooperation in organisations; Management and guidance of modern organisations; Knowledge transfer and communication in modern organisations; development of competences in communication in advisory activities;	Written test, 120 min in each lecture