

Lahti University of Applied Sciences

Master's Degree Programme in Environmental Technology

Study Guide 2014-2015

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MASTER´S DEGREE PROGRAMME IN ENVIRONMENTAL TECHNOLOGY 60 ECT credits



STUDY GUIDE 2014-15

	Academic year		
	1	2	
MASTER´S DEGREE PROGRAMME IN ENVIRONMENTAL ENGINEERING 60 ECTS	1	2	
PROFESSIONAL STUDIES 30 ECTS			
Managing environmental changes Managing environmental changes 20 ects			20
07MET205E Urban and communicative planning 5 ects	5		
07MET305E Climate change and its environmental impacts 5 ects	5		
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07MET505E GIS in environmental planning and research 5 ects	5		
Elective studies 10 ECTS			10
07MET605E Environmental technology and research 5 ects	5		
07MET805E Societal change and future foresight 5 ects	5		
THESIS 30 ECTS			30
07MET730E Master´s Thesis 30 ects	30	(30)	

Master's Degree Programme in Environmental Engineering 60 ECTS

Degree

Master's Degree in Environmental Engineering

Duration

60 credits, 1,5 years

The duration of the degree is from 1 years to 2 years depending on student's personal study plan. All advanced professional studies as well as research methods are offered during the first academic year.

Objectives

Working in the field of urban planning today is a demanding task for the professionals.

New working skills and understanding of multidimensional environmental projects are needed.

The new programme is intended for those who have working experience from the field and want to improve their skills and professional knowledge of environmental issues.

The education covers the following subject areas:

1. Urban planning and collaboration
2. Climate change and its environmental impacts
3. Environmental management
4. GIS in environmental planning and research
5. Environmental technology and research

The new degree programme provides a professionally oriented and international knowledge base to meet the challenges in modern urban planning. The professionals in the field today need more information based on environmental sciences, as well as working skills in contemporary planning processes.

The focus of universities of applied sciences is on advanced work-oriented teaching and on applied research and development. Thus learning assignments and the research-oriented development project of the programme are implemented closely to the student's own work and organization or the thesis can be carried out with the projects run by the university.

The degree programme provides students with a higher university of applied sciences degree – Master of Environmental Technology – which produces the same qualification for public and private positions as an academic master's degree from traditional universities.

The obligatory courses for all the students in the programme are Research process and research methods, Urban and community planning and Master's thesis and research seminars. The student is able to choose courses from other Master's Programmes in LUAS (Lahti University of Applied Sciences) or in other FUAS universities (Häme UAS and Laurea UAS).

Learning outcomes of Master's degree programmes at Universities of Applied Sciences

At Universities of Applied Sciences, the Master's degree comprises advanced vocational studies, elective studies and a final thesis or final project.

Studies leading to the Master's degree provide the student with

- broad and advanced knowledge and the skills for developing the professional field and the theoretical skills for working in demanding expert and leadership positions in the field;
- a profound understanding of the field, its relation to working life and society at large as well as the knowledge and skills needed for following and analysing both theoretical and professional developments in the field;
- the capacity for life-long learning and the continuous development of one's own expertise;
- good language and communication skills required in working life;
- and the knowledge and skills needed to function and communicate in the field internationally.

The aim of advanced professional studies is to provide the student with an opportunity to deepen the application of theory in practice, analytical skills, project management skills, and participation skills in research and development as well as social skills.

The aim of the final thesis or project is to develop and demonstrate the capacity to apply researched information and use the chosen methodologies to analyse and solve problems as well as to develop the capacity for independent expert work.

University of Applied Sciences Master's degrees represent level 7 in the European Qualifications Framework, EQF. The reference levels within the EQF are based on learning outcomes described as knowledge, skills and competences.

TABLE 1. Learning outcomes relevant to level 7 in the European Qualifications Framework (EQF).

Component Learning outcomes

Component	Learning outcomes
Knowledge	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research. Critical awareness of knowledge issues in a field and at the interface between different fields.
Skills	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields.
Competence	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches. Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams.

In the Finnish National Framework for Qualifications and Other Learning (NQF), the learning outcomes include five components: 1) knowledge, 2) work method and application, 3) responsibility, management and entrepreneurship, 4) evaluation, and 5) key skills for lifelong learning.

TABLE 2. Learning outcomes relevant to level 7 in the Finnish National Qualifications Framework (NQF).

Component	Learning outcomes
Knowledge	Understands comprehensive and highly specialised concepts, methods and knowledge corresponding to the special competence in his/her field, which are used as the basis for independent thought and/or research. Understands questions pertaining to the field and interfaces between various fields and evaluates them and new knowledge critically.
Work method and application (skills)	Possesses the capability to solve demanding problems in research and innovation activities, where new methods and procedures are developed and knowledge from various fields is applied and combined.
Responsibility, management and entrepreneurship	Possesses the capability for independent work in demanding expert duties in the field or as an entrepreneur. Possesses the capability to manage and develop complex, unpredictable and new strategic approaches. Possesses the capability to manage work and/or people.
Evaluation	Possesses the capability to evaluate the activities of individuals or groups. Possesses the capability to accumulate knowledge and practices in his/her field and/or take responsibility for the development of others.

Key skills for lifelong learning

Possesses the capability for continuous learning.
Knows how to communicate verbally and in writing both to audiences in the field and outside it.
Possesses the capability to communicate at an advanced international level and to interact in one official language and at least one foreign language.

Learning methods

The studies are part-time studies and can be completed alongside a normal day job. Full-time study is also possible. Study methods include cooperative learning processes, independent work, contact lessons, e-learning, seminars and a research-oriented development project (30 ECTS) leading to a master's thesis. Each course includes an average of four day contact lessons. The contact lessons take place during the intensive weeks according to a separate schedule mainly in Lahti. Most lessons are recorded and they can be listened afterwards.

A part of the studies will be offered in co-operation with the other Master's Degree Programmes of Lahti University of Applied Sciences and Federation of Universities of Applied Sciences (FUAS).

MASTER'S DEGREE PROGRAMME IN ENVIRONMENTAL ENGINEERING (ylempi AMK) 60 ECTS credits

Managing environmental changes 20 ects

Objectives

Student

- is able to compare different viewpoints of environment and its transitions in urban areas
- is able to discuss global and local scale transitions and their interaction in environment
- is able to collect current environmental information and apply it into practise
- is able to discuss complex environmental challenges and their possible future solutions or scenarios

07MET205E URBAN AND COMMUNICATIVE PLANNING 5 ECTS

Objectives

The student

- is able to analyze and discuss contemporary phenomenons like urbanization and urban sprawl, transitions in urban areas, energy efficiency in planning, climate change and its effects, collaboration of professionals and stakeholders
- is able to discuss current theoretical discussion of planning including the role of the planner and planning profession
- is able to use of EIA (Environmental Impact Assessment) and its different aspects in planning process
- is able to evaluate recent planning processes, their management and arrangement of participation in the processes
- is able to reflect environmental issues from the professional point of view
- is able to develop applications from theoretical background into practical situations

Contents

Contemporary phenomenons in urban areas, urbanization, global and local perspective. Sustainable planning, introduction and evaluation of current projects. Theory and practise of collaborative planning. The role of the planner, theoretical perspectives and practices. EIA in planning.

Assessment

Pre-course assignment, group work during intensive week, learning diary and assignment after the week.

Materials

Silberstein, Jane. 2013. Land-use planning for sustainable development. 2nd ed. Boca Raton, FL : CRC Press.

Haas, Tigran. Ed. 2012. Sustainable urbanism and beyond : rethinking cities for the future. New York : Rizzoli.

Hall, Peter. 2002. Cities of tomorrow : an intellectual history of urban planning and design in the twentieth century. 3rd ed. Oxford : Blackwell.

Brenner, Neil, Marcuse, Peter, Mayer, Margit. 2012. Cities for people, not for profit : critical urban theory and the right to the city. London ; New York : Routledge.

Fainstein, Susan S., Campbell, Scott. 2011. Readings in urban theory. Chichester : Wiley-Blackwell.

Healey, P. 2006. Collaborative planning : shaping places in fragmented societies. 2nd ed. Basingstoke : Palgrave Macmillan.

07MET305E CLIMATE CHANGE AND ITS ENVIRONMENTAL IMPACTS 5 ECTS

Objectives

Student

- is able to describe carbon cycle and discuss climate change issues
- is able to survey the EU impacts on reduction of carbon emissions in the future and analyze their consequences
- is able to discuss current possibilities for climate change mitigation in urban settings
- is able to search for information and scientific research results concerning the climate change topics
- is able to develop applications of mitigation in urban settings

Contents

Current research results and understanding of the climate change as a phenomenon including carbon cycle. Urbanization as a global challenge in planning of built environment. Possibilities and challenges in mitigation of climate change in urban areas. Urban floods and stormwater management. Possibilities to manage carbon emissions in different levels; national, regional and local.

Assessment

Pre-course assignment, groupwork during intensive week, assignment.

Materials

Archer, D. 2013. Global Warming : understanding the forecast. Hoboken, NJ : John Wiley & Sons.

Cahill, T. 2012. Low impact development and sustainable stormwater management. Hoboken, NJ : John Wiley & Sons.

Emmanuel, R.; Baker K. 2012. Carbon Management in the Built Environment. London: Routledge.

Kuismanen, K. 2008. Climate-conscious architecture-design and wind testing method for climates in change. Oulu : University of Oulu.

Pickett, S. T. A. ; Cadenasso, M. L. ; McGrath, Brian. 2013. Resilience in ecology and urban design : linking theory and practice for sustainable cities. Dordrecht : Springer.

Watson, Donald ; Adams, Michele. 2011. Design for flooding : architecture, landscape, and urban design for resilience to flooding and climate change. Hoboken, N.J. : John Wiley & Sons.

07MET405E ENVIRONMENTAL MANAGEMENT 5 ECTS

Objectives

Student

- is able to analyze the impacts of environmental legislation in organisations' policy and actions
- is able to compare the environmental management systems in different organisations
- is able to discuss the requirements of environmental impact assessment connected to major building projects
- is able to present case studies applications of environmental management

Contents

Overall view and main topics concerning environmental legislation. Organisation's environmental policy and organisations' operative acts. Organisational structure and responsibility: training, communication, documentation requirements and document control, operational control and emergency preparedness and response actions. Use of the environment, environmental problems and pollution caused by effective usages.

Remediation of contaminated sites. Examples of developing brown fields as urban regeneration projects in European countries. Environmental monitoring and impact assessment in major projects.

Assessment

Pre-course assignment, assignment after the intensive days. Visits in different organisations.

Materials

Carroll, Barbara ; Turpin, Trevor ; Boyden, Adam ; Carroll, Alison ; Thomas, Ruth. 2010. Environmental impact assessment handbook : a practical guide for planners, developers and communities. London : Thomas Telford.

Environmental legislation.

Hitchcock, Darcy ; Willard, Marsha. 2010. The business guide to sustainability : practical strategies and tools for organizations. London : Earthscan.

ISO 14001 standard.

Morris, Peter ; Therivel, Riki. 2009. Methods of environmental impact assessment. London : Routledge.

Noble, Bram F. 2010. Introduction to environmental impact assessment : guide to principles and practice. Don Mills : Oxford University Press.

07MET505E GIS IN ENVIRONMENTAL PLANNING AND RESEARCH 5 ECTS

Objectives

Student

- is able to use GIS in environmental research and planning
- is able to use and combine GIS based information for different needs and situations and discuss the rapid change and current possibilities
- is able to explain the use of GPS and principles of production of own GIS information
- is able to work with a program connected to GIS use and production
- is able to reflect and discuss the development of his/her knowledge base and abilities to use GIS in RDI projects

Contents

How GIS is used today in urban and environmental research and planning. Spatial analyses based on GIS. Introduction to ArcGIS program and its use in planning. Examples of data bases available in Finland and in international level including open access data bases. Open access GIS programmes. Legislation concerning GIS information and its availability.

Assessment

Lectures and practical training. Assignments during the intensive days.

Materials

To be defined later.

Elective studies 10 ECTS

Objectives

The student

- is able to choose elective courses in this Master Degree Programme OR from other Master Degree Programmes either in Lahti University of
- Applied Sciences or in other FUAS Master Degree programmes (Laurea UAS and Häme UAS) can effect on his/her own degree profile by choosing the elective courses
- is able to discuss the effects of the elective courses on on his/her own degree profile

07MET605 ENVIRONMENTAL TECHNOLOGY AND RESEARCH 5 ECTS

Objectives

Student

- is able to discuss the possibilities of using environmental friendly technical solutions in urban settings
- is able to discuss current research in the field and needs for future research
- is able to collect information of different technologies and evaluate their impacts
- is able to develop applications of the field to existing situations

Contents

Possibilities of renewable energy sources and use in the future including solar, thermal and wind energy. Evaluation methods of energy efficiency in buildings and urban areas and current development in the field. Cleantech technology – contemporary research and practical applications (green ICT etc.) in business sector. Responsible business, Waste treatment and possibilities to recycle different types of waste. Developed systems of waste collection and transportation in urban settings. Site visits in different organisations and enterprises in Lahti.

Assessment

Individual portfolio based on lectures and excursions to different sites and enterprises connected with the themes of the course.

Materials

Adler, Frederick R. 2013. Urban ecosystems : ecological principles for the built environment / Frederick R. Adler, Colby J. Tanner. Cambridge : Cambridge University Press.

Wheeler, Stephen M. ; Beatley, Timothy. 2009. The sustainable urban development : reader. Abingdon : Routledge.

Jiri Marsalek ... [et al.]. 2008. Urban water cycle processes and interactions. Leiden : Taylor & Francis ; Paris : UNESCO.

Grigg, Neil S. 2012. Water, wastewater, and stormwater infrastructure management. Boca Raton, FL : CRC Press.

Tchobanoglous, George. 2014. Wastewater engineering : treatment and resource recovery. New York, NY : McGraw-Hill Education.

Ehrlich, Robert. 2013. Renewable energy : a first course. Boca Raton, FL : CRC Press.

Laudon, Matthew ; Romanowicz, Bart. Eds. 2012. Cleantech 2012 : energy, renewables, materials, storage and environment : technical proceedings of the 2012 CTSI Clean Technology and Sustainable Industries conference and showcase. Boca Raton, FL : San Francisco, CA : CRC Press ; CTSI.

Preston L. Schiller, Eric C. Bruun and Jeffrey R. Kenworthy. 2010. An introduction to sustainable transportation : policy, planning and implementation. London : Earthscan.

07MET805E SOCIETAL CHANGE AND FUTURE FORESIGHT METHODS 5 ECTS

Objectives

Student

- is able to describe the theoretical base of future research and its history
- is able to discuss the perspectives used in future research and the different transition processes
- is able to use some main working methods of future research and produce a case studies base on them
- is able to reflect and explain the development of his/her own thinking and working methods by future research
- is able to discuss his/her the use of future research in thesis

Contents

Theoretical principles of future research and possibilities to adapt working methods in current environmental challenges. Urbanization now and in the future. Human behaviour, social relations and communication in history and in future. Innovative means of using future research in environmental planning. The role of built environment and green environment in the future.

Assessment

Lectures giving the background information, workshop day to practice future research methodologies.

Materials

Bell, W. 2000 [1997]. Foundations of Futures Studies. Volume I: History, Purpose and Knowledge. New Jersey: Transaction Publishers.

Bell, W. 2000 [1997]. Foundations of Futures Studies. Volume II: Values, Objectivity and the Good Society. New Jersey: Transaction Publishers.

Dumitrescu, D. 2011. Road Trip to Innovation. How I came to understand Future Thinking.

Masters thesis and research project seminars 30 ECTS

Objectives

Student

- is able to discuss the goals of the thesis work and its process and utilize the tutor guidance in the process
- is able to design the work process and choose suitable working methods
- is able to work by oneself and collectively in the process
- is able to develop the thesis representing a professionally competent and logical approach to the field

07MET730E MASTER´S THESIS 30 ECTS

Objectives

Student

- is able to apply the character and scientific demands of the RDI work as a Master´s thesis in the programme
- is able to define the target of the work and choose the suitable methods for it
- is able to use critical evaluation concerning the work process, the results and the conclusions
- is able to develop new planning solutions or environmental / technological applications in urban settings or
- is able to evaluate current situation in different environmental sectors / urban planning

Contents

Choosing the relevant research methods for the task, background or framework of the study, research design, using analytical tools, report writing and oral defense of different presentations in seminars.

Assessment

Research seminars:

Topic analysis seminar

Field research results seminar

Publication seminar

Assessment is based on the competences defined in Master Thesis guidelines.

Materials

Master Thesis guidelines in Lahti UAS.

Lecture materials – research and development methods.