With its new Campus El Gouna in Egypt, Technische Universität Berlin embarks on a fascinating new international project with a very special profile. Three master courses will commence in October 2012. The topics of Energy Engineering, Water Engineering and Urban Development have been chosen as they address problems and challenges of vital importance for the development and future of Egypt and other countries in the MENA region.

Education at Campus El Gouna follows the internationally respected high standards of Technische Universität Berlin and closes with the Master of Science of this university. The courses will enable young professionals in leading positions to solve problems on an excellent professional level with regard to the concept of sustainability. Sustainability in this sense means to complete technical solutions by reflecting and integrating the economical, ecological, social, cultural and governance dimensions. To realize this concept, the curricula of the three courses have strong elements in the fields of project management and economy. Most important are the term projects as training fields for interdisciplinary and team oriented work. Finally, El Gouna students bring their practical experiences as an asset for the profile of the courses. This combination guarantees El Gouna students with excellent perspectives for their professional career.

Campus El Gouna offers students outstanding working conditions: Modern buildings with excellent facilities, laboratories and halls for experiments for Energy and Water Engineering according to current German standards. One of the four terms brings the students to Berlin and gives them the chance to live in the mother university and to enjoy intercultural life in an exciting European capital. Last but not least, Campus El Gouna as a location for research and development projects and various academic events provides students with a stimulating environment and the chance to be part of regionally relevant research projects.

A number of scholarships are available.

The realization of this Campus El Gouna was made possible by the extraordinary initiative of the sponsor/donor, our TU alumnus Samih Sawiris. We are deeply impressed by his enormous, enduring commitment and thank him heartily for his outstanding generosity.

We also wish to thank all the TU professors who worked and helped elaborating the masters programs, the architects and workers who designed and built the campus facilities and the officials of Egyptian and German administrations who elaborated the necessary bi-national legal fundaments for the project.

I am sure that Campus El Gouna with this educational program will find a wide resonance and broad and intensive interest in Egypt and the MENA region. We are looking forward to requests and applications of future students, companies, public administrations and all those who are curious to know more about Campus El Gouna of Technische Universität Berlin!

Prof. Dr. Rudolf Schäfer

Founding Director of Campus El Gouna
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The Campus El Gouna is a physical part of TUB and is managed and operated by an organizational form named “Zentralinstitut El Gouna” in Germany. In English both, the administrative body in Berlin and the physical campus in El Gouna are simply called “Campus El Gouna”. The objective of the Campus El Gouna is to focus TU Berlin’s strongly growing number of academic activities and its increasing scientific competence in all fields of sustainable development in the MENA region that have been gained especially during the last ten years. The Campus El Gouna should become the headquarter of TU Berlin in the MENA region and at the same time a cultural and scientific gateway between the MENA countries and Europe which aims to play a central role for the development of Egypt and the MENA region. The Campus is similar to a small school or faculty and developed to perform academic degree programs, advanced and further education as well as research and development (R&D).

From October 2012, three full-time post graduate master’s degrees will start in El Gouna:

- Urban Development
- Energy Engineering
- Water Engineering

Students of these courses will graduate with a Master of Science degree issued by TU Berlin.

The fourth Master’s degree “International Healthcare Management” also is about to be approved and is planned to start in the winter semester of 2012/13, too. Students will graduate from this program with an MBA.

The TU Berlin Campus El Gouna is considerably different from current approaches of foreign activities in the academic and educational sector abroad. The profile elements and unique characteristics of the TU Campus in Egypt and its programs are:

- German public University officially recognized in Egypt
- Campus El Gouna of the TU Berlin is a physical branch of the TU Berlin. Consequently, it is part of a German state-run university and employs staff in accordance with German employment law in Berlin to send it to its Campus El Gouna in Egypt. The academic sector will be run exclusively by German or German-educated staff. Even the administrative management and rules correspond to German state-controlled regulations, meaning students can complete a degree in exactly the same way as in Germany.
- The campus benefits from the German-Egyptian Cultural Agreement of 1960 and the supplemental agreement of 4th July 1984. An agreement, which serves as a basis for the project, was concluded in March 2010 between the Egyptian Ministry of Higher Education and Scientific Research (MHERS), the Berlin Senate for Education, Science and Research (SenWf) and the TU Berlin. It refers to the benefits and facilitations of the above mentioned bilateral agreements and all other cultural agreements, Egypt concluded. Additional examinations are not needed to recognize the degrees as a result of existing agreements.
- Campus El Gouna as a Non-Profit Public Private Partnership
- The activities of the Campus El Gouna are mainly funded by a non-profit public private partnership (PPP). The construction and erection of the campus complex is financed by ORASCOM Hotels & Development (OH&D) owned by the TU alumnus Samih Sawiris. OH&D is also providing the financing for the current transitional phase. The launch phase of the International Healthcare Management course is being financed through a subsidy from the DAAD. The intention is to predominantly fund all future activities through tuition fees (degree programs, further education), third party funding (research & development) or sponsorships.
- Post Graduate Master’s Degrees with special Profile
- The courses are described in detail on pages 14-51. They offer a series of significant features compared with conventional courses:
  - As post graduate degrees, they require the students to be able to prove both academic examinations (Bachelor’s or Master’s) as well as a minimum of professional practice (1 year).
The programs have an interdisciplinary focus. The interdisciplinarity of the Master’s courses is additionally based on the fact that graduates with different degrees and professional experience will be accepted. The focal point is on technologies and strategies that are suitable for sustainable development of Egypt and the MENA-region. Project management, intercultural communication and interdisciplinarity are included in all curricula to promote the social skills and therewith leadership competences of the students.

Laboratory tutorials and experimental exercises are included in the Engineering programs and therefore several labs and a huge 500 m² technical hall are included in the campus complex. They are all equipped with technologies of leading international companies, imported from Germany and installed accordingly to German standards and codes.

During the second semesters, completely operated in Berlin for Energy Engineering and Urban Development, the students become acquainted with the Technische Universität Berlin and its three local campuses to take advantage of the university’s networks for excursions, internships and to attend academic life in Germany.

Campus and Laboratory Equipment conform to German Standards

The buildings and technical equipment of the Campus El Gouna offer outstanding study and working conditions for lessons and research. The German TÜV Süd was assigned the task of monitoring the construction process so that the finished buildings conform to German accident prevention regulations and the workplace guidelines of the TU Berlin, exhibiting an overall European quality standard.

Study rooms are available for project team work. The library of the TU Berlin and the Bibliotheka Alexandrina are electronically accessible for all courses.

On campus, generous, green courtyard areas offer the opportunity to hold cultural events and conferences in the open air in an atmosphere typical to El Gouna. A cafeteria is also integrated into the campus complex. The apartments for students and lecturers are located in the neighboring town areas next to the campus.
TU BERLIN_CAMPUS EL GOUNA
Site plan and building concept
Master’s Degree Program
Energy Engineering

Energy has been a key factor in the development of countries, enabling their economic growth and shaping their environments to the needs of human society. Due to the increasing requirements for energy and its carbon based generation, however, a range of serious problems have evolved, such as the exhausting of resources, air pollution and global warming. Air pollution was successfully tackled during the second half of the 20th century and is no longer a serious problem. The problems surrounding resources and CO2 emissions, however, remain. Using renewable energies on a large scale could eliminate these problems. Renewable energy technologies include biofuels, solar heating and cooling, solar power, as well as water and wind power. Research and development at universities and industries faces the challenge of how to find innovative concepts for a safe, sustainable, and economic energy supply in the future.

The Master’s degree program in Energy Engineering at the Campus El Osoura addresses these problems in the context of the special situation in Egypt in order to create the knowledge for sustainable engineering. It offers advanced education for students and young professionals holding a bachelor’s degree or the academic equivalent in engineering or natural sciences. This academic program is primarily oriented to candidates whose educational and professional focus is on environmental studies, e.g. environmental, chemical, process, mechanical, or civil engineering, or related disciplines.

Conceputalized on a modular basis, this four-semester program meets the requirements of the European Education Ministers’ 1999 Bologna Declaration for the European Higher Education Area.
Objectives
The objective of the program is to provide students with a sound theoretical and fundamental and yet applicable knowledge in the field of Energy engineering for leadership positions in the energy industry. The program aims to teach students how to take an interdisciplinary approach in line with the principles of sustainability in order to deal with energy generation and efficient use. This will be achieved by working in teams with the other Master’s degree programs of Urban Development and Water Engineering at the Campus El Gouna and specially designed semester projects using a mix of modern knowledge transfer methods.

The focus of the program is on the particular characteristics and challenges for a sustainable energy supply in the countries in the MENA region and their potentials for economic development. The knowledge, methodologies and skills obtained during this program are applicable in other parts of the world.

The students will acquire the ability to design and manage ambitious Energy Engineering projects and efficiently implement these projects in line with the principles of sustainability. Furthermore, the program provides the students with fundamental scientific methods. It aims to enable students to develop problem-solving strategies and processes, and to implement them in accordance with demand, on the basis of specific projects, with the inclusion of state-of-the-art technologies, and to provide students with interdisciplinary knowledge and cross-cultural competence.

Concept
Based on the objectives, the program is designed around four core areas of expertise: Energy conversion and components, Energy systems and economics, Electrical energy engineering and Interdisciplinary Studies. The reference framework for all four areas is the concept of sustainability – in terms of a general understanding of the interdependencies of ecology, economy, social context and cultural background.

The Energy Engineering program is divided into three semester study periods, in addition to a 4th semester in which students write their Master’s thesis. The first and third semesters will be in El Gouna, Egypt, while the second semester will be in Berlin, Germany. The location of the 4th semester is dependent on the student’s interests in the Master’s Thesis and can be chosen according to the respective subject.

The new Campus is located near the center of El Gouna. The city offers a wide variety of leisure activities. Spending the 2nd semester at the TU Berlin, the students will study in a famous metropolis in the heart of Europe. The contrast between these locations supports the intercultural exchange: the climate and size of the cities not only vary greatly, but the cultural and economic background also provide different insights into the problems of energy engineering.

The Master’s degree program in Energy Engineering takes four semesters full-time. It starts each winter semester (October to March). During the first semester, students are introduced to the principles of energy engineering and the mechanisms of power engineering, building technology with respect to climate control, and conversion technology, taking into account the conditions that apply in low-energy regions. Students also study the principles of energy economics and systems as part of their basic studies.

In the second semester, which takes place in Berlin, students acquire further knowledge by taking advanced courses with a particular focus on energy engineering and climate control. An economic consideration of energy and projects with local energy suppliers regarding energy systems complete the training provided. An interdisciplinary seminar on intercultural communications and project management is also offered. To allow students to pursue areas of particular individual interest, they can choose electives for 3 credits. Students should then complete an internship in industry during the semester vacation.

In the third semester, the field electrical energy engineering comes into focus. This section consists of electrical drives and the physics of photovoltaic cells for solar energy conversion. The applied part of the master’s degree program is intensified with two integrated projects on energy systems and an interdisciplinary project covering subjects related to the other Master’s programs in Urban Development and Water Engineering at the Campus El Gouna.

During the fourth semester, students begin working independently on areas that present particular challenges and issues in energy engineering as part of their master’s thesis, developing potential approaches to resolving these issues under the supervision of faculty members and instructors.

A total of 120 credits under the European Credit Transfer and Accumulation System (ECTS) are awarded for the entire academic program. The 120 credits are allocated to the specific areas of study. The credits serve as a quantitative indication of the workload and comprise not only the actual classroom instruction, but also the time needed to prepare and study the academic materials (self-study) and the time and effort involved in examinations and preparations for examinations, including the master’s thesis and internships. One credit is awarded for a workload of about 30 hours.
Energy Engineering

Energy Engineering focuses on the fundamental thermodynamic and economic aspects of energy conversion and the respective technical plants. The differences between energy resources, supply and energy economics such as pricing are discussed. The analysis is completed with energy flow charts to compare primary energy consumption and fossil fuel supply. Another aspect is the thermodynamic analysis of energy transformations and cycle processes, based on the main theorems of thermodynamics and the concept of the exergy. The energy-based methods for evaluating energy-conversion systems allow a more in-depth view of energy generation, which will come into focus in the 2nd semester.

The economic dimension of energy engineering is also considered, such as the estimation of overall capital needs for power plants, the basics of investment calculations and methods of depreciation. This establishes a basis for a more sophisticated analysis. Large scale energy conversion processes and equipment are shown on steam (power) plants, gas turbine power plants and combined-cycle power plants with a special focus on cogeneration. The efficiency of energy usage is increased through combined heat and power plants. Using renewable energies and their integration within existing energy systems are also discussed in addition to the problems of energy storage and the rational use of energy.

Refrigeration and Air Conditioning

The techniques surrounding air conditioning and industrial cooling processes form the focus of this module. Starting from the basics of cooling devices and heat pumps and covering salt mixtures, vapor compression cycles, air cycles, cryogenics (1st semester) and thermally driven cycles (2nd semester), this module provides a complete overview of the available processes. Some components, such as expansion valves and compressors will be focused on in depth, and refrigerants and environmental issues are also considered. The basics and technology for single-stage absorption chillers allows solar cooling applications and cooling with waste heat. Combined heat, power and cold generation (tri-generation) are also explained.

Conversion Technologies of renewable Energies

The utilization of regenerative energies and the respective conversion plants form the focus of this module. Solar energy is separated into direct and indirect utilization, which includes photovoltaic panels, concentrating solar power plants and wind power plants. The different utilization possibilities of biomass and waste as an energy carrier with biochemical and thermo-chemical conversion technologies also form part of this module, as well as hydro-power plants and geothermal heat. Students will have the possibility of deepening their knowledge in practical experiments regarding fuel characterization (laboratory) and fluidized bed conversion.

Components of Energy Conversion Systems

This module focuses in detail on the most important components of all kinds of energy conversion systems. These include pumps, compressors, turbines and heat rejection devices (cooling towers) as well as internal combustion engines, Stirling engines, Organic Rankine Cycles and Fuel Cells. The theoretical knowledge will be demonstrated on a practical basis in the technical hall with the various test rigs for the respective machines. In addition to this, fundamental measuring techniques for parameters, such as temperatures and pressures, are also presented on an experimental basis, along with the uncertainty, which is of the utmost importance for scientific work. With the calculation of state variables, the machines can be balanced by the students using the measured data.

Content

Energy Conversion and Components: A major focus of this study area is understanding the different forms of energy and their conversion into energy carriers under the constraints of economic aspects. This provides students a holistic view on renewable and fossil energies originating from various resources with respect to sustainable aspects.
Energy Economics and Systems
This course offers insights into the ways in which energy markets are structured and regulated, how prices are developed and what the market behavior of key actor groups such as developers, investors, generators, shippers and customers would be were they to decide rationally. The course considers markets for solid, liquid and gaseous energy carriers as well as markets for electricity and heat which have different properties and include both renewable and non-renewable sources. The key elements of this course include methodological issues, such as cost calculations including external costs, and energy modeling on the basis of energy balances and scenarios. A focus is also put on the market liberalization of the grid business and the related trading at energy exchanges and over the counter. In addition to the supply side of energy markets, the demand side is also covered by analyzing energy efficiency measures and instruments. Understanding the particularities of energy markets is crucial for managers in the energy business, even if their key competence is energy or environmental engineering. While the first part of this module will be held in El Gouna where the students will gain a general understanding of methodological instruments for analyzing energy markets, the second part will be held in Berlin where the students gain practical insights into advanced energy markets by cooperating with companies and experts in this industry.

Energy for Buildings
This module focuses on energy systems in buildings in order to understand the complex energy flows and media required in the context of sustainable aspects in the MENA region to comply with human needs. In terms of the physiology of people with respect to thermal comfort and air quality, the measurement of meteorological data such as solar radiation, air temperature, humidity and winds are crucial in respect of comfort. The goal is to enable students to understand the different energy flows in a building and to use calculation methods for planning and constructions with respect to different building purposes. This also includes the design of thermal heat insulation and the suitable materials. This will be explained using the primary energy consumption for the heating and cooling system. Comparisons between the annual energy needs for heat/cold generation as well as losses of transfer and distribution are discussed. The course provides examples of classical and solar heat supply systems in terms of primary energy consumption for ventilation and air conditioning. It also includes theoretical exercises to develop the learned methods, as well as practical experiments in specially designed test rooms for visualizing air flows, for example.

Electrical Energy Engineering: The most valuable form of energy is electricity, because it can be easily converted into many other energy forms with a relatively high level of efficiency. This study area focuses on electrical applications such as electrical drives and generators which are widely used in industries and most energy systems. Another aspect of electrical engineering is photovoltaic technology, because it can directly convert solar radiation into electricity without requiring sophisticated or expensive process technology.

Electrical Drives
Understanding the functionality and different forms of electrical drives enables the students to plan and design electronic power circuits. This includes the development of control strategies for the respective applications. One example of this might be the correct dimensioning of wind power plants generators.

The module is comprised of an initial part covering power electronic circuits, including boost/buck converters, VSI converters, voltage regulation and on-line modulation strategies. The second part delineates the transient and steady state behavior of synchronous and doubly-fed machines. Part three covers the control of these drives, including digital control strategies, flux observer and dq-frame as well as sensor technologies.

Photovoltaics
Based on the knowledge of semiconductor technologies, this module starts with the physical fundamentals for understanding the concept and function of this technology, as well as the respective raw materials. In addition to the physical understanding of the solar cells, new techniques such as thin layer cells are also explained and characterized. This includes material supply, component design, component characterization and integrated circuits. The students will also have the opportunity to manufacture their own solar cell in the laboratory.
Intercultural Communications
The aim of this course is to provide students with an awareness of cultural differences and to equip them with skills required for tackling problems of intercultural communication in a global setting, particularly between the Western and the Arab World. Key aspects of the course include communication skills, team work in an intercultural context, working in international networks, conflict management, mediation, facilitation, presentation, as well as computer-mediated communication.

Project Management
This course provides an introduction to the area of project management, which can be directly applied in the projects. It includes project organization, schedule management, cost management, quality management, project management tools and case studies.

Projects “Energy Systems” and “Interdisciplinary”
The planning and design of energy supply systems for power, heat and cold systems forms the focus of this project. The analysis and evaluation under energetically, exergetic, economic and ecologic aspects will also form part of the project. The students will be separated into smaller project groups and cluster the specified problem. The size of the groups depends on the respective topic to begin with, the problem is outlined and possible solutions are discussed. The participants in the project organize themselves to solve sub-problems on the way to developing the overall solution. They are responsible for their time management, reporting and results. The tutors may also teach several technological topics in addition. Finally, there is a written report and a final presentation. Students are also required to participate in a cross-disciplinary seminar.

Internship
The industrial internship should be completed during the summer vacation in Berlin and will last a minimum of four weeks. During the internship the students are able to gain an insight into the work flows in industry, planning companies, or servicing firms. There are several possibilities for completing an internship in Berlin and the students will be supported by the El Gouna team. Students must also create an internship report on a weekly basis, describing their activities during their time in the company or organization.

Interdisciplinary Studies: This study area is designed in order to merge the backgrounds of the students from the MENA region and the German teaching staff and the respective methods of education in the area of engineering. The focus is on two projects: an interdisciplinary project and an energy systems project. To support the learning in this context there are also preliminary modules in intercultural communication and project management.

Master’s Thesis
The master’s thesis requires students to develop the knowledge they have acquired during their studies and to transfer it into a novel scientific energy engineering topic on the basis of their individual research. This relates to the development of innovative energy solutions for the challenges in the MENA region in the context of a practical or theoretical study of a self-selected topic in the field of energy conversion, efficiency, systems or infrastructure. The students are encouraged to carry out their own, individual research, preferably in the framework of a research project specified by their supervisor, or possibly in cooperation with an industrial, administrative or governmental organization in a global setting. To ensure the progress of their scientific work students will also receive support from research assistants. The master’s thesis ends with the presentation of the research results to supervisors and fellow students.
Learning outcomes
The Master's Program in Energy Engineering provides participants with the following:

Knowledge and Understanding of:
- the fundamental aspects of energy engineering,
- processes for energy conversion of regenerative and fossil resources,
- different techniques for refrigeration and air conditioning,
- economic aspects of energy, markets, pricing and supply,
- sustainable energy generation and supply in MENA regions.

Intellectual Skills:
- to develop analytical and critical skills to meet the challenges surrounding the growing supply of energy in arid regions under sustainable aspects,
- to apply problem-solving strategies and processes - on the base of specific projects, including state-of-the-art technologies as well as renewable energy technologies,
- to develop a good balance between theory and practice,
- to think creatively and independently about renewable energies and possible combinations.

Practical Skills (able to):
- efficiently implement projects in line with the principles of sustainability,
- research, prepare and present written essays, oral presentations and team-based reports,
- approach practical problems in a knowledgeable and questioning manner and derive a solution, select the most appropriate one, implement it, and reflect on its performance,
- apply scientifically sound and fundamental methods,
- acquire multi-disciplinary team-working skills and intercultural working skill,
- use computer resources and information technology,
- reflect on their own ideas by becoming more tolerant of unfamiliar ideas and practices,
- improve their time management skills and develop self-discipline.

Teaching methods
The modules include lectures, seminars, exercises, practical training and integrated projects which are provided by the respective professors (lectures) or research assistants (exercises, practical training) of the TU Berlin. The experiments in the technical hall and the laboratories will help the students to understand the sophisticated contents in the field of energy and process engineering. The interdisciplinary project work includes site viewings (excursions), group discussions, as well as team and study workshops. Due to the relatively new city infrastructure of El Gouna which includes modern supply systems, the students are able access the facilities such as water desalination, power generation and transformer stations for their project work. The participants also gain professional experience by studying and developing their social and intercultural skills at the same time. The performance of the students is assessed on the basis of written and oral exams, presentations and a final dissertation report (Master’s thesis).

Business and academic opportunities
Graduates with a Master's degree in Energy Engineering have very good career prospects. The demand for knowledgeable engineers trained in the use and development of innovative technologies for renewable energies and sustainable power generation is on the rise. In-depth knowledge of the technology, however, accounts for just one part of the required profile; energy management and expertise on improving efficiency are of similar importance. The best graduates also have a range of excellent options in terms of continuing their academic careers in PhD programs.
Master’s Degree Program
Water Engineering

In the last decades, water resources have been under increased pressure, caused by the gap between the need for water and its availability in terms of both its quality and quantity. This is a particular problem in arid and semiarid regions. Beyond traditional sectors where water is in high demand, this phenomenon is being intensified by rapidly growing populations, increased agricultural irrigation for food production, intensified urbanization and climate change. To overcome this dilemma, a form of water resources management that follows an integrated and interdisciplinary approach is widely proposed, including sustainable capacity building.

To address these challenges, the master’s degree program in Water Engineering was developed in order to focus on the specific requirements of arid and semiarid countries and regions in the fields of hydrogeology, hydraulics, water exploitation, water treatment, water supply, wastewater treatment, treated water reuse and sustainable water resources management. The master’s degree program in Water Engineering at the Technische Universität Berlin offers an advanced course of study for students and young professionals who want to extend their expertise in water science, water and wastewater treatment and hydro-engineering infrastructure so they are able to make a contribution to solving the current challenges in arid and semiarid countries. This academic program is primarily designed for candidates with technical or managerial interests or responsibilities that come from environmental, chemical, process, mechanical or civil engineering, geosciences, biology, chemistry or related disciplines. Prospective participants should preferably hold a bachelor’s degree or equivalent academic qualification in engineering or natural sciences (focusing on environmental studies).
Objectives
The objective of the program is to provide students with shared theoretical and practically-oriented knowledge in the field of water engineering, taking into account the students’ varying levels of previous knowledge. The program aims to teach students how to take a holistic, interdisciplinary approach in line with the principles of sustainability, to deal with water as a resource, and to provide students with both interdisciplinary and cross-cultural competence. Students in the program should acquire the ability to design and structure ambitious water engineering projects and to realize these projects efficiently in line with the principles of sustainability. An ability to interface with others, first-rate leadership and management skills are particular focal points in this context. Furthermore, the program aims to enable students to develop academic and scientific problem solving strategies and processes and to implement them in accordance with requirements and on the basis of specific projects, with the inclusion of state-of-the-art technologies.

Concept
The master’s degree program in Water Engineering covers the following core study areas:
- Water Treatment
- Water Science
- Hydro-Engineering Infrastructure
- Interdisciplinary Studies and Intercultural Competence
- Internship and
- Master’s Thesis.

The main focal points of the curriculum are:
- Conventional and advanced treatment of water and wastewater, wastewater discharge systems, decentralized sanitation solutions, water tanks and networks, sludge treatment, sludge disposal and water reuse;
- Engineering hydrology, basic, applied and field hydrogeology, modeling of water-related and environmental systems for sustainable exploration of water resources, especially groundwater;
- Biological and chemical aspects of water quality management, including water resource protection;
- Modeling of hydro-systems and hydraulic engineering as well as water and wastewater transport;
- Fundamentals of international water legislation, economics and socioeconomic aspects of water;
- Two project management blocks on “Integrated Water Resources Management” (IWRM);
- Soft skills, intercultural competence and scientific work;
- Practical experience, including work in the laboratory and at test stands, field trips, demo-site excursions and an industry internship.

Designed to meet the requirements of the European Education Ministers’ 1999 Bologna Declaration for the European Higher Education Area, the course has been developed on a modular basis.

The academic program consists of four semesters. It starts each winter semester (October to March). Courses primarily take place during the first three semesters. During the fourth semester, students are principally engaged in research work and writing for their master’s thesis.

During the first semester, students are introduced to the principles of water and wastewater treatment techniques, hydraulic engineering and modeling of hydro-systems and water science courses of water chemistry, hydrology and hydrogeology, taking into account the conditions of and regions. Students also apply the basic knowledge that they have acquired in the context of an integrated water management project.

In the second semester, students acquire further knowledge by taking advanced courses. In addition to principles in water biology there is a focus on applied hydrogeology. Students also broaden their understanding of water supply and sanitation, water/ wastewater transport and environmental hydraulics. Their knowledge is further enhanced through integrated courses on intercultural communication and an internship in the field of water engineering external to the university campus.

In the third semester, students deepen their knowledge of industrial wastewater treatment and water reuse and apply their hydrogeological understanding in field studies. This semester also focuses on the field of water economy. The practical dimension of the master’s degree program is further intensified by another integrated water management project and a four-week excursion to water management sites in Germany. During this trip, students will visit the main campus of the Technische Universität Berlin and have the opportunity to visit technical water installations and water management agencies in different parts of Germany.

During the fourth semester, students start working independently, covering areas that present particular challenges and issues in water engineering as part of their master’s thesis, developing potential approaches to resolving these issues. Dual supervision of the master’s thesis by both faculty members and external instructors can be conducted in Egypt, Germany or abroad. In the interdisciplinary seminar which is held jointly with the programs in Urban Development and Energy Engineering, students take a closer look at holistic approaches and interdisciplinary aspects.

A total of 120 credits under the European Credit Transfer and Accumulation System (ECTS) are awarded for the entire academic program. The 120 credits are allocated to the specific areas of study. The credits serve as a quantitative indication of the workload and comprise not only the actual classroom instruction, but also the time needed to prepare and study the academic materials (classroom attendance and self-study) and the time and effort involved in examinations and preparations for examinations, including the master’s thesis and internships. One credit point is based on a workload for a full 30 hours.
Water Supply and Sanitation I
This course presents systems of water supply and wastewater treatment and disposal in principle in order to plan and design relevant components in an economic and ecological way. This includes both the training in and the exercising of the basic design-methods in such a way that modifications to the state-of-the-art can subsequently be undertaken independently. Water Supply and Wastewater Treatment and Disposal deals with planning, design and operation of water supply and wastewater treatment systems and components. This firstly includes water and groundwater pollution control, water exploration and production, basic processes for water treatment, pumping, storage and the distribution of drinking water in settlements. Secondly, this course delineates disposal systems for wastewater and storm water, quantity and quality of wastewater, conventional and basic wastewater treatment technologies.

Water Supply II
This course explores the basic processes in drinking water purification. It not only presents the fundamental processes and technologies in water treatment, it also addresses the advantages and disadvantages of the respective variants. Procedures for determining an appropriate water treatment in and regions are presented in particular detail. Water Supply II covers water treatment processes for various raw water sources, including sedimentation, coagulation, filtration, flotation, adsorption, oxidation, gas exchange, membrane treatment, desalination, ion exchange, biological treatment, disposal of residuals and combined treatment processes.

Water Sanitation II
This course describes technologies for wastewater treatment in terms of understanding and assessing the function of wastewater technology systems as a whole. This includes the handling of the fundamental treatment technologies and the planning, design and operation of regular wastewater treatment plants according to the state-of-the-art. This course concentrates especially on special case studies and prepares students for the fields of research and development that they will later work in. Wastewater Treatment II deals with planning, design and operation of wastewater treatment plants and decentralized as well as advanced wastewater treatment technologies and sludge treatment technologies. It covers decentralized systems for rural areas and small villages, operation and control of wastewater systems, advanced wastewater treatment, sludge treatment and disposal technologies.

Industrial Wastewater Treatment
This course presents basic process engineering principles in industrial wastewater treatment in theory and practice. Therefore it combines the tools of process engineering with wastewater treatment by teaching the physical, chemical and biological fundamentals of the different processes and the combinations thereof. Industrial Wastewater Treatment presents an overview of different industrial effluents, production integrated measures, international laws, and the best available technique reference documents. It goes on to describe solid-liquid separation.
Water Science

Water Chemistry
This course covers the basic knowledge concerning the chemical aspects of water quality which are relevant to all kinds of abiotic and biotic processes in aquatic systems, water treatment, water distribution and wastewater treatment. Water Chemistry deals with substances dissolved or suspended in water, the principles of chemical water analysis, chemical reactions and their quantitative description, acid-base equilibria, the inorganic carbon buffer system, the hydrolysis of metals, the complexion of metals, the precipitation of insoluble substances, surface chemistry and the modeling of chemical equilibria.

Weeks 1 and 2: The chemical composition of water and the occurrence of substances in water; changes in water quality; and the effects of water quality on aquatic ecosystems.

Water Biology
This course highlights the principles of aquatic ecosystems, aquatic biological structures and processes as well as methods for water quality evaluation. This means that the basic tools for water management, a sustainable watershed management and the control, evaluation and protection of aquatic systems are delineated. Water Biology includes the biological components of aquatic systems, methods of biological water analyses, the evaluation of parameters, P-, N- and C-turnover processes, aquatic organisms and food chains, eutrophication, significance of cyanobacteria, methods for water quality control and evaluation, water-borne diseases and the management of watersheds.

Basic Hydrogeology
This course mediates the basic knowledge of hydrogeology to accommodate the fact that groundwater potential is largely dependent on the hydrogeological conditions and thus influences the role of groundwater as a reservoir for various water demanding sectors. It also includes small projects that are undertaken to apply theoretical knowledge into the field. Basic Hydrogeology delineates the different types of consolidated and unconsolidated aquifers and how they were formed, the principles of stratigraphic units, sedimentology, and structural geology as far as it is important to understand the groundwater flow, unsaturated and saturated zone, capillarity, uncoun- fined and confined groundwater, Darcys law, transmissivity, storage coefficient, water chemistry as interaction of rock type and groundwater, main ions, and the importance of the pH-value, Eh and the carbon system in the water cycle.

Applied Hydrogeology
This course concentrates on groundwater exploration and exploitation as well as sustainable groundwater supply in the context of the best quality and constant quantity. It considers urgent challenges related to sea water intrusion problems as well as the fact that groundwater in land regions occurs in aquifers that are mostly deep and non-renewable. Applied Hydrogeology deepens the students’ skills in the construction of water wells and applications of all kinds of hydraulic and other testing methods. For the protection of drinking water wells and problems surrounding sea water intrusion, numerical models are introduced and applied in real case studies, particularly using commercial models such as Visual Modflow and Feflow.

Field Hydrogeology
This course applies theoretically acquired methods in the field to get reliable data for conceptual and nume¬

cal models that are used as tools for a sustainable water resources management. It includes a number of related hydrogeological field measurements and analyses. Field Hydrogeology focuses on the preparation of field work, measurements of hydrologic parameters, runoff and water infiltration, the completion of pumping tests, slug and bail tests, tracer tests, water sampling and chemical analysis in place, the determination of hydro-chemical changes from surface to groundwater of sewage, the use of treated sewage for groundwater storage and recovery, rainwater harvesting and the effects of bank filtration, and the preparation of the field report.
Hydraulic Engineering and Modeling of Hydrosystems

This course introduces students to the principles of hydromechanics and hydraulic engineering as well as to modeling of hydrosystems focusing on the subsurface. Solid fundamentals in combination with modern simulation methods and techniques are essential for planning and managing hydrosystems. A solid and trending and methodical education will be offered which enables students to solve water-related problems in arid regions. Hydromechanics and Hydraulic Engineering focus on balance equations, open channel hydraulics, groundwater flow and transport, experimental design as well as river engineering and restoration, reservoirs, hydropower, waterways and coastal engineering. Modeling of Hydrosystems considers simulation methods, including transport processes in groundwater, model concepts, discretization methods (Finite-Difference, Finite-Element and Finite-Volume Methods), stabilization methods, components of modeling systems, a computer exercise for a groundwater flow and transport model with simple engineering problems in arid regions, and an introduction to subsurface multiphase flow.

Environmental Hydraulics

This course addresses advanced fundamentals of flow and transport processes in surface water systems as well as the associated modern simulation methods and techniques. This emphasizes the fact that modeling systems and the related know-how concerning trend-setting tools such as numerical modeling are crucial to integrated water resource management. Environmental Hydraulics conducts the advanced hydromechanics of shallow water flows, turbulence, transport (matter, sediments, heat), model concepts, discretization and stabilization methods (Finite-Difference, Finite-Element and Finite-Volume Methods), modeling systems, flood protection, river restoration and computer exercises with engineering problems.

Water and Wastewater Transport

This course demonstrates the basics of water and sewage transportation. It covers the design and operation of fluid system elements like pumps, pipes, valves and basins, while, in particular, the operation of pumping systems with respect to the economic conditions is investigated. Water and Wastewater Transport deals with fluid mechanics, fluid flow in pipes, pump basics, pump types, affinity laws/numbers, cavitation, NPSH, operational characteristics, submersible pumps, water pumps, sewage pumps, performance test, technical diagnostic, life cycle cost, standards, seals, valves and basic design issues.

Hydro-Engineering Infrastructure

Water Economics

This course focuses on the theoretical fundamentals of water economics and their application in the area of water policy. It includes the economic principles of efficiency and their interaction with institutional boundary conditions with respect to variations in specific countries. It also relates to the economic logic of competition on water and water resources. Water Economics includes the fundamentals of economic theory, economic water characteristics, efficiency as an assessment criteria, competition for water in terms of quantity and the deviation to water quality issues, legal requirements and institutional boundary conditions, cost-benefit-analysis, pricing in water sector, the functionality of water markets, instruments of environmental pollution control and the analysis of water demand (private households, commercial sector, agriculture).

Integrated Project I

This course constitutes both a recap and a transfer into practice of the basic principles and fundamentals acquired in the first semester on the basis of cooperative practical projects. As the specific professional background of the students spans the entire field of water management, the specific knowledge of each student is integrated into the project and is made available to gain a more homogeneous knowledge overall. Integrated Project I conceptualizes and develops a project theoretically on the basis of a case study. In this context, the required information is provided and working in study groups, the students elaborate the water supply, the distribution of water, the collection of sewage, the pipe network, the treatment of sewage and the reuse of the treated water.

Integrated Project II

This project allows the transfer of the knowledge that the students have gained during their studies on water engineering into practice on the basis of project work. This case study, completed together with students from Urban Development and Energy Engineering, elaborates an Integrated Water Resources Management embedded in urban planning and with the use of efficient energy. This particularly includes the ability to coordinate approaches for different solutions to the problem and the selection of a final decision (Logical Framework Approach). The project results are presented within the interdisciplinary seminar in order to make the specific knowledge of each student mutually accessible. This integrated project focuses on the development of a water supply and sewage treatment for concrete examples regarding the urban planning and the efficiency of energy use.

Intercultural Communication

This course provides students with an awareness of cultural differences with respect to varying values and experiences and the resulting effect on working processes and the related challenges. In this manner, the main concepts of intercultural communication are presented and basic competencies and interpersonal skills for successful intercultural communication in a global setting are developed. This course also includes a continuous dialogue with stakeholders from the fields of science and industry, as well as with customers, employees and the local population. Intercultural Communication addresses communication skills training, team work in an intercultural context, working in international networks, conflict management, mediation, facilitation, presentation and computer-mediated communication.

Excursion in Germany

This excursion presents water technology and water management in Germany on the basis of professional visits to water works, wastewater plants, the water industry in the field of water management, administrative departments in water supply and distribution and water protection facilities. On the basis of typical examples in Germany, water management problems as well as their solutions are demonstrated, and differences to the specific conditions in arid regions are then worked out.

Interdisciplinary Studies and Intercultural Competence
Learning outcomes
The Master's program in Water Engineering aims to develop knowledge and insights, thinking, practical and transferable skills in natural and engineering sciences relevant to the water sector in arid and semi-arid regions. It provides participants with the following:

Knowledge and understanding of
- The complexity of the challenges facing water issues in arid and semi-arid regions, including the significant effects of and on economical, socio-economic, legislative, administrative, technological and natural boundary conditions ranging from the local to the global scale.
- Well-established fundamentals in water science, water and wastewater treatment as well as hydro-engineering infrastructure.

Intelectual Skills:
- Conduct scientific research, facing urgent challenges in the field of water engineering in arid and semi-arid regions.
- Develop academic and scientific strategies and innovative approaches and/or technologies for complex problems in water resources management in a sustainable and integrated manner.
- Select, optimize and modify methods, procedures and techniques related to water engineering.

Practical Skills (able to):
- Prepare written or oral presentations including the defense of the results of experimental, theoretical or analytical studies.
- Adopt the ability of an effective and integrated project management.
- Undertake analytical and modeling analyses as well as experimental work in the laboratory, at pilot test stands and in the field, based on the efficient handling of conventional and modern tools and techniques.
- Plan, design and operate conventional and advanced components and systems in an economic and ecological way.
- Apply methods for finding and evaluating new water resources, and to use them in a sustainable and integrated manner.

Transferable Skills (able to):
- Initiate and consolidate sustainable forms of communication and cooperation among the relevant actors and stakeholders with respect to the interdisciplinary, international and intercultural framework of an integrated water resources management.

Teaching and learning methods
Addressing a sustainable approach in teaching, conventional methods such as lectures, seminars and self-studies are complemented by integrated courses, field trips, internships, integrated projects and an industry internship.

To enhance the international character of this program, classes are held by established international professors and lecturers of the Technische Universität Berlin, all of them specializing in water-related fields. Associated professors may also broaden the scientific expertise. This enables a permanent integration of cutting-edge applied research into the course content. Finally, extensive monitoring and individual support is guaranteed by several research assistants, a limited number of students and small project groups, as well as through the framework of twin-supervision with cooperation partners.

Business and academic opportunities
Students from the program are awarded an official master's degree from the Technische Universität Berlin in Water Engineering. The demand for knowledgeable engineers is rising, especially in arid and semiarid regions. Graduates of the master's degree program are qualified to work in leading positions in the local, regional, national or international context of sustainable water engineering. They are able to work in the private sector, governmental institutions, non-governmental organizations, associations and consultancies and are also qualified to apply for international PhD programs at research institutes, universities or in industry.
Master’s Degree Program
Urban Development

Urban growth is extensively transforming the face of the planet. For the first time in human history, more than half of the world’s population now lives in towns and cities. With an average growth rate of 2.1% per annum from 1990-2003, the MENA region has one of the world’s most rapidly expanding populations, increasingly concentrated in urban areas, accounting for 48% of the overall population in 1980 to close to 60% in 2000. This figure is expected to exceed 70% by 2015, highlighting the increasing role urban areas play in the quest for development and sustainability.

Since urban areas are places of encounters and fulfillment as well as differences and tensions, urbanization creates opportunities and problems at the same time. Cities in both the MENA region and other parts of the world are engines of growth, providing a disproportionate share of jobs, income opportunities and access to services. At the same time, cities are places of growing social and economic inequality, with increasing numbers of people living in poverty and deteriorating living conditions. Furthermore, urbanization also poses a significant challenge in the 21st century, with an estimated 80% of global greenhouse gas emissions linked to urban areas. The enormous contribution of urban areas to global greenhouse gas emissions is set to increase even more.

The challenges surrounding urban growth require theoretical approaches and operational tools that are properly geared to the specific social, economic and institutional conditions of a specific region. In addition, urban low carbon concepts in recognition of local resources, know-how and management capacities are essential elements of an effective planning strategy for the future. The central concern of the master’s program is to equip the participants with a critical understanding of the development of urban areas, unveiling the political, economic and social forces underlying the different types of urban conflict and exploring concrete approaches to address their causes. The program takes an interdisciplinary and international comparative perspective - with a special focus on the MENA region – exploring the specific conditions for interventions in differing urban contexts.
Objectives

The program looks into different approaches in development planning and the (social, economic and environmental) conflicts generated by them. Different methods for enhancing urban productivity through public and private interventions are identified. It contrasts these methods and approaches with the need for long-term environmental sustainability and social cohesion and examines specific attempts to incorporate a deeper awareness of these goals into development, policy making, planning and management in urban areas.

The focus of the program is on the particular characteristics and challenges of urbanization in the countries of the MENA region and their need and potential for sustainable urban development. However, the knowledge, methodologies and skills obtained during the master’s program are also applicable to urban processes occurring in other parts of the world.

Through the critical examination of the theory and practice of sustainable urban development at the international, national and local levels in a variety of contexts, the program seeks to provide participants with an understanding of the processes generating economic, social and environmental change as well as the skills and abilities required to respond to these changes.

Concept

As based on its objectives, the program is designed around different core concerns: understanding the city in the context of public and private interventions, the identification of structures and the mechanisms of urban areas. It also delineates the development and implementation of urban projects according to the principles of sustainability and explores real-life challenges in the practice of urban development planning in the context of urban areas in the MENA region.

On the basis of these concerns, the study program is organized in four areas of expertise: urban planning, project management, technical infrastructure and interdisciplinary studies. The reference framework for all four areas is the concept of sustainability – in terms of the general understanding of interconnectedness of ecology, economy, social context, cultural background and governance. Beyond the perception of sustainability, a specific emphasis on the concepts of low carbon cities, circular economy and the adaptation and mitigation of climate change and socially just cities is provided. For the better understanding of the theories and methodologies in all areas, a special focus is made on interdisciplinary term projects for an integrated and activity-oriented approach.
Urban Planning (Tools)
The aim of this course is to provide an in-depth understanding of sustainable urban planning. It reviews the evolution of urban planning and defines the theoretical and methodological challenges which face contemporary urban development in different parts of the world. It also assesses a range of cases of urban planning practices in the North and the South, delineating their contribution to the current debates surrounding sustainable urban development. The course also covers international trends in urban planning initiatives and the fundamentals of planning tools such as master planning, local development planning, strategic planning, action planning, participation tools and methods. A special focus will be made on the practical constraints of cities in the MENA region regarding the effects of informal urbanization, environmental pollution and the lack of urban services.

Urban Design
This course introduces the role of urban design, its potentials and its problems both from a theoretical and a practical point of view. It offers a comparative investigation between singular building(s) and city scale developments with a special focus on the principles of sustainable and energy-efficient urban design. This includes "high-tech" design solutions as well as "low-tech" alternatives. The key aspects of this course include the principles of sustainable urban design, the functional and organizational aspects of urban design (building structures, context-specific issues such as site and local climate, regional architectural traditions and typologies, local building materials etc.), solar energy and other renewable energy sources in urban design, architecture & urban design in their existing contexts and ecological aspects concerning recycling and the re-use of building-fabrics.

Environmental Planning
The formal and the informal development of cities have a direct influence on the human environment, landscapes and urban open space. The aim of this course is to provide a basic understanding of the environmental implications of human settlements and the necessity for the consideration of environmental aspects in urban development and planning. This refers to natural assets such as soil, water, climate, air, species, biotopes and green spaces, as well as to aspects of recreation and human health. The impact of current developments such as climate change on the urban environment and possible solutions to the resulting impairments will be also discussed. Further emphasis is made on methods such as data collection and analysis, conflict analysis, definitions of planning guidelines and the aims and implementation of the respective measures. Internationally applied planning instruments, such as environmental impact assessments, compensation planning and landscape planning will also be introduced.

Urban Landscape Design
The physical, material, and conceptual understanding of landscapes can enrich the current forms of urban planning and design practice. To do so, the urban landscape design course focuses on landscape production as a complex cultural, social, ecological and economical process. It brings together the landscape with related disciplines such as urban planning, urban design, environmental planning and infrastructure planning. Design methods and realized projects are studied to explain how the urban landscape can have positive ecological effects on the urban system and how they can interact to create resilient urban structures. A special focus will be made on infrastructural interventions on an urban or regional scale and their impact on landscapes. The study objective is to gain a basic knowledge of current landscape theories and design approaches for urban landscapes. The development of competence will tend towards articulating qualitative issues relating to current urban landscapes, integrated master landscape planning as well as large scale interdisciplinary projects.
Urban Sociology
This course will explore the ways in which a socially sensitive approach can be integrated into development interventions in cities in both Europe and the countries of the MENA region. It provides students with the required knowledge to gain and critically examine empirical data from the field as well as an understanding of the current debates in urban sociology. It furthermore demonstrates how social development concerns can be effectively addressed in the processes of development policy, planning and practice. Specific aspects include demographic change (e.g. rural to urban migration), the management of social data, the acceptance of urban development projects and mediation in urban planning.

Project Management:

To establish a common understanding of complex urban projects, the field of project management introduces the key concepts and theories of urban economics, urban management, planning law and good governance as applied to problem diagnosis and policy making in urban development. In addition to this, the correct use of these instruments and their implementation in planning processes enable the realization of urban ideas and development projects.

Projects are unique schemes whose objectives should be achieved with limited resources by a certain point in time. In the field of urban planning in particular, knowledge of project management is of major importance for the success of urban planning/development projects. The courses aim to provide students with the necessary management methods, management techniques and management tools. The content includes e.g. the basics of project management such as the realization and operation of urban projects, life cycle considerations, time management and cost accounting methods, information search, validity checking, cost control, schedule control, risk management, monitoring, project controlling and project control systems and the contractual framework for planning projects. Specialized and methodical competence also needs to be expanded to include social competence, as the tasks normally require processing by interdisciplinary teams. In addition to this, broader urban projects and settlements and questions concerning the organization of local district affairs and urban (land) management form part of the courses.

Urban Economics

This course enables students to develop a critical understanding of the key factors surrounding economic functioning of cities. It comprises the introduction of key concepts of urban microeconomics (e.g. agglomeration economies, external effects, public goods, and information), an introduction to location theories (e.g. locational choices of enterprises), urban land markets (e.g. space demand, speculation, and informal economies), urban labor markets and retail markets. Moreover, the relevant aspects of urban macroeconomics (e.g. urban growth, urban economic structural change, city systems and specialization, urban time structures) and urban public economics (e.g. role of the state, state and local public finance, provision of infrastructure, splintering urbanism) will also be introduced. Additionally, aspects of urban economics in project management, economic decisions, money-time relationships, cost and cost estimating, feasibility studies and financial accounting and benefits analysis also forms part of the courses. All of these concepts and theories are placed in the perspective of sustainable urban development from the economic, social and environmental points of view.

Planning Law

Urban planning theories and policies require implementation. Planning law refers not only to policy, but the implementation devices or laws that can be utilized to apply policies, particularly through regulations, subsidies, or tax and other incentives, and at which levels of government. This course introduces the range of federal, state and local governmental rules and regulations that a planner may have to deal with. It also covers the basics of the different national planning systems as well as regional land use regulatory programs. Emphasis will be placed on identifying the measures that apply to a given project, formulating a strategy for addressing them, and understanding the reasons for their adoption. The course further explains the basics of land tenure and land regulation and the relationships between urban regulations and informal planning. In addition, corruption as a major obstacle for urban planning also forms part of the course discussion.

Urban Governance

Sustainable urban development requires adequate and effective governance processes. Therefore, the different meanings and theoretical approaches of the governance concepts (mostly characterized by the interdependent principles of sustainability, equity, efficiency, transparency and accountability, responsibility, security, civic engagement and citizenship) are analyzed and their promises and pitfalls are subsequently elaborated in different parts of the courses and projects in the study program.
Technical Infrastructure: Urban infrastructure includes all of the physical facilities relevant to the provision of transportation, sewage, water supply, waste water disposal, solid waste, energy, telecommunication, fire services, general government services etc. This course will introduce the primary infrastructure needs and up-to-date responses to them from both a technical and policy perspective.

Water Supply and Wastewater Disposal
The high concentration of people in urban areas places massive pressure on the local environment and the available resources. This generates very high demands on services such as water supply, wastewater disposal and sanitation. At the same time these are of direct relevance to sustainable urban development. The aim of this course is to provide the basic knowledge required to understand what a water resource system is, how it works and how it can be financed. Furthermore it highlights the management of the human impact on water resources, the reduction of human water consumption, the planning, design and operation of important urban water systems and methods for sustainable water and wastewater disposal such as grey water recasting, rain water harvesting and water re-use.

Energy Supply and Technologies
The aim of this course is to provide basic knowledge surrounding sustainable energy supply and technology. This includes energy in buildings as well as energy in urban design and planning with a special focus of the use of renewable energies in the MENA region. The content of the course includes global and European Arab strategies concerning energy supply, concepts of sustainable energy supply, the environmental consequences of energy use and production (climate change/global warming), technologies for mitigation such as renewable energies, decentralization, basics of building physics (heat transfer in building elements, shading devices, humidity and condensation effects, thermal comfort, ventilation, global radiation on buildings), the reduction of embodied energy of buildings, solar thermal energy for domestic hot water, space heating and the criteria and indicators of the concept of sustainable energy supply.

Traffic Planning
The growing problems of traffic in urban areas have led to renewed conceptions in ‘mobility’ planning and traffic management. As the quality of the urban environment relates directly to its transportation facilities, growing concerns regarding clean air, economic development, congestion management, transportation control measures etc. have greatly increased the importance of well-planned transportation facilities and policies. This course introduces the basics of traffic planning in an urban context. Furthermore, new directions in the urban transportation planning processes will be highlighted and the correct use of these instruments introduced. The content involves e.g. network planning for roads, public transport, bicycles and pedestrians, new directions in the urban transportation planning process, networks used for public and private transport (planning methodology, design of transport plans) and the design of access roads and main roads, public transport facilities, facilities for pedestrians, bicycles and parked vehicles.

Waste Management
In the countries of the Global South, it is common for municipalities to spend a lot – in some cases up to 50% - of their available recurrent budget on solid waste management. Nevertheless, in most cases, urban solid waste remains uncollected due to the lack of functioning services. In most countries of the South, open dumping with open burning is the norm, generating immense problems for the environment and public health. The course in waste management covers the fundamentals of sustainable waste management in the urban context. It includes questions of urban metabolism and waste generation, waste collection, waste transfer and transport and recovery and treatment technologies, final disposal sites and landfill aftercare and reclamation. Beyond a brief introduction to the technology, the course introduces the specific planning perspective of waste management. Key elements are a stakeholder analysis, strategies for the integration of waste management in urban infrastructure and economic instruments for financing waste services.
Term Projects I, II, III
In these courses students are introduced to the critical analysis of a realized or a developing urban project in the context of integrated study projects. The basis of this interdisciplinary team work is the combination and integration of the knowledge and skills gained in the disciplines of urban planning, project management and technical infrastructure. Furthermore, external experts from different companies and organizations will also present their experiences and opinions. Their additional inputs will provide the opportunity for students to integrate professionals’ expertise within their projects.

Term Project I (1st semester):
Ex-post analysis of a complete planning process of a city quarter project (best-practice example)
Potential case study: ‘New Towns’

Term Project II (2nd semester):
Ex-ante analysis and development of a complete planning process of a city quarter project (best-practice example)
Potential case study: ‘Urban Renewal’

Term Project III (3rd semester):
Integrated analysis and development of a complete planning process
Potential case study: ‘Informal Settlements’

Intercultural Communication
The aim of this course is to provide students with an awareness of cultural differences and to equip them with skills needed for tackling the problems surrounding intercultural communication in a global setting, especially between the western and the Arab worlds. Aspects of this course include communication skills training, team work in an intercultural context, working in international networks, conflict management, mediation, facilitation, presentation as well as computer-mediated communication.

Internship
The internship provides practical experience in a study area in order to enhance the acquired knowledge of students in their field of interest.

Master’s Thesis
The master’s thesis enables students to apply their knowledge of urban development and their competence in managing their own project. The students’ own selection of a topic ensures a further specialization of the individual knowledge of their specific field of interest. Students will be encouraged to cooperate during their master’s thesis e.g. with local administration and other governmental organizations, private industry or national and international non-governmental organizations. Within the thesis, the work is structured on a self-reliant basis. The academic (and practical) challenge of a topic in the field of urban development will be identified and hypotheses and objectives formulated. An appropriate approach to resolve these challenges will be selected, the acquired methodological understanding applied and, if necessary, methods modified. The results of the study will be discussed and conclusions proposed. The thesis will finally be presented and defended. Since the supervisor(s) and location of the master’s thesis is the subject of selection as well, the intercultural and interdisciplinary qualifications of the student will also be developed.
Teaching/Learning Methods and Strategies

The courses consist of lectures, seminars, workshops, exercises and integrated projects. The integrated projects form the backbone of the study program: on the basis of real cases, interdisciplinary teams will be put together to find solutions for the development of complex topics in the field of urban development. The project work will include site viewings (excursions), enquiry sessions, moderated group discussions, teamwork and mediation workshops. The participants will gain professional experience through studying while developing their social and intercultural skills at the same time. The students' performance is assessed through course work, examinations and a final dissertation report (Master's thesis).

The Urban Development program is divided into a three semester study period along with a 4th semester in which students write their Master's thesis. The first and third semesters provide study conditions at the TU El Gouna campus as well as in the city itself. In addition, students experience life in a vibrant metropolis in the heart of Europe while studying in Berlin during the second semester. This represents a multi-faceted contrast: the climate and size of the cities not only vary tremendously, their cultural and economic backgrounds also provide different insights into the problems of urban development. The TU Berlin parent campus with about 34,000 students - an impressive and motivating environment for academic studies and research - also emphasizes the range of different study locations: a unique opportunity to study urban development; between places calm and lively, in eastern and western parts of the world.

Business and Academic Opportunities

The UD program is primarily oriented to future leaders in the complex field of sustainable urban development. Graduates of the UD program will be highly qualified to work in leading positions in the local, regional, national or international contexts of urban development. They will be able to work in governmental institutions, the private sector or academia. The qualifications are typically required in the national or international fields of sustainable urban development planning, master planning, sector planning and management, strategic planning, sustainable urban renewal, area- and project development (developer), public administration in the areas of urban development, town planning, local economy, facility management, business development, scientific research and consultancy. On successful completion of this Master's program students will also be qualified to apply to international PhD programs.

Learning Outcomes

The Master's Program in Urban Development provides participants with the following:

Knowledge and Understanding of:
- The complexity of urban contexts and the significant economic, social, political and environmental changes affecting cities
- Contemporary challenges of urban development planning and its relation to wider development processes and policies that affect urbanization
- The social and physical transformation of cities in the MENA region in the light of debates on sustainable development and within the context of the economic and political structuring of urban areas
- Strategies, concepts and instruments for the mitigation of, and adaptation to climate change, including approaches such as "low-carbon cities"

Intellectual Skills (the program aims to help students):
- To develop analytical and critical skills for comprehending complex urban problems and to devise conceptual solutions towards environmentally sustainable and socially just cities
- To develop academic and scientific problem-solving strategies and processes - on the basis of specific projects, including state-of-the-art technologies as well as renewable energy technologies
- To analyze and contrast the role, power and practices of different stakeholders in the field of urban development
- To think creatively and independently about (new) urban development problems and projects

Practical Skills (enabling students to):
- Acquire the ability to design and structure urban development projects and efficiently implement those projects in line with the principles of sustainability
- Adopt the ability of integrated project management and interface-management
- Undertake a well-supported diagnosis of problems and opportunities in urban development, formulate proposals, devise, select and implement solutions and reflect on its performance
- Initiate and consolidate sustainable forms of communication and partnerships among relevant actors and stakeholders
- Acquire multi-disciplinary team- and intercultural working skills as well as first-rate leadership and management skills
- Carry out scientific research (written essays, oral/visual presentation, team-based reports) and consultancy work

Transferable Skills:
- Live and work in a multi-disciplinary, multi-cultural environment
- Reflect on their own ideas by becoming more tolerant of and acquainted with unfamiliar ideas and practices
- Challenge conventional wisdom
- Act in gender-sensitive manner
- Develop negotiation skills
- Improve time management skills and develop self-discipline

Teaching/Learning Methods and Strategies

The courses consist of lectures, seminars, workshops, exercises and integrated projects. The integrated projects form the backbone of the study program: on the basis of real cases, interdisciplinary teams will be put together to find solutions for the development of complex topics in the field of urban development. The project work will include site viewings (excursions), enquiry sessions, moderated group discussions, teamwork and mediation workshops. The participants will gain professional experience through studying while developing their social and intercultural skills at the same time. The students' performance is assessed through course work, examinations and a final dissertation report (Master's thesis).

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How to apply

Energy Engineering (EE)
Master of Science, 4 semesters
Requirements:
• Successful completion of university degree, preferably in power engineering or similar;
• professional experience or experience as an intern of one year in total preferred and is part of the selection criteria;
• sound knowledge of English – language certificate is not obligatory but serious lack of language ability might cause rejection or extend study time and expenses
• number of participants is limited to 30;
• program starts in winter semester (October);
• venue: winter semester (1st & 3rd) in El Gouna/Egypt, summer semester (2nd) in Berlin, Germany;
• tuition fees: 20,000,- Euro in total if studied as scheduled, to be paid in installments

Water Engineering (WE)
Master of Science, 4 semesters
Requirements:
• Successful completion of university degree, preferably in geo-engineering sciences, chemical engineering, process engineering, mechanical engineering, biology, chemistry, environmental protection technology or similar;
• professional experience or experience as an intern of one year in total preferred and is part of the selection criteria;
• sound knowledge of English – language certificate is not obligatory but serious lack of language ability might cause rejection or extend study time and expenses
• number of participants is limited to 30;
• program starts in winter semester (October);
• venue: El Gouna/Egypt (1st to 3rd semester), several week visit to Berlin during 2nd semester, last semester (4th, master thesis) flexible;
• tuition fees: 20,000,- Euro in total if studied as scheduled, to be paid in installments

Urban Development (UD)
Master of Science, 4 semesters
Requirements:
• Successful completion of university degree, preferably in architecture, town and regional planning, landscape architecture or similar;
• professional experience or experience as an intern of one year in total preferred and is part of the selection criteria;
• sound knowledge of English – language certificate is not obligatory but serious lack of language ability might cause rejection or extend study time and expenses
• number of participants is limited to 30;
• program starts in winter semester (October);
• venue: El Gouna/Egypt, summer semester (2nd) in Berlin, Germany;
• last semester (4th, master thesis) flexible;
• tuition fees: 20,000,- Euro in total if studied as scheduled, to be paid in installments

Admission and Matriculation

For application at the Technische Universität Berlin, the following details/documents are to be submitted by all applicants from 01.01.2012 until 31.07.2012:
• First name, surname (must correspond exactly with details in copy of passport)
• Gender
• Date of birth, place of birth, country of birth
• Address, email address
• Course of study
• Qualifying university degree including date
• CV incl. job references
• Letter of application reflecting your motivation to apply
Applications will be appraised by an admission council consisting of professors of TU Berlin. Applicants will be informed as soon as possible when they are approved for matriculation.

For matriculation at the Technische Universität Berlin, the following details/documents are to be submitted by all applicants:
• Application for matriculation (to be downloaded from webpage)
• A certified copy of the degree certificate in German, English or French. We are able to complete the certification process by creating a photocopy with the annotation: original was presented + signature / stamp
• Regular photocopy of national ID card or passport
• Residency permit for study purposes
Please send the documents referring to the detailed information that will be available here: http://www.tu-berlin.de/?id=96807

Scholarships and Accommodation

The following information relates to the master degree programs “Energy Engineering”, “Urban Development” and “Water Engineering” only. Further details can be found here: http://www.tu-berlin.de/?id=96808

General things of interest:
Scholarships:
The Campus El Gouna offers an own scholarship fund. Every year at least the 5 high qualified applicants of each of the following degree programs are eligible for receiving a scholarship to cover the full tuition fees (cf. Webpage “TU Berlin El Gouna Scholarship Fund”).
Further accessible external scholarships to cover daily life expenses and/or at least partly the tuition fees are available by individual application to several institutions. Enterprises and other benefactors are invited to propose “Working Students” for application. Conditions and benefits offered by TU Berlin are available on our webpage (“Working Student”).

Sojourn time in El Gouna:
Accommodation for students: Student halls of residence are provided for TU Berlin students by Orascom Hotels & Development (OHD), in immediate proximity to the campus. The apartments are rented to students at reasonable rates of approx. 300 E/month. An average apartment is approx. 20m² incl. bathroom and kitchenette. A common room and a laundry are also accessible in the dormitories.

Sojourn time in Berlin:
As Berlin is an internationally popular place to study, various types of accommodation are available. TU Berlin’s staff will enjoy supporting their students if assistance is needed.

Residence Permit / Visa:
As the programs are open to all nationalities, terms and conditions may vary. TU Berlin will support all accepted students in this issue. Generalities can be found on our webpage.
The Campus El Gouna is a “Zentralinstitut” in accordance with the Berliner Hochschulgesetz [Higher Education Act], which has the quality and functions of a school. Members of the Campus El Gouna are professors, academic employees, students, technical employees and administrators. All university lecturers at the Campus El Gouna have simultaneous membership in one of the faculties of TU Berlin. Currently, they come predominantly from the Faculties VI (Planning Building Environment), III (Process Engineering) and VII (Economics and Management).

As Campus El Gouna has the quality and function of a school, the principles of academic self-government in accordance with the Berliner Hochschulrecht apply for the internal organization: All members have the active and passive right to vote about the self-governing committees of the Campus El Gouna.

The structure of self-government contains the following organizational units:
- Academic Director
- Campus Council
- Department Councils
- Deans of Studies
- Administration and Management.

Future Prospects

In terms of prospects, the Campus El Gouna is set to develop into a site with diverse activities. Prospectively, the following will be added:
- Further study and further educational courses
- Innovative research projects with regional significance, also in cooperation with Egyptian universities. The following projects are already starting up or being prepared:
  - Desalination plant
  - Planning laboratory for a CO2-free city of El Gouna
  - Postgraduate program
  - Vocational school training
  - An example of such scientific projects is the current BMBF project “Water-Energy-Building” - Training and Transfer” (WEB-TT) which is managed by the TU Berlin. In this project, vocational training in Egypt is picked out as a central theme, as its importance has been recognized alongside academic university education. Together with several German and two Egyptian partners, vocational training in Egypt is to be intensified, particularly in the building sector. The partners in Egypt are Orascom Housing Communities (OHC) and Orascom Construction Industries (OCI). Initially, environmentally-friendly, resource-saving technology should be made accessible to the Egyptian population through vocational training. In addition, this should create the basis to use this technology in the country in the long term. The consortium plans to build and establish a vocational training center close to Cairo in 2012/13.
- Start-ups: TU Berlin has a very successful „Start-up Service “ and a Centre for Entrepreneurship which guarantees effective support for students and graduates looking to set up a company.
- Planning and building exhibition
- Cultural events

Networks in the MENA Region

In the past few years, the TU Berlin has developed its activities in the field of sustainable design of living spaces in the MENA region with a focus on applied engineering, the planning sciences and human sciences. The intention is to incorporate findings from projects in Central Asia, the Near and Middle East and North Africa into the lessons in El Gouna, thus initiating new projects. Among others, the relevant subjects include energy-efficient construction and urban planning, urban farming, sanitary environmental engineering and vocational training in the construction trade.

The projects and activities with a focus on the subjects mentioned above are being coordinated and supported by the TU’s own „West Asia North Africa Cooperation Unit“ (WANACU). On the Campus El Gouna, the cooperation unit itself and the “Middle Eastern North African Sustainable Habitat Development Association” (MENAHHDA) network coordinated by it will contribute to establishing an international sustainability network in the region.
The TU Berlin is a traditional and globally recognized research university. The university wants to further develop science and technology to benefit our society. The members of the university are bound by the principle of sustainable development, which will satisfy the requirements of the present, while ensuring this is not at the cost of future generations. To us, research and teaching are inextricably bound with one another.

The TU Berlin contributes to designing the future in an innovative and technical manner, with an integral approach. It is committed to its responsibility - also justified in terms of history - for socially and ethically focused research and teaching, bound by a humanism approach. Against this background, natural sciences, planning sciences and engineering research and teach on an equal footing with human and social sciences in close cooperation. They only pursue civil purposes in research and teaching.

The members of the university campaign actively for the equality of women and men and create family-friendly study and working conditions. The TU guarantees equal opportunities and freedom from discrimination on all levels of the university organization. The members of the university also pay explicit attention to the plurality of philosophies and life forms in their teaching and research.

The TU Berlin considers itself to be a learning organization with continual development of its staff. All status groups contribute to the creation of modern organizational and management structures as well as designing everyday university life. The TU operates its facilities securely, in conformity with health and safety standards, with careful use of resources and in an environmentally-conscious manner. It systematically encourages its next generation of academics and offers attractive and demanding working and training places.

Teaching and Study

The TU Berlin is an attractive educational facility, in which students acquire technical and social competences with which they can actively design their personal and our social future. The wide range of subjects at the TU Berlin makes it possible for students to acquire a transdisciplinary, academic education, which takes into account the social and global responsibility of the university.

### Personnelse (as of: 6.9.2011)

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors (including 13 junior professors)</td>
<td>507</td>
</tr>
<tr>
<td>Private lecturers</td>
<td>218</td>
</tr>
<tr>
<td>Academic assistants</td>
<td>2459</td>
</tr>
<tr>
<td>Employees in the administration etc.</td>
<td>2072</td>
</tr>
</tbody>
</table>

### Students in Summer Semester 2011

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of students</td>
<td>28308</td>
</tr>
<tr>
<td>Number of males</td>
<td>19142</td>
</tr>
<tr>
<td>Number of females</td>
<td>9166</td>
</tr>
<tr>
<td>Number of foreign nationals</td>
<td>5671</td>
</tr>
</tbody>
</table>

Academic further education is an integral component of teaching and enables life-long learning.

The quality of teaching is continually further developed through the dialogue between the teaching staff and students and through services to make teaching more professional.
Courses and programs at the TU Berlin:
Undergraduate courses of study

Master programs
http://www.studienberatung.tu-berlin.de/menue/studi-um/courses_and_programs/master_programs/parame-ter/en/

Further education
http://www.tu-berlin.de/?id=7520

PhD and doctorate programs
http://www.forschung.tu-berlin.de/?id=57719
http://www.tu-berlin.de/?id=97845

International programs
http://www.studienberatung.tu-berlin.de/menue/studi-um/courses_and_programs/international_programs/parame-ter/en/

Research
The TU operates principle-based and application-orien-
ted research at a top international level. Using its diversity
of subjects, future fields are established and cross-faculty
research activities networked with external participants
are promoted.

The academic developmental planning of the TU aims
to develop academic fields which can prospectively rein-
force the developments of the economy in the next two
decades. Since 2004, the TU Berlin has defined socially
relevant problem fields in interaction with the special-
list structure, in which questions of the future should be
answered using interdisciplinary cooperation.

The core areas of TUB research are:
- Material-Sciences
- Science & Engineering in Health
- Information & Communication Technology
- Resources & Sustainability
- Infrastructure & Mobility

The professors who have merged together into an “inno-
vation center” in the field of one of these research fields
receive infrastructural support from the research funding
within the university.

Since 2006/2007, the TU Berlin has been represented by
the Berlin Mathematical School and the “Unifying Con-
cepts in Catalysis” excellence cluster in the German ex-
cellence initiative by the government and states.

Since 2009, the TU Berlin has been the central partner
of the two European “Knowledge and Innovation Com-
nunities (KICs)” of “Climate Change” and “Information
Technology” of the “European Institute for Innovation
and Technology” founded by the EU.

KICs are considered to be innovation drivers by the EU,
which are intended to bring Europe and, particularly,
Germany, into a leading position on the world’s market.
They are being supported for five years by the EU, with
funding of 100 million euros each year.
Practical Relevance and Knowledge Transfer

An outstanding sphere of activity of the TU Berlin is the transfer of knowledge and technology between the university and practice. There are countless strategic alliances with companies and academic and non-academic research facilities. The TU Berlin systematically promotes the transfer of innovation through start-ups and supports its members in founding companies. We hold discussions in public.

The TU advises political actors, is part of a regional and cross-regional network and maintains its alumni relationships.

Research by the TU in 2005 based on figures from 2004 showed the foundation of more than 900 companies by graduates of the TU. In the launch phase, these companies had a total of approx. 580 employees. In 2004, they had more than 11,000 employees in total and achieved an annual turnover of about 1.4 million euros.

In order to make setting up the necessary business infrastructure easier for young companies, the TU Berlin was the first German university to set up the Berlin Innovations- und Gründerzentrum (BIG [Innovation and Start-up Central]) in the district of Wedding in 1988. Further start-up centres followed, which have been set up by various operators. Due to the positive opportunities to form cooperation, research institutes from the Fraunhofer Society, Deutsche Telekom, Deutsche Bahn and many medium-sized start-ups have settled in the area around the TU, which now form a major technical park that has been known as the “Campus Charlottenburg” for a number of years now.

The “start-up service” of the TU has very successfully raised substantial funds, predominantly from the Federal government, to support the founders.

In 2010, the Centre for Entrepreneurship was set up, which guarantees effective support for students and graduates looking to set up a company. The establishment of the TU’s own Entrepreneurship School comprehensively anchors the subject of entrepreneurship into the TU education.

Since 2011, the TU Berlin has been awarded as one of three German “Exist - Gründerhochschule”, universities specializing in entrepreneurship. This is the result of a competition by the German Ministry of Economics, in which 83 universities were involved.

In the ranking for the start-up incentives in 2011, the TU Berlin was given 2nd place in Germany, behind the TU München.

History

As an origin of today’s Technische Universität Berlin, the Prussian Mining Academy was founded in 1770 at the instigation of the Prussian King Friedrich II. As the second university precursor, the Prussian Building Academy was opened in 1799 by order of the king. The Royal Vocational Academy, which was founded in 1821, became the third precursor faculty.

In 1879, the Bauakademie and Gewerbe-Institut were merged to form the Technische Hochschule of Berlin. The Bergakademie was incorporated into the Technische Hochschule 40 years later.

Even at that time, the Technische Hochschule of Berlin had a versatile range of tasks. Teaching, i.e. the training of engineers, and research were on an equal footing to one another. The academic character of technology and the significance of research for the technical sciences was emphasised by Kaiser Wilhelm II when he conferred the right to award doctorates to the Königlich Technische Hochschule of Berlin in 1899. Five Nobel Prize winners adorn the list of TU professors.

At the end of the 2nd World War, the Technische Hochschule of Berlin was closed. It was reopened in the British sector as Technische Universität. As the first university of technology in Germany, its subject range was expanded to include human and social sciences in order to facilitate social-critical evaluation of the results of the technical research. In this tradition, human and social sciences still cooperate with one another today. These sciences are intensively focused in their content towards the engineering and natural sciences departments of the university, as well as the technical and natural sciences at the TU.

A Brief Chronology of the History of the TU Berlin is available under:

http://www.tu-berlin.de/...
The Town of El Gouna

The town of El Gouna offers students and lecturers from the campus an attractive urban environment. El Gouna is situated approx. 22 km north of Hurghada and has been located in an artificial lagoon landscape on the Egyptian coast of the Red Sea since 1989. The city founder is Samih Sawiris, who manages the urban development with the company Orascom Hotels & Development. With its sandy beaches, its mild climate, the outstanding infrastructure and the prize-winning architecture, El Gouna is an extraordinary place that attracts tourists from many parts of the world.

El Gouna is not just a first-class tourist destination. It is also a real, developing town with residential areas of different architectural styles, with two small spots, with various production plants from different industries.

El Gouna has an outstanding infrastructure and offers all the services you expect from a city:

- Inner-city transport system with shuttle systems for buses and boats and cheap minicabs
- Connection to Highway 44 and bus connections to Hurghada and Cairo
- Hurghada international airport is only 22 km away which is a four-hour flight from Europe
- Wide spectrum of retail trade and gastronomy
- Extensive range of sporting activities: Marinas, diving schools, kite surfing, golf, tennis, riding. The FC El Gouna football club plays in the Egyptian Premier League.
- Media: El Gouna Radio, El Gouna TV & El Gouna Magazine
- 1 cinema
- Health services with pharmacies, fully equipped hospital in accordance with the European standard for all medical treatment, including dentist, paediatrician, optician, general surgery, intensive care ward.
- The mosque and Coptic Church are also part of the cultural infrastructure.

Various educational facilities are particularly pronounced:

- Bibliotheca Alexandrina branch of El Gouna and a Culturama
- Branch of the American University of Cairo
- International curriculum K-12 school
- Nurseries and Childcare
- Nursing school (32 students)
- Hotel management school, certified by the Leipzig Chamber of Commerce, Germany
- International school (offering IGCSE and American Diploma with 550 students) and kindergarten
- The TU Campus of El Gouna is located centrally in this complex of educational facilities.

The town of El Gouna as a pilot project of sustainable urban development

El Gouna is generally recognized as the most environmentally-friendly tourism destination in Egypt. The city's administration cooperates with the hotels, businesspeople and residents to protect the unique nature. Thanks to its environment protection program, El Gouna has received several awards, including the Green Globe and Travelife. The resort was chosen to be the pilot project for the Green Star hotel initiative.

Waste is sorted in a recycling plant and reusable products are recycled. By distilling seawater, the city produces its own drinking water and used purified wastewater to water the numerous green spaces. The town also has its own power stations to supply electricity to the town and surrounding areas.

In a joint “Planning Laboratory for a Sustainable El Gouna”, the TU Campus of El Gouna and the city's administration will develop projects which make El Gouna into an energy-efficient and CO2-free city.