Environmental training for municipality officers in Bosnia and Herzegovina
- A needs analysis performed before the start of a postgraduate programme for environmental officers in municipalities in Bosnia and Herzegovina.

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Abstract
This is a study that aims to help create a better world. As big as it sounds, it is the truth. Every day municipality officers in Bosnia and Herzegovina work for a better environment, a better world. Despite their efforts the work they do is not as efficient as it could be and the support available for them is meagre. For this reason a programme called Municipality Environmental Infrastructure is under development in cooperation between the University of Sarajevo (Bosnia and Herzegovina) and the Royal Institute of Technology (Sweden) with financing from the Swedish International Development Cooperation Agency (Sida). This thesis is a part of the work to make the programme successful.

Competence needs for municipality officers will be identified through a needs analysis based on interviews with different stakeholders. The answers provided will create a picture of the needs that is both univocal and diverse with competences in identifying and handling environmental threats as well as managing infrastructure projects.

The thesis will also look at what pedagogical methods the teachers at the programme plan to use and how this affects the programme. Since the programme is held in a formal setting but intends practical use of the knowledge this leads to high demands on the pedagogical methods. The programme syllabus will be found to not entirely encompass all competence needs but suggestions will be made as to how to include the identified needs.
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1 Introduction

Bosnia and Herzegovina has been an independent nation since 1992 and a nation with relative peace since 1995. The years that have passed since the signing of the peace treaty in Dayton has been spent rebuilding the infrastructure and governing system of the country (SFOR, 2001). Now it is time to take the next step. The environmental situation has been questionable since Bosnia and Herzegovina was a part of the socialist Republic of Yugoslavia. While environmental studies have been conducted in the country since the seventies the environmental education level is low. The country lacks specialists at all levels and those who work with environmental issues often have a poor knowledge of how the governing works. The state is weak in many ways and even though national environmental legislation was approved in 2003 there is no state level ministry for environmental protection. The two separate entities thus conduct environmental protection in parallel with few regulations and byelaws to support environmental officers in their work (United Nations Development Programme, 2010). There is a great need for educated personnel who can help remedy the environmental situation in Bosnia and Herzegovina and this is a situation the Swedish International Development Cooperation Agency (Sida) plans to address in cooperation with the University of Sarajevo and the Royal Institute of Technology in Stockholm.

This thesis is a part of the project of starting up an education programme at the University of Sarajevo. A project team with members from Bosnia and Herzegovina and Sweden will work together to ensure the success and goal fulfilment of the programme. The content of the thesis is a needs analysis based on information from different stakeholders in Bosnia and Herzegovina. With two different foci, one on the competence need of environmental officers at municipalities and one on the teaching methods used in the programme, the thesis looks at what changes might be needed in either of these areas in order for the programme to become successful and at how these foci can be combined for the project to reach its goals. Hopefully, this thesis will contribute to developing a programme that meets the actual needs of municipality officers in Bosnia and Herzegovina.

1.1 The project

The education programme that is the product of this project is called Municipality Environmental Infrastructure (acronym EMI). The University of Sarajevo owns the project and proposes content and curriculum and the Royal Institute of Technology contributes with experience from similar programmes. One of the challenges of the project is to, within a formal education context, create a learning environment that promotes learning of practical and theoretical skills that will be accessible in the workplace of the participants. Another challenge is to develop a programme where, after fulfilling the programme, the students have acquired competences that they need to help both administration and citizens become aware of the environmental situation and work towards a solution.

There are also challenges that emerge in working with the project. To start with, the project team consists of members from universities in two different countries. For each project meeting half of the project team has to travel across Europe, which of course involves extensive costs for the project and consumes much time for the travelling members of the team. Even though all team members speak English the level varies throughout the team and there is always two steps of translation involved in the communication. Cultural differences have also had an impact on the work, for example with different perspective on time. Another difference between the two teams is the status of university professors and lecturers at the two universities. In Sweden a student can ask a professor almost anything and expect a straight up answer or an offer for help. In Bosnia
and Herzegovina the professors have a higher position and the interaction between professors and students is weak. As preparation for the interviews with professors at the programme the recommendation was to present me as a part of the project rather than as a student working on a master thesis within the project. These differences were not always evident at first, but become more so as the project moved forward. The more evident the differences, the more considerations can be made.

1.2 Structure of the report

Having two different foci such as Competence and needs and Pedagogical methods gives reason for straying from a general report structure with separate sections for Results and Analysis. In this thesis a more pragmatic structure suitable for this subject has been chosen. Section 2 provides a theoretical framework for the thesis and section 3 presents the country Bosnia and Herzegovina. Section 4 is a general description of the first programme suggestion and section 5 describes the methodology. In section 6 the stakeholders are presented after which section 7 approaches the core of the thesis that is the competence and needs. Section 8 discusses pedagogical methods and in section 9 the developed programme is looked at more carefully. These four sections (no. 6–9) are what will be referred to as “the result” in later chapters. A part of the result is also the developed programme. After the results, the report continues with section 10, Discussion and section 11, Conclusions.
2  Aim of the master thesis

The aim of this master thesis is to evaluate the planned content and methods for teaching in the programme Municipality Environmental Infrastructure in order for the programme to give the specific knowledge needed in the municipalities.

Questions:
1. Which competence needs are expressed by different stakeholders and the project description?

2. Which teaching methods do the teachers plan to use, and what do they need to incorporate further in order to fulfil the needs and reach the goals of the programme?

3. To what extent are the competence needs covered by the programme syllabus?

4. What changes might be needed to make the programme more successful based on the needs analysis and the pedagogical competence of the teachers at the programme?

2.1 Limitations

Some limitations have been made in order to keep the thesis work at a suitable level. The limitations have been both conscious and have come as results of unexpected events. From the outset the stakeholders were limited to three groups: municipality officers, their employers and teachers at the programme. This limitation was later broadened because of the interviews offered by the MEF team. No exhaustive list of competences was compiled before the interviews, which limits the competence need to what the stakeholders could reminisce at the time of the interview.
3 Theoretical framework
As a basis for data collection and analysis a theoretical framework must be established. This framework is important both as a background for understanding collected data and for analysis of the same. These theories have been chosen in order to clarify and structure the data that in this case revolve around competence and learning in one setting for work in another.

3.1 The concept of competence and qualification
The word competence became a “buzz-word” during the eighties and nineties when more and more companies started to focus on corporate education. (Granberg, 2009) A common core meaning can often be noticed between the multitudes of available definitions, although different researchers include more or less of this core meaning. This section will give some examples of how different researchers look at the concept of competence, and a more thorough discussion around the definition used in this thesis.

Skogsberg and Sköldborg (1991, pp. 6-7) define competence as “the individual’s capacity to easily and in cooperation with others contribute to the solving of the tasks at hand with available resources”. As high competence their definition describes a combination of three capacities:
- technical capacity, the capacity to deal with necessary hands-on techniques in the day to day work situation given the time and the resources at hand.
- social capacity, the capacity to work in and assume responsibility for the social environment in which the job is performed.
- organizational/strategic capacity, the capacity to contribute to the development of the individual, the group’s and the organization’s combined capacity through personal, technical and social capacity.” (Skogsberg & Sköldborg, 1991, p. 7, translated)

The multiple aspects of competence is something that also Their (1994, pp- 58-60) focuses on, and she draws it a few steps further when she divides competence into full ten different factors or capacities; cognitive, affective, social, personality, psychomotor, creative, pedagogical/communicative, administrative, strategic and simultaneous factors. These capacities are arranged into a model where each capacity can be given a grade somewhere between novice and specialist in order to create a special profile for an individual, mark the demands for a certain task or to describe what competences a future employee might need to hold.
Ellström (1992, p. 21) gives a more thorough definition of competence: “Competence stands for an individual’s potential capacity to react in relation to a certain task, situation or context. More precisely the ability to successfully (according to own or other’s criteria) perform a task, including the skill of identifying, using and, if possible, expanding the interpretation space, acting space and valuing space of the task. The skill can be defined in terms of:

- **psychomotor factors**, such as different types of perceptual and manual skills;
- **cognitive factors**, such as different types of knowledge and intellectual skills;
- **affective factors**, such as want based (motivational) and emotional suppositions for acting;
- **personality factors**, such as suppositions for acting related to personality feats (e.g. self confidence);
- **social factors**, such as different social skills (e.g. ability to cooperate and communicate and leadership abilities).” (Ellström, 1992, p. 21, translated)

Ellström sees competence as a relation between the individual and a problem or a task. As a result competence can never exist in the sense of “The professor is very competent”; there must always be an area in which “the Professor” is competent. This also means that an individual can have varying levels of competence in different areas and that it is difficult to tell what competence will be needed in order to succeed with a certain task. Ellström means that the only way to learn what competence is needed is to study the individual trying to solve the problem (1992, p. 22).

Another difficulty with deciding what competence an individual holds is, according to Ellström, the difference between **formal competence**, **informal competence** and **real competence**. Formal competence comes from formal education and a certificate or diploma can often give evidence of the competence at hand. Informal competence has its origin in experience and learning in other, less formal, contexts than the formal education. Neither formal nor informal competence can alone accurately describe the competence of an individual. The real competence is the competence that the individual shows when facing a task, and it can be both higher and lower than the formal competence. As Their (1994, pp. 58-60) points out it is often the formal competence that is
measured or taken into account when competence is evaluated. In this way mainly the psychomotor and cognitive factors of competence are taken into account and many dimensions are thereby disregarded.

Stockfelt (1987, pp. 112-116) doesn’t focus on factors of competence, but instead on three prerequisites for competence. Firstly, of course, there has to be knowledge, but only knowledge won’t be perceived as competence unless you have the right opportunity to use it, and in order to actually use it there has to be a will to use the knowledge. Without these three prerequisites, all you have is independent factors, good as they may be, but not competence.

![Figure 2. Prerequisites for competence. Based on Stockfelt (1987).](image)

Another important concept in Ellström’s discourse is qualification. He sees qualification as “competence, but from the other way round”, the focus shifts from the individual to the task. “Qualification is the competence that is impartially needed on account of the character of the task, and/or that formally or informally is asked for by the employer.” (Ellström, 1992, p. 29, translated)

This definition opens up to two different ways of looking at qualification. First we can look at the qualifications that the task objectively demands from the individual, and then we can shift focus to the qualifications that are prescribed for a task, either formally or informally. Qualifications that are demanded by the task (actual qualifications) are irrefutable, but formally and informally demanded qualifications can be more questionable. As with competence, it is very difficult to determine the actual qualification need. The best situation is always if there is as little difference as possible between actual and demanded qualifications, but the demand can be both higher and lower than the actual need. In a working place situation, the manager can be unsure of the demands of the task and therefore ask for more or less qualification than what is actually needed. Another situation can be that the manager wants to raise the status of the task and thereby raises the qualification demands. It is when the qualification demands, be it formal, informal or actual, are higher than the actual competence that human resource development is necessary. (Ellström, 1992)

With this small selection of definitions of competence as a background Ellström’s definition of competence and qualification will be used as a theoretical foundation within this report. His definition manages to cover the scope of competence with a handful of factors and thereby makes his theories a functional basis for analysis.
3.2 Formal, non-formal and informal learning

Formal institutions are often considered as the “only” places for learning, but that is not the whole truth. As much as learning occurs in schools and universities it also occurs at home, at work or during leisure time. Learning can thus be divided into three categories. Formal learning includes learning that occurs in formal institutions, non-formal learning means learning with a concrete goal but outside of formal institutions while informal learning is the unintentional learning that takes place every day. The European commission has defined the three categories as follows:

- “Formal learning is typically provided by education or training institutions, with structured learning objectives, learning time and learning support. It is intentional on the part of the learner and leads to certification;
- Non-formal learning is not provided by an education or training institution and typically does not lead to certification. However, it is intentional on the part of the learner and has structured objectives, times and support;
- Informal learning results from daily activities related to work, family life or leisure. It is not structured and usually does not lead to certification. In most cases, it is unintentional on the part of the learner.” (European Commission, 2008)

These definitions are not unchallenged, and others consider formal learning to have goals set by a learning department, non-formal learning to be learning with goals set by a supervisor and that informal learning has goals set by the learner. In this report, the EC definition will be the one in use.
4 Bosnia and Herzegovina

Before preparing the investigation in Bosnia and Herzegovina I found it important to study the history and governance of the country. Firstly to be able to ask the "right" questions, and secondly to be able to understand the answers I would get. The state of the country as it is today has been influenced by events during the last 2000 years, but the war during the early nineties and the following Dayton agreement has made the greatest impact.

The last census in Bosnia and Herzegovina took place in 1991, before the war, and at that time the population was 4,3 million. The current population (2009) is estimated to be 4,6 million by the CIA and 3,8 million by UN, so the uncertainties are substantial. (BBC News, 2010) The majority of the people living in Bosnia and Herzegovina today belong to one of three ethnicities, Bosniak (48%), Serb (37%) or Croatian (14%). The Bosniak population is to a large extent Muslim, the Serb population is largely Serb Orthodox and the Croatian population is mainly Roman Catholic (Central Intelligence Agency, 2010). These three co-existing ethnicities have a problematic relation, and have had so from time to time during the last 100 years with a climax during the war in the late 1990's.

After the Second World War, Bosnia and Herzegovina became a part of the newly proclaimed Federal Republic of Yugoslavia. At the outset this was positive for Bosnia since the country received the status of an independent republic within Yugoslavia. The relationship between people of different ethnicities remained calm due to the ruler Tito’s strict rules against nationalism, but in the late 60s the Bosniak’s were recognized as an ethnicity (instead of the more ambiguous term of Muslims) and things started to change. After Tito’s death in 1980, the different ethnicities started to abandon Tito’s ideas with demands of increased autonomy. When Yugoslavia started to crumble in the early nineties, the communist idea of tolerance between people of different ethnicity was no longer imperative and nationalistic tendencies were predominant. (SFOR, 2001) In October 1991 the Bosnian Serbs formed the Assembly of the Serb People in Bosnia and Herzegovina, which at the beginning of the next year resulted in the
A referendum for Bosnian independence from Yugoslavia was held in March 1992 but was boycotted by a majority of the Bosnian Serbs. It was still carried out, resulting in a strong majority for the independence of Bosnia and Herzegovina. Open warfare started in April 1992 when the Bosnian Serbs started the siege of Sarajevo after a short time of tensions. (SFOR, 2001)

Bosnians of different ethnicities fought each other during the war, often clearing villages of minority ethnicities. The estimated number of deaths amount to more than 200,000 and more than 2 million Bosnians had to leave their homes, ending up both within the country and abroad. (Bosnian Institute, London, 2010)

The war ended in 1995 when a peace agreement was signed in Dayton, U.S.A. The Dayton-agreement resulted in the present and somewhat hampering constitution of the country. What makes Bosnia and Herzegovina different from other countries is that it is divided into two entities: the Federation of Bosnia and Herzegovina (Bosniaks and Croats) and the Republika Srpska (Serbs). These entities each hold about half of the total superficies and have separate governments, which controls most of the entity affairs such as infrastructure, education, healthcare and so on. The District Brcko is an exception, situated in the north of the country, and is directly subordinate to the state with equal influence from the two entities. (BBC News, 2010)

The Federation of Bosnia and Herzegovina (FBiH) is divided into ten cantons with relative self-governance, for example there is a ministry of education in each of the cantons. In Republika Srpska (RS) there are no cantons so the municipalities are directly subordinated to the entity. The state government of Bosnia and Herzegovina is in charge of foreign affairs, customs, of executing decisions of the Parliamentary Assembly and the Bosnia and Herzegovina military service. The presidency is at the head of the state and is constituted by three members: one Bosniak, one Croat and one Serb. The position of chairperson rotates between the three during their period of mandate. The presidency can only make decisions in consensus. (US Department of State: diplomacy in action, 2009)

The administrative structure inherent in the Dayton agreement is cumbersome and supports a both expensive and inefficient system. It ranks as the lowest of the 15 countries in the west Balkans when it comes to government effectiveness and 64% of the population believes that most or all officials are corrupt. Even though the division of power between state and entities is quite clear, the constitution does not give much guidance on how the power should be divided.
between different levels further down in the hierarchy. The relationship between entity and municipalities in Republika Srpska and the relationship entity-canton-municipality in the Federation are difficult to understand and the rights and responsibilities of local authorities are often ill defined. (United Nations Development Programme, 2010)

In addition to the complicated governing structure in Bosnia and Herzegovina there is an international position called the High Representative who is “responsible for overseeing implementation of civilian aspects” from the Dayton agreement. (Office of the high representative and EU special representative, 2007) The High Representative can, when needed, take immediate action to help the peace process forward, but the governing principle is domestic responsibility. (Office of the high representative and EU special representative, 2006)

4.1 Education

Children in Bosnia and Herzegovina start their schooling at the age of six and finish primary school after 9 years. Secondary education lasts for three to four years and students can chose between a general study programme and vocational training. Schools of all levels are governed by the entity in Republika Srpska and governed separately in each canton in The Federation of Bosnia and Herzegovina. This has created a school system with 12 separate education ministries that is very dispersed and hard to control from state level (British Council, 2007). During the first time after the Dayton agreement was signed it was very difficult for children of minority ethnicity (in the region) to get a proper education. Both students and teachers from the ethnic minorities were shut out from schools. Before the year 2000 schools in areas with different ethnic majorities had different curricula and often propagated nationalistic values. (Pasalic-Kreso, 1999) Since 2000 a new curriculum, taking into account the riches of each of the three major ethnicities, has been agreed upon. There has also been a textbook reform where all textbooks describing Croatia or the Federal Republic of Yugoslavia as the motherland have been put out of use. (Office of the high representative and EU special representative, 2001)

There are eight public universities in BiH, in general situated in the larger cities. Before the start of the Bologna process a time of three to six years was required for the first part of the university education. To obtain a master degree another two years of studies was required and the defence of a masters’ thesis had to be passed. In 2003 BiH became a full member of the Bologna process and has subsequently started to work towards a system where a bachelor degree takes three years, a master another two, and a PhD can follow. (Bologna process, 2010?)

4.2 Environmental governing

The environmental governing in Bosnia and Herzegovina is highly dependent on the overall structure in the country. The weak state hampers coherent policymaking at all levels and throughout the system old rules are applied rather than current ones, mostly due to lack of implementation through secondary legislation such as regulations and bye-laws made by cantons and municipalities. The number of environmental specialists is low in all areas and environmental administrators often have an unproportionate workload due to the high number of unfilled positions. Overall the information about issues such as monitoring and inspection is unclear and the public do not easily have access to environmental information. At state level there was not in 2008 a proper action plan for the environment. The document that does exist is a National Environment Action Plan (NEAP), which to the name sounds like it could fulfil the conditions of being an action plan but unfortunately no public actors were appointed responsible for the different parts of the NEAP so it is now more a document pointing out a general direction than a document with practical influence. (Vukmir, & Palandzic, 2008)
5 First programme suggestion

Sida (Swedish International Development Cooperation Agency) has been operating in Bosnia and Herzegovina since 1995 assisting the country with different development projects (Swedish international development cooperation agency, 2010). With funds from Sida the university of Sarajevo are now planning to start a programme to enhance the environmental knowledge of employees in the municipalities. The programme is called Municipality Environmental Infrastructure and the participants are required to have some previous education within technology or economics from before the introduction of the Bologna process.

Before the EMI-programme was put into motion a consultant firm from Sweden was hired to find out whether Sida had any more to give to the country or if it was time to move the focus to another geographical area. The result of the study was that there still is a great need in the country; there is still need for physical reconstruction, but that Sida’s efforts should be more focused on educational efforts. These efforts are mostly needed at municipality level, and the lack in knowledge, or “know how”, is most urgent within the environmental area. For example, the competence of carrying out large projects improving municipality infrastructure is at a loss according to the consultant firm. There are opportunities to finance local infrastructure projects with international funds, but the municipalities seldom succeed in filing proper project documentation and in reality carry out large and demanding projects. They also found evidence that local authorities lack the knowledge to put new appliances into a system of economically sustainable use. Sida decided to prolong their presence in Bosnia and Herzegovina to address these deficiencies. (Hästad, 2009)

The application for the Postgraduate Specialist Study Municipality Environmental Infrastructure was completed in May 2009 describing several areas where expertise is lacking in Bosnia and Herzegovina. The goal according to the application is “to increase the number of environmental experts and to improve the level of environmental expertise in Bosnia and Herzegovina, in order to respond to the urgent needs of institutional set-up and infrastructure improvements.” (Appendix 3)

The programme will be held at the University of Sarajevo with teaching one week per month, the rest of the time the students will work in their municipalities as usual. The primary version of the programme is a Specialist study with two semesters of courses and one semester for a thesis work, but there is also a possibility to follow one semester of courses and do a smaller thesis work in order to complete a vocational study (Expert study). The Specialist study gives a formal diploma while the Expert study only gives a certificate.

In order to reach the programme goal eight courses were suggested:

| 1. Project management |
| 2. Environmental protection |
| 3. Water management in local communities |
| 4. Economy and environment |
| 5. Spatial planning and utility |
| 6. Cost-effectiveness of enterprises in public sector |
| 7. Obligation law |
| 8. System of local self-governance in BiH |

First course list (EMI Syllabus 1, Appendix 4)
The courses were suggested by the Swedish consultant firm, in cooperation with a local consultant and a professor at the Mechanical Faculty at the University of Sarajevo (MEF). The project team from MEF is composed of teachers in relevant fields, the dean of the faculty and a project manager. The team from the department of Industrial Ecology at the Royal Institute of Technology (IE) in Stockholm is composed of an associate professor, a project coordinator, a teacher and a master thesis student. The MEF team performs the work and the IE team suggests changes if needed and can contribute with experience from teachers in different areas.

In the first programme syllabus the same courses as in the Project description were suggested together with a description of the study where it says: “The Study aims at qualification of people in the local communities to be able to apply for and to implement programmes of local environmental infrastructure (water supply, treatment of waste water, waste control, district heating) using the EU funds [...]” (EMI Syllabus 1, Appendix 4) This aim is further divided into more tangible goals:

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<th>Goals according to the first syllabus (EMI Syllabys 1, Appendix 4)</th>
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<td>- Identify the need to establish and build utility devices, installations and organizational forms,</td>
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<tr>
<td>- Draft Project description such that designing may be commenced, financing model drafted and international assistance requested,</td>
</tr>
<tr>
<td>- Lead project implementation,</td>
</tr>
<tr>
<td>- Monitor project implementation,</td>
</tr>
<tr>
<td>- Lead implemented project.</td>
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These goals, just as the rest of the syllabus, focuses on the ability to identify the need for and carry out infrastructure projects.
6 Methodology

This study is largely based on data collection other than literature studies. Both the selection of collection methods and the analysis of the data require some reflection. This paragraph describes how the data was collected and what considerations were made in the process as well as it describes how the data was analysed.

6.1 Collection of data

In order to answer the questions set up for the thesis, a broad range of information was needed. Most of this information was not to be found in books or other media, but rather in thoughts and knowledge of people connected with the project, however loosely. For this reason, conducting interviews was considered an efficient method for collecting data. As complementary methods the project documents have been studied, questionnaires have been sent out and meetings have been observed.

The circumstances of the study have not enabled a free selection of stakeholders, meetings and documents although the consequences of the selections have always been considered. For the interviews the project manager from MEF made a choice of interesting stakeholders from his point of view. I had initially planned to interview a few stakeholders from each of the three categories Future participants, Employers of future participants and Teachers within the programme, to get some variation in the results but the interviews instead gave a broader picture of the practices in environmental governing in Bosnia and Herzegovina today. As hope was raised to be able to interview all proposed teachers, three interviews were conducted before questionnaires were added to the list of methods. The performed interviews with teachers have been used mostly towards the needs analysis, but also as a possibility to clarify the results from the questionnaires where questions such as why? were not commonly answered. All teachers proposed to hold courses according to the second syllabus have answered the questionnaire except for one teacher, responsible for two courses. The answer rate was 91%. As for the documents the supply was not overwhelming and therefore all official project documents have been studied. Apart from the interviews, material from three project meetings has been used. These meetings were chosen because of the possibility of interaction between the teams from MEF and IE.

6.1.1 Interviews

There was an opportunity within the project to visit the Mechanical Faculty at the University of Sarajevo (MEF) as an occasion to interview stakeholders at the start of the study. Interviewees were requested in the three groups Future participants, Employers of future participants and Teachers within the programme. The project manager was able to set up interviews with these stakeholders, but also with representatives of the state administration and Sida. The interviews were with employees at The Ministry for foreign trade and economic relations; The Ministry of physical planning and environmental protection in an urban canton; The mayor of an urban municipality; The environmental department in an industrial municipality and Sida in Sarajevo. The list of planned interviews was presented upon the arrival in Sarajevo.

The interviews were conducted in a semi-structured style. Three sets of questions were carefully prepared beforehand, one for each group of interviewees (Future participants, Employers of future participants and Teachers within the programme). For each question a set of probes (reminders for the interviewer) were prepared to ensure that the interviewees had nothing more to say before moving on to the next questions (Gillham, 2005). Since some unanticipated interviews occurred,
additional sets of questions were prepared at the last minute. Questions for Future participants mostly concerned their previous education, their responsibilities at work, their personal competence need and how they prefer to learn. To the Employers of the participants questions were asked about the governing of the municipality or canton, what issues were important for them at the moment of the interview and what they considered to be knowledge needs for their employees. The Teachers within the programme were asked about the needs in the country, but mostly about how their courses were structured and what the content would be. Questions for the state administration and Sida were worked out with the questions for employers as a starting point. Interview questions are presented in Appendix 1.

For the purpose of later recollection of the contents the interviews were recorded, but the notes taken during and immediately after the interviews was the main source for recollection. Most of the interviews were conducted in English, but in some cases a translator had to be used. The information from those interviews is regarded as somewhat less accurate because of the bias of the translator. During all interviews at least one member of the project team from MEF was present. Information from the interviews has been used in analysis and for country background.

6.1.2 Observations
Some of the data was collected during meetings with the project team. During the project two meetings were held in Stockholm and one in Sarajevo. At all meetings most of the team members were present and all meetings had an agenda that was followed loosely. The observations were of the unstructured kind where key information was noted. During two of the meetings the observer also had a role as rapporteur.

6.1.3 Questionnaire
In order to learn about the proposed courses and the teachers’ pedagogical methods a series of interviews were planned. When this proved unrealistic the interview questions for professors were reworked into questions for a questionnaire. Some questions were formalized and the probes were added as sub-questions. To reach all the teachers the questionnaires were sent to the project manager. The answers were sent back in a digital text document, sometimes with an additional question about how the students were supposed to spend their time during the course. The questionnaire is presented in Appendix 2.

6.1.4 Documents and literature
To collect specific data regarding the project three main documents have been studied. The Project proposal or Project description (as it will be called in this thesis) was the initiation document for the project. Later on came a first and a second version of the programme syllabus. These are the only three general project documents. The documents have been studied both to form a background to the study and to provide information towards the needs analysis. The author of the documents is the MEF team.

For the theoretical background literature studies was used as method. Most material was found at university libraries or online. Material about Bosnia and Herzegovina was mainly searched for online.

6.2 Analyses of data
The method for analysing the material differed between the different methods of data collection but also between the different areas of interest. One area is the competence need and another is the pedagogical methodology in use. A third area is the comparison between the first two.
6.2.1 Competence needs

The competence need was analysed with information from the Project description, the interviews and from project meetings. In accordance with Ellström’s definition of competence (1992, p. 21) the collected data was formulated as 21 competences and organized in a matrix. For the Project description and each stakeholder a mark was made for the competences they mentioned as important. These competences were numerous and hard to grasp as a whole and were therefore combined into nine categories (a-i). Each category contain from one to six of the original competences that are similar or addressed the same area. The stakeholders were also combined into groups of the same function with all teachers in one group and all possible participants in another group. For each stakeholder group the competence categories were ranked in three steps from the competence of highest importance (+++) to the mentioned competence of lowest importance (+). See table 1.

Ellström’s definition (1992, p. 21) (see section 3.1) describes five factors of competence and these have been used for an analysis of the competence categories. Each of the 21 original competences were analysed according to the five factors and the result was registered in a matrix similar to that of the competence needs perceived by the stakeholders. The matrix results in a sum for each factor showing which factors are most important. See table 2.

6.2.2 Pedagogical methods

Questionnaire data including descriptions about the courses have been used to analyse the pedagogical methods in the EMI-programme. The information has been looked at in three different areas: teaching, examination and course material. For each of the areas a matrix was put together showing the frequency of different methods or course material.

6.3 Ethics

Questions of research ethics constantly circle the duality of the possible benefits from the research and the harm it could afflict an individual. These two must always be weighed against each other. To be sure to protect the individual there are four requirements for researchers to fulfil: the requirements of information, consent, confidentiality and use. The information requirement compels the researcher to give information to the subject about their contribution, what kind of research it is and that their contribution is completely voluntary. This information should, unless there are special circumstances, be given at the start of the interview, questionnaire etc. The requirement of consent means that the subject has to give their consent before a study can begin. The subject can also chose to exit the study at any time. Given the requirement of confidentiality, the researcher has to keep the subjects personal data away from the public. Data storage should not be open and subjects should not easily be possible to identify from information in published material and oral reports. The last requirement, the requirement of use, gives instructions to keep scientific material scientific. Personal information from a research project cannot be used commercially. (Vetenskapsrådet, 2002)

In this study each interview started with some information about the project and the interviewees were asked if the would approve of having the interview recorded. They were also given a slip of paper with contact details if they had any further questions. At the first project meeting I introduced myself as a master student doing my thesis work and that I therefore would be observing at the meetings, among other things. At further meetings with new members I introduced myself as working with the project rather than being a master student. Direct statements from the meetings have been avoided in order to keep the confidentiality of the participants. No ethical concerns have been raised by the use of the documents. Concerning the questionnaire, on the other hand, there are some confidentiality issues. To get a good
understanding for the answers there is a need to present the data together with the course intended for the teacher, but when disclosing the subjects it is not that hard to find out from whom the answers come. All subjects are considered to having given their consent when filling in the questionnaire. No subjects are referred to by name.
7 Stakeholders

The stakeholders are all of individual importance to the study, but all the same, some of them represent the same group and have therefore been put into the same group in the analysis. Five groups of or individual stakeholders are used in the study. The first stakeholder is not an individual as such, but is still considered to be very important, namely the Project description (PD) that lay ground to the financing and the start of the project. The Project description outlines some of the sought after competences in Bosnian municipalities and states the overall goals for the programme. The second stakeholder is Sida, the main sponsor of the project. Sida works loosely with the project team to ensure the success of the programme. As a third group the interviewed state officers are introduced. The state has little influence on environmental issues but aims to start an environmental department. The fourth group is comprised of possible programme participants and their employers. In this case we have a canton official and a municipality mayor, who are both people who have the power to send their staff to attend the programme, and we have a municipality officer from an industrial municipality as a member of the group of possible course participants. The fifth and last group consists of the three professors that were interviewed. They are all involved in the development of the programme and will be teaching some of the courses.

7.1 Project description

In the Project description that lay ground to the approval of the programme four specific competences are emphasized:

- Be able to identify possible environmental threats from new and existing devices and enterprises. (For example when approving permit applications.)
- Be able to develop Local Environmental Action Plans (LEAPs).
- Have the knowledge required for environmental inspection in different areas.
- Be able to implement internationally funded infrastructure projects with economic efficiency.

The need to increase the number of environmental experts in the country is strongly emphasized, and this is also a specific goal of the project. The hope is that by increasing the number of environmental experts, the country can take a few steps closer to EU candidacy and membership.

(Projekt description, Appendix 3)

7.2 Sida

As a background to this project the Sida officer described three now ongoing projects. The first is focused on Local Environmental Action Plans (LEAPs) that should be under development in all municipalities. The second is called Government Accountability Project (GAP) and is focused on bureaucratic issues such as budgeting and citizen services in the municipalities. The third is a project concerned with solid waste treatment where Sida is helping to build landfills in the 16 designated waste-regions all over the country including help for the municipalities to arrange for the transport of waste. According to Sida the most important needs for the country is development in the water sector, air pollution and energy efficiency. Competences in economics, environmental planning, setting sustainable tariffs on improvements, project documentation and how to include citizens were put forward as important to improve.
7.3 State level
At state level there is not yet a ministry for environmental protection, so the officers handling issues about the environment are situated at the Ministry for foreign trade and economic relations. The lack of competent personnel on all levels is strongly emphasized; only in state administration there are seven vacancies for environmental officers. The relative success of environmental work is attributed to ambitious persons all over the country and at all levels of administration. Actors at the state level believe that the most important issue is to enforce the power of the state level. More tangible needs are noted within the sectors of waste management, wastewater treatment, air quality management, soil contamination and hazardous chemicals.

There is also a need to increase the public awareness. Desirable competences are to know how to prepare project proposals in EU-format, to be able to define local priorities and to know how to increase the public participation in decision-making. It is also mentioned that it is important for environmental officers at all levels to know where to turn when they need assistance.

7.4 Possible participants
In an urban canton the interview was held at the ministry of physical planning and environmental protection. The interview was held with a translator. In the canton in hand some issues are centralized and neither money nor human resources are as scarce here as elsewhere in the country. Environmental legislation exists on entity level since 2003, but the canton officer does not see the municipalities as very keen on implementing these laws. She speculates on reasons such as lack of education and bad understanding for environmental issues and the governing system in the country but another reason she puts forward is the lack of a holistic view on the environmental work. Most municipalities have only part time officers working with environmental protection and thus she considers the conflict of interest between development and environmental work to be an essential problem. Her answers to the questions about needs and competences were focused on the importance for each sector to think about the environment. She also thinks that a network between environmental officers in different municipalities would be helpful, for example in order for them to find help to recognize environmental needs of the local community.

In an urban municipality the environmentally involved mayor was interviewed through a translator. The mayor is very proud of the environmental work in his municipality. They have done visible work such as installing new pathways and planting tulips in the municipality, but also more invisible improvements such as renovating the fresh water system, installing a new sewer system and initiating a project to clean up the river running through the municipality. It seems important for the mayor to perform actions that the public can see. The municipality works with three major documents concerning the environment: a development strategy (valid until 2015), a capital investment programme and a local environmental action plan. Moreover, in everything they do in the municipality the idea that development should never go against the environment is kept in mind. The greatest needs according to the mayor are to set up a system of education between municipalities, to have better steering from canton, entity and state level and to change the habits of the citizens. Competences needed are mostly within the waste management sector.

In an industrial municipality the chief of the environmental department was interviewed with a translator present. The municipality is the location for a thermal power plant, coalmines and a cement factory. The responsibility for the eco-policemen in the municipality, coordinating environmental permits and coordinating reports to the municipality assembly lies with the chief of the environmental department. She also makes proposals to use international funds and reports back once the project is finished. The municipality is at the time of the interviews in the middle of two projects: one is an assessment of natural values of forests and the other one
concerns protection of a bird area. Previous projects are a study on waste management in an area inhabited by Romany and the writing of a local environment action plan. Before becoming chief of the environmental department she studied technology for agriculture. This education made her familiar with technical issues, but she feels that she has a lack of knowledge about flora and fauna, protection of natural areas and waste recycling. She says that others at her department would benefit from more knowledge about monitoring of air quality and how to recognize violations of environmental regulations. She also feels that there is a great importance in being able to present environmental proposals as a part of development rather than in conflict with development. Her focus is very strongly on the problems that the governing system brings. The division of authority between canton and municipality (in the entity FBiH) is very unclear, she says, and this makes the work at both canton and municipality level difficult. She considers waste treatment to be most important at the moment but monitoring of air quality and the ability to raise the public awareness are also important competences.

7.5 Professors

Three professors and future teachers within the EMI-programme were interviewed separately, but the answers are presented together. All three professors feel very strongly for both the programme and their country and try to make the best programme possible for the municipality officers. One of the most important of the issues that were presented is the importance of having good knowledge of environmental regulations, both national and international. Within the water sector there is room for much improvement, for example just by reducing the leakage in municipal water pipes a lot can be accomplished. This thought is in line with the general perception of creating money efficient solutions to environmental problems within the municipalities. A common idea for all of the teachers is that they want to convey a holistic picture of the environmental field. The environmental approach that is so much needed at every step of development is now missing in many places according to the professors. This holistic approach is also important to convey to the public. An increased public awareness is what stands between the municipal projects being just projects and a part of the society. Apart from these consensus needs the need to know how to treat protected areas and the need for municipality officers to know where to turn to get support were mentioned.

7.6 Competence and needs discussed during project meetings

Two main issues have been put forward during the three project meetings that have taken place. Firstly, the ability to apply for funding, manage the project and manage the outcome of the project and secondly, having a holistic view on environmental threats and possibilities. Members from project teams in both countries were present at all meetings as well as invited stakeholders and teachers at the programme. The first was a kick-off meeting in Stockholm at the start of the project, the second was held in Sarajevo after a few months to follow up the progress and a third meeting was held in Stockholm with possibilities for teachers to exchange experiences.

More than once during the kick-off meeting at the start of the project, the hope of becoming a member of the European Union was expressed. In order to fulfil the requirements for accession they feel a need to improve their environmental performance. This depends, to a large extent, on the municipalities. The efficiency of local environmental projects is low and must be increased for more funding to be granted. A suggestion was made to work with goals for the programme and adjust the curriculum to ensure that the students reach the goals.

The second meeting revolved more around the content of the courses and the curriculum. The MEF team put forward three main learning outcomes: recognizing regional specific environmental needs, preparing project documentation and securing finances for and managing project
implementation. Six specific areas of interest were also presented: Energy management, Waste management, Water management, Environmental protection, Air quality management (urban aspect) and Nature protection. A preliminary report was made on the needs analysis and a discussion about the content of the courses followed. Some important suggestions were to include international conventions, to integrate different parts of sustainability such as technical, economical and ecological and to include a financial aspect in all courses. The goal for the programme is said to be to get as much international funding as possible and therefore it is important to learn how to find meaningful projects.

The third meeting started with a more thorough presentation of the needs analysis. From the presentation two topics continued into discussions. One of the discussions was related to the municipality officers’ present capability to handle internationally funded projects and the other took up the antagonism between the two concepts development and environment. Further on, the format of the programme was discussed. The municipality officers were considered not capable of handling internationally funded projects despite their own conviction (according to the study’s limited selection) and the antagonism was considered important enough to focus on in the programme. In addition to the Expert and Specialist studies the MEF team wanted to add a possibility to continue to fulfil a Master’s programme. The IE team was concerned about the vocational focus of Expert and Specialist programme and the theoretical focus of the Master’s programme and wanted to keep the focus on a practical level.
8 Competence and needs in municipalities

The opinion about what is important and what is not, what is needed and what is not is seldom unanimous. Data have been collected and different stakeholders have had their say about competence and needs in Bosnia and Herzegovina. The results are summarised in table 1 and table 2.

The data collected through interviews, literature studies and observations has been “translated” into specific competences and distributed into nine different categories (a-i). These categories are presented in the matrix below cross-referenced with the answers from the different stakeholders. The number of plus signs for each competence indicates how important the competence was to the stakeholder. The most important competence has three plus signs, the second most important has two plus signs and the ones mentioned only once has one plus sign.

Table 1. Competence need according to different stakeholders (+++ is the most important and + is the least important for each stakeholder). PD stands for Project description.

<table>
<thead>
<tr>
<th>Competence categories</th>
<th>Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PD</td>
</tr>
<tr>
<td>a - Internationally funded projects</td>
<td>+</td>
</tr>
<tr>
<td>b - Environmental threats and specific knowledge</td>
<td>+</td>
</tr>
<tr>
<td>c - Public awareness</td>
<td>+</td>
</tr>
<tr>
<td>d - Environmental regulations and governing</td>
<td>+</td>
</tr>
<tr>
<td>e - Holistic view</td>
<td>+</td>
</tr>
<tr>
<td>f - Intersectional work</td>
<td>+</td>
</tr>
<tr>
<td>g - Protected Areas</td>
<td>+</td>
</tr>
<tr>
<td>h - LEAPs</td>
<td>+</td>
</tr>
<tr>
<td>i - Environment vs. Development</td>
<td>+</td>
</tr>
</tbody>
</table>

8.1 Competence categories

Looking at the matrix and the sum of plus signs for each competence category it is evident that the stakeholders consider category b, Environmental threats and specific knowledge, such as water and waste management, important for the municipality officers and that category h, LEAPs, and knowing how to treat Protected areas (category g) is not considered quite as important. Unfortunately not all information can be looked at out of context and the significance attributed to each category in the matrix might best be examined further with some background information. Here follows a more examining approach to each category.
8.1.1 Category a – Internationally funded projects

Environmental officers should be able to implement internationally funded infrastructure projects with economic efficiency, compile correct project documentation and handle appliances once finished.

Internationally funded projects in order to improve the environment at local level are perceived as an important means for the municipalities to get started with environmental work and for the country to get on the road to becoming a member of the European Union. This is a joint understanding, expressed at meetings and in interviews, but how to deal with this understanding is not altogether clear. In the Project description the ability to perform such projects are emphasized in the goal for the programme. Sida seems very much to be in accordance with the Project description and the state follows in suit. The professors and the project team also focus strongly on the ability to perform these projects but the participants, on the other hand, only mention this sporadically and that is more regarding setting sustainable tariffs on appliances than compiling complete project documentation. This narrow selection of participants are used to applying for money and therefore sees it as something they know how to do, while for example the state officers point out that applications seldom are correctly handled before arriving at their desks.

8.1.2 Category b – Environmental threats and specific knowledge

Environmental officers should be able to identify possible environmental threats and needs in the water sector, with air pollution, waste management, energy efficiency, soil contamination and hazardous chemicals within the municipality and handle permit applications with environmental issues in mind.

When it comes to specific environmental knowledge there is not much discrepancy. All stakeholders are aware of the importance of knowledge about different areas of environmental work, the participants feel their own lack of knowledge and the other stakeholders know that this is something that will help the municipalities become more aware of the environmental situation. The most emphasized competence is that of being able to identify threats and needs within the municipalities.

8.1.3 Category c – Public awareness

Environmental officers should be able to include citizens in decision-making, spread public awareness and change habits regarding environmental issues.

This category has two sides to it. In table 1, it looks like all stakeholders agree that it is important to be able to include citizens and spread public awareness. When looking closely at the interview results it is actually more important for Sida and the state that the municipality officers know how to include the citizens in decision-making processes but for the state, the participants and the professors how to spread awareness to the public is the most important. The participants know that their work will not be completely successful until the public is working in the same direction and that they need help to achieve this, and the professors have the same notion.

8.1.4 Category d – Environmental regulations and governing

Environmental officers should be well acquainted with both national and international environmental regulations, know how environmental work is governed in BiH and have the knowledge required for environmental inspection.

This category is made up by three specific competences; knowing how the country is governed, having the knowledge for environmental inspection and being familiar with national and international environmental regulations. As a total, this category is one of the most mentioned.
during the interviews, but the interest is not evenly distributed. Neither Sida nor the state government mention anything about these issues. The majority of opinions come from participants and the professors but there are some differences between these two groups. Each of the three interviewees among the participants conveys a feeling of confusion when it comes to how the environmental issues are governed in BiH. Two of them, along with the professors, also express the need for knowledge about environmental regulations and inspection. Environmental inspection is also mentioned in the Project description.

8.1.5 Category e – Holistic view

*Environmental officers should have a holistic view on environmental issues.*

The expression “have a holistic view” in this context means that everyone who works with environmental issues need to work from a broader perspective. Even though the water issue is the most important in a certain municipality it is still important to be aware of possible threats from air pollution or waste management. A holistic view also means to be aware that measures taken for improvement in the water sector can end up in problem in another sector, such as air or soil. Having a holistic view is considered most important by the professors, both in interviews and at project meetings. It is also mentioned by the participants, but not by any other stakeholders.

8.1.6 Category f – Intersectional work

*Environmental officers should know where to turn in the neighbouring municipalities, at canton or state level and NGO’s when difficulties arise.*

Seeing as many environmental officers at municipal level work alone and sometimes even not full time with environment, a contact in the neighbouring municipality could be a big help. The possible participants to this programme are therefore very concerned about knowing who handles similar duties in the neighbouring municipalities. The state and the professors think that cooperation with officers at canton or state level as well as NGO’s would be beneficiary for the municipalities. This difference is interesting but not very surprising. The participants are focused on doing their job and getting the help they need in order to be able to perform well while the state and the professors are more concerned with the holistic view of environmental work throughout the society and through all governing levels.

8.1.7 Category g – Protected areas

*Environmental officers should know how to treat protected and rare areas.*

This is a competence that is weakly emphasized, but non-the less; the participants and the professors mention it as a competence need. Among the participants, the officer from the industrial municipality is the one who remarks on it, and that is the only municipality in the survey that has any areas to protect, so this is a competence self-evidently only requested by those who have use for it but still important in order to give a holistic view on environmental issues.

8.1.8 Category h – LEAPs

*Environmental officers should be able to develop a Local Environmental Action Plan for their municipality.*

The Local Environmental Action Plan is a document that all municipalities have to complete according to law, but all municipalities have not yet complied. The LEAPs are specified in the
Project description as important documents and Sida feels strongly for them, but they already have another project that is meant to help municipalities work with their LEAPs.

### 8.1.9 Category i – Environment vs. Development

*Be able to argue for the environment without arguing against development.*

Both state and participants argue that it is important to know how to present environmental facts and needs in a way that does not make other people think that development cannot be environmentally friendly. In Bosnia and Herzegovina environmental work is still seen as something that puts a stop to development, as experienced by some of the participants.

### 8.2 Competence factors

With all the important competences the stakeholders believe that the programme should focus on clearly stated and discussed it is time to go back to the concept of competence. As mentioned above, Ellström (1992) defines competence in the terms of five factors: psychomotor factors, cognitive factors, affective factors, personality factors and social factors. If these competence categories are analysed regarding these factors we can see what competence factors are seen as important within the programme.

**Table 2. Importance of each of Ellström’s competence factors (1992) for the different competence categories.**

<table>
<thead>
<tr>
<th>Competence categories</th>
<th>Competence factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychomotor</td>
</tr>
<tr>
<td>a - Internationally funded projects</td>
<td>1</td>
</tr>
<tr>
<td>b - Environmental threats and specific knowledge</td>
<td>1</td>
</tr>
<tr>
<td>c - Public awareness</td>
<td></td>
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<tr>
<td>d - Environmental regulations and governing</td>
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<td>1</td>
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<tr>
<td>i - Environment vs. Development</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

Far from surprising a large majority of the competences have a focus on cognitive and psychomotor abilities, that is manual and perceptual skills and knowledge and intellectual skills. With less than half the importance of cognitive and psychomotor skills the affective, personal and social skills fall way behind and even more so if the importance of the different competences are taken into account.
8.3 Summary competence and needs in municipalities

Different stakeholders hold different competences important and different competences are given different amounts of importance. Some of these competences are naturally incorporated into the programme and some are not. Important competences such as recognizing needs and having specific knowledge will be thoroughly addressed, but a larger effort must be put on combining the knowledge from all courses into a holistic view on environmental issues, on how to include citizens and how to create a network of officials in neighbouring municipalities to contact, not to forget the very important discussion about environment and development.
9 Pedagogical methods

For each course the pedagogical methods have been presented. These methods have been analysed in order to give a picture of how the chosen methods can help the students take in the subjects and take the knowledge back with them into their daily work.

9.1 Result from the questionnaires

The data concerning methods for teaching is collected through questionnaires and will be presented separately for each course within the programme. The courses are presented in the order they appear in the syllabus. The results are summarized in table 3, table 4 and table 5.

9.1.1 Project Management

The teaching in this course will be quite varied. Lectures with practical examples, group discussions, group exercises, individual work, practical work with case studies and problem solving using computers will be used. The lectures will be given with Power Point presentations, discussions and problem solving. Both group and individual assignments will be worked on both in class and out of class and the group work will be presented in front of the other students. All assignments will be compulsory and graded and the examination will include group work, individual work, project, presentations and discussions, comments and questions on other students’ work and perhaps an exam. The course material will be comprised of Power Point presentations, photos and videos, a textbook and software.

9.1.2 Environmental Protection

No data available.

9.1.3 Energy Management in Local Community

During this course, the teaching will consist of lectures, exercises and small group assignments during the course. Exercises will only be relevant for two sub subjects where the students will be asked to solve an assignment and then together with the other students identify the best way of solving the problem. In order to pass the course the students have to submit a project and pass a final exam. The course material provided during the course will be photocopied material and Power Point presentations.

9.1.4 Water Management

This course will combine lecturing and practical examples with group discussions and examples from the students’ municipalities. During overhead lectures group discussions will be stimulated to let the students participate in each lecture. The students will be given the assignment to in writing discuss issues of the home municipality and propose solutions to the problems. These assignments will be graded and in combination with discussions, comments to other students’ work and an exam (if a sufficient grade is not already obtained) give the final grade. The course will be coordinated with Project management, Sustainable spatial planning and Environmental Protection. Course material will be Power Point presentations, videos and photos and documents relating to specific projects.

9.1.5 Sustainable Spatial Planning

Lecturing will be the main means of knowledge transfer during this course. Early on, during a seminar, the students will have to define the title and content of a case study related to their professional engagement. During later seminars, the students will present progress and
experiences and discuss together with their fellow students in order to further develop the project. During the case study, parallel with the lectures, the students will have contact hours with teachers. The case study, including a report of 10 pages, will be graded and constitute the final mark for the course. Material used during the course will be printed literature, mainly in English. For the case studies, the students will have to find additional material.

9.1.6 Indicators and Tools for Sustainable Development
No data available.

9.1.7 Waste Management
During this course the focus will be on giving lectures with group discussions. Lectures will be conducted with overhead presentations and the students will be given handouts in advance or during the lecture. The students will receive the task to write a report on the current waste management situation in their municipality and prepare a proposal for a local Waste Management plan. Each student will have scheduled meetings with the lecturer to discuss the progress of the report. To obtain a grade in the course the student has to prepare the report and present it in class and pass a final exam. Course material will be photocopied material, Power Point presentations and video material.

9.1.8 System of Local Self-Government
This course will be divided into two parts. The first part will cover theoretical considerations of self-governing on a European and EU-accession level and the second part will focus on the legal and organizational structures in Bosnia and Herzegovina. Lectures will be given for each topic of the course and the students will be participating in discussions. The students will prepare presentations of different topics in smaller groups. Exercises will be used for a deepened understanding of some threads of the topics and the students will be given assignments after each lecture, either to prepare for the exercise, preparing the group presentation or to write a seminar paper. The seminar paper and the group presentation together with a midterm exam, presence at lectures and exercises and a final exam will determine the final grade. Case studies during the course will be performed on situations in the students’ municipalities. The material used for teaching the course will be Power Point presentations and two books written by the professor himself.

9.1.9 Environmental Measuring and Monitoring
In this course, lectures and exercises will be used and the lectures will be structured around main topics. The passing grade will be based on both a project and a final exam. Power Point presentations and photocopied material will be distributed to the students as course material.

9.1.10 Renewable Energy Resources
Lectures, exercises and group discussions will be the main methods of teaching in this course. The course has been divided into three major parts, Introduction to Renewable Energy Resources and Educational Platform, Solar Derived Renewable Energy and Non Solar Derived Renewable Energy. The students will be required to have basic knowledge in Fluid Mechanics and Thermodynamics to start the course. Submission of a project and passing an exam will give the final grade. Software, photocopied material and Power Point presentations will be used as course material.

9.1.11 Environmental Impact Assessment
The goal is to make this an interactive course. Lecturing with overhead presentations will be combined with group discussions and work on real case examples. Handouts will be distributed
in advance or during lectures. Parallel with the lectures the student will start to prepare an Environmental Impact Assessment (EIA) of a project the student is familiar with. The presentation and report of said EIA combined with comments and questions to other students’ presentations will lay ground to a final grade. Course material will be photocopied material, including EIA documents and templates and Power Point presentations. Photos and videos relating to specific projects will also be distributed.

9.2 **Analysis of the pedagogical methods**

The view on teaching is fairly traditional. Lectures will be the main means of transferral of subject matter and lectures will in most cases be aided by overhead material, be it Power Point presentations or over head sheets. The examination and grading will in most cases depend on how the student performs in a project and the course material will mostly consist of PDF-documents or Power Point presentations. All these methods are common in teaching at a university today but how will municipality officers respond? The programme was started to increase the environmental expertise in Bosnia and Herzegovina but first and foremost in Bosnian municipalities.

When analysing the pedagogical methods the data has been divided into three parts: **Teaching, Examination** and **Course material**. Each part has been summarised in a matrix that shows what different methods are being used in which courses and what methods are the most frequently used.

### 9.2.1 Teaching

Table 3 gives a summary of what types of pedagogical methods are planned for the different courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Lectures</th>
<th>Exercises</th>
<th>Group assignment</th>
<th>Discussion</th>
<th>OH lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Project Management</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 - Energy Management</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4 - Water Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5 - Sustainable Spatial Planning</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7 - Waste Management</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8 - Local Self-government</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9 - Measuring and Monitoring</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10 - Renewable Energy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11 - Environmental Impact Assessment</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Exercises</th>
<th>Group assignment</th>
<th>Discussion</th>
<th>OH lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

“Lectures” is what it sounds like. If the teacher plans to use Visual aids in the form of Power Point presentations or overhead slides there will also be a marking in the “OH lecture” column. “Exercises” is more practical teacher-lead activities whereas “Group assignment” indicates in
which courses small problem solving exercises for smaller groups to solve during lecture time will be used. Discussion topics for learning purposes will be used where the column “Discussion” is marked.

During a vast majority of the courses some sort of lectures will be used as the main method for transfer of knowledge. Discussion is seen as a good means of learning in about half of the topics and the same goes for group assignments. Exercises are used moderately in those courses that will include areas where the students need hands-on practice.

9.2.2 Examination

Table 4 describes the choices of examination methods.

<table>
<thead>
<tr>
<th>Course</th>
<th>Project</th>
<th>Presentation</th>
<th>Group assignment</th>
<th>Home assignment</th>
<th>Active presence</th>
<th>Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Project Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 - Energy Management</td>
<td>1</td>
<td></td>
<td></td>
<td>n.d.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4 - Water Management</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5 - Sustainable Spatial Planning</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - Waste Management</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - Local Self-government</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9 - Measuring and Monitoring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - Renewable Energy</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - Environmental Impact Assessment</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

| Sum                           | 9       | 6            | 2                | 2               | 4              | 7    |

The "Project"-column does not only stand for traditional projects but also in some cases for individual papers. “Presentation” denotes oral presentation in front of the whole or part of the class with following questions and discussion. “Group assignment” is marked for those courses where the grade is partly based on performance on group assignments. “Home assignment” stands for smaller assignments to prepare between lessons and “Active presence” has been marked for the courses where the teacher gives importance to attendance and active participation in discussions. The courses with markings in the column “Exam” have a written exam at the end and/or at the middle of the course.

Most of the courses will have project as one of the forms of examination and about half of these also require presentation of the project work. Three of the courses have planned the project work as the only examination form but a little more than half of the courses have exams as a complement to the project work. In a few courses the examination will depend on group performance and in some home assignments or active presence will be part of the grading.
9.2.3 Course material

Course material can be in different forms and shapes. In table 5 six different types of course material that will be used within the programme are presented.

Table 5. Planned use of courses material for courses in the EMI-programme. (No data available for courses no. 2 and 6.)

<table>
<thead>
<tr>
<th>Course</th>
<th>Book</th>
<th>PPT + PDF</th>
<th>Photocopies</th>
<th>Documentation</th>
<th>Software</th>
<th>Photo/video</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Project Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 - Energy Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - Water Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - Sustainable Spatial Planning</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - Waste Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - Local Self-government</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 - Measuring and Monitoring</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - Renewable Energy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - Environmental Impact</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

The “Book” column shows in which courses printed literature will be used. “PPT + PDF” stands for digital material, either in the form of Power Point presentations or material in PDF format. This column takes up the same type of material as “Photocopies” with the difference that the latter is for physical handouts. “Documentation” refers to specific method documentation such as Environmental Impact Assessment or laws and regulations. In some courses plan specific “Software” will be used for calculations or project organization and others plan to distribute photos and videos either digitally or during class as indicated in the column “Photo/video”.

Power Point presentation and PDF-documents are the most common course material within the programme; it will be used in almost all courses. In about half of the courses photocopied material will be handed out but only a few will be using a printed book. In two of the courses documentation regarding laws of methods for analysis will be distributed. In a few courses software and video materials will be distributed. In one of the courses books in English will be used even though discussions during project meetings have pointed at poor knowledge of English.

9.3 Summary of pedagogical methods

The teaching within the EMI-programme will be quite traditional for formal learning institutions with lectures as the most common method; however, in many of the courses other methods such as discussions or smaller group assignments will be used for variation. The topics discussed in class shall in most courses result in a project report concerning the situation in the workplace municipality of the students. In some cases there reports will be written in groups but most projects will be based on individual topics. Regardless of the large amount of group assignments that are planned for the teaching sessions the examination will in very few cases be based on
group work. The course material during the programme will be mainly handouts, both in digital form and on paper.
10 Shaping of the programme

The first programme suggestion was developed by a limited number of people and was approved by both University Senate and Sida before the IE team was introduced into the project. After a preliminary presentation of the results of the needs analysis some points were taken up by the IE team. At that point the programme included many courses on how to run a project, but only three courses regarding specific knowledge of environmental issues. One of the participants’ reaction to the first syllabus was that there was a strong emphasis on water management, and that it was of no need to her since the problems in her municipality were related to waste management and air pollution. The IE standpoint was less subjective but they were of the same opinion. The message was that in order to convey a holistic view on the environment, the courses needed to take more aspects of environmental work into account. There was also a small amount of scepticism towards the distribution of lecture hours between the courses with less time for the environmental and more for the project related subjects. The whole project team shared these opinions and the syllabus was reworked.

In the second, and present, syllabus the goals remained the same (see chapter 4) but the course list had changed.

1. Project Management
2. Environmental Protection
3. Energy Management in Local Community
4. Water Management in Local Community
5. Sustainable Spatial Planning
6. Indicators and Tools
7. Waste Management
8. System of Local Self-government
9. Environmental Measuring and Monitoring
10. Renewable Energy Resources
11. Environmental Impact Assessment

Second course list (EMI Syllabus 2, Appendix 5)

Courses nine through eleven are planned for a voluntary third semester in case the student wants to reach master’s level (with fourth semester spent on writing a master’s thesis).

After a presentation of the full needs analysis a discussion about environment vs. development was struck up in the project team, which wanted to give it a strong focus. Still, after this no changes were made to the syllabus.

10.1 Programme goals and competence needs

Looking at the goals set in the syllabus it clearly shows that the competence categories a, Internationally funded projects, and b, Environmental threats and specific knowledge, are seen as the important competences for the municipality officers. These are also, according to the stakeholders, two of the most important competence categories, but both category c, Public awareness, and d, Environmental regulations and governing are of the same level of importance as category a, Internationally funded projects. The goals give a very narrow picture of the programme in contrast to the needs that need to be met.
Table 6. Correspondence between competence categories and programme goals and course descriptions.

<table>
<thead>
<tr>
<th>Competence categories</th>
<th>Goals</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>a - Internationally funded projects</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>b - Environmental threats and specific knowledge</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c - Public awareness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d - Environmental regulations and governing</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>e - Holistic view</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>f - Intersectional work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g - Protected Areas</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>h - LEAPs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i - Environment vs. Development</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When looking past the programme goals and focusing on the courses, a broader picture of the programme is shown. Competences from almost all competence categories are mentioned in the course descriptions, but still, there are some discrepancies. Category a, *Internationally funded projects*, is completely covered, mainly by the course in Project Management, but economical aspects, how to handle appliances once finished and project documentation are mentioned in other courses as well. Category b, *Environmental threats and technology* is partly covered by courses in specific areas of environmental protection but there is no mentioning of soil contamination or hazardous chemicals and the focus on how to recognize threats and needs is not overwhelming. Regarding category c, *Public awareness*, one of the most emphasized during project meetings, the focus in the courses is weak. Two courses take up how to include citizens in decisions and one will describe “public information systems”. The larger issue on how to raise awareness and change the citizens’ habits remains unmentioned. The large category d, *Environmental regulations and governing*, has a somewhat higher level of coverage, but still the courses don’t quite reach the competence need described by the stakeholders. Environmental regulations are covered in the respective fields in three courses and environmental inspection is mentioned in one. The larger issue of how environmental issues are governed are however not mentioned at all. The way of governing on a local level will be described in one course, which is highly valid and most certainly useful, but no record shows that an environmental perspective will be used. There are many courses that build towards category e, *Holistic view*, and if put together, the knowledge might well result in a holistic view, but no course will take the knowledge acquired in the previous and discuss how to bring it all together and why a holistic view is important. The category f, *Intersectional work*, is almost totally absent from the syllabus. In the course System of Local Self-government the political structure will be clarified but no course has planned to take up the concept of intersectional work. Category g, *Protected areas*, is on the other hand covered both in general in one course and in more detail about protection of wetlands and such in the course Water Management. Category h, *LEAPs*, was only mentioned in the Project description as important and is not mentioned in more detail than a discussion about the role of the LEAPs in one of the courses. Last but not
least comes the category i, *Environment vs. development*. This category is hard to both write down in a course plan and to identify if it is in there and will therefore be noted as absent from all courses.

### 10.2 Summary of programme shaping

The goals of the programme cover only a few of the competence categories mentioned by the stakeholders.

As for the content of the courses there are still some parts missing that were brought up in the needs analysis. Soil contamination and hazardous chemicals should be mentioned in some course to broaden the spectra of environmental threats and put focus on a threat that might be underestimated. Some focus should also be put on environmental governing. The category Intersectional work, with neighbouring municipalities, state and canton level as well as NGO’s as possible interaction partners is not mentioned at all. Two categories that are missing from the syllabus are Public awareness and Environment vs. Development.
11 Discussion

At the end of a study the scrutiny of the chosen methods can give valuable insights both about what methods are valid in this type of study but also about the collected data and the conclusions drawn from it.

11.1 Methods

Collection of data

In this study a wide range of methods were used for the data collection. Some were chosen because of initial ideas and some because of lack of time and extensive travel costs. The initial interviews were performed early on in the process and with stakeholders not wholly expected at the outset. The interviews were planned to cover not only the stakeholders and their view on competences and needs, but also all teachers within the programme and their teaching methods. This second aim for the interviews turned out to be a difficult to fulfil. The questionnaires that were used to collect the complementary information from teachers not interviewed turned out to be a much more efficient way to collect equivalent information from all teachers and were sent also to the teachers that were interviewed. The problem with the questionnaires turned out to be getting the answers back. Some teachers were very helpful, others did not prioritize the questionnaire, and for teachers that were interviewed it did not seem as important. Administrative team members from Sarajevo relayed contact with the teachers, but regarding the teacher that didn’t answer there was no response. Even with the small falling off the questionnaires gave the information that was needed for the thesis. Interviews would have given a deeper understanding for the teaching in the different courses but would also have created a much larger study.

Analysis

The arrangements of competences into matrixes of different sorts helped in some ways clarify the material but also forced the information into an accuracy that did not initially exist. This also put high demands on the categorisation of the material, higher demands than time could offer. The minute accuracy of the categorisation was consciously sacrificed in benefit of the analysis.

Theories

The theories applied in the thesis were introduced with the hope that they could help the collected data go beyond the immediate reactions and provide a framework for analysis. The concept of competence has offered support to review the interview answers from the stakeholders but also offered ways of analysing the competence categories. Looking at skills and what types of skills are valued in different situations has inspired new thoughts and ideas. The paragraph about qualification was important to show the specifics of competence but has not been used as such in the report.

Validity

The validity of a study is always an important issue. In this case there are two major areas where the validity can be questioned. The first is the choice of stakeholders. The choice in this case was no more than an acceptance of the stakeholders offered. There is just one environmental officer from a municipality, only one mayor and only one canton officer and they are not in any way representative for the country as a whole. Especially the Republika Srpska has been neglected in the choice of stakeholders and differences between the entities cannot be observed. The second is the organisation of the material. The competence categories could have been formulated in many other ways. This seemed to be the right way to go in this thesis but another classification
could have given other conclusions. Also, all conclusions and classifications are coloured by the inherent picture of environmental work formed during an upbringing in Sweden. For a more specific study an initial investigation could have been made towards the composition of the whole body of environmental officers working with environmental issues.

### 11.2 Results

**Environmental situation**

One of the main results of the study is the mapping of the present situation of environmental work and municipality officers working with environmental issues in Bosnia and Herzegovina. One of the major problems is the confusion about authorities, which provides both hindrances for and excuses for not doing environmental work. This problem is evident at all levels and despite some opinions about the system, that objectively seems to be the real problem, different actors spent some time blaming each other. If the knowledge about how the governing is structured was more widespread maybe officers at different levels could interact more and give each other assistance. Other problems are the poor knowledge of environmental issues, low efficiency of infrastructure projects and a low degree of public awareness. Apart from this, the environmental officers don’t often have a holistic view of environmental work. Many problems are solved by creating others or by moving them to become problems for the neighbouring municipalities instead. This is an attitude well spread within the society. Some of the members of the project team talks about people throwing garbage from their windows and a lack of respect for rivers as ecosystems. The overall knowledge about environmental protection seems to be very weak.

**Competence need**

Introducing the plus signs into the matrix of competence needs was a way to reduce the overwhelming impact of the categories consisting of many different competences and to more clearly show the difference between different stakeholders. The importance of each competence category is to some extent given by the amount of plus signs attributed in Table 1, but some other issues can also affect the importance and give information about how to handle issues around each category. The discrepancy between stakeholders is well worth taking into account. Since everyone involved in the development of the programme is of an opinion contrary to that of possible participants on category a, Internationally funded projects, it is wise to tread gently around these areas. If the participants feel that they already know what is taught in the courses they might not feel the need to attend. It could also be unwise to openly insult them by right out stating that they are unable to fulfil their jobs. Regarding category d, Environmental regulations and governing, the confusion about national environmental governing seems to hinder environmental work in the municipalities, a situation that the participants should have the tools to remedy after having participated in the programme. Not all categories get the attention they might have deserved because of a difficult phrasing rather than an unimportant concept. Even though not heavily emphasized by all stakeholders category e, Holistic view, might mean the difference between functional and non-functional environmental work in the municipalities. As with category a, participants and professors are of rival opinions when it comes to category f, Intersectional work. Both contacts with other municipalities and with other levels of the administration could, in my opinion, lead to a better job performed in an easier way. This is important to address and deal with in many ways and in more than one course of the programme. It is not overwhelmingly important to focus on category h, LEAPs, during the EMI-programme, but they can surely be mentioned as an important help for the municipality environment work. A category not often mentioned is category i, Environment vs. development, and for the participants to fully be able to argue for environmental actions in development processes they need to get experience from this way of thinking continuously. Since it is not covered in any specific course the teaching methods could be the way of addressing the issue.
Ellström’s five factors (1992, p. 21) (see section 3.1) of competence are important in order to understand the breadth of the concept of competence and shows that in order to be competent to handle a situation, for example write a letter to get the inhabitants of a municipality to start recycling their waste, it is not just necessary to know how to formulate the letter, but it is also important to have the knowledge about recycling and capacity to actually want to write the letter. Competence is dependent on all of these factors.

Learning is often considered as behaviour and can be seen as taking place in three domains: the cognitive, the psychomotor and the affective domain. Each domain is considered important but the cognitive domain is usually in focus in formal education (Gareis & Grant, 2008). This theory shows domains of learning but not factors of the competence developed. Even so, the theory does not include the last two of Ellström’s competence factors: social and personality factors (1992) as domains of learning. Traditional learning is thus generally heavily tilted towards one end of the competence factors presented and of course these factors are important but they cannot be everything in a programme where the students learn in order to practice their occupation rather than continue in academia. In formal learning the “hard” knowledge is often the focus, in this case cognitive and psychomotor factors, but the question is how efficient the education is if the students don’t get a feeling for the environment, a confidence to convey their feeling and a way to communicate it. If the focus in the learning situation is never on the social or personal domains, how can they be further developed? In most cases, the answer is probably: “Somewhere else”. In this case I think it is important to focus on these factors in the learning situation as well, because just like in theory, certain types of competence are more represented among the proposed competence categories than others. Of the four competence categories considered to be the most important by the stakeholders only one conveys personality affectionate and social factors of competence. Furthermore, the competence categories that were not fully covered by the syllabus were to a higher extent composed of the less common factors than the categories actually covered by the syllabus. Is it really more important with cognitive and psychomotor factors of competence or is there some other reason for the distribution in the syllabus and the opinion of the stakeholders? I would answer “No” on the first question and “Traditional thinking” on the second. When considering all five factors as important for the success of the programme, they may all be incorporated. If the course contents don’t give room for all competence factors the methods must be adjusted to include the development of affective, personal and social skills.

**Pedagogical methods**

Most of the teachers in the programme show a great pride in their work pedagogues. They talk about using different methods to make the lectures more interactive and to catch the attention of the students. Some of these methods show in the answers to the questionnaire and some don’t. I see the general enthusiasm for the programme and for teaching as a great asset but I believe that the enthusiasm needs to spill over into curiosity and experimentation with new methods in all courses in order to give the students the knowledge and the competences they need.

Teaching methods should, in my opinion, be adjusted to suit the audience and to be a means towards the goals. It is hard to know what participants to expect before the programme has started, but a large diversity ranging from newly graduated students to long time employees in municipalities can be expected. This diversity can be a great asset if the students’ varied knowledge is properly taken care of. With an audience well used to working and solving issues they are faced with it could be hard to capture attention with long lectures. Overhead presentations can help students remember and follow the lecture, but can also lead to students
who don’t fully take in the material to make it their own. I see group assignments as a way of being able to learn from each other and to work a problem in more detail. Group work can both develop social and cognitive skills and lead to learning in other areas than the intended \textit{(informal learning)}. Full class discussion unfortunately often leads to three or four students talking and the rest just listening, but can be used to lift some different opinions about issues.

The examination methods should reflect the way the new knowledge is supposed to be used. It is not a surprise that many of the courses have assignments in the form of projects when the programme aims for the students to be able to manage projects in their day-to-day work. Just as with group assignments, projects can lead to other areas of knowledge than intended and therefore also to areas outside the formal learning goals. In this way, the projects will be as much a teaching method as a method for examination. I believe that the use of projects can help the students connect their studies with their working environment, but it is extremely important that the project tasks are well adapted to the workplace of each student so that they learn to implement their new knowledge as soon as possible. I also consider the presentation exercise to be very useful. Due to the situation in BiH today where environmental protection and development are seen as opposites, it is important to have the ability to convince stakeholders both in the country administration and in the private sector that protecting the environment is not a threat towards development or the other way around. More than being able to present ideas, it is imperative that the project assignments give the students opportunities to consider the duality environment-development and bring out the positive effects that can come out of the duality in their project. Concerning group assignments they do not seem as popular as a method for examination as a teaching method. In six courses group assignments will be used as parts of the in-class teaching, but only two will use group assignments for evaluation of knowledge. There is of course some difficulty in individual grading of work done within group assignments but surprisingly few teachers take on this challenge. The informal learning that might take place in graded group assignments could give the students valuable insights about how to handle project teams in their municipalities even though the formal learning goals focus on the topic for the project more than the process of the work. Although it is good to use group assignments in teaching it is definitely worth to look at different forms of group examination and look at the benefits and drawbacks. To ensure that all students are activated during in class discussions different methods should be studied and tested. The project assignments within the programme need to be coordinated with each other and start the students’ thinking on the question of development vs. environment. If the participants are supposed to be able to work in teams, then maybe examination should reward prosperous cooperation. If the students are supposed to be able to bring awareness to the citizens then maybe it needs to be asked for as part of project outlines.

The few books in the matrix have been chosen for subjects where books with current content are available, preferably in a language accessible by all students; however, one teacher has actively chosen to use literature in English. I can see a problem with literature in English when the students are not young and recently graduated from a bachelor programme but municipality officers with a few years’ experience. Among these students English is not considered assured prior knowledge. In my opinion the dilemma between using photocopied handouts and digital likes is an important dilemma in a programme focused on environmental protection. One teacher prefers to use digital sources in order to decrease the amount of paper used, but argumentation built on accessibility for the students can be used against his reasoning since many students consider reading on a screen more difficult than reading on paper. There are two things I think are extremely important for the students when it comes to teaching material. The first is to build a personal library of books etc. that they can use as references and memory aid in future projects.
The other is to learn how to find the information they need. As far as I can see some material will be possible to include in that personal library but I cannot see when the students will learn to find more material, hopefully that will be part of the teaching in more than one course. Photos and videos can certainly be used to inspire (and appal) students and might also be a welcome relief from a more traditional teaching session.

Programme shaping
The syllabus has been reworked once, but some parts of the needs expressed by the stakeholders have not yet reached it. Some competence needs are still missing that ought not be merged into one of the existing courses but into all of the courses and into the examination methods of the courses.

The goals of the study do not fully reflect the scope of the programme. Only three of the competence categories are touched by the goals and in cross-referencing them with the courses about the same number of courses would be covered by the goals. Two of the most important categories (category a, *International funding*, and category b, *Environmental threats and specific knowledge*) are touched, but both category c, *Public awareness*, and category d, *Environmental regulations and governing*, might do well to be included in the goals. Since it is a diffuse category that is easy to forget, even though strongly emphasized, category i, *Environment vs. development*, could also be included in the goals, which could thereby serve as a reminder in further course development. The programme goals should be an indication of what the content of the programme looks like and in this case, the goals don’t show the whole scope of the programme. A too narrow programme has already shown to dissuade possible participants (syllabus 1), but since the course list is probably also perused before applying for the programme the limited scope of the goals might not give a severe impact on the applicants.

Returning to the aims set up at the start of the study will tie the knot and finish the work for this time. The planned content and methods for teaching have been evaluated, questions have been asked and suggestions made. The main competence needs that were expressed were the competence to know how to identify threats and needs in a municipality and to have knowledge about different parts of environmental work in order to do so. The second most important competence need was for the municipality officers to be able to apply for project funding and thereafter carry the project through. The courses will be taught with mainly traditional methods, in some cases with discussions or group assignments during class. Examination will in most cases consist of individual project work and an exam. The course material will rather be handouts than printed literature but both will be used. The teachers would do well from looking at the competence needs and try to incorporate subject areas that promote the competence needs but also methods that promote competence factors that can help the students perform in their municipalities. The competence needs are not fully covered by the syllabus; some areas are still fully missing and others will only need some additions.
12 Conclusions

The population as well as the municipality officers in Bosnia and Herzegovina has a poor knowledge of both environmental protection and the environmental situation in the country. Adding to the lack of knowledge is the lack of understanding for the governing system, making enemies out of possible allies.

Competence needs have been identified in many areas, some more urgent and grave than others. The absolutely most urgent need set by possible participants is the need to know how to identify threats in the municipalities and to have the knowledge to do something about the identified threats. Even though not one of the most emphasized competence needs, the ability to give reasons for how environmental work can help development rather than hinder it is important enough to bring up as a general conclusion.

In order to have the competence to do something Ellström’s five competence factors (1992, p. 21) have been discussed. These factors are not all naturally incorporated into the programme. Affective, social and personality factors are underrepresented but can represent the difference between academic knowledge and the practical application of the knowledge needed in the municipalities.

By adjusting the teaching methods keeping the shortcomings in mind, the missing pieces in the table of competence needs and the underrepresented competence factors can be covered.

The competence need, the programme syllabus and the actual programme are now three different unities. In some places they intersect but they still don’t cover each other as much as would be preferred.

12.1 Suggestions for the future

For the immediate future the incorporation of some of the competences from the needs analysis into the programme is important. The main parts that need to be incorporated into the programme are methods for raising the public awareness, ideas for intersectional work and ways to promote environment and development. I think it is important that the teachers make a collective effort to incorporate some of the issues into all courses in order to create a holistic view of not only environmental protection but of the programme itself.

For the future that comes after the immediate, an investigation should be undertaken to define what pedagogic methods can be efficient for creating good conditions for the municipality officers to learn in such a way that they can use their knowledge. A discussion should also be initiated about whether it is important to start promoting the competence factors that are now at a low focus.
13 References


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Questions for potential course participants from the municipalities

Employment

What is your previous education?

What is your work description? - Responsibilities?

What are you working with right now? - Projects etc.

Have you been part of any environmental projects in the municipality?
  - What?
  - How did it work?

Competencies

What environmental competences and skills do you use in your work?

Is there anything you would like to learn in order to do a better job with environmental issues?
  - Do you lack any skills?

Do you feel that your superiors have any expectations on you, regarding environmental work, which you currently do not fulfil?

Expectations

*What are your professional expectations on the programme?

What work tasks do you hope to do when you have finished the specialist programme?

Teaching

In what teaching context do you feel that you learn the most?
  - Lectures
  - Projects
  - Discussions
  - Home assignments
  - Other?

Summary + is there anything you would like to add?
Questions for employers at municipalities

Organization

What is your position?

*How is the environmental work organized and governed in your municipality?

What are the political priorities in the municipality?
- General priorities
- Environmental priorities.

What are your environmental goals for the municipality?

Environmental work

*What present environmental difficulties is the municipality facing?

Are there any ongoing environmental projects in the municipality right now? Which are they? Sort them in order of importance.

What projects do you think will be needed in the future? Sort them in order of importance.

Are you particularly proud of any environmental project within the municipality, ongoing or finished? - What makes you proud of it?

Employees

What type of environmental competencies do you expect from your employees? - What do you value? - What do you lack?

*What knowledge and skills do you wish that your employees would gain from the programme?

Summary + Is there anything you would like to add?
Appendix 1

Questions for teachers at the University of Sarajevo

Can you give me a brief summary if the course? - Most important?

How is the course structured? - Number of lessons
- Different kinds of lessons
- Duration of lessons
- During what time frame?

How will you conduct lessons? - Different types
- Pedagogical methods

What kind of course material will you use? - Books
- Interactive material
- Software
- Photocopied material

Have you planned to use assignments between lessons? - What type of assignm.?
- Compulsory?
- Graded?

What methods for examination have you planned? - Exam
- Project
- Essay
- Group assignment
- Laboratory ex.

Have you coordinated your course with any of the other courses in the programme? - Joint projects
- Home assignments

Summary + Is there anything you would like to add?
Questions for professors within the Specialist Study Municipality Environmental Infrastructure at the University of Sarajevo

1a. Can you give a brief summary of the course?
1b. What topics do you consider as the most important?

2 a. How is the course structured?
2 b. Are you planning to use different types of lessons (lectures, exercises, discussions etc.)?
2 c. How will you conduct the different types of lessons?

3. What kind of course material will you use?
   (For example textbook, interactive material, software, photocopied material, power point presentations etc.)

4 a. Have you planned to use assignments between lessons?
4 b. If you have planned to use assignments between lessons, what type of assignments would it be?
4 c. Will they be compulsory and/or graded?

5. What methods for examination have you planned?
   (For example exam, project, essay, group assignment, laboratory exercises etc.)

6. Have you coordinated your course with any of the other courses in the programme?
   (For example joint projects or home assignments etc.)

7. Is there anything else you would like to say about your course?
INITIAL SUPPORT TO SET UP
POSTGRADUATE SPECIALIST STUDY OF
“ENVIRONMENTAL MUNICIPAL INFRASTRUCTURE”

With this document the Mechanical Faculty of Sarajevo (MEF) applies for SIDA support of establishment of the post-graduate study “ENVIRONMENTAL MUNICIPAL INFRASTRUCTURE”.

The Faculty has experience in teaching environmental courses within postgraduate studies in Energy, Health and Safety, Industry, Economics, and since 2005 Environmental Engineering. While performing these studies, the Mechanical Faculty had established partnership and received support from Kungliga Tekniska Hogskolan (KTH, Sweden). The proposed project is designed to enable further knowledge transfer from KTH, Sweden and improvement human and technical capacity of the faculty of Mechanics in the field of sustainable urban development.

The project specific goal is to increase the number of environmental experts and to improve level of environmental expertise in Bosnia and Herzegovina, in order to respond to the urgent needs of institutional set-up and infrastructure improvements. In the long run the project will enable the Faculty to continuously educate the future required experts, which is particular important as the country will be approaching the EU candidacy and membership.

The total project cost is € 679,430.00 and the time frame for its implementation is 15.06.2009.- 14.06.2011. The costs are planned to be covered by SIDA (64 %), Mechanical Engineering Faculty (2 %), tuition fees paid by students or municipalities whose employees participate in the Programme (15 %) and other donors (19 %).

The amount applied to SIDA is 419 230 €, including costs of MEF of 194,500.00 € and KTH costs of 221 730 €.

1. **Background information**

The Faculty of Mechanical Engineering in Sarajevo was the first university level institution in Bosnia and Herzegovina (BH) that has introduced environmental component into its education system, scientific and professional work (already in 1964). Education was performed within the Department for Process Technique (Chemical Engineering) under the subject mechanical operations (water and air cleaning technology), and later on under the special subject *Environmental protection*. Subject *Energy, Economics, Environment* has been taught since 1995.

2. **Environment in BiH**

2.1. **Legislation**

Bosnia and Herzegovina, by means of international support, has got updated environmental legislation based on some EU directives (EIA, IPPC, Seveso II, etc.). Six laws were enforced as well as about 50 pieces of secondary legislation. Development of entity strategies for environmental protection is underway. Area of air protection, for example is regulated by entity laws on air protection, as well as nine rulebooks (bylaws) relating to limit emission values, limit air quality values, monitoring emissions and air quality monitoring.
Appendix 3

2.2. Enterprise environmental permits

Procedure for obtaining environmental permit for new enterprises is fully applied, and activities are underway for drafting plans of adjustment of existing enterprises in order that they obtain environmental permits. Integral part of the procedure is identification of state of arts of environmental quality and forecast of status after the set up of the new plant or as an input data for identification of measures for pollution reduction from existing enterprises.

2.3. Public sector

A number of relevant CARDS projects have been implemented in Bosnia and Herzegovina, however, mainly for the purpose of strengthening of public administration. A number of professionals are hired in public administration. There is still insufficient number of qualified experts available, and another problem remains in terms of their insufficient skill.

2.4. Municipal level- Development of LEAPs

Municipalities in Bosnia and Herzegovina have a legal obligation to develop their Local Environmental Action plans (LEAPs). Projects related to development of LEAPs, funded by SIDA, EU within CARDS (now IPA) projects, OSCE and other organisations, became popular and well accepted by the municipalities. It proved to be excellent instrument for building up partnership between authorities, business entities and citizens. However, lack of necessary environmental knowledge was evident in local communities.

2.5. Inspection services

Process of set up of independent inspection service in Bosnia and Herzegovina is underway (unlike earlier practice when each ministry had its own inspection). Inspection supervision is performed in administrative areas subject to area of inspection supervision. There have been established 12 inspection vocations according to set up areas: technical inspector (supervision in Energy industry, mining and vessel with pressure, performing electro-energy, thermo-energy, mining, geological supervision as well as electrical inspectors in mining, geology, petrol and gas); water management inspector (supervision in the area of waters); urban-civil engineering-environmental inspector (supervision in spatial planning), inspector of labour and labour protection (supervision in working relations and labour protection) and health-sanitary inspector (supervision in human health care, sanitary protection, production and trade of medicine and protection from ionising radiation); there is also cold eco-police (there is no clear division of their responsibilities). There is high probability that Bosnia and Herzegovina lacks professionals who are capable to perform these activities.

3. Activity of Mechanical Engineering Faculty

The course Environmental Protection, according to new curriculum adjusted to Bologna process has been taught since 2005, within the Department of Process Technique that has five environmental subjects at undergraduate study, and four more at post-graduate study. Other subjects related to processing and energy industry taught at this course are akin to this issue.

Postgraduate Specialist and Master studies lectures in „Environment and Safety“ has started in 2006. More than 30 students enrolled the study, coming mainly from consulting organizations and public administration from the whole Bosnia and Herzegovina.

Within the activities in the area of research and technological development - “SIXTH FRAMEWORK PROGRAMME” FP 6 (EU) in May 2004, European Union approved and signed the contract on implementation of the project „Advanced Decentralized Energy Generation Systems in Western Balkans – ADEG “. The project will be implemented in the course of three years. The project coordinator is: National Technical University of Athens (NTUA), and participants are: Instituto de
Appendix 3

Engenharia Mecanica (IDMEC-IST), Lisbon, Portugal, University of Stuttgart (USTUTT), Stuttgart, Germany, Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb (FSB-UZ), Zagreb, Croatia, Institute for Nuclear Sciences Vinca (VINCA), Belgrade, Serbia and Montenegro, University of Sarajevo, Mechanical Engineering Faculty Sarajevo (University of Sarajevo), Sarajevo, Bosnia and Herzegovina.

3.1 Master studies

- In the period from 1996 till today, three cycles of master study “Energy industry” have been delivered, where special attention was paid to environmental protection and renewable energy resources utilisation.

- Two Tempus projects are under implementation at the Faculty:
  1. JEP 19036-2004 "Post-graduate study in sustainable energy engineering". Members to the consortium are Royal Institute of Technology in Stockholm; University Dublin, Ireland; City University London and Mechanical Engineering Faculty from Banja Luka and Mostar. Lectures will be held in English and will take one year’s time. Preparations for the study are underway (2007 – 2009).
  2. JEP 40059-2005 „Development of Master program in Industrial Ecology in Bosnia and Herzegovina“. Participants in the project are: Kungliga Tekniska Högskolan (KTH), Universitat Politecnica de Catalunya (UPC), University of Sarajevo, University of Tuzla, University of Mostar, Chamber of Economy of the Federation of BiH and TU Delft (Expert Prof. K. Hanjalic) – (2008-2010).

- Distance lectures are made possible by setting up of teleconference call (e-centre).

The Faculty adapts its education process to the Bologna process (first generation by end 2005). The reform process is well accepted and ongoing, yet it requires some adjustments such as to fit out some classrooms by appropriated equipment.

3.2 Professional activities

Faculty of Mechanical Engineering has been dealing professionally with air quality protection since 1965 when the first measuring of emission of particles from a coal boiler was performed on an object. Exactly due to measuring of emissions from local sources (that utilised types of local coal), measures to reduce air pollution were proposed, having significant effect before natural gas was put in Sarajevo. Institute of process, power & environmental engineering that was operating within the Faculty, built up the first inventory of emission in BH for a city (Sarajevo) in ex-Yugoslavia (1975), and for Soc. Republic of Bosnia and Herzegovina (1980). This Institute, inter alia, rendered service to ex-Yugoslavia Government with respect to application of the Geneva Convention on long-range trans-boundary air pollution.

4. Development of concept of Postgraduate Study at Mechanical Engineering Faculty

4.1 Education needs

In post war period European Commission in BH funded few Phare and Cards programs with aims of rising of knowledge, adaption of legislation and capacity building of the state in respect to environmental protection, in order to create conditions for set up environmentally responsible market as well as possibilities for approaching of BH economy to internal market of European Union. However, in spite of these efforts of European Union, general level of knowledge in the state administration, and especially in economy (there was not organized education) is on relatively low level. While certain results are achieved on the entities level, meanwhile the situation on lower levels of authorities is more unsatisfactory.
According to the analysis of the EU Functional review 2005, as well as the Ministry of Foreign Trade and Economic Relations, Environmental Department in February 2007, on necessary human resources to be hired in the public administration (at all levels), in Agency for environment and inspection services, the number of necessary human resources should be approximately hundred (100). The biggest gap was detected in municipal environmental urban and infrastructure units, in all 140 municipalities and at the potential state and entity environmental agencies.

4.2. Concept of new cycle of postgraduate study

The whole system of environmental education is shown on the scheme. In September 2008, the first generation according to bologna process has started. On this occasion Department for environmental protection was introduced. Since September 2007, third year students will attend five environmental courses. Next year (2008), certain number of students will continue study (MSc degree), where they can choose between regular study program of the faculty and postgraduate Industrial Ecology (TEMPUS). Both postgraduate studies that are in accordance to bologna standards could study students from the whole BH; students from other countries of SEE are expected too.

In this way three parallel studies in the field of environmental protection will exist:

1. Regular study (Bsc. and MSc degree),
2. Two master studies in the framework of TEMPUS and
3. Two specialist/master studies for students that graduated before introducing of Bologna process, of which Municipal Environmental Infrastructure is new one, for which the support is required.

Postgraduate - specialist/master study „Environmental Protection & Safety” and „Municipal Environmental Infrastructure”, that refer to students graduated before so-called Bologna process, are designed in two versions: specialist study (two semesters of courses and finalising of specialist thesis) and master study (three semesters and finalising of master thesis). In this context two studies are foreseen: (i) Environmental Protection & Safety, that has started in September 2006 and (ii) Municipal Environmental Infrastructure, which start is scheduled for February 2009. These studies are aimed to employees in public administration, developing agencies, consultancy and engineering companies.
Support to the system of environmental studies are needed, especially for studies described in p.3, for which there is no sufficient funding, except contribution of students and interested organizations.

4.3. Specialist / Master degree in «Environmental Protection & Safety»

First environmental Graduate study, as part of the new education approach at Mechanical Engineering Faculty is Master degree in «Environmental Protection & Safety». The study enables qualification for making scientific research in different fields such as (i) measurement, (ii) researching of quantities and causes of emission into air and water and measures for its minimization, (iii) development of methods for environmental risk assessment, (iv) development of methods for environmental management, occupational health and safety, (iv) contribution to technological development etc. – all these in integral approach. Students employed in the state administration, attend specialist study, will engross of procedure of issuing of enterprise environmental permits, and involvement of environment in spatial and urban planning. Also, the study gives support to involvement of environmental issues in branch strategies (energy, tourism, health, agriculture etc.). Training of understanding and implementation of international environmental agreement is especially important.

Students are assisted with respect to browsing literature, i.e. records should be kept on quality and appropriate data sources, and own data base of data sources and data should be kept. In that context, enlargement of the contents and capacity of existing web page is envisaged (http://dl.mef.unsa.ba/zastita/). It is interactive web page, where each lecturer, i.e. associate has access and possibilities to it in terms of changing and amending web page in the domain of his/her responsibility.

Teachers on the study are professors from Mechanical Engineering faculty (3 different departments), Faculty of Natural Sciences (two different departments), Civil Engineering faculty and Electrical Engineering faculty, all belonging to University of Sarajevo. Certain number of experts coming from industry and state administration are involved in classes performing. Lectures at this study have been completed. Master theses activities have commenced.

The chief of course «Environmental Protection and Safety» has been Professor Aleksandar Knezevic, one of the pioneers of environmental protection and sustainable development in Bosnia and Herzegovina, author of about ten professional and scientific books and participant in many important projects in this field in Bosnia and Herzegovina.

5. New course - Specialist degree in «Municipal Environmental Infrastructure»

The Faculty of Mechanical Engineering is developing a new study programme - Specialist Degree Programme in «Municipal Environmental Infrastructure». The need in this programme is proved by low efficiency of the foreign investments in environmental infrastructure projects at local level caused by lack of knowledge and skills in implementation of such projects at municipalities. Thus, the main goal of the new study programme is capacity building in environmental management among decision-makers at municipalities in BiH. This study is an object of the Project.

5.1. Organisation of the study

Basic system of the study is Postgraduate specialist study in two semesters (140 hours) with making of Specialist thesis. The study is approved by University of Sarajevo. List of subjects of the study is given in Table 1.

Beside teachers, experts with practical knowledge and useful experience will be engaged in lecturing in certain volume.

For students who are interested for the study topic, but they can not dedicate required time for the study or they do not have ambition to finish the complete study, there is possibility to finish course
with 70 hours and make their Expert thesis. The content of the course are the same as Specialist course with the same subjects, but with the focus on know-how. Topics of Specialist and Expert thesis will be related to local environment infrastructure, covering concrete problems in concrete community.

### Table 1. List of subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>number of hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project management</td>
<td>20</td>
</tr>
<tr>
<td>2. Environment protection</td>
<td>15</td>
</tr>
<tr>
<td>3. Water management in local communities</td>
<td>15</td>
</tr>
<tr>
<td>4. Economy and environment</td>
<td>15</td>
</tr>
<tr>
<td>5. Spatial planning and utility</td>
<td>20</td>
</tr>
<tr>
<td>6. Cost - effectiveness of enterprises in public sector</td>
<td>15</td>
</tr>
<tr>
<td>7. Obligation law</td>
<td>20</td>
</tr>
<tr>
<td>8. System of local self governance in BH</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>140 hours</strong></td>
</tr>
</tbody>
</table>

The plan is to enrol 40 students on Specialist study and 60 students on Expert seminars. Students have to be capable to use literature in English, basic informatics knowledge and internet access in their own place or to use internet access at the Faculty.

Students would be from the whole BH, so the study will be performed during the working days in the week (maybe one week in a month). So, students would be in a group during week, what would improve the quality of studding.

The preparation and implementation phases will include the following activities:

1. Upgrading of curriculum and courses with inputs from KTH and development of quality assurance system.
2. Training of teachers
   2.1. Selection of additional teachers from University of Sarajevo and if necessary from other BiH universities, as well as experts from municipalities and companies to be involved as guest teachers;
   2.2. Upgrading seminars provided by KTH teachers
3. Advertisement of the programme and selection of students
4. Implementation of the courses:
   4.1. Lectures and seminars at MF, Sarajevo;
   4.2. Lessons to be delivered at other venues in Sarajevo (possible also in Banja Luka and Mostar depending on student residence place and their number)
   4.3. Exercises (measurements in laboratories or in situ, project tasks etc)
5. Distance learning (web pages and e-communication with professors, discussion forums, virtual work groups), using also video link at Mechanical engineering faculty in Sarajevo.
6. Expert works, Specialist thesis: The students shall link their thesis with potential municipal infrastructure projects at their municipalities. In this way the specialist thesis shall have a practical value and in the best case it could support the municipality application for project loans from the national and international financial institutions. The period of 2/3-month practice at a foreign municipality or institution is highly recommended as a part of thesis preparation (it has to have separate financial sources).
7. Evaluation of the project results
8. Ensuring visibility and sustainability of the project and the created Specialist Study

The selection of students requirements for the study programme will be published in the open call. The requirements will include:

- Completed university education programs (technical, bio-technical or economic background)
- Relevant work experience
- References
Students will be nominated by their employees - local authorities and they will establish a contract on mutual rights and obligations – costs covering (tuition fee, travel costs, absence from the work, and obligations about finishing of the study and to be employed for certain time in the local community after finishing of the study). Therefore, it is very important to advertise the Programme among local authority officials. It will be done throughout:

- Civil Service Agency in BiH, which has a task to select people who are going to be employed in civil service on each level (from municipalities to entity and state levels). The Agency could not require graduation from a particular programme, but the Agency could require related knowledge and skills, that will provide advantages for the programme graduates. The Agency has own web page where recommended courses and study programs are announced (including SIDA seminars). Announcements are sent to more than 8,000 subscribers
- Visits to local authorities’ officials (authorities and development agencies)
- Media promotion (a press conference will be organized, and also information will be delivered to press agencies),
- Web page of the Faculty

Out of mentioned activities, support is sought for:
- Advertisement of the programme, in order to attract the potential students and their organizations (costs estimated in Table 3 (a))
- Direct project management costs, including those related to co-operation with KTH (costs estimated in Table 3 (c)),
- travel of BH professors and limited number of students to Stockholm in few groups (costs estimated in Table 3 (d))

5.2. Creation of preconditions for making of Specialist thesis

Creation of precondition for making of Specialist and Expert theses could be serious problem – limited number of mentors, students are scattered in their own towns (conditions for making of thesis within projects and teams at the Faculty will not exist). Thus, special care is dedicated to organization of making these theses, with the following phases:

a. creation of topic fields,
b. creation of working groups (teams),
c. international relations and communications,
d. information and communication base,
e. application for projects (out of the Faculty) within which research will be done.

ad. a. Creation of certain number of topic fields, from each field several tasks. For instance, two topic fields in waste water management, in each field 3 to 4 tasks. For each field there is one source of data.

ad b. Working groups (teams) will consist of (i) mentors for particular task, (ii) students from the study, (iii) master and PhD students from other relevant studies, (iv) students working on diploma thesis. In this way, virtual team is created, which will enable communication and share of information. Contacts are established with other universities in BH, as well as universities in Croatia and Serbia in order to share mentors, in this way to bring more information.

ad. c. In principle, each thesis should involve any kind of international cooperation – electronic communication, participation on international seminars or stay some time in organization in abroad. Specialist thesis should have support of state fund for science.

ad. d. Special care will be dedicated to sources of information, starting from making available of internet system of the Faculty to students, then using of specialised world information bases.

ad e. Thesis should be based in certain communities, in principle, in community where a student comes from. In the most cases it will be developing agency, consultancy organisation working on
municipality program, department in municipality, etc. This organization has its own terms of reference, working team, funds, source of data and others. The thesis should be in accordance with certain wider developing program of these organizations. By entering of a student who has own task in the same field, the project will be improved from quality aspect of view.

Costs of this activity are given in Table 3 (b)

5.3. Improving Faculty infrastructure

Renovation of the amphitheatre with capacity of 150 seats is envisaged within the Project. The amphitheatre is located in the „new” faculty building which was very damaged in the war 1992 – 1995. The building is partially renovated. Civil works are related to the full renovation of the amphitheatre as well as procurement of equipment for the amphitheatre. Apart of funding from the Project, funding of renovation is provided from Government of Canton and Government of Federation of BH.

Upon finishing of renovation, in gratitude for support of Swedish government, the amphitheatre will be called “Swedish amphitheatre”.

KTH and the MEF accept that SIDA does monitoring of the civil works, and apart from that, the Faculty will give guarantees by separated document that the civil work will be done according to the relevant law in BH and in quality way.

Up to 1992, the Faculty had laboratories equipped for environmental measuring, as well as knowledge, so it was preparing guidelines for emission and air quality monitoring within the Yugoslav society for air cleanliness (the seat being at the Faculty). The laboratories were devastated in the war (the faculty building was at the front line). Building where equipment was stored is being gradually repaired, which highly depends on fundraising. Equipment procurement, to be used for training students and for certain forms of scientific-research work, has been prioritised:

- equipment for measuring parameters of exhaust gases (speed, pressure, temperature);
- equipment for measuring emissions of particles by using gravimetric method;
- equipment for measuring key chemical components in gas (CO, CO₂, SO₂, H₂S, NOₓ);
- equipment for acquisition and processing of measuring data.

In order to enable to students modelling of process in environment, within the teaching process the study will provide them the following:

- software for modelling of air pollutants dispersion,
- software for modelling of water pollutants dispersion
- software for LCA (Life Cycle Assessment).

In the framework of the TEMPUS project, some equipment is ordered; also some money is obtained for Sarajevo Canton. Small amount of money is provided in framework of this project.

Costs of this activity are given in Table 3 (f).

5.4. Final conference

It is foreseen to roganise a final conference at the end of the project, in order to summarise the results and evaluate the sustainability strategy. (The costs of MEF are given in Table 3-e)

6. Support Arrangements by KTH

Preparation and implementation of such a complex study program requires engagement and support from experienced Universities, professional organisations and financial institutions.
Appendix 3

Faculty of Mechanical Engineering possesses a part of the facilities needed for a new study programme and can cover part of the related costs. The students themselves will finance a part of the study costs, which shall comply with the Bosnian economic conditions. Hereby we are applying for the SIDA support that shall be given for the programme preparation and piloting and improvement of the technical infrastructure.

KTH/Division of Industrial Ecology (IE/KTH) has a broad experience in education and research in the area of Sustainable Urban Development. Since 2004 Division of Industrial Ecology runs the International Master programme in Sustainable Technology, which enrols students from all over the world. KTH has a long history of fruitful cooperation with the University of Sarajevo within EU Tempus programme. KTH was a lead partner of the Tempus project "Post-graduate study in sustainable energy engineering". Currently IE/KTH is coordinating the Tempus project "Development of Master program in Industrial Ecology in Bosnia and Herzegovina".

IE/KTH has on-going cooperation projects with municipalities in Sweden and Baltic Sea Region. Currently together with the City of Stockholm IE/KTH participates in evaluation and following up of the Hammarby Sjöstad project. IE is also preparing an application for the Interreg IVC project "Climate Neutral Urban Districts in Europe" based on the Norra Djurgårdssstaden urban development plan. IE/KTH was a lead partner of the Interreg IIIB COASTMAN project with participation of the coastal municipalities from the Baltic Sea Region. Training courses for representatives of municipalities and other stakeholders from Sweden, Germany, Finland, Estonia, Latvia, Lithuania and Russia was an important task fulfilled by IE within the project. Besides, IE conducted training courses for municipalities from Russia and Belarus in cooperation with Nacka Municipality.

Within above mentioned Tempus project IE in cooperation with the Chamber of Economy of BiH and University of Sarajevo organised a training course in waste management in April 2008. Taking into consideration good results of cooperation with University of Sarajevo and the relevant experience of IE/KTH in the area of education and research in sustainable urban development, IE/KTH will contribute to the project “Specialist study of Environmental Municipal Infrastructure, University of Sarajevo” due to the following work packages:

**WP1: Upgrading of the curriculum and study programme**

This work package is designed in order to upgrade the following components of the study program:

- Specification of the learning outcomes: The learning outcomes that the students should have achieved when they have graduated will be formulated to become a starting point for evaluation of the program/separate courses and programme advertisement among students and employers.

- The content: The proposed content of the programme will be revised to ensure that the programme provides the state of the art knowledge and linked to current needs and developments of the BiH municipalities. The programme shall demonstrate the holistic view on the sustainable urban development. The project team will decide how to reach this goal by either a separate course or a set of lectures/seminars that will describe principles and best practices of creation of the environmental programs that incorporate different sectors such as construction, transport, infrastructure and system solutions for the handling of energy, waste and water. It is essential to highlight the importance of the economical and social impacts and significance of the people lifestyle (values and attitudes towards environment) as well as stakeholders’ involvement in the urban development process. While studying a specific topic within all program courses, students must be able to refer this topic to the holistic picture of the sustainable urbanism. Besides, such areas as climate change, environmental management system, methods for conflict resolution in the urban development process as well as gender-responsible management will be incorporated in the programme. It also needs to be clearly demonstrated that the goals of the programme are reflected in the main contents, teaching and examination methods.
• Admission requirements and selection criteria: As the proposed study program refers to education on an advanced level (specialist) it will be specified which knowledge and skills the students shall have achieved at the previous educational level. This is to be a base for identification of the admission requirements and the selection criteria. Selection of students will be made with the effort to reach a gender balance.

**Activity 1.1.** Further development of the programme goal, structure, admission requirements and selection criteria

- Organisation of a 1-week Seminar at the University of Sarajevo for discussions the training needs with stakeholders and description of the programme in terms of learning outcomes, general overview of the Programme modules and separate courses.
- The Seminar will be followed by the syllabus review, support in formulation of learning outcomes from the programme/courses, review of the programme structure and evaluation of possibility to use distance learning methods; support in definition of the admission requirements and selection criteria.

KTH input: 2 person/month

**Activity 1.2.** Upgrading of the Programme content

- Review and proposal for upgrading of the programme courses
- Proposal of a new course in Sustainable Urban Development or a set of lectures/seminars that provide holistic view on the sustainable urban development

KTH input: 6 courses*1/2person/month = 3 person/month
1 new course (a set of lectures/seminars): 1 person/month
Totally: 4 person/months

**WP2: Training of teachers**
The Programme quality heavily depends on availability of the teachers with relevant competence and interdisciplinary knowledge necessary for the more comprehensive understanding of the environmental work at municipalities.
The available teaching capacity will be evaluated in order to identify missing competences both in the subject areas and modern teaching and learning methods (problem-based learning, project work in groups, role-plays, and elements of e-learning).
The teacher training will be organised due to the identified needs. The short- and long-term strategy to provide the necessary complementary competences will be developed to ensure successful introduction of the Programme and its sustainability after the end of SIDA financing period.
The final goal of the project team will be to ensure that the teacher resources are sufficient for realizing the major part of the programme with involvement of invited lecturers and experts for the well-defined tasks.

**Activity 2.1** Evaluation of teaching capacities and identification of missing competences

KTH input: 1 person/month

**Activity 2.2.** Training session in sustainable urban development and modern teaching methods for all involved teachers

KTH input: 2 person/month

**Activity 2.3.** Study visit to Sweden (1-week):
Education and research in Sustainable Urban Development at KTH; cooperation between Universities and municipalities (example of KTH and the City of Stockholm); national and
international training courses for local authorities; Hammarby Sjöstad eco-model; Käppalaverket (water treatment plant); gender-awareness projects)

KTH input: 1 person/month
The travel costs for BiH teachers shall be included in the budget

**Activity 2.4.** Intensive lecturing periods by KTH (Spring-autumn semesters 2009, spring semester 2010)

KTH input: 6 courses*2 person/week = 3 person/months

**WP3: Quality assurance (on the level of the whole programme and separate courses)**

Setting up a plan for quality assurance processes will become one of the central tasks of the project. This might include, for example:
- Development the forms and methods for course/programme evaluation
- Specification of the appropriate performance indicators to follow up the study programme
- Decision on methods for involvement of stakeholders and external experts for independent quality assessment and assurance.

**Activity 3.1.** Support of the BiH colleagues in formulation of the procedures and indicators for quality control;

**Activity 3.2.** Evaluation of the first and second years of the project involving teachers, students and stakeholders

KTH input: 3 person/month

**WP4: Dissemination and sustainability**

Involvement of the various stakeholders such as municipalities, students, companies, potential sponsors, etc in the process of the new programme design and implementation is crucial for sustainability of the project. This work package is designed to disseminate the project results among stakeholders and to ensure its sustainability.

**Activity 4.1.** Support in identification of dissemination methods and tools towards different stakeholders (municipalities, students, companies, potential sponsors)

**Activity 4.2.** Support in formulation of research projects in cooperation between academic staff involved in the programme and municipalities in order to increase quality of education through participation of the teachers and future PhD students in research projects.

**Activity 4.3.** Support in creation of the short- and long-term strategy to provide the necessary complementary competences to ensure successful introduction of the Programme and its sustainability after the end of SIDA financing period.

**Activity 4.4.** Final conference for presentation of the project results

KTH input: 3 person/month

**WP5: Project management and monitoring**

KTH will manage activities within its responsibility.

**Activity 5.1.** Coordination of the SIDA’s supported project activities
Activity 5.2. Kick-off meeting for all project partners: administrative and teaching staff. Meeting with stakeholders: municipalities and potential students

Activity 5.3. Support in acquiring lab equipment (tender procedure)

Activity 5.4. Mid-term monitoring of the project results and final monitoring with involvement of external expertise

Activity 5.5. Financial management of KTH budget

Activity 5.6. Reporting to MF

KTH input: 5 person/month

SIDA traditionally supports organising courses on Solid waste management. Solid waste management is a very important aspect of sustainable urban development and KTH has an extensive experience in education and research in this area. Proposal includes waste management course as a part of the curriculum, giving a possibility to municipalities' specialists that will be involved in SIDA projects to decide to participate in the whole specialist programme, or to take only one course in waste management.

It is necessary to find synergies with the solid waste programme – it could be achieved through joint seminars for staff retraining, or through developing themes for specialist thesis within area of solid waste management and developing case studies based on examples from Sweden and BiH. It will be a task for the project work group to ensure synergy with solid waste programme and to suggest concrete activities to SIDA or to the solid waste programme work group (what would be even more efficient).

7. Attraction of other donors

As it is mentioned earlier, the costs usually are covered by organisations in which students are employed, but often by students themselves. In some administrative units in BH certain support for making of master or specialist thesis could be approved within open competition with very limited funds. The purpose of donations is reducing of study costs as well as improvement of study conditions. Examples of improvement of the study are participation of KTH in the preparation of the study, adaptation of damaged classrooms as well as teaching of teachers. Therefore, participation of other donors in the costs covering of the study is very important.

Support will be asked for:
- Covering of the part of the costs of travel and accommodation of students coming out of Sarajevo, in order to attract students from the whole BH.
- Cooperation of donors and students on making of specialist thesis in donor's organisation.

Activities on the fund raising will start after approving of the SIDA's support. Support will be asked from relevant international organisation with offices in Sarajevo as well as development agencies of some states. Fund raising will be based on the material which will content requirements from donors. Visiting of some potential donors will be organized.

With respect to post-graduate specialist lectures, development of expert works and speciality theses proved to be an issue. It is necessary to get acquainted with mechanisms of linking leaders of various environmental projects in BH (international organisations, public administration, and economy) with post-graduates in order to gain realistic fields of research as well to financially support to the project, aimed to minimise costs which students have to cover. Thus, support from other organisations is expected and welcome. It would be included in the above mentioned support system.

8. Project Costs
The costs of creation of the new Specialist Study are relatively high. According to present BH legislation and practice, students (or their organizations) shall bear the costs of the postgraduate study, what can to be a problem. Another problem is a lack of research projects in BH that would support preparation of the specialist thesis, which leads to the situation when students develop their thesis at home using literature and statistical data. This approach is lowering overall quality of education and it does not allow students to acquire necessary skills in research work and/or solution of the real problems.

According to the practices at the Mechanical Engineering Faculty in Sarajevo the costs of specialist study per student consist of:
- Tuition fee (for two semesters): 1.000 €,
- Costs of specialist thesis supervision: 1.500 €, and
- Travel costs and costs of developing of specialist thesis.

Since the State does not finance this type of study programs, the costs are covered by the students’ employer or by students themselves. In BiH there are some options of support for development of master or specialist thesis or scientific work, through the open competitions with very limited funds (total sum is less then 0.01 % of GDP in B&H). The aim of this support is to decrease the study costs and to improve the study conditions.

It is very important for the project team to attract donors in order to co-finance the study costs for students, especially costs of stay in Sarajevo for students from outside the city. This would encourage students from the whole BiH to apply for the new study programme. Activities on approaching the potential donors – national and international financial institutions, local authorities and industrial companies is planned to be one of the key project activities starting from its very beginning - autumn 2008.

Multi-source financing of the new study programme is described below. It consists of students’ self-financing as well as financing of their employers (municipalities, companies and developing agencies), own funds of Mechanical engineering Faculty and funds from SIDA and other international donors:

Total costs are divided into two groups:
- costs related to KTH (covered by SIDA) and
- costs related to MEF.

Cost related to MEF would be covered from more sources:
- SIDA support
- cost covered by student themselves,
- participation by MEF and
- support by other organizations.

Budget related to KTH participation in the project – would be covered by SIDA – is given in Table 2.

KTH budget is calculated in SEK.


Using this exchange rate, the budget of KTH in EUR is € 244,430.00

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Budget of KTH activities in the Project</strong></td>
</tr>
</tbody>
</table>
Travel costs and costs of stay: Sweden - BiH

<table>
<thead>
<tr>
<th>Activity</th>
<th>Person/week</th>
<th>SEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kick-off meeting + Seminar,</td>
<td>3p*1 week</td>
<td>45000</td>
</tr>
<tr>
<td>Training session</td>
<td>3p*1 week</td>
<td>45000</td>
</tr>
<tr>
<td>Lecturing</td>
<td>7p*1 week</td>
<td>105000</td>
</tr>
<tr>
<td>Quality assurance</td>
<td>3p*1 week</td>
<td>45000</td>
</tr>
<tr>
<td>Monitoring</td>
<td>3p*1 week</td>
<td>45000</td>
</tr>
<tr>
<td>Final conference</td>
<td>3p*1 week</td>
<td>45000</td>
</tr>
<tr>
<td><strong>Totally</strong></td>
<td></td>
<td><strong>330000</strong></td>
</tr>
</tbody>
</table>

Staff costs, KTH

<table>
<thead>
<tr>
<th>WP</th>
<th>Person/month</th>
<th>Lön inkl LKP, SEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wp1</td>
<td>6</td>
<td>60000</td>
</tr>
<tr>
<td>Wp2</td>
<td>7</td>
<td>60000</td>
</tr>
<tr>
<td>Wp3</td>
<td>3</td>
<td>60000</td>
</tr>
<tr>
<td>Wp4</td>
<td>3</td>
<td>60000</td>
</tr>
<tr>
<td>Wp5</td>
<td>5</td>
<td>60000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>60000</td>
</tr>
</tbody>
</table>

**Total: staff costs + travel costs**  
1770000

4.1.3. Indirect costs (overheads)*)

<table>
<thead>
<tr>
<th>Costs</th>
<th>Amount (SEK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit costs 2009.2010, 2011</td>
<td>49 500</td>
</tr>
</tbody>
</table>

**Total costs**  
2 439 000

*) Overheads for KTH: calculations used a standard overhead rate, which is decided by KTH and the ITM school at KTH (to which it belongs). Thus, it is obliged to apply this overhead rate to all projects (both educational and research ones). In practice the actual overheads are even higher, but KTH has a precedent to use this rate to Formats projects, and it was decided to use that rate for SIDA project as well. These costs are audited on the yearly basis.

Budget of MEF participation in the Project – part would be covered by SIDA is given in Table 3.

**Table 3. Budget of MEF - part covered by SIDA financing**

<table>
<thead>
<tr>
<th></th>
<th>person/months(*)</th>
<th>amount €</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Attraction of students and their organizations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>staff costs</td>
<td>6</td>
<td>12000</td>
</tr>
<tr>
<td>travel costs</td>
<td></td>
<td>6000</td>
</tr>
<tr>
<td>advertisements and similar</td>
<td></td>
<td>1000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6</td>
<td>19000</td>
</tr>
<tr>
<td><strong>b. Establishment of system for support of making Specialist theses</strong></td>
<td>10</td>
<td>20000</td>
</tr>
<tr>
<td>staff costs</td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>travel costs</td>
<td></td>
<td>3000</td>
</tr>
<tr>
<td>material costs</td>
<td></td>
<td>25000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td>25000</td>
</tr>
<tr>
<td><strong>c. Project management,</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>co-operation with KTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(data for indicators, information, etc..)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3

<table>
<thead>
<tr>
<th></th>
<th>SIDA</th>
<th>MEF participation</th>
<th>Students participation</th>
<th>Other donors</th>
<th>TOTAL EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training and monitoring - KTH</td>
<td>2221.730</td>
<td>194.500</td>
<td>15,000</td>
<td>100,000</td>
<td>244,430</td>
</tr>
<tr>
<td>Preparing of the Study - MEF Study</td>
<td>15.000</td>
<td>15.000</td>
<td>100,000</td>
<td>130,000</td>
<td>679,430</td>
</tr>
<tr>
<td>TOTAL</td>
<td>416,230</td>
<td>15.000</td>
<td>100,000</td>
<td>130,000</td>
<td>679,430</td>
</tr>
<tr>
<td>%</td>
<td>64</td>
<td>2</td>
<td>15</td>
<td>19</td>
<td>100</td>
</tr>
</tbody>
</table>

9. Schedule

The project is starting on 1 July 2009. In the most optimistic scenario, the Study will start already in September 2009, but the project team must be sure that such an early start will not influence the programme quality. However, the programme will be started not later than January 2010, while preparation and training activities will take place already from from June 2009, before the project start.
Main Activities (MEF)

Specialist study (40 students)

- September / October 2009: First semester teaching + examinations
- October 2009: Choice of a theme for Specialist thesis
- November / December 2009: Second semester + examinations

Seminar (60 participants)

- September / October 2009: First part of the Seminar
- October 2009: Choice of themes for Expert work
- November / December 2009: second part of the Seminar

Supporting activities (KTH)

- Activity 1.1 and 5.2: in Stockholm at the beginning of the project
- Activity 1.2, 2.1, 3.1: in Sarajevo during middle – end of August 2009
- Activity 2.3: September – Dec 2009
- Activity 2.2: January – February 2010, Sarajevo
- Activity 2.4: Jan – May 2010 in BH
- Activity 3.2: After finalisation of the first year of the study
- Activity 4.1 – 4.3: Jan - Feb 2011
- Activity 4.4: March – May 2011

10. Project management

Structure of the project, including structure of financing is given in Table 5.

Table 5. Structure of project phases and financing

<table>
<thead>
<tr>
<th>Phase</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SIDA</td>
</tr>
<tr>
<td></td>
<td>KTH</td>
</tr>
<tr>
<td></td>
<td>MEF</td>
</tr>
<tr>
<td></td>
<td>MEF, other donors and students</td>
</tr>
<tr>
<td>Preparing the Study</td>
<td>Support in upgrading of MEF capacity</td>
</tr>
<tr>
<td></td>
<td>Upgrading of MEF capacity (teachers, space, equipment)</td>
</tr>
<tr>
<td></td>
<td>Preparing the Study; animation of students</td>
</tr>
<tr>
<td>Implementing the Study</td>
<td>Monitoring</td>
</tr>
<tr>
<td></td>
<td>Reporting to KTH, Final conference</td>
</tr>
<tr>
<td></td>
<td>Study, specialist and experts works</td>
</tr>
</tbody>
</table>

The project Lead Partner and main beneficiary is the Faculty of Mechanical Engineering, Sarajevo. The overall project management will be performed by the Faculty of Mechanical Engineering. Responsible person is Prof. Dr. Ejub Dzaferovic, Dean of the Faculty. MEF is responsible for reporting to SIDA.

KTH, Division of Industrial Ecology will perform management of the activities within its responsibility due to this project application. Dr. Olga Kordas will be the KTH project manager. KTH team reports to MEF.
For efficient implementation and decision making on the important issues of the project the Steering Committee will be created. The representatives of Academic and Administrative staff of MF and KTH will participate in this Steering Committee. The project team will invite several representatives of stakeholders (1-2 Municipalities) and 1 student representative when selected. The Chairman of the Steering Committee is the Dean of MEF, Vice Chairman – Director of Studies at Industrial Ecology, KTH. The Steering Committee will make decisions using consensus principle, but when necessary the democratic voting will be applied.

The project will be implemented within two years: July 1, 2009 - July 1, 2011. Additional period of six months is necessary to finalise the project activities and reporting to Sida.
Interdisciplinary post-graduate study
VOCATIONAL AND SPECIALISTIC STUDY
“MUNICIPALITY ENVIRONMENTAL INFRASTRUCTURE”

1. Background information on the Study

<table>
<thead>
<tr>
<th>Title</th>
<th>Municipality Environmental Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronym</td>
<td>EMI</td>
</tr>
<tr>
<td>Manager of the Study</td>
<td>Prof. Ejub Džaferović, Ph.D.</td>
</tr>
<tr>
<td>Professional manager</td>
<td>Prof. Aleksandar Knežević, Ph.D.</td>
</tr>
</tbody>
</table>

Interdisciplinary post-graduate study «Municipality Environmental Infrastructure» is intended to graduates who had not completed education based on Bologna process. Students may choose one of TWO modes of the study: vocational (non-formal education) and specialist study (formal education).

The study has been initiated by the international organisations in BiH. A curriculum was developed in cooperation with the institutions. The Study aims at qualification of people in the local communities to be able to apply for and to implement programmes of local environmental infrastructure (water supply, treatment of waste water, waste control, district heating) using the EU funds, after signing of Stabilisation and Association Agreement with BiH. The Study aims at awareness raising of the people who should:

- Identify the need to establish and build utility devices, installations and organisational forms,
- Draft Project description such that designing may be commenced, financing model drafted and international assistance requested,
- Lead project implementation,
- Monitor project implementation,
- Lead implemented project.
In a nutshell, the process should encompass need identification and management of utility activities, and installed into given spatial, economic, social system of the local community and country.

A candidate may choose between three Study levels:

1. Vocational study, including one semester; with module A (to be determined according to student needs) + drafting of Vocational paper. Number of lecture hours is 70-80.

2. Specialist study, including two semesters; with modules A and B + drafting of Specialistic paper. Number of lecture hours is 140 (60 ECTS credits) and specialist theses (30 ECTS credits).

Subjects on Specialist study

<table>
<thead>
<tr>
<th>Subject</th>
<th>Responsible teacher</th>
<th># hours</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PROJECT MANAGEMENT</td>
<td>Prof. Mugdim PAŠIĆ Ph.D. Faculty of Mechanical Engineering</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>2. ENVIRONMENTAL PROTECTION</td>
<td>Prof. Aleksandar Knežević Ph.D. Faculty of Mechanical Engineering</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>3. WATER MANAGEMENT IN LOCAL COMMUNITY</td>
<td>Ass. Prof. Branko VUČIJAK Ph.D. Faculty of Mechanical Engineering</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>4. EKONOMY AND ENVIRONMENT</td>
<td>Prof. Kasim TATIĆ Ph.D. School for Economics and Business</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>5. SPATIAL PLANING</td>
<td>Prof. Nihad Ćengić Ph.D. Emeritus Prof. Vlasta ŽULJIĆ Ph.D. Faculty of Architecture</td>
<td>20</td>
<td>8</td>
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<tr>
<td>6. ECONOMY OF UTILITY COMPANIES</td>
<td>Prof. Mugdim PAŠIĆ Ph.D. Faculty of Mechanical Engineering</td>
<td>15</td>
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<tr>
<td>7. LAW ON OBLIGATION</td>
<td>Prof. Abedin BIKIĆ Ph.D. Faculty of Law</td>
<td>20</td>
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<tr>
<td>8. SISTEM LOKALNE SAMOUPRAVE U BiH</td>
<td>Prof. Mirko PEJANOVIĆ Ph.D. Faculty of Political Science</td>
<td>20</td>
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<td>TOTAL</td>
<td></td>
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Lectures will be held in one week per month within the given semester. Organisation of the Study includes lodging and meals for the students, as well as Internet access during the week of lectures. Also, all day communication with teachers and lecturers will be available, as well as with public and professional institutions in Sarajevo.

All lectures (text, power point presentations and further references) will be posted on web page of the Study. Lectures will be held in the distance learning room of the Faculty of Mechanical Engineering, so it will be possible to involve teachers who will be based out of Sarajevo at the time (e.g. universities from abroad). In addition to lectures in given number of hours, field visits will be organised, as well (e.g. visit to landfill).

Final papers:

- Vocational study: Drafting requests for international assistance for construction of the installation of utility infrastructure, Project of programme realisation, etc.
- Specialist study: Detailed draftings of certain programme aspect of the basis of knowledge acquired; there is a possibility that some of the candidates, when drafting the paper, spend some months in a foreign organisation (development agency, bank, fund, etc.);
Subjects

1. PROJECT MANAGEMENT

TEAM WORK: Team and teamwork as basis for realisation of the project and role of project manager. PROJECT: Project definition. Project planning and resources necessary (material, human, financial). Project justifiability. Realisation and monitoring of project realisation. Closing and documenting project.
ENSURING QUALITY: Systems of ensuring project quality; Evaluation of project accomplishment.

2. ENVIRONMENTAL PROTECTION

ENVIRONMENTAL PROTECTION PRINCIPLES: Definition of nature and environment, protection of nature (ecology basics; biodiversity protection, strategy for protection of nature; area protection); environmental protection (protection principles; environmental impacts; sustainable development; state competencies: procedure for obtaining permits; legal obligations of the operators; Planning of environmental protection, Strategic assessment of environment; Previous assessment of impacts; environmental protection Study; Regulation of cross-border impacts, Plan for prevention of large scale accidents; Monitoring; Information System;
NATURE PROTECTION PRINCIPLES: Principles of conservation of biological and geological diversity, conditions and method of revitalisation, protection, conservation and sustainable development of landscapes, natural areas, plants, animals and their habitats, minerals and fossils and other natural components, competencies of authorities dealing with protection of nature, planning of protection of nature, general and special measures for protection of nature; categorisation of protected areas and procedure for designation and management of protected areas.

3. WATER MANAGEMENT AT LOCAL COMMUNITIES LEVEL


4. ECONOMY AND ENVIRONMENT

BUSINESS ENVIRONMENTAL ECONOMICS: 1. Operative and strategic environmental management; 2. Enterprise/organization; 3. Level of contribution of environmental protection to
company's success; Strategy – what is the company's objective, BSC: Balanced Scorecard, Management Review – assessment of the highest management;
CALCULATION OF ENVIRONMENTAL COSTS: implementation of environmental cost calculation; cost assessment of „non-products“;

5. SPATIAL PLANNING

INTRODUCTION: Knowledge about general methodology of spatial and urban planning as interdisciplinary and multidisciplinary activities. Levels of spatial and urban planning.
CRITERIA AND DOCUMENTATION: Analytical-documentation basis and its role in all-level plans. Evaluation of all spatial elements, criteria for condition assessment as basis for further planned sustainable development of the observed space. Purpose of space and necessary indications for certain functional units depending on the level of spatial unit and plan documentation. Urban functions and their impact on environment.
EUROPEAN PRACTICE: European practice through spatial planning in regional orientation of organization of space (regional infrastructure). Role of urban agglomerations (centres) in regional planning. Tendencies of decentralisation of central functions within spatial units.

6. ECONOMICS OF COMPANIES IN PUBLIC SECTOR


7. OBLIGATION LAW

INTRODUCTION: Importance of law for utility infrastructure. Preparatory activities for contract conclusion.
CONCLUSION OF CONTRACT: Negotiation phase, conclusion of contract, ensuring proper execution of obligations assumed. Failure to execute contract, improper execution and late contract execution. Fulfilment / Non-fulfilment of obligations assumed during acquisition of a company. Contract termination and contractual responsibility for damage.
CIVIL (DELICATE) RESPONSIBILITY FOR ENVIRONMENTAL PROTECTION: Preventive actions, Prohibition of damage, Request for eliminating potential damage threats, Responsibility of a company for damage caused, Responsibility of other legal entities for damage, environmental pollution as a reason for closing down activities of the company.
SPECIAL CONTRACTS: Sales contract, special sales cases, contract on rent, service contract, contract on construction.

8. SYSTEM OF LOCAL SELF-GOVERNMENT IN BOSNIA AND HERZEGOVINA

LOCAL SELF-GOVERNANCE: Beliefs of local community; Political-legal background of local self-governance; Principles of European Charter on local self-governance;
CONSTITUTIONAL AND LEGAL CONCEPT: Constitutional and legal concept of local self-governance in Bosnia and Herzegovina; units of local self-governance and their institutional
Appendix 4

structure in Federation BiH and Republic Srpska; self-governance scope and organisation of local self-governance unit; city as local self-governance unit;

DECISION MAKING: participation of citizens in decision making in public business in local self-governance unit; role of municipality council /municipality assembly in socio-economic development of the municipality; role of a mayor in the development of a municipality and city; cooperation and trans-boundary cooperation of municipalities and cities;

FUNCTIONS AND FINANCING: Local self-governance unit; municipality administration, utility departments and infrastructure;

EU HARMONISATION: Reform of local self-governance in the process of EU integration of BiH.
Interdisciplinary post-graduate study
VOCATIONAL, SPECIALISTIC AND MASTER STUDY
“MUNICIPALITY ENVIRONMENTAL INFRASTRUCTURE”

1. Background information on the Study

Title: Municipality Environmental Infrastructure  
Acronym: EMI  
Manager of the Study: Prof. E jub Džaferović, Ph.D.  
Professional manager: Prof. Aleksandar Knežević, Ph.D.  

Interdisciplinary post-graduate study «Municipality Environmental Infrastructure» is intended to enrolle students who graduated according to pre-Bologna process programme, as well as those who graduated at three or four year (first cycle) study programme according to Bologna process. Students may choose one of THREE modes of the study: vocational (non-formal education), specialist study (formal education) and master study (formal education).

The study has been initiated by the international organisations in BiH. A curriculum was developed in cooperation with this institutions. The Study aims at qualification of people in the local communities to be able to apply for and to implement programmes of local environmental infrastructure (water supply, treatment of waste water, waste control, district heating) using the EU funds, after signing of Stabilisation and Association Agreement with BiH. The Study aims at awareness raising of the people who should:

- Identify the need to establish and build utility devices, installations and organisational forms,
- Draft Project description such that designing may be commenced, financing model drafted and international assistance requested,
- Lead project implementation,
- Monitor project implementation,
- Lead implemented project.
In a nutshell, the process should encompass need identification and management of utility activities, and installed into given spatial, economic, social system of the local community and country.

A candidate may choose between three study levels:
1. Vocational study, including one semester; Vocational study consists courses of first and second semester according to student needs. Number of lecture hours is 70 - 80.
2. Specialist study, including two semesters; Specialist study consists first and second semester courses + specialist theses. Number of lecture hours is 145 (60 ECTS credits) and specialist theses (20 ECTS credits).
3. Master study, including three semesters; Master study consists first, second and third semester courses + master theses. Number of lecture hours is 205 (90 ECTS credits) and master theses (30 ECTS credits).

First semester courses:
1. Project management
2. Environmental protection
3. Energy management in local community
4. Water management in local community

Second semester courses:
5. Sustainable spatial planing
6. Indicators and tools for sustainable development
7. Waste management
8. System of local self-government

Third semester courses:
9. Environmental measuring and monitoring
10. Renewable energy resources
11. Environmental impact assessment

Table: Vocational, Specialist and Master study courses

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<th>Course</th>
<th>Responsible teacher</th>
<th>Class hours</th>
<th>ECTS</th>
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<tbody>
<tr>
<td>1. PROJECT MANAGEMENT</td>
<td>Prof. Mugdim PAŠIC Ph.D. Faculty of Mechanical Engineering Sarajevo</td>
<td>20</td>
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<tr>
<td>2. ENVIRONMENTAL PROTECTION</td>
<td>Prof. Aleksandar Knežević Ph.D. Faculty of Mechanical Engineering Sarajevo</td>
<td>15</td>
<td>7</td>
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<tr>
<td>3. ENERGY MANAGEMENT IN LOCAL COMMUNITY</td>
<td>Prof. Miroslav Bobrek Ph.D., Faculty of Mechanical Engineering Banja Luka</td>
<td>20</td>
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<td>4. WATER MANAGEMENT IN LOCAL COMMUNITY</td>
<td>Ass. Prof. Branko VUČIJAK Ph.D. Faculty of Mechanical Engineering Sarajevo</td>
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<tr>
<td>5. SUSTAINABLE SPATIAL PLANNING</td>
<td>Ass. Prof. Nihad Čengić Ph.D. Faculty of Architecture Sarajevo</td>
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<tr>
<td>6. INDICATORS AND TOOLS FOR SUSTAINABLE DEVELOPMENT</td>
<td>Prof. Aleksandar Knežević Ph.D. Faculty of Mechanical Engineering Sarajevo</td>
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<td>7. WASTE MANAGEMENT</td>
<td>Ass. Prof. Senad Oprašić Ph.D.,</td>
<td>20</td>
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Appendix 5

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<tr>
<th>8. SYSTEM OF LOCAL SELF-GOVERNMENT</th>
<th>University of Sarajevo</th>
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<tr>
<td>Prof. Mirko Pejanović Ph.D., Faculty of Political Science Sarajevo</td>
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<tr>
<th>9. ENVIRONMENTAL MEASURING AND MONITORING</th>
<th>University of Sarajevo</th>
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<td>Prof. Ejub Džaferović Ph.D., Faculty of Mechanical Engineering Sarajevo</td>
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<tr>
<th>10. RENEWABLE ENERGY RESOURCES</th>
<th>University of Sarajevo</th>
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<tr>
<td>Prof. Ejub Džaferović Ph.D., Faculty of Mechanical Engineering Sarajevo</td>
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<tr>
<th>11. ENVIRONMENTAL IMPACT ASSESSMENT</th>
<th>University of Sarajevo</th>
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<tr>
<td>Prof. Tarik Kupusović Ph.D., University of Sarajevo</td>
<td>20 8</td>
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Specialist theses 20
Master theses 30

Courses outline

1. PROJECT MANAGEMENT

Project as lateral organisational link – dynamic aspect of organisational structure and relation to static aspect. Project and matrix organisation – method of functioning of matrix organisation. Team and teamwork as basis for realisation of the project and role of project manager. Project definition. Project planning and resources necessary for project (material, human, financial). Project justifiability. Realisation and monitoring of project realisation. Systems of ensuring quality of project Closing and documenting project. Evaluation of project accomplishment.

2. ENVIRONMENTAL PROTECTION

BASIC PRINCIPLES: Definition of nature and environment; Nature protection (basic of ecology; preserving of biodiversity, strategy of nature protection; proceting of areas); Environmental protection (principles, environmental impacts; Sustainable development

ENVIRONMENTAL PROTECTION: Principles of emission regulation and principles of planning ambiental air quality in urbanoj area, monitoring (register of polutants, emission ckecking, air quality monitorong).

RESPONSIBILITY OF AUTHORITIES: procedure of geting permits; Legal obligations of operatere; Planing of protection of environment, Strategic environmental assessment; Environmental impact assessment; Plan of preventing tomajor desaster; Monitoring; Public information sistems;

PRINCIPLES OF NATURE PROTECTION: Principles of preseving bio- and geo- diversity, Terms and method of restoration, protection, conservation and sustainable development of landscapes, natural areas, plants, animals and their habitats, minerals and fossils, and other components of nature, bodies which exercise jurisdiction nature protection, nature conservation planning, general and special measures for the protection of nature; categorization of protected areas and the proclamation of the way and protected areas management.

3. ENERGY MANAGEMENT IN LOCAL COMMUNITY

Holistic resource management as a process directed towards attaining goals in three areas: Quality of life, Production, Natural resources preservation; Managing for sustainability — A quality management approach; Energy management, scope, principles, indicators; Energy economy, cost management; Reference Energy System (RES); Primary energy resources, cogeneration; Integrated...
Energy and Environmental Modelling and LEAP Application; Balanced scorecard in energy management.

4. WATER MANAGEMENT AT LOCAL COMMUNITIES LEVEL


5. SUSTAINABLE SPATIAL PLANNING

INTRODUCTION: Knowledge about general methodology of spatial and urban planning as interdisciplinary and multidisciplinary activities. Levels of spatial and urban planning.

CRITERIA AND DOCUMENTATION: Analytical-documentation basis and its role in all-level plans. Evaluation of all spatial elements, criteria for condition assessment as basis for further planned sustainable development of the observed space. Purpose of space and necessary indications for certain functional units depending on the level of spatial unit and plan documentation. Urban functions and their impact on environment. Traffic in spatial planning.

EUROPEAN PRACTICE: European practice through spatial planning in regional orientation of organization of space (regional infrastructure). Role of urban agglomerations (centres) in regional planning. Tendencies of decentralisation of central functions within spatial units.

6. INDICATORS AND TOOLS FOR SUSTAINABLE DEVELOPMENT

INDICATORS OF SUSTAINABLE DEVELOPMENT: Indicators of development at the state level (GDP (real, PPP) GNI. HD, ESI); indicators of sustainable development at local community level (economic indicators: income per capita, employment, electricity consumption per capita, the percentage of dwellings with connection to town water and sewerage connection).

ECONOMIC INSTRUMENTS: importance and role of economic instruments: Definitions; EI versus command and control approach; EI Types: Fees/taxes on pollution; fees/taxes on products, fees/charges to customers, deposit-refund systems; License which can be traded; guarantee against damage to the environment; payment for damages; Subsidies;

ECONOMIC INSTRUMENTS IN BiH: EI in the water sector; EI in the air protection sector; EI in the transport sector; EI in the field of solid waste; EI in the field of land use, forestry and agriculture; Other EI;

FUNDS: Funds for environmental protection, information system, monitoring, funding of nature protection
7. WASTE MANAGEMENT


WASTE MANAGEMENT STRATEGY: regional concept, aims and measures, task of local community in the process of implementation waste management startegy

ROLE OF LOCAL COMMUNITY: legal aspects (responsibilities, planing, environmental permitting, obligation of operators, waste data and waste register management), contents and operational planing, role of operational waste plan and local development plan, implementation of regional concepts at local level, financial aspects of waste management.

POSIBLE CONCEPTS: waste separation on situ, waste transfer stations, pre-tretements of the waste.

8. SYSTEM OF LOCAL SELF-GOVERNMENT

LOCAL SELF-GOVERNANCE: Beliefs of local community; Political-legal background of local self-governance; Principles of European Charter on local self-governance;

CONSTITUTIONAL AND LEGAL CONCEPT: Constitutional and legal concept of local self-governance in Bosnia and Herzegovina; units of local self-governance and their institutional structure in Federation BiH and Republic Srpska; self-governance scope and organisation of local self-governance unit; city as local self-governance unit;

DECISION MAKING: participation of citizens in decision making in public business in local self-governance unit; role of municipality council /municipality assembly in socio-economic development of the municipality; role of a mayor in the development of a municipality and city; cooperation and trans-boundary cooperation of municipalities and cities;

FUNCTIONS AND FINANCING: Local self-governance unit; municipality administration, utility departments and infrastructure;

EU HARMONISATION: Reform of local self-governance in the process of EU integration of BiH.

OBLIGATION LAW; Conclusion of contract: Negotiation phase, conclusion of contract, ensuring proper execution of obligations assumed. Failure to execute contract, improper execution and late contract execution. Fulfilment / Non-fulfilment of obligations assumed during acquisition of a company. Contract termination and contractual responsibility for damage.

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SPECIAL CONTRACTS: Sales contract, special sales cases, contract on rent, service contract, contract on construction.

9. ENVIRONMENTAL MEASURING AND MONITORING

Land and water investigation techniques; Investigation strategies; Formulation of monitoring programmes; Applied measurement techniques for dynamic and static processes; Flow measurements Field sampling techniques; Groundwater sampling and hydraulic field tests; Physical properties of soil and water; Air pollution measurements techniques; Evaluation techniques; Statistical methods for time series and spatial analysis; Modelling of geophysical data; Evaluation of hydraulic tests.
10. RENEWABLE ENERGY RESOURCES

Different sources of primary energy and their environmental impact. Utilisation of energy in the present day society. Fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels. Use of solar (thermal and photovoltaic), hydropower, wind, geothermal, tidal and geothermal energy, as well as energy from biomass. The use of fuel-cell and heat pump systems is dealt with. Issues relevant to energy efficiency and energy storage are discussed. The potential of using renewable energy technologies as a complement to, and, to the extent possible, replacement for conventional technologies, and the possibility of combining renewable and non-renewable energy technologies in hybrid systems are analysed - utilizing local energy resources (renewable and non-renewable) to achieve the sustainable energy system. Strategies for enhancing the future use of renewable energy resources are presented. Lectures/presentations are given by both program specialists and experts from relevant fields of industry and research. A visit to a modern renewable energy plant/facility is arranged for the on-course. Students are advised to arrange visits to power plants using renewable energy that is close to their location.

11. ENVIRONMENTAL IMPACT ASSESSMENT

Interaction between human activities and natural or man-made systems and links to the concept of environmental sustainability and to Environmental Impact Assessment (EIA) procedures. Strategic EIA and project EIA. EIA procedure. Key principles of the EIA process. EIA trends and practices in an international and specifically EU perspective. Terminology and methods used in EIA. Role of EIA in relation to the planning and decision-making process. Methodological issues related to the performance of EIA. Screening and scoping of an EIA, based on existing requirements. Quality requirements concerning the EIA process. Interdisciplinarity in relation to the performance of EIA. Critical quality review of an EIA. Interpreting EIA and translating its conclusions into actions.