International MSc Programme
Sustainable Energy Engineering

Study in Croatia
International Master of Science Programme: Sustainable Energy Engineering

In brief: Sustainable Energy Engineering (MScSEE) is an international Master of Science Degree Programme with two parallel study majors, both having a strong environmental focus: Sustainable Energy Utilization in the Built Environment and Sustainable Power Generation.

The programme is carried out by the Department of Thermodynamics, Thermal and Process Engineering and the Department of Power Engineering, at the Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb, 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 programme similar to the present one, as well as with other consortium member universities: University of Rijeka, Croatia; University of Split, Croatia and University of Padova, Italy.

Project Director: Prof. Tonko Ćurko, PhD
Project Coordinator: Vlasta Zanki Alujević, MSc
Secretary: Zdenka Kuhta
is the oldest and largest faculty in this field in Croatia, dating back to 1919 when it was founded as a part of the Royal High Technical School. Nowadays, being a part of the University of Zagreb, it enrols 1600 students within the study majors of Mechanical Engineering, Naval Architecture and Aeronautical Engineering and employs the teaching staff of 180.

The activities of the Faculty of Mechanical Engineering and Naval Architecture include both the theory and practice of design, construction and production of marine structures, machines and devices in power generation and process industry, command production of internal combustion engines and conveying machinery, as well as the manufacture of consumers' products. In addition to the undergraduate studies relevant to the degree of a graduate mechanical engineer or a graduate naval architect, the Faculty offers postgraduate studies for obtaining the master and doctoral degrees in technical sciences.

The faculty is about to re-organize its educational system in accordance with the Bologna Declaration (signed by Croatia in May 2001) and to adopt the European Credit Transfer System. Additional effort is being put into the modernization of teaching methods and the introduction of new ones (on line education, lecturing provided by video links to the partner universities, industry experts' guest lecturing, encouragement of student mobility towards the universities abroad, study visits) and the updating of course objectives. The faculty also provides specialized up-grading courses to the specialists from industry.

UZ - FSB is the only institution in the continental part of Croatia with an established Lab for Renewable Energy Resources Utilization being focused primarily on solar energy and biomass (research, testing and designing of commercial equipment). Two departments involved in the realization of the present Tempus project - Department of Applied Thermodynamics, Thermal and Process Engineering, (15 prof. and assist. prof., 8 PhD students) and Power Engineering Department (16 prof. and assist. prof., 11 PhD students) take an active role in promoting energy efficiency and environmental aspects of energy production and utilization through a close co-operation with industry, as well as with the responsible Ministries and the National Institute of Energy. Four laboratories have been established in these two departments: Lab for Technical Thermodynamics, Lab for Applied Thermodynamics, Lab for Process Measurement and Power Lab.
The Department of Thermodynamics, Thermal and Process Engineering and the Power Engineering Department offer the International Master of Science Degree Programme 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 MScSEE programme (carried out within the Tempus Joint European Project)

The Royal Institute of Technology (KTH)

The Royal Institute of Technology (Kungl Tekniska Högskolan) 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 broad spectrum -from natural sciences to all branches of technology, including architecture, industrial economics, urban planning, work science and environmental technology. KTH is especially active in the field of Sustainable Energy Engineering. It has two special Master programmes taught in English in this field. Sustainable Energy Engineering is closest to the MSc programme offered at UZ-FSB. The cooperation between UZ - FSB and KTH was established in the early 80s in terms of joint projects and student exchange and has been intensified through the mentioned MSc programme.
University of Padova, Faculty of Engineering (DFT-UP)

comprises a number of departments covering a wide range of engineering studies such as architecture, mech. engineering, chemical engineering, transportation, process eng. etc. The Department Fisica Tecnica, which is involved in the project realization, focuses on the following areas of research: theoretical and applied acoustics; new developments in refrigeration; heat transfer on enhanced surfaces with liquid-gas two-phase flow of new refrigerants; solar collectors and absorption; testing of refrigerating machinery; building-systems interactions in the study of seasonal heat loads. There are 20 professors and assistant professors together with 19 PhD students employed at the Department. Laboratory for Acoustic and Heat Transfer Laboratory for students are integral parts of the department which has developed co-operation with industry and other Universities from all over the world. Among them is also the University of Rijeka, Faculty of Engineering with established co-operation in the field of absorption refrigeration and solar collectors.

University of Rijeka, Faculty of Engineering (UR - FE)

provides education in the fields of mechanical engineering, naval architecture as well as electrical engineering. Co-operation on the project realization will be established with the Department of Applied Thermodynamics and Energy Technology with which UZ -FSB has already developed close co-operation in the field of solar collectors, heat pump and refrigeration technologies, as well as in student exchange. This faculty is the local centre in the northern coastal region for education of specialists, particularly in tourism, with strong environmental and sustainability orientation of the study. The first solar collector manufactured in the region in the early 70s was designed at this Faculty, which continues work on the development of new types of solar collectors in co-operation with industry. There is also intensive cooperation with the local industry and universities from the Czech Republic, Italy, Slovenia and Croatia.
University of Split, Faculty of Electrical Engineering
Mechanical Engineering and Naval Architecture (US FESB)

employs the teaching staff of 111 and 16 PhD students working in the fields of mech. engineering, electrical, industrial and computer engineering. The students enrolled in the study of naval architecture continue their study either in Zagreb or Rijeka after having completed a 2-year study at this Faculty. The chair for thermal energy technology, involved in the realization of this programme, is particularly active in the field of utilizing wind power and has contributed to the development of the national strategy of wind power utilization guided by National Institute of Energy. One of the first test rigs for testing solar collectors and PV systems in Croatia has been established in close cooperation with the first manufacturer of solar PV panels in Croatia. The Faculty has good co-operation with Croatian universities as well as with the ones from the US, UK and Germany.
Consisting of introductory general courses followed by two parallel majors with advanced courses, the MSc SEE programme 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 programme 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 applied to the practical design and modelling 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 programme includes a study week at the Centre for Advanced Academic Studies (CAAS) in Dubrovnik as well as a number of study visits to power and refrigeration plants, factories and other facilities relevant to the program objectives in both Croatia and neighbouring 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 full time studies corresponds to 1.5 ECTS credits) followed by five months reserved for thesis project work accounting for 30 ECTS credits. The programme 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 programme language is English. Successful completion of the programme leads to obtaining the degree of Master of Science with specialization in Sustainable Energy Engineering.

**Course Program**

The programme consists of an introductory part 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.
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. These courses are followed by two finishing advanced courses, i.e. Energy and Environment and Energy Management, available to the students from both majors.

The work in the subsequent part of the programme is devoted to the thesis project with a task relevant to the attended major.
GENERAL COURSES

Introduction to Energy Technology (3 ECTS 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 analysed from the perspective of different sectors, including industry, households, transport, agriculture, as well as commercial and public sectors - in Croatian and international perspective. The significance of power generation and energy utilization is analysed 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 environmental laws/regulations and goals, etc.). Future energy systems and energy use scenarios are discussed, with a focus on promoting the use of energy efficient technologies and renewable energy resources and technologies. Relevant political and socio-economic issues are discussed.

Sustainable Power Generation (9 ECTS 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. A more detailed course on renewable energy technologies is provided in the course Renewable Energy Technology and Biomass, Wind and Hydro Technology. The second portion of the course deals with reactor technology and nuclear power safety, focusing on the properties and performance of boiling and pressurized water reactors.
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.

**Sustainable Energy Utilization (9 ECTS 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.

**Renewable Energy Technology (6 ECTS 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 is 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 utilisation 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.
ADVANCED COURSES

Study Major: Sustainable Energy Utilization in Built Environment - SEU

Thermal Comfort and Indoor Climate (6 ECTS 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 analysed 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 analysed as relevant to energy management in built environment. The course covers the latest technology in energy efficiency practices in built environments and passive systems.

Applied Refrigeration and Heat Pump Technology (6 ECTS 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 optimising insulation thickness and different mechanical components are analysed. Design and optimisation 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.
Applied Solar Technology (3 ECTS credits)

The course gives an overview of different solar systems intended for heat production, and their application. Different types of solar collectors are analysed from the standpoint of heat transfer and pressure drop. The methods for determination of necessary solar collector area, hot water accumulators and other purpose-related components in various applications within tourist, residential and industry sector are explained (dwellings, apartments, hotels, auto camps, process and food industry). The basics of modelling and simulation of typical solar system behaviour under different climate and energy consumption conditions are presented. The course includes the following laboratory work: determination of solar collector efficiency and system characteristics. Seminar work, concerns the design of a solar assisted hot water system, modelling of heat transfer in plate solar collector as a function of collector geometry and characteristics of its components (glazing, coating, insulation).
ADVANCED COURSES

Study Major: Sustainable Power Generation - SPG

Applied Heat and Power Technology (6 ECTS 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 analysed. State-of-the-art heat and power technology is dealt with as relevant to both industrial and district heating applications.

Wind, Biomass and Hydro Technology (9 ECTS credits)

The purpose of this course is to discuss the utilization of wind, biomass and hydro energy. The first part of the course deals with the basic characteristics of wind and types, fundamental principles, basic parts, aerodynamics and design of wind turbines/plants. This section includes the economics of wind turbines/plants and their impact on the environment. The part of the course concerning biomass gives an overview of different types of biomass fuel (wood, pellets, pyrolysis products, anaerobic digestion products) and possible application. The use of biomass for biogas production, utilisation and system design is explained. The theory of wood combustion in hot water boilers and the impact on boiler design are presented. The third part deals with the basic types, fundamental principles and main parts of hydraulic turbines/plants. This section includes the problems of cavitation, vibrations, revitalization and useful life. The systems for measurements, monitoring, control and protection of wind and hydraulic turbines/plants are presented. Also, the usage of numerical modelling as a substitute for physical modelling of wind and hydraulic turbines/plants is analysed. A visit to modern wind and hydraulic turbine plants is arranged.
ADVANCED COURSES

Study Major: SEU + SPG

Applied Energy Technology - Project Course (6 ECTS 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.

Energy and Environment (6 ECTS 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; Desulphurisation processes; Catalytic 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 analysed, both from the standpoints of the generation as well as utilisation. Finally, legal and economic tools for energy policy are presented, including international agreements and programs, as well as economic mechanisms.
Energy Management (6 ECTS 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.
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 programme 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 FSB in Zagreb, 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 programme and defence of the thesis project student is awarded by FSB the degree of Master of Science with specialization in Sustainable Energy Engineering.
## Eligibility

Applicants interested in being considered for admission need to have academic backgrounds in disciplines/professions 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 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 Croatia. 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

In general, a regular student needs about 240 EUR per month to cover the cost of study and living expenses, including monthly rent and food (see cost of living) Applicants are encouraged to secure financial support on their own before arriving in Croatia. Tuition fee, living expenses in Croatia and all travelling costs should be covered by students themselves.

## Visas and residence permit

Visa is required for all students coming to study in Croatia. Foreigners can apply for visa at the nearest Croatian embassy, consular or diplomatic mission in their home country.
You can find a list of Croatian embassies at the following web address: www.mvp.hr.
If you are staying in Croatia for a period longer than three months you have to apply for a residence permit at the central police station in Petrinjska 30, 10000 Zagreb or at any Croatian embassy.

**Application procedure**

The application needs to contain:

1. A 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.

**Application deadline**

Hard copies of the application forms for the academic year of interest may be ordered by May 1 of the preceding academic year. (The academic year starts in October each year and lasts till the end of June of the following year). Application forms can be downloaded on the web site: www.fsb.hr/see.

Fully completed applications need to be submitted not later than May 15 to the address:

*MSc Programme Sustainable Energy Engineering*

*Faculty of Mechanical Engineering and Naval Architecture*

*Ivana Lucica 5*

*10000 Zagreb*

*Croatia*

*Europe*
Formal Letters of Admission will be sent to applicants admitted to the Programme by June 15. Any further information about the programme and hard copies of application forms can be obtained from the Programme Administration at the addresses below:

If you have questions relevant to Programme content, scope and structure, or eligibility please contact:

**Vlasta Zanki Alujević, MSc Programme coordinator**
Faculty of Mechanical Engineering and Naval Architecture
Ivana Lučića 5, 10000 Zagreb, Croatia
Phone: + 385 1 6168 564
Fax: + 385 1 6118 714
E-mail: vlasta.zanki@fsb.hr

If you need information concerning practical issues including application procedures, insurance, accommodation etc. please contact:

**Mrs. Zdenka Kuhta, Programme Secretary**
Faculty of Mechanical Engineering and Naval Architecture
Ivana Lučića 5, 10000 Zagreb, Croatia
Fax: + 385 1 6118 714
E-mail: see@fsb.hr
Programme duration

The programme has a total duration of three semesters accounting for 90 credit points based on the European Credit Transfer System (ECTS). The academic year starts in October and ends in June. The first Fall Semester covers the general courses while the second Spring Semester continues with the advanced part of the programme. Successful completion of all the programme work by the end of July will allow student to be assigned a final thesis to be carried out in the subsequent period of typically 5-6 months.

Tuition fee

The payment conditions considering tuition fee for the current academic year are available on www.fsb.hr/see.

Scholarships and grants

- Subsidised meals at student restaurants will be provided to all students.
- Students who do not have residence in Zagreb can use subsidised
- All study visits within Croatia
- All students will have access to the Faculty's sports hall with all sports activities available for free.
- The overwhelming part of the required literature and all handouts are offered to all students free of charge.
- Foreign applicants should check if there is any bilateral agreement between their home country and Croatia and try to apply for available scholarships. Some information about existing bilateral/international agreements between the University of Zagreb and foreign universities might be found at www.unizg.hr

Accommodation in Zagreb

Upon request, programme participants will be assisted in finding affordable student-type accommodation. Subsidised accommodation is provided in student residence halls. The accommodation in twin-bedded rooms with en-suite bathrooms currently costs 36 EUR/per month. This type of accommodation will be provided, free of charge, for all participants who do not have residence in Zagreb.
However, it is possible to rent apartments for one or more students, but this type of accommodation is not subsidised by the Ministry of Science and Technology. Regular price of a one-room apartment is approximately 250 - 300 EUR/month. A non-refundable booking fee of 100 EUR/participant is charged for finding accommodation in apartments.

**Student Identity Card**

Students of the University of Zagreb are entitled to an identification card ("iksica"). The card serves as a means of student identification and enables you to have subsidised meals, entrance to libraries and other University premises, discount at some cultural institutions and shops, etc.

### Cost of living

To give you an idea of the costs of studying at the University of Zagreb, you will find information in the table below.

<table>
<thead>
<tr>
<th>Category</th>
<th>EUR/month</th>
</tr>
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<tbody>
<tr>
<td>Accommodation</td>
<td>36</td>
</tr>
<tr>
<td>Food and drinks</td>
<td>70</td>
</tr>
<tr>
<td>Books</td>
<td>19</td>
</tr>
<tr>
<td>Clothing</td>
<td>65</td>
</tr>
<tr>
<td>Insurance</td>
<td>40</td>
</tr>
<tr>
<td>Sports</td>
<td>free</td>
</tr>
<tr>
<td>Transportation</td>
<td>10</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>240</strong></td>
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### Health insurance

All foreign students must have health insurance during their stay in Croatia. The best option is to enrol in an insurance plan from your home country that covers your stay in Croatia. The students who decide to take out a Croatian health insurance policy can do so at the Croatian Health Insurance Institute (Hrvatski zavod za zdravstveno osiguranje), at a cost of app. 40 EUR per month.
Location

Croatia is an Adriatic and a Central European country. It stretches in the form of an arc from the Danube in the northeast to Istria in the west and Boka Kotorska in the southeast. Its area is 56,538 sq.km, and the area of the coastal sea about 31,900 sq.km. Geographically, it is situated on the cross-roads between Central Europe and the Mediterranean.

Geographical position

Croatia is situated close to densely populated and industrially developed European countries. Many internationally important transport routes cross Croatia. The importance of the geographical position of the Republic of Croatia is also enhanced by the Adriatic Sea, the northernmost gulf of the Mediterranean that is the closest to the central part of the European continent. The most important routes are centred along the Sava River, the Adriatic and the Drava River; there are also several important transversal routes from the Austrian and Hungarian border to the Adriatic coast (to Rijeka and Split).

Natural and Geographical Features

The area of Croatia can be divided into three major natural and geographic parts: The Pannonian and Peri-Pannonian area comprises the lowland and hilly parts of eastern and northwestern Croatia; mountains higher than 500 m are rare and of an insular character. Most of this area is being used for farming and livestock breeding. Slavonija and Baranja in the east are the most suitable for growing cereals; the humid valleys and the hills are richly afforested while the northwestern part, which gravitates to Zagreb, is industrially the most developed. The hilly and mountainous area, which separates Pannonian Croatia from its coastal part, is less developed. Its future development will be based on its transit importance, the growth of the already existing wood and timber industry, and the still underexploited potential for the production of healthy food, and winter and rural tourism.

The Adriatic Area includes the narrow coastal belt separated from the hinterland by high mountains. This is predominantly a karst area with very dry summers. The few streams mainly follow narrow gorges in breaking their way through to the sea. The Croatian coastal area may further be divided into the northern (Istria and Kvarner) and southern part (Dalmatia).
It also lends itself to a longitudinal division into the islands, the coast proper and the immediate hinterland. The Croatian Adriatic coast is one of the most indented in the world: it has 1185 islands and islets with a total coastline of 4,058 km, the total length of the mainland coast being 1777 km. The largest island is Krk; other large islands include Cres, Brac, Hvar, Pag and Korcula. The largest peninsulas are Istria and Peljesac, and the largest bay is Kvarner Bay.

**Adriatic Sea**

It stretches from the northwest to the southeast between the Balkan and Apennine peninsulas for 783 km, its average width being 170 km. Its average depth is 252 m; its northwestern part is shallow (maximum 23 m in the Bay of Trieste), while it is much deeper in the south (1200 m in the South Adriatic basin). The prevailing winds are the cold bura, the humid jugo and the refreshing maestrale.

**Climate**

Northern Croatia has a continental climate. Central, semi-mountainous and mountainous regions, as well as the entire Adriatic coast, have a Mediterranean climate. Spring and autumn are mild along the coast, while winter can be cold and snowy in central and northern regions.

**Population**

4,437,460 (2001). The majority of the population are Croats. National minorities include Serbs, Moslems, Slovenes, Italians, Hungarians, Czechs, Slovaks, and others.

**Official language and alphabet**

Croatian language and Latin alphabet.

**Religions**

The majority of the population are Roman Catholics, and in addition there are a number of those of Orthodox faith, as well as Muslims, and Christians of other denominations.
Zagreb is the capital city of the Republic of Croatia. Zagreb is an old Central European city. For centuries it has been a focal point of culture and science, and now of commerce and industry as well. It lies on the intersection of important routes between the Adriatic coast and Central Europe.

Zagreb is a political and administrative centre for the Republic of Croatia and also the hub of the business, academic, cultural, artistic and sporting worlds in Croatia. Many famed scientists, artists and athletes come from the city, or work in it. Zagreb can offer its visitors the Baroque atmosphere of the Upper Town, picturesque open-air markets, diverse shopping facilities, a wide selection of crafts and a choice of the traditional cuisine. Zagreb is a city of green parks and walks, with many places to visit in the beautiful surroundings.

### About Zagreb

#### Location
- northern Croatia, on the Sava River, 170 km from the Adriatic Sea
- 45° 10' N, 15° 30' E
- situated 122 m above sea level

#### Time
- Central-European time (GMT+1)

#### Climate and Weather
- continental climate
- average summer temperature: 20° C
- average winter temperature: 1° C

#### Population
- 779,145 (2001)
<table>
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<tr>
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<tr>
<td>Ministry of Science, Education and Sport</td>
<td><a href="http://www.mzos.hr">http://www.mzos.hr</a></td>
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<td>City of Zagreb</td>
<td><a href="http://www.zagreb-convention.hr">http://www.zagreb-convention.hr</a></td>
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<td>Diplomatic Missions and Consular Offices of Croatia</td>
<td><a href="http://www.mvp.hr">http://www.mvp.hr</a></td>
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<td>About Croatia</td>
<td><a href="http://www.croatia.hr">http://www.croatia.hr</a></td>
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<td><a href="http://www.hr/hrvatska/general.en.shtml">http://www.hr/hrvatska/general.en.shtml</a></td>
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<td><a href="http://adriatica.net/home/home_en.htm">http://adriatica.net/home/home_en.htm</a></td>
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