



University of Sarajevo  
Mechanical Engineering Faculty

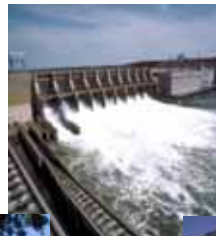


International Master of Science Program  
Sustainable Energy Engineering



# International Master of Science Program

## Sustainable Energy Engineering



### Study in Bosnia and Herzegovina



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## INTERNATIONAL MASTER OF SCIENCE PROGRAMME: SUSTAINABLE ENERGY ENGINEERING

Master of Science Degree Program in Sustainable Energy Engineering (MSc SEE) is an international Master of Science Degree Program that includes a strong environmental focus: Sustainable Energy Utilization in the Built Environment and Sustainable Power Generation.

The program is carried out by the Department of Energy and Process Engineering, at the Faculty of Mechanical Engineering, University of Sarajevo, within the Tempus Joint European Project in a close co-operation with the Royal Institute of Technology, Stockholm, Sweden, which has already successfully established the international SEE program similar to the present one, as well as with other consortium member universities: University of Mostar, University of Banja Luka, Bosnia and Herzegovina; University of Dublin, Ireland and City University of London, United Kingdom.

Project Director: **Prof. Ejub Džaferović, PhD**

Project Coordinator: **Nijaz Delalić, MSc**

Secretary: **Sadjit Metović, MSc**



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### **Mechanical Engineering Faculty Sarajevo, University of Sarajevo, (US - MEF)**

is the oldest and largest faculty in this field in Bosnia and Herzegovina. Mechanical Engineering Faculty in Sarajevo was founded in 1958 and for more than ten years was the only mechanical engineering faculty in Bosnia and Herzegovina, educating mechanical engineers not only for Bosnia and Herzegovina, but for some other parts of ex-Yugoslavia republics.

After several years of development five departments were established: 1) Department for manufacturing technologies, 2) Department for special technologies, 3) Department for power engineering and processing techniques, 4) Department for internal combustion engines and vehicles and 5) Department for wood processing technologies. Beside the undergraduate study (Dipl. ing. or Graduated Mechanical Engineer), the postgraduate study was organized periodically.

The Mechanical Engineering Faculty had 170 employees before the aggression, out of which academic staff consisted of 110 professors and assistants covering over hundred subjects at undergraduate level and number of subjects at post-graduate study. Professors from the other universities, including those from EU and North American universities were also teaching at postgraduate study organized by Mechanical Engineering Faculty in Sarajevo.

Mechanical Engineering Faculty had good cooperation with other mechanical engineering faculties in Bosnia and Herzegovina helping them in foundation and development, through establishment of courses and with visiting professors. Very successful cooperation was established with faculties and universities from other countries, as well, resulting in exchange of staff and work on joint projects.

The Department of Energy and Process Engineering offer the International Master of Science Degree Program in Sustainable Energy Engineering (MSc SEE) which provides basic and advanced state-of-the-art education in the fields of power generation and energy utilization in both economically and environmentally sustainable way.



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**The Department of Energy and Process Engineering** offer the International Master of Science Degree Program in Sustainable Energy Engineering (MSc SEE) which provides basic and advanced state-of-the-art education in the fields of power generation and energy utilization in both economically and environmentally sustainable way.

### **Consortium members involved in the realization of the MSCEE program**

(carried out within the Tempus Joint European Project)

#### **The Royal Institute of Technology (KTH)**

The Royal Institute of Technology (Kungl Tekniska Högskolan –KTH) was founded in 1827 and is the largest of Swedish technical universities. KTH is responsible for one-third of Sweden's capacity for engineering studies and technical research at post-secondary level. KTH is an international institution with established research and educational exchanges all over the world, especially in Europe, the USA, Australia and South-East Asia. The University conducts top-notch education and research of a broad spectrum – from natural science to all branches of technology, including architecture, industrial economics, urban planning, work science and environmental technology. KTH is especially strong in the field of Sustainable Energy Engineering. It has two special Master programs taught in English in this field. Sustainable Energy Engineering is the program that is closest to this proposal and will be very important for the present project.



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### University College of Dublin

University College of Dublin (UCD) traces its origins to the Catholic University of Ireland founded in 1854 with Cardinal John Henry Newman, author of the celebrated 'The Idea of a University', as its first rector. Since then the University has played a central role in Ireland's advancement as a dynamic and highly successful European state and, in addition, has educated generations of international students from over 50 countries. Today UCD is a vibrant modern university with 11 faculties and over 20,000 students situated on a beautiful leafy campus at Belfield, 4km to the south of the centre of Dublin. UCD today is a research-intensive university where we strive to advance knowledge through cutting-edge research and to communicate knowledge through excellence in teaching within a creative and collegial environment. Through innovative links in Ireland and abroad UCD has exciting educational and research partnerships and collaborations with other academic, industrial and not-for-profit organisations. UCD's staff and students influence the fabric of Ireland's cultural, social and economic development through a range of extramural activities.



### City University London, School of Engineering,

City University was founded in 1894 as the Northampton Institute and awarded full university status in 1966. It has almost 11,500 students from 153 countries who benefit from the University's internationally renowned experience of more than one hundred years' of teaching and learning. City's graduate employment record continues to be one of the best in the country and friendly staff help to make it a pleasant place to work and study. Dynamic research activity across all schools and institutes, including substantial interdisciplinary work, underpins City's distinctive position as the University for business and the professions. More information about the University can be found at <http://www.city.ac.uk>. The School of Engineering and Mathematical Sciences has its origins in the Northampton Institute of Technology, founded in 1894. With some 1300 students and 100 staff, the school offers first class education and research in a carefully selected number of niche areas in engineering and the mathematical sciences. Our balanced portfolio of undergraduate and postgraduate courses is informed by relevant research activities in the following key areas; advanced industrial applications for transportation, applied mathematics, construction processes, instrumentation and sensors, systems and control. All the MEng and BEng courses are accredited by the relevant professional bodies and provide a foundation for and exemptions from the route to Chartered Engineer (CEng) status. Many of the courses in the school's thriving postgraduate programme have been developed in consultation with industry, and they are offered part time as well as full time to allow students to update their education, while remaining in employment.



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### **Faculty of Mechanical Engineering, University Džemal Bijedić of Mostar**

The Faculty of Mechanical Engineering in Mostar was founded on 11 November 1959 as a two-year School of Mechanical Engineering. In 1968 it became part of University of Sarajevo – the only existing University at the time. In 1975, a decision was made that the Department of Mechanical Engineering should be separated from the Faculty of Mechanical Engineering of Sarajevo, and then founded as an independent Faculty. There are about 200 students at Faculty of Mechanical Engineering and teaching process is performed by 29 professors and assistants. The Faculty offers two-year and four-year degrees, as well as master's and doctoral degrees. Postgraduate study lasts four (4) semesters or two years. The Faculty has cooperation with several foreign universities: Paderborn – Germany (regular students exchange), Liege – Belgium, Barcelona – Spain, etc.

### **Faculty of Mechanical Engineering, University of Banja Luka**

The University of Banja Luka was established on 7th November 1975. In relation to European universities comprehensive cooperation will be developing in order to adopt modern criteria in appraisal and estimation the quality of teaching process. The University of Banja Luka is a CRE (The Counselor of Real Estate) member. Since 1996 we have made a significant number of international contacts, most of them within the frameworks of various TEMPUS projects. The undergraduate studies at the Faculty of Mechanical engineering at each department (course, sub course) last for ten semesters. When entering the studies in Mechanical Engineering, a student is due to enroll in one of the departments for Production Engineering, Departments for Energy and Process Engineering, Departments for Motor Vehicles and Department for Occupational Health and Fire Prevention. The department for Energy and Process Engineering has a long tradition in research of the Thermotechnics and Fluid mechanics areas, heating and turbo machines, pumps and ventilators.



## OBJECTIVES

Consisting of introductory general courses followed by two majors with advanced courses, the MSc SEE program provides a basic and an advanced state-of-the-art education in the fields of power generation and energy utilization in the built environment by means of economically and environmentally sustainable systems and technologies. The program is focused on the technical and economic aspects of application of both conventional and renewable energy technologies as well as of relevant policies and practices with the final aim of providing and utilizing energy at the least financial, environmental and social costs. Advanced methods are to apply to the practical design and modeling of thermal systems, the construction of relevant devices, as well as to their performance evaluation during operation and the assessment of environmental impact. Through various project work assignments carried out in collaboration with experts from companies, services and enterprises, students will have an opportunity to obtain proficiency in solving real problems. The MSc SEE program includes a number of study visits to power and refrigeration plants, factories and other facilities relevant to the program objectives in both Bosnia and Herzegovina and neighboring countries. Advanced lecturing in terms of distance learning is arranged with the partner universities.

Total duration of the taught courses is 9 months corresponding to 60 ECTS credits (one week of part time studies corresponds to 1 ECTS credits) followed by six months reserved for thesis project work accounting for 30 ECTS credits. The program is offered to applicants from all over the world with a suitable academic background i.e. degrees equivalent to 8 semesters of study, at least. The program language is English. Successful completion of the program leads to obtaining the degree of *Master of Technical Science*.

### Course Program

The program consists of an core and elective modules comprising general courses from two major fields: Power Generation and Energy Utilization dealing with the corresponding basic issues. In addition, an introduction to the Renewable Energy Technology is provided in this part.

After completing the general courses, students will have option to choose between two study majors comprising a number of advanced courses with a strong environmental focus: Sustainable Energy Utilization in Built Environment and Sustainable Power Generation. The work in the subsequent part of the program is devoted to the thesis project with a task relevant to the attended major.



## I semestar

Core modules
1. Basics of Energy Technology
2. Sustainable Energy Generation
3. Modern Energy Utilisation
4. Advanced and Renewable Energy Sources

### Elective modules

- |  |
|--|
| 1. Applied Refrigeration and Heat Pump Technology          |
| 2. Machines and Equipment in Power and Process Engineering |

## II semestar

Core modules
1. Applied Energy Technology
2. Energy Management

### Elective modules

- |   |
|---|
| 1. Climate Comfort                                |
| 2. Selected Topics in Nuclear Power Engineering   |
| 3. Clean Coal Technology                          |
| 4. Measurements in Power and Process Technology   |
| 5. Computer Simulation and Modelling of Processes |
| 6. Energy and Environment                         |
| 7. Applied Heat and Power Technology              |

## Thesis project

A principal scheme of the programme courses is given above.

After completing the general courses, students will have option to choose between two study majors comprising a number of advanced courses with a strong environmental focus: Sustainable Energy Utilization in Built Environment and Sustainable Power Generation. The work in the subsequent part of the program is devoted to the thesis project with a task relevant to the attended major.



## I SEMESTAR

### Core modules

#### 1. Basics of Energy Technology, 6 credits

This course aims at providing an introduction to and overview of the broad field of energy technology. A condensed cross section of essential engineering concepts/principles from the domain of thermodynamics and heat transfer is provided, including a review of the concepts of energy and power, energy conversion, energy efficiency, reversible and irreversible processes, and basic thermodynamic cycles. An overview of global energy resources is given, leading to a historic review of human energy use and power generation. Society's energy demands and the pertinent energy flows are analyzed from the perspective of different sectors, including industry, households, transport, agriculture, as well as commercial and public sectors in B&H and international perspective. The significance of power generation and energy utilization is analyzed as relevant to GDP, living standard, associated socio-economic issues and development. The significance of measurements in energy technology is described and temperature and pressure measurement basics are given.

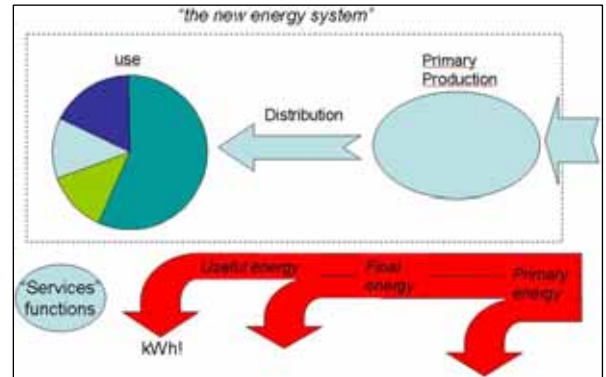
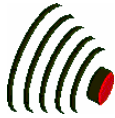
The importance of energy efficiency and conservation within the context of future energy supply is dealt with from a life-cycle and environmental perspective (with regard to emission control/reduction, global warming, international environmen-

tal laws/regulations and goals, etc.).

#### 2. Sustainable Energy Generation, 6 credits

The objective of this course is to discuss energy-efficient and environmentally compatible power generation systems. The introductory section includes an overview of heat and power technologies, followed by an analysis of the most significant heat and power generation technologies, including those based on steam and gas turbine cycles, as well as combined steam and gas cycles. The course also provides a general overview of non-combustion-based (renewable) power generation technologies, including those based on the exploitation of wind, hydro, solar and geothermal resources.

This section deals with the choice of materials, fuel cycles, control systems, and particularly, environmental and safety related issues. The course includes study visits to relevant industries and plants, as well as laboratory exercises.

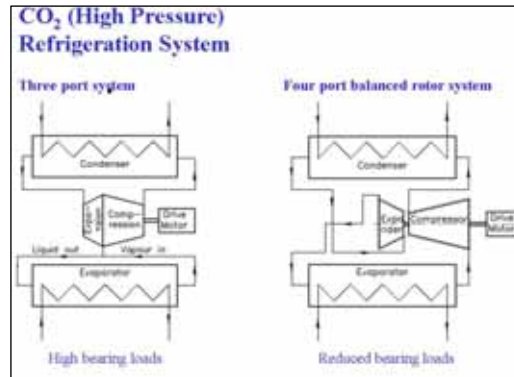


### 3. Modern Energy Utilisation, 6 credits

The objective of this course is to discuss the codes of sustainable practice in energy utilization in built environment. A broad range of technologies used for space conditioning regarding thermal comfort, as well as cooling, both for space and technological purposes, are studied. A part of the course deals with refrigeration and heat pump technology, their theoretical standpoints and application development, both compressor and absorption driven systems and plants, refrigerating storage organization, cold chain for food product treatment, storage and distribution. The other part of the course gives an overview of HVAC (heating, ventilation and air-conditioning) systems. The main principles of the heating and cooling load calculations and psychometrics will be studied and discussed. Particular focus will be on hydronic heating system design and energy conservation.

### 4. Advanced and Renewable Energy Sources, 6 credits

The purpose of the course is to give an overview of the most significant renewable energy resources and state-of-the-art technologies and their application. The use of solar (thermal and photovoltaic), biomass, wind, hydro, geothermal, hydrogen, wave and tidal energy are discussed through the course as well as fuel-cell and heat pump applications. The possibilities for combining renewable and conventional technologies are presented from the point of view of the future utilization of renewable energy technologies. Project work is focused on designing combined systems based on renewable energy technologies for various purposes and possibilities for their application instead of conventional ones. The course includes a study visit to built facilities and laboratory installations.



## Elective modules

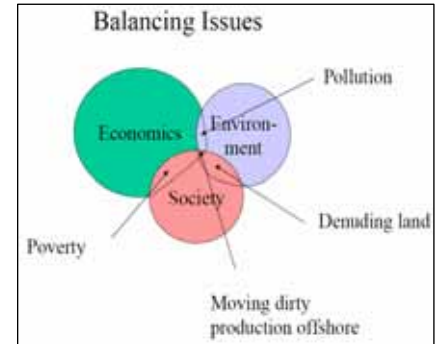
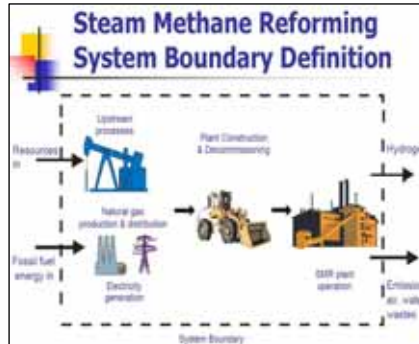
(students should take 1 of 2 elective modules)

### 1. Applied Refrigeration and Heat Pump Technology, 6 credits

The aim of the course is to provide advanced knowledge in the field of refrigeration and heat pump technology. A wide range of different refrigeration processes, refrigeration machinery and plant designs are dealt with in lecture and seminar format. The present status concerning the development of new refrigerants, as well as advanced refrigeration processes are discussed. Methodologies used in computing the cooling load, as well as in optimizing insulation thickness and different mechanical components are analyzed. Design and optimization of heat pump plants, including heat sources for such plants are dealt with in detail. Air-conditioning systems, ice banks and sorption processes are covered. Testing methods and safety standards for refrigeration systems are discussed in class and in laboratory exercises. The course also includes study visits and seminars given by experts.

### 2. Machines and Equipment in Power and Process Engineering, 6 credits

Full details models of positive displacement compressors including descriptions of geometric models, models of the thermo-fluids processes of admission, compression and discharge, including leakage and fluid injection, pressure load calculations, performance analysis and parametric studies. The course consists of lectures, handouts and model software and participants will be given the opportunity to carry out hands on design studies under the direction of the course tutors, using the software supplied.



## II SEMESTAR

### Core modules

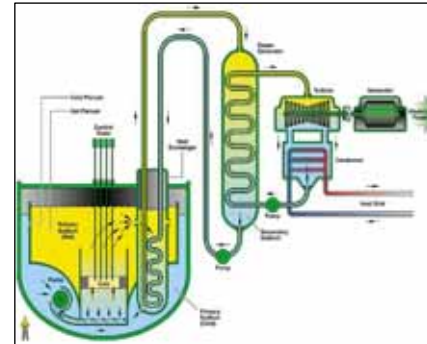
#### 1. Applied Energy Technology, 6 credits

The aim of this course is to provide the participants with an opportunity for specializing in an area of energy engineering of particular interest by taking part in a project carried out in close cooperation with the industry. The project typically deals with a specific real-life situation in which sustainable energy solutions are to be applied. The project is generally carried out on a task within the domain of the chosen study major (SEU or SPG). The knowledge/information required for dealing with the specific task is acquired by complementary lectures and literature studies.

#### 2. Energy Management, 6 credits

This course aim is to give some answers to a very broad question: What is Energy Management? System thinking as a powerful tool is introduced to give some answers about energy systems and system analysis. This ranges from very limited and quantifiable system descriptions to the so called socio-technical systems. The ability to formulate a system and "the problem" at various levels of complexity will be discussed.

This course provides training in forecasting and developing the strategies and settings required for managing and promoting the advancement and use of economically and environmentally sustainable energy systems and technologies. The issues discussed include energy system analysis, methods for evaluating system efficiency (energy and pinch analysis, as well as static and dynamic energy balances, life-cycle analysis), energy economics (investment analysis, life-cycle cost, choice of technology as related to pay-off requirements), use of information technology in energy engineering, strategies for introducing and disseminating emerging technologies, knowledge formation in energy technology. The course is based on the analysis and discussion of a series of relevant case studies. The issues discussed include power generation and distribution technologies, energy utilization in built environment, energy technology development strategies, project management, as well as the related social and international aspects. The course includes invited lectures given by experts in relevant fields from both industry and administration. Practical projects are performed in group work.



## Elective modules

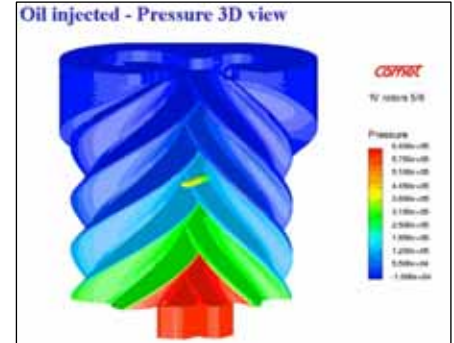
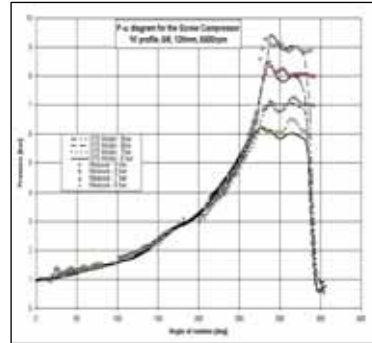
(students should take 3 of 7 elective modules)

### 1. Climate Comfort, 6 credits

The objective of this course is to provide a thorough understanding of different heating, ventilation and air-conditioning (HVAC) system designs and how these systems affect thermal comfort and air quality indoors. Thermal comfort and space conditioning are analyzed against the background of human physiological requirements for different indoor environments (dwellings, industries, offices, etc.). Ventilation demand and ventilation effectiveness are discussed as determined by requirements of pollutant and heat removal in different indoor environments. The course gives basics in duct sizing and air distribution elements. An overview of equipment characteristics will be presented. Methods for estimating/calculating the energy flows required for achieving specific levels of thermal comfort and air quality are analyzed as relevant to energy management in built environment. The course covers the latest technology in energy efficiency practices in built environments and passive systems.

### 2. Selected Topics in Nuclear Power Engineering, 6 credits

The purpose of this course is to provide in-depth knowledge in reactor technology and basic proficiency in reactor safety. The essential differences between “thermal” and “fast” reactors are discussed against the background of the advantages and shortcomings of different types of reactors. The concept of moderation in thermal reactors, and the choice of appropriate moderator materials are discussed. The influence on core construction of moderator material choice is analyzed. A number of important problems within the domain of reactor physics are discussed, including essential methodologies for computing core-physical processes. “Internal fuel cycles” are dealt with, as relevant to both fast and thermal reactors.



### 3. Clean Coal Technology, 6 credits

Elements of the clean coal utilization: Coal pre-treatment, high-efficiency coal-combustion technologies, flue gas processing and treatment, desulphurization, DeSOxing and DeNOxing, CO<sub>2</sub> sequestration, combined steam/gas cycles and technologies, topping cycles and technologies (gasification, pressurized fluidized bed), biomass and other alternative fossil fuels, oil shells, methane hydrate. Low temperature combustion, combustion staging. Efficient cleaning of the heat transfer surfaces.

### 4. Measurements in Power and Process Technology, 6 credits

Measurement Systems. Signal Characteristics. Monitoring. Instruments. System accuracy. Pressure measurements. Temperature measurements. Radiation. Level and Flow measurements Density and weight measurements. Viscosity. Gas analyzers. Humidity and moisture measurements. Concentration of solid and liquid particles. Data signal processing. Microprocessor-based transmitters and measuring instruments.

### 5. Computer Simulation and Modelling of Processes, 6 credits

Flows and flow conditions relevant for energy and process engineering. Mathematical models describing these flows. Finite volume discretization of the mathematical model. Introduction to a simple 2D CFD open source software. Solution of some simple problems. Introduction to a commercial CFD software. Simulation and analysis of some typical flow configurations and patterns.



## 6. Energy and Environment, 6 credits

The aim of this course is to give an overview of the influence of power generation on the pollution of air, water and land, especially by the use of fossil fuel. The impact on the atmosphere of the different power generation types is discussed. An overview of the global energy situation, energy impact, as well as the processes and technologies for environmental protection are given as follows: Composition and properties of atmosphere; Global energy balance - Greenhouse effect; Greenhouse gases and Global Warming Potential GWP; Ozone in stratosphere -balanced formation and decomposition; Catalytic decomposition processes of ozone, Ozone Depletion Potential ODP; Sources of air pollution; Photochemical processes in troposphere -smog; Acid formation; Air quality standards; Thermal pollution. Environmental impact of energy transformation (Processes - control systems): Formation and control of pollutants in power plants; Techniques for separation of suspended particles in flue gases; Desulphurization processes; Catalytic  $\text{NO}_x$  reduction processes; Exhaust gases from internal combustion engine - Catalytic converters; Sources and characteristics of power plant wastewaters; Wastewater treatment processes; Power plants and hazardous waste; Technical mitigation methods available at various stages of the cycle are presented and analyzed, both from the stand-

points of the generation as well as utilization. Finally, legal and economic tools for energy policy are presented, including international agreements and programs, as well as economic mechanisms.

## 7. Applied Heat and Power Technology, 6 credits

This course aims at providing in-depth knowledge of a broad array of heat and power technologies, including a detailed discussion of relevant power plant components, as well as typical applications in industry and heat generation. Plant components, including gas turbines, steam turbines and condensers, are discussed in detail. Measurement techniques used in thermal systems are analyzed. State-of-the-art heat and power technology is dealt with as relevant to both industrial and district heating applications. Different types of power plants are presented in detail, including combined cycle plants where a variety of different technologies can be applied.

Special attention is given to combined gas and steam plants. The performance of different types of cycles is discussed, including the performance of a variety of novel cycles. The course includes laboratory exercises and an applied project assignment.



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### Thesis project

After completing all course work the final thesis project will be proposed and assigned to the students within the domain of sustainable energy engineering and conducted under the guidance of an advisor from the program as well as an external advisor from the country in which the thesis project is going to be carried out. A certain number of thesis projects will be offered to students to be performed within the consortium member universities, which can possibly ensure financial support in cooperation with industry. The project may be carried out at a university, research institute or in a non-academic setting such as a power plant, energy consulting company, research and/or development department in a factory, or other industry/business. Students are encouraged to define topics on their own, preferably the ones related to the energy engineering problems arising from the specific conditions and requirements in the student's home country. The work on the thesis should be performed within a period of 5-6 months during which student is expected to regularly inform the advisor about the project progress.

Completed thesis will be formally presented / defended in front of a committee consisting of the project advisors and invited referees. The presentation can take place either at MEF-US in Sarajevo or at any other location (e.g. student's home country) if this is more convenient to the parties involved.

Upon successful completion of the program and defense of the thesis project student is awarded by MEF-US the degree of Master of Technical Science.



## ADMISSION REQUIREMENTS

### **Eligibility**

Applicants interested in being considered for admission need to have academic backgrounds in disciplines relevant to the study major of interest, and are required to substantiate their keen interest in continuing their careers in areas relevant to sustainable energy engineering. Suitable academic backgrounds include mechanical engineering, applied physics, and areas of electrical/chemical engineering relevant to power generation/distribution, and/or energy utilization. Applicants should hold Bachelor of Science (BSc), or Bachelor of Engineering (BEng) degrees in relevant disciplines - or documented equivalents thereof. Equivalency will be evaluated at the discretion of the Programme Administration, based on academic achievements and profile, as well as pertinent professional experience.

It is imperative that applicants have a sound knowledge of basic engineering sciences, including engineering thermodynamics, heat transfer, fluid dynamics, mathematics and numerical methods. Since male students are traditionally most numerous represented in this field of studies, female candidates are especially encouraged to apply for enrolment.

### **Knowledge of English**

You are expected to be proficient in English before you arrive in Bosnia and Herzegovina. A sound and documented knowledge of written and spoken English (equivalent to a minimum TOEFL-score of 575 or/and IELTS-test scores 6) is required from all applicants.

### **Financial security, cost of living and study**

Applicants are encouraged to secure financial support on their own before arriving in Bosnia and Herzegovina. Tuition fee, living expenses in BiH and all travelling costs should be covered by students themselves.

### **Visas and residence permit**

Visa is required for all students coming to study in Bosnia and Herzegovina. Foreigners can apply for visa at the nearest embassy, consular or diplomatic mission of Bosnia and Herzegovina in their home country.

You can find a list of embassies of Bosnia and Herzegovina at the following web address: **[www.mvp.gov.ba](http://www.mvp.gov.ba)**.

If you are staying in Bosnia and Herzegovina for a period longer than three months you have to apply for a residence permit at the central police station in Sarajevo or at any embassy of Bosnia and Herzegovina.



## Application procedure

The application needs to contain:

1. Letter detailing the applicant's academic background and practical experience, which of the two study majors the applicant wishes to join, as well as the applicant's professional interest and future career objectives (e.g. intending to do a PhD programme after completing the Master's Programme);
2. The applicant's Curriculum Vitae, covering academic studies, as well as professional experience and publications;
3. A photocopy of the applicant's original complete (university) study records detailing courses read and grades achieved (if possible ECTS credits awarded for each course);
4. Two letters of recommendation preferably from academic supervisors at your home university;
5. A certificate or equivalent proof of the applicant's proficiency in English;
6. A certificate or equivalent proof/statement of good health.

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## About Bosnia and Herzegovina

### History

Bosnia and Herzegovina is the heart shaped land that lies in the heart of southeast Europe. It is here that eastern and western civilizations met, sometimes clashed, but more often enriched and reinforced each other throughout its long and fascinating history. BiH is a long name for a country that measures just over 50,000 km<sup>2</sup>. Bosnia covers the north part and the centre of the country with its name probably derived from 'bosana', an old Indo-European word meaning water. The southern region of ancient Hum, ruled by Herceg Stjepan (Duke Stjepan), was later named Herzegovina after region was conquered by the invading Ottomans. Perhaps what is most important for visitors to know today, though, is that BiH is a stunningly beautiful country with a vast array of landscapes, cultures and traditions. BiH prides itself on its hospitality and treating our guests as if they were family members.

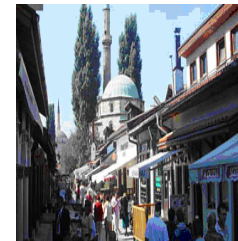
### Geography

Situated at the heart of the Balkan Peninsula, Bosnia and Herzegovina encompasses both Mediterranean and Alpine climates, landscapes and henceforth some of the richest flora and fauna found in Europe. Much of Bosnia and Herzegovina is mountainous. The long chain of the Southern Alps – the Inaric Alps - stretches from northwest Slovenia through the heart of BiH and into Montenegro, and finishes in the Prokletija Mountains on the Albanian border.

Herzegovina hosts the highest and wildest part of this mountain range, which for centuries provided the population protection from Roman invaders, and which slowed the Ottoman conquest of Bosnia. The central belt of Bosnia has both rocky mountains and green, rolling hills covered with conifer forests and lined with countless freshwater streams and rivers. Some northern area share part of the long and agriculturally rich plains that extend from Hungary, Croatia into the fertile fields of the Sava and Drina River valleys that flow into the Black Sea basin. Parts of the northwest of the country are all karst topography, with deep limestone caves and underground rivers.

### Climate

BiH is ideal for multi-season visits. Our climate suits every type of tourists, from sun seekers on the Adriatic Coast to white powder skiers we have got the best of both worlds. The Mediterranean and Alpine influences meet and create a mosaic of climate types. The south enjoys warm, sunny and dry weather, with very mild winters. In the more continental areas the weather is similar to that of central Europe – hot summers, cool springs and autumns, and cold winters with snowfall. The Mediterranean and continental climates meet in the middle, creating one of the most diverse eco-systems in Europe. The Alpine climate rules the mountain terrains of the high Dinarics above 1700 meters. The winters there are extremely cold, with temperatures well below zero for more than six months of the year.



## People

There are three main 'peoples' that inhabit this country: Bosniaks, Croats, and Serbs. Despite different religious and/or ethnic background their language, traditions and culture are more similar than not. For practical purposes you'll find quite a few versions of the people of BiH. There is also sentiment of just being Bosnian, with no particular affiliation except to the country from where they are from. The Bosniaks are mainly Muslims, the Croats Catholic and the Serbs Orthodox. Despite different religious and/or ethnic background their language, traditions and culture are more similar than not. Their roots are in the early Slavic tribes that settled this land between the 6-7th centuries and intertwined with the indigenous Illyrian tribes. In short, the people of BiH are southern Slavs, with varying religious backgrounds. According to the last population census there were 4,354,911 inhabitants in Bosnia and Herzegovina in 1991. Due to war-related death and migration, that number is lower now. Policy makers estimate that the country's population is now around 3.8 million people and steadily growing, and that over one million Bosnians now live abroad. The ethnic composition remains similar to the pre-war percentages: Bosniaks (Muslims) 44%, Serbs (Christian Orthodox) 32%, and Croats (Catholics) 17%. The remaining 7% of the population is composed of Yugoslavs, Albanians, Roma, Jews, and several other minority groups.

## Religion

Bosnia and Herzegovina is a country at the crossroads of eastern and western civilizations. Muslims, Orthodox, Catholics, Jews live here together. In this country it is hard to find a town that doesn't have both churches and mosques. This illustrates that BiH is indeed at the crossroad of eastern and western civilizations.

## Culture

Until contemporary times BiH usually fell outside the realm of European artistic movements. Creative forms, however, have a long and fascinating history dating back to Neolithic times. The museums and galleries in BiH are not filled with renaissance or romantic paintings but rather with the living forms that represented everyday life. Contemporary art has been a key influence in the cultural revolution that has taken place in the last half of the 20th century. Culture in the centuries leading up to this revolution can be visited today as a living museum through the architecture, traditional dress, stone carvings, pottery and jewelry, and sacral places. The culture of BiH will not be found hanging from the walls of a museum but can be seen in the intricate paintings of the mosques, the beautiful woodwork of traditional furniture, or the magnificent stitch of the highlander's attire. Today's cultural scene is a steadily flourishing one. Sarajevo hosts some of southeast Europe's finest festivals in the Sarajevo Film Festival, Jazz Fest, the MESS alternative theatre festival and others. Contemporary literature, music and art embraces the creative struggle of a country reborn.



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## About Sarajevo

**Sarajevo** is capital city of (the state of) Bosnia and Herzegovina. It is its administrative, economic, cultural, educational (university) and sport center. The city of Sarajevo is unit of local self-governance, which consists of four city municipalities: Old City, Center, New City and New Sarajevo.

### Geographical position,

Sarajevo is situated in the area of Sarajevo plain, which is surrounded by mountains Bjelašnica and Igman from the Southwest, by Trebević from the Southeast, middle-range mountains and inter-valley headlands (capes) on the North and Northwest.

Average height above sea level of Sarajevo plain is 500m. The most distant (farthest) western point of the plain is at 180 16' eastern geographic longitude. The most distant (farthest) eastern point is at 180 27' eastern geographical longitude, the most distant northern point is at 430 53' northern geographic latitude while the most distant southern point is at 430 47' southern geographical latitude.

### Time zone

CET – Central European Time (Europe)  
GMT +01:00

### Climate

- medium continental
- average summer temperature 19,1 C
- average winter temperature – 1,3 C
- average annual temperature 9,5 C

### Population

The city of Sarajevo in (the area of) four municipalities (Old City, Center, New City and New Sarajevo) has 297,416 residents.

**Area: 141,5 km<sup>2</sup>**

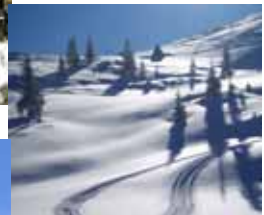




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[www.mef.unsa.ba](http://www.mef.unsa.ba)

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City of Sarajevo

[www.sarajevo.ba](http://www.sarajevo.ba)

Diplomatic Missions and Consular Offices

[www.mvp.gov.ba](http://www.mvp.gov.ba)

About Bosnia and Herzegovina

[www.bhtourism.ba](http://www.bhtourism.ba)



