T.I.M.E. Projects 2022-2023

Top International Managers in Engineering

Application Form

Deadline for submission: ***December 14th, 2021***

Please submit the completed form to: ***gwenaelle.guillerme@time-association.org***

Applications must be submitted by e-mail only. You are required to attach a scanned copy of a Letter of Support signed by the Head of your Institution.

Please remember that T.I.M.E. promotes international cooperation and therefore only applications from consortia of at least three T.I.M.E. members in three different countries can be accepted.

You will be notified of the results of the selection after the Advisory Committee meeting on ***February 2022****. Projects run from February 2022 to January 2023.*

Title of Project	
Onsite Summer School: ***Fracture Structures: Material Stress Resistance***	
Acronym (if any)	
FracStr	
Details of the Applicant	
Name of Institution(s)	Riga Technical University (RTU)
Faculty/Department/Office	RTU Foreign Students Foundation and Short-Term Courses Unit/ The Faculty of Mechanical Engineering, Transport and Aeronautics
Contact Person/s and Details	Natalja Muracova – RTU Head of the Unit (Summer School's Coordinator) Marina Cerpinska, PhD – Head of Study Program *Engineering Technology, Mechanics and Mechanical Engineering*
Summary of the Project (max. 2000 characters)	
Climate change mitigation and environmental sustainability are two of our most pressing global issues. An increasing number of public and private stakeholders develop intersectional approaches to both combat the devastating impact of global warming and create environmentally sustainable solutions. A massive consumer of raw materials and natural resources, the construction industry has a particular responsibility to create more sustainable approaches. When it comes to building materials, wood seems to be making a return to its former glory as a preferred material with environmental benefits. Increasingly, the world uses wood as the main, often even the only material for basic structures. The Summer School ***Fracture Structures: Material Stress Resistance*** is an interactive, practical approach-based course that will keep an in-depth focus on material durability, their resistance to cracks, and empirically determine the effect of different coatings on the strength properties of materials. During the summer school, participants will have lectures and practical classes that will make it possible to compare the endurance of materials such as wood, cross-laminated timber (CLT), glued laminated timber (GLT), concrete, and metal. The main aim of the hands-on activities is to determine the strength of construction materials and to compare the obtained characteristics with those of other materials used. Please note that this summer school is not only a cooperation of T.I.M.E. association partner institutions (Riga	

Technical University, Dresden University of Technology, Lappeenranta-Lahti University of Technology, Wroclaw University of Science and Technology), but also includes industry partners as this project is aimed at solving real-world problem and provide applicable solutions for the construction industry.

The Summer School includes industry field trips to provide participants with the opportunity to visit facilities of companies such as *UAV Factory, Aerons, Latvijas Finieris* and gain insights into the various materials' manufacturing processes. During the company field trips, students will have the opportunity to engage in discussions with industry professionals.

In addition to the company visits, students will have practical classes, labs and visits to *RTU Design Factory, Laboratory of Materials for Experimental Mechanics, Scientific Laboratory of Machine and Mechanism Dynamics, Scientific Laboratory of Machine and Mechanism Dynamics. (the detailed plan is attached to this document)*

Reason for applying for T.I.M.E. funding (max. 2000 characters)

Riga Technical University together with T.I.M.E. association members - Dresden University of Technology (Germany), Lappeenranta-Lahti University of Technology (Finland), and Wroclaw University of Science and Technology (Poland) are combining efforts to organize a Summer School in the field of ***Fracture Structures. Material Stress Resistance***. The Summer School organizers would welcome the financial support that the association is willing to provide as it will contribute to the Summer Schools' programming and help develop strategic cooperation in science, technology and mobility of students. Funding by the T.I.M.E. association will be used as a significant support mechanism and will secure that high standards of the educational process are achieved. Funds will be allocated efficiently to cover the organization of the summer school, materials needed for the lab works, accommodation for summer school's participants and lecturers in the RTU Student Hostel, transportation during summer school (airport transfers, transportation services for industry field trips and cultural/free time, team-building activities) etc.

Fracture structures: Material Stress Resistance is planned as an intensive, practical skill-centred, international educational and networking event that has the potential of serving as an excellent starting point for developing further cooperation between institutions and contribute to developing new joint projects, research achievements, and plant the seeds for double-degree programs.

The Summer School is organized by four higher educational institutions and it is expected that each partner sends to the school at least 5 students and 1-2 lecturers. As organizers expect a significant number of both international and local participants, the funding that is offered by the T.I.M.E. association is considered to be a great complimentary support.

The organizers of the summer school would like to stress that if the members of the consortium face difficulties in sending students and guest lecturers, project coordinating HEI can legitimately replace participants from one partner by another.

Expected outputs of the project

The proposed Summer School will ensure the following outputs for the involved parties:
1) Improve students' practical, applicable knowledge and provide an opportunity for summer school participants to work in a specialized material testing laboratory;
2) Demonstrate the high strength threshold of natural, "green" materials and compare their sturdiness indicators with other materials used in the industry;
3) Provide an opportunity for participants to get acquainted with companies that produce building materials, experience in person the whole product development process, and discuss questions with industry professionals;
4) Ensure networking opportunities for students and faculty members that can foster collaboration and personal growth;
5) Develop student collaboration and cross-cultural communication skills;
6) Improved cooperation between T.I.M.E. partners that sets the ground for double degree program, joint projects;

7) Established contacts for students, which should lead to increased number of Erasmus+ applications
8) Improved cooperation of lecturers and scientists, which should lead to joint research, common conference papers and publications.
9) Transcript of marks with ECTS (optional).
10) New international collaborations on research will be established as Riga Technical University is a member of EUt+ initiative and is planning to join the lecturers/students from EUt+ consortium as well to integrate cross-cultural perspective to the Summer school.

Target group/s and expected impact

The Summer school ***Fracture structures: Material Stress Resistance*** tends to address T.I.M.E. association students that are enrolled in the member institutions. Priority groups are students of senior year of the bachelor degree studies and students of master degree studies.

The summer school support the idea of gender equality and inclusiveness.

Students will acquire specific knowledge and skills, while teaching staff will share expertise and build common ground for future cooperation.

We expect that during the summer school, students will not only improve their practical skills in working on material resistance testing but will also improve their overall collaboration skills. As students will work in international teams during the summer school, organizers believe that the participants will gain invaluable experience that can be useful for future career up growth.

The organizers of the summer school hope that the project will also find solutions that would be relevant for the construction industry, which companies could use to improve the production issues.

Sustainability of the programme

This project is intended to release students and lecturers from "ZOOM fatigue" that science community experienced during the Covid-19 pandemic. The summer school will be organized in labs and lecture rooms, including social events and sport activities, to promote healthy and sustainable lifestyle, for example, the Riga city tour will be organized using bicycles.

The construction industry is one of the sectors of the economy that, despite various global challenges, is still experiencing active growth. The development of the industry ensures that new construction materials and various innovative types of coatings appear on the market, which in turn guarantees that the durability testing of newly created materials will be relevant in the upcoming years as well. Based on this conviction, the organizers of the summer school believe that universities could compose fruitful cooperation and will continue to be able to develop summer programs in this direction together also for the next years.

Specific deliverables

March 2022 to May 2022 – promotion of the Summer School on the websites of this Consortium partners and via T.I.M.E. network;

May 2022 to June 2022 starting online registration process for students;

July 2022 (18 – 29 July) the Summer School, starting with short presentation of each project partner.

Upon completion of the school, each project participant will receive a certificate. The Summer school organizers expect that participation in the Summer School ***Fracture Structures: Material Stress Resistance*** will improve students' knowledge and comprehension in the various topics regarding strength of materials and factors that are affecting their durability. Important to note that participants during various laboratory works will be able to develop their practical knowledge and skills that will be applicable in their future studies and professional career.
August 2022 – final report and letter of intention to introduce the new summer schools. The report will be presented to teaching community during annual international RTU Methodological Conference in October 2022.

Total duration of the project
6 months: March 2022 - August 2022
Planned budget
10.000 EUR – the Summer school organizers intend to allocate the funding efficiently to cover not only organization of the summer school, materials needed for the lab works and practical applications, but also to cover accommodation for the summer schools' participants from T.I.M.E. partners in the RTU Student Hostel, transportation during summer school (airport transfers, transportation services for industry field trips and cultural/free time, team-building activities). Students (5 per partner institution) and guest lecturers' provision of accommodation (RTU Student Hostel in RTU Student campus). Student participation from T.I.M.E partner university is free of charge. Registration fee is 50 EUR (to be discussed) Costs of materials for the samples to be tested during lab works are covered from the funding as well. Professors' and researchers' reimbursement.
Requested financial support from T.I.M.E.
10.000 EUR
Other sources of funding
Internal funds of organizing institution (Riga Technical University)
Members of the consortium
1. Riga Technical university (LATVIA-RTU), Latvia (Project Coordinator) 2. Dresden University of Technology (TU Dresden), Germany 3. Lappeenranta-Lahti University of Technology (LUT University), Finland 4. Wrocław University of Science and Technology (PWR-WUST), Poland
Key Staff (Name, Position, E-mail)
1. Riga Technical University (Latvia) – Natalja Muračova – RTU Foreign Students Foundation and Short-Term Courses Unit/T.I.M.E. Summer School Coordinator, natalja.muracova@rtu.lv; 2. Dresden University of Technology (Germany) – Peter Rosenbaumn – T.I.M.E. Coordinator peter.rosenbaum@tu-dresden.de; 3. Lappeenranta-Lahti University of Technology (Finland) - Evgenia Balbutskaya, Evgenia.Balbutskaya@lut.fi Project Manager, LUT Summer School, Leonid Chechurin/ Professor (tenured) of Industrial Management Department, Leonid.Chechurin@lut.fi; 4. Wrocław University of Science and Technology (Poland) – Ewa Mroczek – Head of the Division of Foreign Students Admission and Support/ T.I.M.E. Coordinator, ewa.mroczek@pwr.edu.pl .

Check List

- ***Attached a signed Letter of Support from the Head of the Applicant Institution, draft programme of the summer school***
- ***Send this form and supporting documents by e-mail only to:***
  gwenaelle.guillerme@time-association.org

THE DEADLINE* FOR *THE SUBMISSION OF APPLICATIONS IS DECEMBER 14th 2021

Summer School

Fracture Structures: Material Stress Resistance

Introductory Part

09:00 – 10:00	Introduction to the Summer School. Information on expected results. The partners present their universities by giving short presentations
10:00 – 11:00	Team building and warm up activities
11:00 - 12:00	Introductory lecture on Damage or Failure? What are the main problems in engineering mechanics? ”
12:00 - 13:00	Lunch
13:00 – 14:30	General Perspectives. Strength, Loads, Endurance
14:30 – 16:00	Practical Work in Simulation Environment
16:30 – 18:00	Excursion to the RTU Laboratories: *Scientific Laboratory of Machine and Mechanism Dynamics* (The main research directions of the laboratory are Machine dynamics and strength modelling, computer aided design and calculations, Development of experimental design and metamodeling techniques, Multicriteria robust optimization of composite elements, etc.); *Laboratory of Materials for Experimental Mechanics* (The aim of the laboratory is to develop a new research direction of experimental mechanical methods for innovative constructive materials. The main task of the laboratory is to study the operation of new multifunctional materials, composites and other innovative materials); *Tribology Scientific Laboratory* (The laboratory is able to provide highly qualified scientific research and develop new and innovative solutions in the field of tribology); *Scientific Laboratory of Mechanics and Biotextiles* (Development and research of 3D environmentally friendly materials, including Latvian natural resources, such as amber, juniper, etc. Development of textile technologies for the production of nanostructured 5D materials); *RTU Design Factory* (RTU Design Factory is a lively place that brings together research, education and the industry, creating a new hands-on learning culture and opportunities for radical innovation).

Deformation in Theory

10:00 – 12:00	Mechanics of Deformable Firm Bodies
12:00 -13:00	Lunch
13:00 – 16:00	Types of Damages, Analysis, Behaviour of Different Materials as a Result of Damage.
16:30 – 18:00	Exploring Riga as a destination city. Excursion to the Old City and other interesting places.

Ecology and Sustainability in Mechanics

10:00 – 12:00	Biomaterials
12:00 - 13:00	Lunch
13:00 – 15:30	Coatings, Viscoelastic Material and Resistance
15:30 – 18:00	Field trip to the company "*Latvijas Finieris*". Company is the leading plywood and its products manufacturer in Baltic states. The company also is active in forest management, logging and the production of synthetic resins and phenol films. *Latvijas Finieris* has grown international with production facilities in Latvia, Lithuania, Estonia and Finland, as well as 12 fully owned product development and sales companies in Europe and overseas.

Damage day & workshop

10:00 – 12:00	Types of Loads in Mechanics
12:00 - 13:00	Lunch
13:00 - 17:00	Practical applications. Damage Workshop. Laboratory work

Cultural Activities

Activity day. Boat Trip

Cultural Activities

Hike in the National Park.

Time to Break

10:00 – 12:00	Practical applications. Damage Workshop. Comparison of the Strength Performance of Various Materials
12:00 - 13:00	Lunch
13:00 - 15:00	Practical applications. Damage Workshop. Evaluation and discussion of conclusions
15:00-17:00	Field trip to the company *"UAV Factory".* Company is the leader in the small, fixed-wing UAV segment. *UAV Factory* develop and produce not only unmanned aircrafts, but also subsystems, stabilized EO/IR camera payloads and accessories for the unmanned and manned aircraft industry. Production such as airframes, components and subsystems are delivered to over 57 different countries.

Repair the Broken

10:00 – 12:00	From Research to Mechanical Equipment. Why is it important to simulate and experimentally determine material properties?"
12:00 - 13:00	Lunch
13:00 - 16:00	Micromechanics Analysis
16:00 – 20:00	Find out your level of stamina in adventure park “Mežakaķis”

Fit for Purpose

10:00 – 12:00	Structural Integrity
12:00 – 13:00	Lunch
13:00 - 16:00	Practical class: Structural Integrity. Simulation
16:00 – 18:00	Field trip to the company *“Aerones”* which is the first company in the world that provide an automated wind turbine maintenance system. The products created by the company ensure a new approach to the maintenance process that is much more efficient faster, cheaper, and safer than services provided by any other competitor in the market.

Future Smart Materials and Economic Evaluation

10:00 – 12:00	"Smart" and Innovative Materials
12:00 – 13:00	Lunch
13:00 – 16:00	Economic Evaluation of Innovative Materials

Presentation and farewell day

12:00 – 14:00	Presentations of the results achieved and obtained
14:00 - 16:00	Formal Ceremony and Certificates

Any lectures or practical’s both online and onsite from partners can be added as an extra to this list. This is the draft plan and some slight changes might occur.

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T.I.M.E. Association Advisory Committee

T.I.M.E. Projects 2022 for launching the International Summer School Fracture Structures: Material Stress Resistance.

It is with great pleasure that I support the Riga Technical University International Cooperation and Foreign Students Department and the Faculty of Mechanical Engineering, Transport and Aeronautics to create a consortium of four universities that will collaborate under the a T.I.M.E. Projects 2022 for launching the International Summer School *Fracture Structures: Material Stress Resistance*.

Riga Technical University, Dresden University of Technology (TU Dresden) and Lappeenranta-Lahti University of Technology, Wroclaw University of Science and Technology are T.I.M.E. association members. This initiative is a notable tool for the visibility of our international network and it will strengthen the connection and collaboration between partners and promote international student exchange.

I strongly recommend this project to the T.I.M.E. Association Advisory Committee.

Rector L. Ribickis

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