



**FACULTY OF CIVIL ENGINEERING AND  
INFRASTRUCTURE**

**RESEARCH PLAN**

**2024-2029**

The program seeks international cooperation in research through the following means:

- Participation in contractual regional and international research projects as a leading implementation partner and as a full or guest implementing member;
- Participation in contractual projects leading to the creation of original datasets or in refining and modernizing data for the purposes of research in in Civil Engineering and Infrastructure;
- Supporting non-contractual mobility through conferences, symposiums, roundtables, lectures, publication events;
- Supporting and promoting co-authorship and co-presentation of publications and research reports with colleagues from international universities;
- Supporting in-coming mobility of the most established researchers in the various fields of in Civil Engineering and Infrastructure;
- Sponsoring open-access publications where necessary;
- Supporting peer-reviewing engagements of academic staff in the international scene;
- Supporting major book projects through friendly adjustment of teaching and administrative engagement expectations for lecturers, and even sabbatical leaves in foreign universities where cooperation takes place.

List of international cooperation in research and teaching:

- International cooperation with more than 300 Institutions worldwide (EU, UK, USA, Asia, SEEC)
- Double Degrees, Joint degree and Certifications
- Study visits of students, Staff, Businesses and Government's people.
- EU Higher Education Projects and CEEPUS:
- 6 Tempus Projects, since 2004
- 5 Erasmus Mundus Projects incl. SIGMA
- Erasmus +, KA1 Mobility Grants, Capacity Building – EURPS
- Capacity Building Support for successfully application and Networking in FP7 / National Contact Point for Horizon 2020 for ICT and FET
- Different Projects with International and National Organizations and Donors: European Commission, World Bank, EBRD, UNHABITAT, UNICEF, USAID, GIZ, ADA, Czech Republic, Switzerland, Norway, Sweeden, etc.

International Recognitions

- Professional and Scientific Membership of UBT on Education, Science and Technology

International Communities:

IFAC, IEEE, IPMA, EOQ, EUROSIM, FIRA EU Chapter, AESOP, PLAN, EFQM, QA, IASP, EURAM, SAP University Charter, BUA.

Below are samples of selected projects UBT implemented and partnership agreements that UBT signed with international partners

TEMPUS Program 1 & 2 – Curriculum Development Bachelor and Master Study Civil Engineering and Infrastructure in Kosovo (ULMK) & (MSMMK) – The program provides a well-structured education in principles of mechanical and computer engineering and management. Different modules are structured in order to equip the student with the theoretical and practical aspects of the subject. The Civil Engineering and Infrastructure program at UBT is the only one of its kind in the country and the region. The need for a study program that combines aspects of mechanical engineering, electronics engineering, control systems and computer systems was seen as extremely important for the country and the region. Moreover training the future generations of engineers and giving them a comprehensive set of skills is extremely important for engineering industry and for society.

TEMPUS Program 3 – “Supporting and Developing the Structures for the Q&A at the Private Higher Education Institutions in Kosova”- The TEMPUS project focused was definition quality assurance that can be understood as all actions taken to ensure that standards and procedures are adhered to and that delivered products or services meet performance requirements. In particular for higher education institutions this definition implies, that quality assurance is a continuous process of improvement accompanying the development of knowledge and experience in a given discipline, the requirements of the market and the stakeholders and the national and international legislative demands.

TEMPUS Programme4 – “Encouraging the process of curriculum development based on learning outcomes in the private higher education institution of Kosova “- The Project is designed to provide support the HEI of Kosovo for Curriculum design based on learning outcomes, involvement of stakeholders, and sharing the experience regarding curriculum design from the different EU universities. UBT is very much dedicated to the project and always contribute with its experience in order it increase the benefit as it is aim of the project.

TEMPUS Programme 5 – UBT is also part of the Tempus 5 program on higher education.

ERASMUS MUNDUS Program –EM2STEM (2010-2014)- The first tangible outcome of this new partnership has been the formation of a consortium of 18 universities (led by City University), to bid for Erasmus Mundus EM2-STEM (Western Balkans) funding for 264 staff and student motilities at Bachelor, Masters and PhD levels. The bid designated UBT as coordinator for the eight universities from the Western Balkans. The bid was successful, with Euro 3.9 million awarded over three years; a total of 37 mobility places allocated to Kosovo (second highest allocation); the kick-off meeting was held in Berlin in January 2011.

ERASMUS MUNDUS Program –EM2STEM (2010-2014)- The first tangible outcome of this new partnership has been the formation of a consortium of 18 universities (led by City University), to bid for Erasmus Mundus EM2-STEM (Western Balkans) funding for 264 staff and student motilities at Bachelor, Masters and PhD levels. The bid designated UBT as coordinator for the eight universities from the Western Balkans. The bid was successful, with Euro 3.9 million awarded over three years; a total of 37 mobility places allocated to Kosovo (second highest allocation); the kick-off meeting was held in Berlin in January 2011.

ERASMUS MUNDUS Program –SIGMA (2012-2016) – Based on evaluation and results of the UBT students during the mobility at Erasmus Mundus Program EM2STEM, UBT is again part of

the consortium for a new Erasmus Mundus Program called SIGMA. Through this program UBT will make possible the mobility of about 20 students to the EU partner Universities and welcomes all interested students to be part of the UBT study programs. Through the program UBT, and its students, are doing promotion of the Kosovo's young generation oriented to the global education.

AEP Academic Exchange Program – UBT and Jovik University Norway have reached an agreement of cooperation in staff development, teaching and research.

UBT- City University Joint-Research – UBT and City University London have signed a cooperation agreement for joint research.

SEECEL- The South East European Centre for Entrepreneurial Learning – UBT has been part of the SEECEL The South East European Centre for Entrepreneurial Learning (SEECEL) that is a regional institution with a mission to promote inclusion of entrepreneurial learning and entrepreneurial literacy in eight pre accession countries of South East Europe (SEE). SEECEL is financed by the European Union (EU). There is widespread recognition that entrepreneurship is the driving force behind national economies and societies. Entrepreneurship brings benefits both at the society level and at the individual level through personal satisfaction and achievement, while also promoting sustainable and smart growth and development. Parallel to the evolution of the field of entrepreneurship, there is increasing interest in the development of educational programs to encourage and foster individual entrepreneurial competences.

Improvement of investment and entrepreneurial climate in Kosovo- Kosova /EU-Czech Republic/SOROS – The project expects to impact on Kosovo regions abilities to create favorable conditions for attracting FDI and accelerating economic transformation. As the Kosovo regional development players often lack examples and best practice on how to actively promote FDI and attract foreign investors, the project's anticipated impact should result in strengthened capacities of regional development agencies and their nongovernmental counterparts. This, in turn, should lead to increase of number of FDI projects located in Kosovo regions; and, ultimately, to accelerated social and economic transformation of Kosovo regions with all associated positive effects. International impact expected from the outcomes and results of the activities of this initiative. On the international level the project hopes to lead to improved international competitiveness of Kosovo since FDI projects located in a host economy directly impact on country's business sophistication, infrastructure development, market efficiency and capacity for innovation – all of which are included in global competitiveness measures (e.g. Global Competitiveness Index). Workshop for all institutions involved in the attracting the Foreign Direct Investment. Study visit for 12 stakeholders involved in strategy created for FDI.

Investment Friendly Municipality-Kosova /EU-Czech Republic/Local Government – Provision of highly practical advice, expertise and know-how in FDI promotion to municipalities of a selected Kosovo region. Sharing of an internationally recognized accreditation methodology developed in the Czech Republic with Kosovo partners. Accreditation of up to 15 municipalities from a selected Kosovo region in FDI promotion and further. Increased awareness about the role of FDI in economic development in Kosovo.

Feasibility Study for Economic Zone of Gjilan and Novoberde Municipality- Kosova/EU-Czech Republic/Local Government – This study was commissioned by Kosovo municipalities of Gjilan and Novobërdë to determine the market demand and financial viability of establishing an economic zone in Llabjan. The study was prepared under a Czech development cooperation program Aid for Trade 2013 by a Czech contractor CzechINVENT Technology Agency and Quality Kosova Institution of UBT.

## **UBT RESEARCH**

UBT strongly encourages staff members to publish and according to their contracts they should have at least two publications per year. In the UBT, 100% of lecturers are either research active, or engaged in self-tasked research, while many of them are active researchers at an international level. According to the contract that UBT staff has they should have at least two publications per year. As a matter of fact, this is not the case that every single academic staff makes two publications per year. UBT has been working on increasing the number and quality of the academic outputs of its both academic and research staff.

UBT assigned research coordinators at the departmental level who are generally vice deans. In some departments the research activities are monitored by the deans. Names of the responsible staff members and their department are provided below:

Name	Department
Bertan Karahoda	Mechatronics
Fitim Alidema	Medicine- Nursing
Haidi Xhixha	Political Science
Gjylije Rexha	Media and Communication
Alma Lama	Education
Visar Krelani	Civil Engineering
Shpend Dragusha	Pharmacy
Valon Durguti	Food Science
Hizer Leka	Dentistry
Ahmet Maloku	Law
Blerton Abazi	Information Systems
Muhamet Gervalla	MBE
Besnik Qehaja	Computer Science
Artrit Bytyci	Design
Gazmend Ejupi	Art
Mimoza Sylejmani	Architecture
Armend Ymeri	Energy Engineering
Denis Ceclima	Psychology

The responsibilities of the research coordinators are as follows:

Tracking the Research output of the Academic staff

- Research Strategy Formulation
- Determination of Code of Ethics in the Departmental Level
- Creation of Research Clusters in departmental level
- Determination of Research Platforms in the ins and departmental level
- Determination of Research Priorities of Staff
- Preparation of Research Reports twice a year

The responsibilities of the conference coordinators are as follows:

- Delivering the 1.st Call for papers
- Delivering the 2. nd Call for Papers
- Acceptance of Abstracts
- Notification of Authors about the Abstracts
- Acceptance of Full papers
- Notification of Authors about the Full papers
- Regular meetings once in every two weeks

UBT organizes one of the biggest conferences of the region. UBT staff members are strongly encouraged to make presentations and publish in the conference proceedings. Below is the summary of the latest UBT conference:

The UBT International Conference took place in Prishtina, or other pces in Kosovo or outside Kosovo the capital city of Kosovo every YEar. The main perspective of the conference was to connect the scientists and practitioners from different disciplines in the same place and make them be aware of the recent advancements in different research fields, provide them with a unique forum to share their experiences, support the new academic staff for doing research and publish their work in international standard level.

UBT being the main organizer of this conference and aiming to implement an integrated strategy to establish itself as an internationally competitive, research-intensive institution, committed to the transfer of knowledge and the provision of a world-class education to the most talented students from all backgrounds partnered with the following institutions: RILEM, EUCEET, University of Inusbria, University of Riga, Politecnico di Milano, University of Tirana – Faculty of Economics, University of Korca, Kosova Association for Control, Automation and Systems Engineering (KA – CASE), Kosova Association for Modeling and Simulation (KA – SIM), Quality Kosova, Kosova Association for Management. The conference was sponsored by EUROSIM - The European Association of Simulation. The conference provided a forum for NGOs, academics, researchers, experts and practitioners active in education, research and development to present new research results, and share their ideas and experiences. This event offered scientist from 24 different countries and 4 different continents opportunity to present their research results.

The sessions are held on the last week of October at the UBT Innovation Campus Lipjan. The conference consisted of sub conferences in 20 different fields being : Management, Business and Economics – Law - Political Science and International Relationship- Media and Communication-

Computer Science, Information Systems – Mechatronics and Robotics- Energy and Systems Engineering – Architecture and Spatial Planning-Integrated Design-Civil Engineering and Infrastructure - Food Science- Psychology-Medicine, Pharmacy and Dentistry- Education and Development. There takes party usually over 500 participants.

Each sub-conference had its own agenda, keynote speakers, organization committee and international scientific committee. Below are the some of key note speakers as per related sub-conferences:

- 1- Energy Efficiency and Engineering- Dr. Peter Groumpos
- 2- Mechatronics System Engineering and Robotics- Dr. Peter Kopacek
- 3- Political Science and International Relationship- Dr. Olli E. Kangas-Dr. Velizar Shalamanov
- 4- Media and Communication- Adelheid Feilcke and Dr. Ferid Selimi
- 5- Computer Science- Dr. Felix Breitenecker, Dr. Niki Popper
  - a. Information Systems- Dr. Felix Breitenecker and Dr. Anita Mirjamdotter
- 6- Management Business and Economics- Dr. Edmond Hajrizi, Dr. Peter Groumpos
- 7- Law- Joana Qeleshi
- 8- Architecture and Spatial Planning- Dr. Csaba Patkos
- 9- Integrated Design- Aferdita Statovci and Dr. Miran Mohar
- 10- Civil Engineering and Infrastructure - Dr. Bruno Dal Lago, Dr. Francesco Foti
- 11- Food Science - Dr. Renata Kongolli and Fisnik Laha
- 12- Psychology- Moshe Landsman and Dr. Dashamir Bexulli
- 13- Medicine, Pharmacy and Dentistry- Dr. Kastriot Haxhirexha- Dr. Syheda Latifi Hoxha
- 14- Education and Development- Dr. Claire Gordon and Dr. Edmond Hajrizi

Due to the figures related with mentioned disciplines, it seems quite possible to claim that UBT International Conference is one of the biggest academic events of the Balkan region. Organization of such complicated scientific international conference with a success is one of the indicators of UBT` s academic capacity.

UBT knowledge Center is the platform that UBT tracks the publications and research outcomes of its academic staff. UBT Knowledge Center is established in 2017, as one of the main pillar of UBT. The aim of the Knowledge Center is capturing data to produce information and create knowledge. Knowledge Center consists of three essential parts: A digital environment to advance local knowledge visibility. An organizational environment to enhance boundary crossing collaboration, A digital academic library environment to enable discovery of and access to published academic scholarship.

UBT also tracks the publications of academic staff member manually that academic staff are expected to post their publications on a google drive and DOI number also at knowledge center document that the administration can follow up with.

### **Scientific research projects and funds**

Currently, Kosovo research strategy and challenges are related with the state policy, while as state spends the least on research and scientific activities in the region. Despite the fact that the Law on Scientific Research Activity provides that 0.7% of the annual budget should be allocated to this area, only 0.19% of the budget (or 0.05% of GDP) was allocated, while around 0.33% of the budget (or 0.1% of GDP).

However, it is expected that this low budget for research and research in Kosovo will change during future years, with the support provided by the Ministry of Education and Innovation, through NGO financial support programs, start-up companies, and small and medium-sized enterprises related to research activities.

An important impact at the research it is expected by the international, mostly EU Projects where UBT leads in Kosovo, based on the statistics of the Erasmus +. office in Kosovo.

The Faculty of Civil Engineering and Infrastructure has been part of different capacity building project, mostly interdisciplinary project, while three of them are related with Civil Engineering and Infrastructure program such as Balkan Stone, BESTSDI, GEOGIZ, Quality of water at River Basin “IBER” based on EU Directive 2000/60 etc.

Despite all the support from different such as COST ACTION where UBT has allocated even Kosovo on it, UBT has allocated for each department the funds related to its income and research projects. This is related with works for third part such as laboratory testing, and in this sense should be enhanced the accreditation of the UBT materials laboratory will help to increase the resources for research activity and help to rich these goals of the research strategy. Also lately RILEM has supported Civil Engineering Conference.

Within the framework of drafting and implementing a comprehensive and interdisciplinary research platform, UBT aims to position itself as a regional epicenter, generating debate on the key issues of construction and urban development facing contemporary urban societies, and in particular regional and local societies. Research at UBT aims at empowering individual candidates for more in-depth, focused research, integrating theoretical research with innovative experimental research paradigms.

Within the framework of drafting and implementing a comprehensive and interdisciplinary research platform, UBT aims to position itself as a regional epicenter, generating debate on the key issues of construction and urban development facing contemporary urban societies, and in particular regional and local societies. Research at UBT aims at empowering individual candidates for more in-depth, focused research, integrating theoretical research with innovative experimental research paradigms.

## **Scientific research topics**



- The main topic that will serve as a reference for particular research projects is SUSTAINABILITY in terms of construction, considering all three of its dimensions: economic, social and environmental.
- Structural Durability/ Technological / Materials Sustainability - the use of modern environmental technologies and ecological materials in the process of composing and designing architectural, engineering and design;
- Environmental / Ecological Sustainability - beyond the purely physical dimension, including human, economic, social and political;
- Energy Efficiency - from optimal use of large-scale territorial resources and renewable energies to architectural design through active and passive systems;
- Information Technology - as a new paradigm that through experimental methods reform traditional concepts of environmental management, urban design, architectural design and design, introducing advanced models of sustainability.
- Virtual Reality and Digital 3D Printing with also using the updated model of BIM management.

Within this general platform, several specific research topics have been identified, as follows:

- A. New approaches to environmental design and information technology
  - Design and processes
  - Materials and durability
  - Geotechnics and geology engineering
  - Structures and robustness
  - Environmental Engineering and Sustainable Water Management
  - Road Safety and Smart Transportation Systems
  - Seismic vulnerability assessment
  - Structural retrofit of existing buildings
  - Geotechnics and environment
  - Structural assessment of existing industrial buildings
  - Energy performance of housing;
  - Environmental design and use of active, passive systems, retrofitting techniques, etc .;
  - Assessing the local potential for renewable energy use;

**Some of the most important topics will be elaborated in the upcoming sections of the research plan**

- B. Theoretical and applied studies of urban and architectural environments - based on the principle of interdisciplinarity and interaction of similar professions.
- Structural theory - studies focused on the interpretation of structural issues from a theoretical and methodological perspective. Architecture Theory and Urban Design - studies focused on interpreting architectural and urban issues from a theoretical and methodological perspective
- Information architecture - experimental and innovative research with a systematic and ecological approach, focused on context computing models, interactive architecture, design research, prototyping, etc.

Qualified Research Capacities: UBT and international academic / research partners that formalize relationships through agreements recognized by authorities in the respective countries have all the human, financial, infrastructural capacity to conduct elite scientific research, in addition to resources. internal also from joint projects funded by international projects. Further capacity is complemented through international partners such as: Sapienza University, Italy; EUCEET network, COST Action, etc. All of the above indicate that the study program in Construction Engineering and Infrastructure has all the human, physical and financial capacity to be a leader in the field.

The Faculty of Civil Engineering and Infrastructure at UBT is basing its research on topics such as material characterization, structural behavior, environmental and sustainability aspect of civil engineering, geotechnical issues, water resources, GIS system, software application on civil engineering, application of innovative materials, recycled materials, transportation network, building science etc. These topics represent an important activity towards the research activities and supporting, sustaining the researchers to meet each other in different events as UBT International Civil Engineering, Infrastructure and Environment Conference (IC-CEIE) or Summer Academies organized every year from the UBT.

Interdisciplinarity is a key component of our research strategy. We focus of preparing our student for real case scenarios through the collaboration with other faculties in specific workshops, classes, study visit, open lectures, etc.

The Faculty of Civil Engineering and Infrastructure is “constructing” internal multidisciplinary activities between different faculties such as architecture and urban planning, economics and management, information system, energy efficiency and mechatronics to relate these fields to prepare students and researches for their professional future which is becoming more and more interdisciplinary. In this sense, emphasizing the interdisciplinary for civil and environmental engineering is one of the main aims of the The Faculty of Civil Engineering and Infrastructure, so

in this way the problems of this field would be dealt by using an integrated approach. In details the strategic plan for the research activity is based in these areas.

### **Overall research strategy**

The Faculty of Civil Engineering and Infrastructure research should be of benefit to society and should challenge current practice. The research will contribute to the realization of the United Nations Sustainable Development Goals in areas where construction plays a key role, and in this context we will work with the following research strategy priorities:

- Experimental research, where access to and use of unique research facilities across all disciplines of The Faculty of Civil Engineering and Infrastructure is essential
- Within or through strong strategic cooperation with other The Faculty of Civil Engineering and Infrastructure or institutions, nationally or internationally
- Innovative construction, where CEI will challenge the civil engineering profession and develop its purpose e.g. developing new design and construction principles, expanding our technical horizons on sustainability, harmonizing security across disciplines, and developing complex structures that can only be designed and realized with digital technologies.
- Selected strategic research topics that address the long-term challenges and opportunities in society and in the building sector based on Civil Engineering strengths.
- All areas of The Faculty of Civil Engineering and Infrastructure research will develop elements related to the aforementioned departmental strategy priorities.
- We will particularly focus on activities that are within selected strategic research topics

### **Research topics**

The two main pillars where our main research area, such as Sustainable Construction, is supported, are

- Digital construction and civil engineering
- Civil Engineering and Infrastructure

#### **1. Digital Construction and Civil Engineering:**

Engineering will explore the digitalization of civil engineering in the broadest sense, but our focus will be on future digital aspects of the built environment, including instrumentation and monitoring simulation, systems and interactive structures due to the UBT investment done in the digital systems including 5g that will help these processes in real time.

#### **2. Civil Engineering and Infrastructure**

Construction Engineering will investigate all possible aspects of construction at all levels including production, reuse, characterization and improvement of waste and construction materials. Furthermore, the principles and systems for the reuse of construction elements, engineering

sections and entire buildings through the development of renovation methods, as well as disassembled and recyclable building systems.

## **Research Area**

### **a) Design and processes**

Within the design and processes for civil engineering, the department will further develop research within the following areas:

- Design methodology: meeting the requirements for fully functional facilities including stakeholders, professionals, digital tools, incentives and collaboration methods in the design process
- Construction Engineering: developing systems and components in robust, safe, healthy, buildable and sustainable facilities, including recycled materials design.
- Digital platform: develops a digital environment based on open formats, enabling tools to simulate the technical behavior of buildings.
- Construction fire and fire safety engineering: development of design methods and investigation of fire properties of building materials, as well as fire safety research in relation to new, existing and reconstructed buildings

### **b) Materials and durability**

Nowadays the construction industry should face the more complex buildings that are being constructed by complex materials. This means that the traditional materials still represent the base but the answer that these materials should give are different from ones presented at earlier stages. In this sense the base for research could be for ex. fib Model Code 2020 which has different requests in from of Eurocodes where the sustainability concerns are becoming more and more relevant to any human activity, including civil engineering. In this sense the relation of construction materials and environment cannot be divided anymore. This scenario requires innovative solutions to size up the technical performance as well as the energetic and environmental impacts, but also to estimate the balance between efficiency and effectiveness, environmental and economic sustainability.

This research line aims at updating the modalities used in the construction processes, promoting the use of advanced materials and advanced processes, taking into account the security aspects, management and use of the built environment. While all these interdisciplinary skills will deal by producing building materials that aims at supporting transfer of research results to the construction sector and in a sense these research activities will promote innovation of the built environment in general improving professional skills and construction management.

Related with this area as mentioned before, the focus in this field the next years would be the Balkan Stone Capacity Building Erasmus Project + where, on behalf of the curriculum upgrade, in parallel way, this project will help directly in the research activity in laboratory related with raw

materials - stones in civil engineering, as the name of the project and will connect Balkan Countries with other EU Partners.

Research topics basically will be concentrated in Advanced materials; Advanced applications of traditional materials, Recycled Materials and Innovative building systems.

Within materials and sustainability for buildings and infrastructure, the department is conducting studies within the following areas to pave the way for a sustainable future built environment:

- Material characterization, modeling and optimization
- Construction physics and moisture conditions
- Deterioration and repair
- Reuse and improvement

### **c) Geotechnics and geology engineering**

Research in Soil and Rock Mechanics, including Engineering Geology will be dedicated to practical problems. The aim is to improve the geotechnical design and construction with respect to safety, costs and durability. One of the main topics of research is the assessment of ground and system behaviors under different geological and boundary conditions. Observations are used to identify characteristic behaviors. Theoretical models then are developed to describe those behaviors. Testing the theory on practical situations is a mandatory step in the development. This implies that a focus is also set on observations of the behavior of tunnels, as well as the interpretation of monitoring results. By continuous development over many years and on many projects a considerable knowledge has been accumulated and this based in the UBT staff will promote future application in this area. Related with this area as mentioned before, the focus in this field the next years would be the Balkan Stone Capacity Building Erasmus Project + where, on behalf of the curriculum upgrade, in parallel way, this project will help directly in the research activity in the field to understand the capacity of Kosovo in geological aspect and then study in the laboratory of the raw materials - stones in civil engineering, as the name of the project and will connect Balkan Countries with other EU Partners.

Departmental research is based on general disciplines related with geology and geomechanics:

- Technical geology, petrophysics and geophysics that address geological information as well as physical information for engineering and modeling purposes
- Geotechnical engineering and characterization of soil and rock mechanical parameters and their application to underwater engineering
- Pavement engineering for transport infrastructure, including modeling and feature analysis.

### **c) Structures and robustness**

To provide efficient resource and robust structures and modernization of analysis and design methods, a range of structural engineering disciplines are included below:

- Construction design focusing on new design methods based on advanced numerical analysis and design methods for structures made of new and innovative materials.
- Structural analysis with numerical methods for optimizing the material and topology of reinforced concrete structures and steel structures, simulating damage and propagating cracks, as well as welding processes.
- Evaluation of existing structures, including techniques for assessing and monitoring conditions, as well as methods for updating numerical models
- Loading on structures that focus on structural response and risk analysis of complex loading scenarios in a changing climate

### **d) Environmental Engineering and Sustainable Water Management**

Demographic and climate changings together with the pollution of the natural and built environment ask first of all from research group of this field to know the state-of the art. The institution have developed research program that consist in the hydrology and hydraulics, sustainable urban water and wastewater systems, ecological water management were all these fields represent deficient in the area.

The research activities include experimental and numerical modelling of water, wastewater and waste management systems respecting the environmental issues. In this sense the European Codes will give an important impact to promote the use of modern systems for sustainable water management, where actually the region has still a lot to do.

Different constructions systems related with this field will be constructed during next stages so the research in this fields result as crucial for the environment as for the management of these projects. To support research activities related with this field, UBT has well prepared staff, based on their experience and publications, related with other institutions in the region and the support that EU commission or other supports are giving for such an important field. Due to this field we continue to work on the support of our partners which ex. Algarve University, Portugal specialized in issues related with water and environment.

Faculty of Civil Engineering and Infrastructure is part of the implementation of the research activities to Assess the Quality water at river basin “Iber” based on EU framework directive 2000/60, also, the Faculty of Civil Engineering and Infrastructure has created the Weather Station which crates important databes (for temperatures, wind, air pressure, precipitations, UV) for the UBT itself and stakeholders.

The laboratory support will be important than for application and development helping for decision support performing an optimal planning and operation of urban water, wastewater and waste management system.

### **e) Road Safety and Smart Transportation Systems**

The department has professors who conduct innovative grant and contract research in a wide array areas related to road safety, highway geometric design, human factors, intelligent transportation systems, and application of geographic information system (GIS) by using GPS for coordination, total station and drones.

This area, as well known in Kosovo represent the most important one, based on the investment that governmental and non-governmental founds are being continuously invested. Some examples that will be concentrated for further research activity are: road safety systems, collision warning systems for intersections and freeways, platform for online network that enable intelligent transportation systems, statistical modelling frequency, causation and prevention, development and valuation of engineering countermeasures, noise mapping.