

A. QUALITY OF PROJECT DESIGN AND COOPERATION ARRANGEMENTS

Ερώτημα Α (Σε επίπεδο Σχεδίου/για όλες τις προτάσεις συνεργασίας με ιδρύματα, 40 βαθμοί)

TUC is an outward looking HEI, whose main aim is to provide high-quality education to students and research opportunities to staff members, driven by excellence in research, teaching and innovation, through strong ties with international organizations that give complementarity and add to the excellence standard of the entire team. In 2016, the external Higher Education Evaluation committee ranked it amongst the 10 best achieving institutions in Greece. The same year, TUC submitted a successful application at the ICM Call. In the last 27 years has signed a significant number of MoUs, more than 100 Inter-Institutional Agreements under Erasmus program and has received and sent hundreds of international distinguished academics, scholars and students to and from European and non-European Universities (Israel, Jordan, U.S.A, China, Botswana, Canada, South Africa, Armenia, Ecuador, Laos, Serbia, Chile, India, New Zealand). After the end of the inter-institutional agreements, channels of cooperation are maintained either at the level of Faculties or at the level of research working groups between the partner Institutions. For this reason, the cooperation with the majority of the Institutions continues in the plans 2019-22 and 2020-3 within the framework of the international mobility program. Although the majority of the Institutions expressed interest in continuing the collaborations under the same program, the TUC in the new mobility plan (call 2022) gave priority to collaborating with new Institutions in the same educational fields in order to expand its global cooperation network on international issues.

Preparation for the submission of the cooperation proposal: The responsible persons for the implementation of the program are predetermined **in writing**, while pre-agreed the observance of the principles and procedures, as foreseen in the inter-institutional agreement. In the preliminary cooperation agreement both Institutions have defined: Erasmus management officers for the implementation of the program (TUC: Markos Ntoukakis/Erasmus office) and Inclusion Officers (TUC: Lefteris Maragkoudakis/Erasmus office) who undertake to reach out and increase accessibility to more participants with fewer mobility opportunities. In addition, Erasmus academic Institution coordinators (TUC: Prof. Michael Zervakis/**Vice Rector**) and the legally responsables for the conclusion of the inter institutional agreement (TUC: Prof. Evangelos Diamantopoulos /Rector). Erasmus Offices of the partner Institutions communicate with e-mail, skype, cloud storage services (Dropbox) for file sharing on the needs of the project. Basic parameters of the cooperation have been regulated, such as the procedures for the information of the academic communities and the invitation ways to participation in mobility, the selection criteria for applicants and the recommendation of the evaluation committee. In addition it is identified the educational field(s) of the project, the participating faculties from each Institution, the academic coordinators from each faculty (TUC: <https://www.tuc.gr/index.php?id=12861&L=928%27>) and academic calendars are exchanged (TUC: <https://www.tuc.gr/index.php?id=3624>). Specifically for student mobility (1st, 2st cycle) the Erasmus officers exchange information about the required language skills and the offered courses of each faculty (TUC: <https://www.tuc.gr/index.php?id=534&L=928%27>). Also, information is exchanged regarding the professors who can supervise thesis for students and for those who can contribute the activities of incoming staff, for the organizations that can employ students for traineeship and for the required language skills of incoming participants in each institution. After the mobility grant, each Erasmus officer will post announcements on the official websites and social media accounts about the procedures and benefits of the Erasmus program. The Inclusion officers will post information about the possibilities, the criteria and the capabilities of the program for the support of vulnerable groups. At the same time, the Erasmus officers in collaboration with the academic

coordinators of participating faculties of each Institution will relate the offered courses for the incoming Erasmus students. The inter-institutional agreement will then be checked by the Erasmus Institution Coordinator and be signed by the legal representative of each Institution. After the signing, the Erasmus officers and the Inclusion officers will post invitation on the media and sessions will be organized to inform the academic communities for the approved mobilities. The invitation to participate in the program for staff and students by the Erasmus officers will be composed in the pre-agreed way at the same time in both Institutions if this is possible for better control of the process. Applicant outgoing students from TUC evaluated by the motivation to participate in mobility, from their activities in the specific educational field, while priority will be given to students with fewer opportunities to participate in mobility. A point allocation system evaluate outgoing staff of TUC, based on the years of their employment at TUC, the time since the last participation in mobility and the submitted activity plan. Erasmus officer at the Partner Institution informs in writing the Erasmus office of TUC about the procedures of information, selection and evaluation of the candidates. In this way, TUC as the coordinator of the program ensures a selection process fair, transparent and documented, ensuring equal opportunities to participants eligible for mobility. Details for the pre-planning of the cooperation with each candidate Institution are given in in the corresponding section.

Before the mobility: The required arrangements in the Inter institutional Agreement to support the participants before the mobility for procedures related to visa, insurance, travel, accommodation, integration and linguistic support of students will be implemented in collaboration with the Erasmus officers and Inclusion officers of both Institutions. They are responsible to post information on the websites of their institutions about the above procedures and to provide administrative support and advice to participants. Incoming students at each Institution can receive additional information for the planning of their studies from the Erasmus academic coordinators of each faculty and from professors who specialize in the educational field of the cooperation and have stated that they can co-supervise their thesis. Incoming staff at each Institution can receive additional information from members of TUC who specialize in the same education field and have stated that they can contribute to their activities. In this way, the participants will have all the information for the planning of their activities in the mobility agreements. Incoming students to TUC can receive additional information about their stay in Chania from the Erasmus Student Network (ESN) at TUC (<https://tuc.esngreece.gr/about-us>). The Inter-institutional agreement clearly states that TUC's Erasmus office will manage the OS and will be responsible for uploading and updating the Mobility Tool. Under the terms of the Erasmus Program, students will not be required to pay any tuition fees to the host Institution. TUC, as applicant and Coordinator, will be in charge for the financial management, conforming to the guidelines and policies of the European Commission and the National Agency (IKY). All grants and travel expenses of the Erasmus+ International Credit Mobility Program participants will be covered by the TUC. The data required for the signing of the grant agreement (visa, insurance contract, bank account, tickets) will be collected and checked by the Erasmus office of TUC. The prepayment (80%) will be granted to participants at least one month before the start of mobility. The disbursement of money and their deposit in the bank accounts of the participants is a responsibility of finance department of TUC, "Special Account for Research Funding–ELKE" (<https://www.elke.tuc.gr/en/home>) in collaboration with the Erasmus office of TUC.

During the mobility: In addition to the participant support procedures mentioned in the inter-institutional agreement, upon arrival of the grantees, TUC Erasmus Office will organize a campus-tour and a meeting in order to inform the applicants regarding the city, the transportation and the campus life. TUC will offer free the student ID card and full access to classic core ICT services (e.g. e-mails account, Wi-Fi, etc), to library, in campus sports installations, at meals and in public transport at low prices. TUC's Language Research and Resources Center contribute to the improvement of the linguistic skills of Greek students by offering free of charge lessons in English language and free lessons in Greek language to incoming students. Students and academic staff with physical disabilities have full access to all above activities and services. There are spacious elevators and parking facilities, so that all the physical barriers are eliminated and many laboratories are on the ground floor. TUC will integrate incoming students and staff by encouraging them to participate in

students' associations and campus life, cultural activities and visits. The Erasmus academic coordinators of participating faculties will attend their studies in the courses provided in the learning agreements. An appointed team of Professors will co-supervise the progress of their dissertation and will also draw a final report at the end of their mobility period, in order to facilitate the recognition of the learning outcomes. Incoming students are expected to participate to presentations, seminars, conferences or other academic and scientific activities in order to diffuse the acquired and gained knowledge. Particularly important is the contribution of the Erasmus student association (ESN) for the integration of incoming students in community of TUC and in the social life of the city.

After the mobility: The original Certificate of Attendance that will be handed from the Erasmus officer of TUC will be the proof of recognition for the mobility period. Erasmus officer at the partner institution will be required to provide written recognition of the courses and postgraduate and doctoral studies (part of thesis) for TUC outgoing students. After the final check of all the presented documents, the participants will receive from ELKE the remaining 20% of the grant. After the end of mobility, participants have to submit the EU Report. The final reports in combination with the open-ended questionnaire to the participants are used to evaluate each mobility. In short, participants are asked if they have implemented the planned activities and if they are satisfied with the services (information, criteria for selecting participants, measures to support vulnerable groups) provided by Erasmus offices and academic coordinators from each institution before, during and after mobility. Every answer must be justified. The processing of the participants' reports in combination with the above questionnaire and the final evaluation of the project by the IKY are used as indicators for the evaluation of the project and are discussed in a special session of the Erasmus office contributes to the continuous improvement of the implementation of the mobility program. Participants' activities post on the Erasmus website and presented by them at an event organized by the Erasmus Office after the end of each mobility project, which is attended by the entire academic community. In this meeting, the participants discuss the benefits and potential problems that arose during the project and propose solutions to improve the planning and management of the mobility program.

B. RELEVANCE OF STRATEGY Ερώτημα Β (Σε επίπεδο Ιδρύματος, 40 βαθμοί)

The School of Chemical and Environmental Engineering (CHENVENG) of TUC and the Department of Environmental and Civil Engineering of Toyama Prefectural University (TPU) in Japan will participate at the proposed collaboration on the education fields "Environmental sciences" (ISCED code: 0521), "Chemical engineering and processes" (ISCED code: 0711) and "Environmental protection technology"(ISCED code: 0712) in scientific areas "Municipal, industrial and agricultural waste and wastewater", "Waste-To-Energy (WTE) technologies ", and "Fate and Transport of Viruses in Subsurface Formations".

Currently, TPU has academic and student exchange agreements with 16 universities and research institutions in the world, including those within Erasmus program. Among them, TPU have an exchange program with a Chinese university for exchange students and credit recognition. TPU also have a program with a German university to send and receive graduate students as special research students. Currently TPU does not have exchange programs with Greece yet.

Under the international mobility program, the TUC has partnered with institutions in China, India and Laos. TUC does not have any previous experience in managing of the same or related programs or projects with the TPU. The mobility program's scientific aims are to expedite and synergize joint research with the TPU regarding environment and fight against climate change, digital transformation and participation in democratic life, common values and civic engagement.

TUC has a lot of experience on the fields of municipal, industrial and agricultural waste and wastewater, Waste-To-Energy (WTE) technologies , and fate and transport of viruses in subsurface formations. Various industries and plants involved in water sector can aid in the prevention of seawater, freshwater, and

underground water pollution and contamination. Prof. Petros Gikas is currently working on a project to develop an energy-self-sustaining wastewater treatment process and biosolids management system, which will include the installation of a gasifier to generate hydrogen and carbon dioxide from wastewater sludge. Additionally, sewage sludge from wastewater could be used as a fuel source for electrical and thermal energy production, though anaerobic digestion (mainly methane) or gasification (mainly hydrogen) processes. By utilizing these alternative fuels, we can minimize our reliance on fossil fuels and mitigate the dangerous flue gases that are the primary contributor to global warming. Additionally, the proposed project's execution quality will be strengthened by publications in prestigious scientific journals and conferences.

Even though Japan and Greece are geographically distant, both countries have a robust agricultural sector (with notable high quality wineries). They share a number of environmental and social concerns, including soil quality, water management, wastewater treatment, and water policy. Both countries, particularly the Greek Islands and Japan's Shikoku region, are water-scarce, and despite the phenomenal differences, common measures for environmental improvement may apply. A significant difficulty that both countries are addressing is regional heterogeneity in water pricing, owing to substantial differences in water availability (mountainous regions with ample water and insular or desolate places with extremely limited water supplies). The extent to which global concerns are incorporated into national aspirations becomes critical in determining whether countries can work cooperatively to solve global challenges. A significant benefit of the proposed mobility is that it frames national interests within the context of global interests. Environmental science recognizes that environmental problems such as climate change, global warming, ozone depletion, acid rain, and impacts on biodiversity and marine life are global, not national, in scope. Students and academics are increasingly collaborating online on scientific issues. Thus, the proposed mobility will enable the establishment of a platform for data registration and processing, which can be managed by students and/or academics from both universities who are interested in or examining a common scientific subject. Additionally, the platform will be capable of disseminating scientific information in an understandable manner to the general public. The proposed program would assist participants in comprehending of the value of active citizenship and democratic involvement through their active participation in university societies; participation in undergraduate courses or conferences, and so forth.

Based on the proposed mobility, two incoming and two outgoing academic staff for teaching (5 activity days and 2 travel days each), based on two academic visits per academic staff. Since the education will be centered on the best methods employed by the host institution in teaching and research, as well as in course organization, a minimum of 5 days is required for each academic visit to be successful. The 2 incoming and outgoing academics will undertake independent teaching duties on Environmental Engineering (wastewater and biosolids management), aiming in disseminating of institutions' scientific object. Prof. Petros Gikas will contribute to the scientific object of the proposed mobility by delivering lectures on municipal, industrial and agricultural waste and wastewater; water reclamation and reuse applications and energy recovery from biosolids and municipal solid waste. Prof. Petros Chrysikopoulos will contribute to the proposed mobility's scientific objective by giving lectures on Biological Processes in Wastewater Treatment and the Fate and Transport of Viruses in Subsurface Formation. Assoc. Prof. Keisuke Kuroda of UAC will teach courses on Environmental and health-related water microbiology, control of health-related viruses in urban water systems and Wastewater-based epidemiology (WBE). Dr. Akihiko Hata will give lectures on Sustainable water and wastewater treatment technologies and Management of decentralized water systems.

The proposed flow mobility predicts 2 students (1st and 2nd cycle) from each University for 5 months, and one 3rd cycle student from each University for a total duration of 3 months each. Students of the 1rd cycle will choose to be enrolled to courses, such as Ecology and introduction to Technical Ecology, General Chemistry, Reaction Engineering (Chemical and Biochemical processes), etc. The students of 2nd cycle may choose to be enrolled to courses, or to carry out their thesis at a lab. Assoc. Prof. Keisuke Kuroda from TPU and Prof. Gikas from TUC have offered to accept students from the sending university to their labs, for carrying out their thesis (or part of it). In each student (1st and 2nd cycle) will be assigned a project related with the

scientific object of the proposed mobility, aiming to foster a sense of collaboration and engagement in the research endeavor, while also providing them with the opportunity to participate in a research project if they so desired. The PhD student will be engaged in the experimental procedures of the host institution and will complete part of his/her thesis in the host institution. The objective of the third-cycle student visit is to produce one international conference publication that advances the state of collaborative expertise. With respect to the visit of 3rd cycle student, the requested duration of the visit is 3 months, which is enough for carrying out part of his/her thesis, based on the fact that the visit will have been prepared in advance, so not to lose time during the visit for preparatory activities.

Adherence to the principles of the Inter institutional Agreement and the required procedures before, during and after mobility have been pre-agreed in writing. Legal representative of the agreement: Prof. Isao Shimoyama, President Of TPU. Assoc. Prof. Keisuke Kuroda of TPU's Department of Environmental and Civil Engineering and Dr. Akihiko Hata of TPU's Department of Environmental and Civil Engineering, Lecturer, have agreed to co-supervise the dissertation of one incoming PhD student at TUC and to contribute to the activities of two incoming students who wish to enroll in courses.

On the part of TUC, Academic coordinator of Erasmus program at CHENVENG, Prof. Paraskevi Panagiotopoulou can contribute to the activities of 2 incoming students who intend to attend courses. Professors Petros Gikas, Constantinos Chrysikopoulos and the Working team of PhD Candidates Anthoula Manali, Georgios Makaroglou and Konstantinos Tsamoutsoglou have stated that they can co-supervise the dissertation of the PhD incoming student and contribute to the activities of the 2 incoming staff members for teaching.

Erasmus management officers of both Institutions have already been informed about the academic calendars. The recommended language skills for incoming participants at both Institutions is English/B2. Evaluation criteria of students at TPU are Academic merit, curriculum vitae and motivation to participate to the mobility. Criteria for evaluation of staff at TPU are the teaching and research experience and the activity plan.

C. IMPACT AND DISSEMINATION

Ερώτημα C (Σε επίπεδο ιδρύματος/20βαθμοί)

The primary target groups of the proposed program are the students and academic members at each University. Outgoing students and faculty will benefit directly from their first-hand experience studying, teaching, conducting laboratory work, and collaborating at TPU. In addition, all students and faculty at TUC who welcome incoming students and faculty from TPU will benefit from active interactions and collaborations at TUC. Our research focuses on wastewater treatment and Waste-to-Energy (WtE) technologies can be can benefit both large cities and small towns and villages. Diverse sectors involved in the water sector will also benefit from the innovative technologies we are developing.

1) **Impact for exchange students:** Students from both institutions will have the opportunity to gain valuable international study experience, intercultural understanding, academic horizon expansion, and meet internationally recognized researchers. Additionally, they will acquire new inventive methods of research and develop their creativity. Moreover, they will gain experience and become more confidence in their choices in the future. They will improve their English speaking and writing skills via everyday interactions with other students and local residents. They will have experience living in a foreign nation with a different culture, which will aid with socialization. As a result, they will acquire intercultural understanding and communication skills. Even after returning to their home countries, the TUC and TPU will continue their exchange through regular exchanges and joint research.

2) **Impact for academic staff:** In the future Erasmus+ ICM program, TUC's academic staff will deliver courses on Wastewater treatment processes, Water reclamation and reuse and Waste to Energy, etc. to TPU. In addition, the host institution will provide training to the visiting academics on best practices in teaching and research. Academic staff at TUC will have their academic profiles bolstered by the formation of global working

groups on common research topics such as wastewater treatment, occurrence and fate of emerging contaminants in aquatic systems, and water and wastewater treatment, etc., or educational issues of global concern. Academic staff at TUC will be able to create, through the proposed mobility, a publicly accessible digital repository to transmit and track developments on the proposed scientific object and to analyze data from scientists globally, since the proposed mobility prioritizes digital transformation.

3) Impact for the Universities: TUC will gain from the development of internationalization policies, the strengthening of socioeconomic relationships, and the opportunity to promote their academic excellence. Furthermore, TUC's expertise of Asian teaching methods will be expanded as a result of the proposed collaboration, and their laboratories will be informed about cutting-edge new processes. TUC will be able to build its research capacity, develop methods to promote mobility, modernize their curricula, improve the scientific quality of their teaching and research, and ultimately achieve joint worldwide objectives through the Erasmus+ ICM Program. The Program will assist the TUC by speeding the development of a high-performance digital education ecosystem for teaching and research. However, university digital transformation extends well beyond lecture recordings. Students and academic staff will be able to engage in classes regardless of their location, owing to the availability of totally virtual and hybrid classrooms. Throughout the COVID-19 epidemic, TUC's digital transformation was critical to ensuring the continuation of teaching and learning. However, the possibilities for virtual classrooms, hybrid classes, and hyflex are not limited to last years' exceptional circumstances. They are essential to reaching today's students who are globally oriented and frequently juggle education with employment and family responsibilities. The proposed program will solidify the TUC's digital transformation even further.

4) Impact for both counties: At the national level, collaboration between public and private entities will be created in order to transfer and utilize the innovative technologies presented. Greek academics will be aware of global concerns and informed about technology solutions to comparable environmental problems in order to address similar issues country (e.g. the occurrence and fate of emerging contaminants in aquatic systems, as well as water and wastewater treatment, the presence and fate of microplastic in aquatic environments, and its role as a vector of contaminants) in Greece. TUC's growing prominence as an academic education area will draw significant attention to the development and implementation of digital transformation initiatives for educational institutions in other countries. By proposed program, TUC will serve as the central axis of transformation in developing national policies and agendas that support the country's transition to developing teachers' and students' digital abilities through the use of digital technology, as well as promoting self-organized competency-based learning, novel modes of teaching, learning, and assessment. Synergies and collaborative actions at the regional level may help the country's universities. Co-teaching in highly specialized scientific fields that an institution cannot cover would help strengthen the country's scientific foundation. Finally, the Erasmus+ ICM Program will bolster Greek (and specifically Cretan) tourism.

5) International impact: TUC's international potential will be increased through enhanced managerial capabilities and internationalization strategies. TUC will assist countries in establishing commercial and diplomatic ties and establishing a shared approach to overcoming obstacles and challenges in Environmental Engineering. Students and academics are increasingly collaborating online on scientific issues. Thus, the proposed mobility will enable the establishment of a platform for data registration and processing, which can be managed by students and/or academics from both universities who are interested in or examining a common scientific subject. Additionally, the platform will be capable of disseminating scientific information in an understandable manner to the general public. Lastly, young people still face unequal opportunities for participation and civic engagement. The proposed program would assist participants in comprehending of the value of active citizenship and democratic involvement through their active participation in university societies; participation in undergraduate courses or conferences, and so forth.

Measures for the dissemination of the results at the level of Institutions:

The results of the mobility at TUC will be disseminated through the following channels: official announcements on Institutional websites and social media platforms (Facebook, Instagram, LinkedIn, etc.), Erasmus news in

universities newsletters with testimonials from incoming and departing students and faculty, and presentations/events addressed to academic staff and students. Returnees will serve as ambassadors for the Erasmus+ ICM Program and will be invited to participate in events and sessions planned by both institutions to share their exchange experiences. Teaching staff and students who are interested in participating in the mobility program in the future will be informed and assisted by the International Offices and previous participants at both universities.

Measures for the dissemination of the results at the level of Countries: Dissemination to the general public and interested scientific communities will take place primarily through social media platforms (Facebook, LinkedIn, and Twitter), but also through research-oriented media (ResearchGate). The experiences and outcomes will be shared on the social media platforms of both institutions, and an Erasmus+ newsletter with testimonies will be distributed to all of the TUC partners as well. The results of the studies will be presented at national conferences (e.g. Japan Society of Water and Environment, annual meeting <https://www.jswe.or.jp/eng/index.html>) as well as published on national journals (e.g. Journal of Japan Society on Water Environment <https://www.jswe.or.jp/eng/publications/journals/index.html>). The produced teaching or training material will be retained by the host institution to be widely used after the project's completion and will serve as the foundation for the academic program's modernization and improvement.

Measures for the dissemination of the results at international level: The results can be disseminated internationally primarily through social media platforms (Facebook, LinkedIn, and Twitter), as well as through research-oriented media sites (ResearchGate). The results of the studies will be presented at international conferences (e.g. World Water Congress <https://worldwatercongress.org/>) as well as International journals such as Science of the Total Environment (<https://www.journals.elsevier.com/science-of-the-total-environment>) or Journal of Environmental Management (<https://www.journals.elsevier.com/journal-of-environmental-management>). Lastly, academic staff and student perspectives on the program may be shared with the Erasmus Student Network (ESN) for further international dissemination. During Prof. Petros Gikas' visit to TPU, Japanese academics showed an interest in establishing a Greek-Japan Academic Forum. The aforementioned concept will be developed further during the Greek professors' visit to Japan, and efforts to apply it will occur in the event that the TUC and TPU achieve an agreement of the Erasmus International Mobility.