iREEDER

Introducing Recent Electrical Engineering Developments into undErgraduate cuRriculum

IREEDER NEWSLETTER

Issue 1, July 2020

Co-funded by the Erasmus+ Programme of the European Union

Brief About IREEDER Project

IREEDER is a project co-funded by the Erasmus-Plus program of the European Union. IREEDER consortium includes ten partners; five Jordanian and five European, and led by Al-Hussein Bin Talal University, Jordan. IREEDER has been started in November 2019 and will last for three years.

IREEDER aims at creating bachelor degree subjects with appropriate laboratories in Renewable Energy (RE), Internet of Things (IoT) and Cyber Security (CS) taught by universities in Jordan and brought into line with the EU requirements, as well as engaging faculty in the development of online lectures and laboratory training and sharing expertise with EU universities, while extending services and training in collaboration with the local industry and community and providing training opportunities for aspiring young academic staff.

The three topics, RE, IoT and CS, have been selected as the most important recent technologies in electrical engineering and related fields. Jordan, as a nonproducing oil country, has paid a lot of attention and investment in the RE field especially solar energy and wind energy, which makes RE knowledge and training skills are of a paramount importance for Jordanian

students. Also, the IoT applications in Jordan are expanding to encompass many industrial, military and medical applications, which requires IoT skilled engineers to be provided to the labor market. Moreover, CS has recently gained a significant interest worldwide and in Jordan as well. Many institutional websites have been hacked in the last year in Jordan; which highlights the need for improving security and data protection over the cyber. As such, skilled engineers in RE, IoT and CS represent a pressing need for the labor market in Jordan.

Within the framework of IREEDER, three laboratories will be established in Jordan. Specifically, an IoT laboratory will be established at Al-Hussein Bin Talal University, RE laboratory will be established at Mutah University, and CS laboratory will be established at Tafila Technical University. These laboratories will support the remote access feature such that all students in all Jordanian partners can remotely access the equipment and run their experiments.

IREEDER consortium is committed to disseminate all the project results and outcomes for all interested institutions and individuals in Jordan and worldwide. This newsletter will be issued in a biannual base and will contain the most recent activities and results of IREEDER.

Do you believe that IoT knowledge will open up more career opportunities for fresh graduate students?
- No
- Maybe
- Yes (Surely)
81,5% / 18,5%
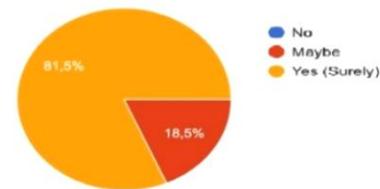
IREEDER Kick-off Meeting

The last February 3-4th, the IREEDER consortium met at AL-Hussein Bin Talal University (AHU), Ma'an-Jordan, to kick-off the IREEDER project. Although the official project activities have been started in November 2019, IREEDER partners have decided to have the opening ceremony and kick-off meeting in February 2020.

In the first day (February 3rd), the opening ceremony held at AHU with the presence of Prof. Ahmad Nusairat, the president of Isra University, Prof. Marwan Almousa, the Vice-President of Mutah University, Prof. Ahmad Abu El-haija, the director of National Erasmus Office at Jordan, representatives of all IREEDER partners, delegates from some of IREEDER associated partners, and representatives of the local community. The president of AHU has officially announced the kick-off through a short message. The Dean of Engineering at AHU, Prof. Mohammad AlHowiti, has also welcomed the university guests and gave a short overview about the university and the faculty of Engineering.

The Erasmus-Plus program and its activities has been explored by a talk given by Prof. Abu El-haija. He also presented some tips to ensure successful management of Ersamus projects. The international funded project and relations have been overviewed by Dr. Bassam AbuKaraki, the Director of International Relations Office at AHU.

Project coordinator, Dr. Saud Althunibat, welcomed all the guests and gave a quick overview for the whole IREEDER story. He highlighted the need for including the recent developments into the undergraduate curricula by introducing new subjects or updating the current ones. He appreciated the fund provided by the European Union under the Erasmus-Plus program.

Two missives in behalf of the local and European partners have been presented by Dr. Omar Daoud (Philadelphia University, Jordan) and Prof. Andreas Kazantzidis (University of Patras, Greece). Both explored their roles in the projects and showed the

commitment to ensure the successful implementation of IREEDER project.

TALK BY PROF. ABU EL-HAIJA

Anothertalk was given by Eng. Mohammad Alkhudari, the general manager of Green Circle Company, about the recent advances of CS and the related needs of the labor market in Jordan. He also showed an interest in the expected outcomes of IREEDER project, and he expressed his ability and readiness to provide any feedback from the labor market viewpoint. Eng. Amer Alrawad, IoT expert, gave another talk about the potential applications of IoT in the Jordanian market. He also highlighted that including technologies such as IoT, CS and RE will enhance the job opportunities for our students after graduation.

In the afternoon, a detailed talk was given by Prof. Abu Elhaija about the Erasmus+ CBHE Projects: Sound Contractual and Financial Management. All the financial rules have

been explained with a focus on the new rules. After that, technical sessions of the project have been commenced among the project partners. Dr. Althunibat, project coordinator, has viewed some rules regarding the IREEDER website, partnership agreements, payment schedule and the deliverable preparation.

In the second day (February 4th), technical sessions continued by discussing the different work-packages in the projects. Specifically, the work progress of the work-packages, which have been already started, has been presented by the corresponding work-packages' leaders. Also, the work plans of the other work-packages have been presented by the work-packages leaders.

TECHNICAL SESSIONS IN THE 2ND DAY OF THE KICKOFF MEETING

IREEDER
Work Progress

The activities of IREEDER are partitioned into seven work-packages (WPs) and spread over the three-year project lifetime. In what follows, we report the main activities of the WPs that have been already started.

WP1: "Project Initialization and Work Preparation" has been started by the beginning of the project and finalized by the mid of February 2020. It has been led by Prof. Fabrizio Granelli from the University of Trento (UNITN), Italy. One of the key activities of WP1 is the identification of teaching and training needs for IoT, CS and RE which will be used as guidelines for preparing the teaching materials and specifying the laboratories' equipment. Three questionnaireswere distributed among all stakeholders in Jordan such as faculty members, industrial sectors, students, trainees, private companies, and public administration. The questionnaires were completed by around one thousand participants. Overall, all participants – of all professional fields - undoubtedly underlined the need for the courses proposed by IREEDER. Moreover, they provided some suggestions on the topics to cover in the courses as well as the material to use for developing the corresponding laboratories.

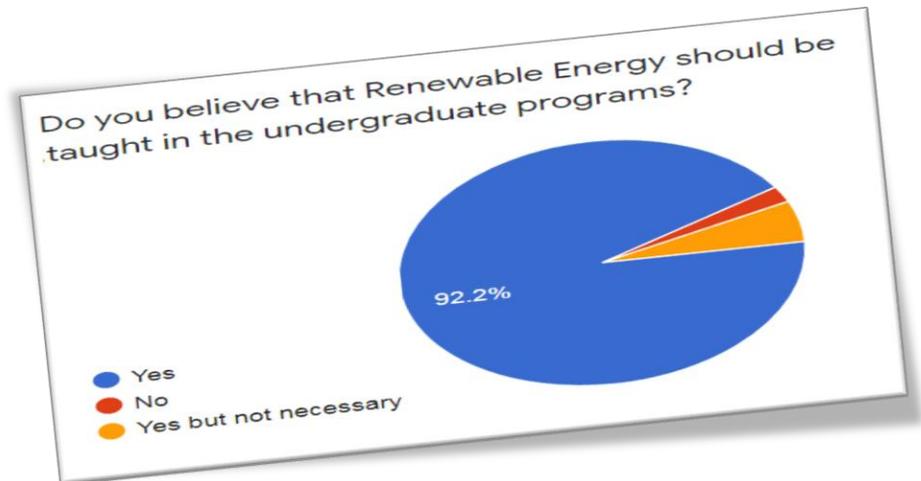The findings of the conducted survey at this stage can be summarized as follows

• All interviewees believe that the selected topics (RE, CS and IoT) are very important for

undergraduate studies in Electrical and Electronic Engineering and that the students' attendance of courses on such topics will increase their employability and boost their professional career.

• With regards to RE, academics believe that this course should include solar and wind energy, as well as energy storage and smart grid concepts,operation and control issues like planning and costs. Regarding the laboratory practice of this course, most suggestions point to the usage of photovoltaic and wind training kits, as well as


storage devices and simulators. This is in line with the opinion of the interviewees from industry who have indicated the same topics as being the most important in the course and also have favored training kits for the laboratory sessions although simulators and actual equipment can also be used.

• As for CS course, most professors believe that it is more appropriate for this bachelor's degree course to include the fundamentals of CS as well as security breaches and prevention techniques. Regarding laboratory

practice, most suggestions point to the usage of emulators or simulators to provide hands-on experience on intrusion detection, potential attacks or malware although various other options are considered as being of equal importance. This is also in agreement with the option of the industry professionals.

• With regards to IoT course, professors suggest that it is more important to include topics that have to do with IoT devices like sensors, actuators etc., IoT architectures and protocols, IoT applications, the relevant networks that facilitate IoT as well as

providing a broad vision of the world of IoT. Regarding the laboratory practice, most suggestions point to the usage of training kits, emulators or simulators, actual devices to provide hands-on experience. The importance of programming skills is also highlighted but this could be part of another pre-requisite course.

The obtained results of WP1 will be provided to the coming WPs, WP2 and WP3, of the project to be analyzed and filtered by the experts within the IREEDER consortium in order to define the contents of the courses and their laboratories' equipment.

In **WP2: "Development of Teaching Materials",** the results obtained by WP1 together with the expertise of the involved European and Jordanian partners will be utilized to prepare a teaching material for each of IREEDER topics. WP2, led by University of Central Lancashire (UClan) – Dr. Marios Raspopoulos, has been started by the mid of February 2020. Tasks of WP2 has been organized by creating three different teams from the IREEDER partners, where each team is responsible for tasks related to a single course. Through a detailed discussion and
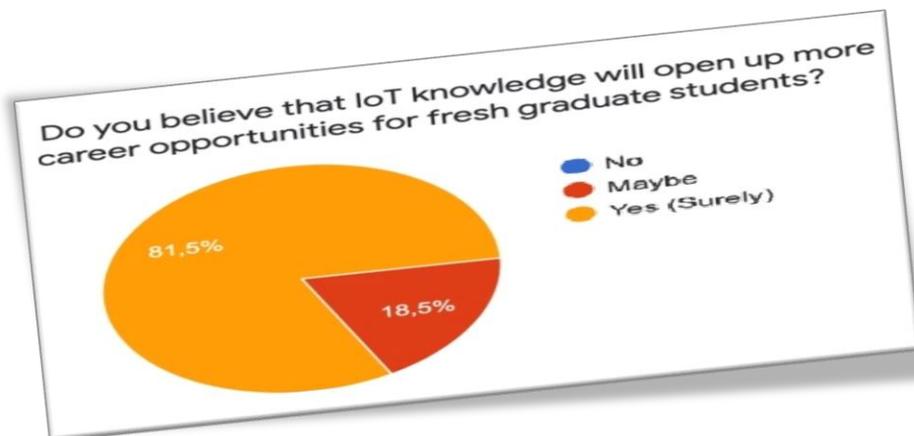
analysis performed by all partners and via two online meetings, a detailed outline has been finalized for each course of the three IREEDER topics. Course contents to be developed through WP2 have been distributed among the involved partners. Teaching materials are expected to be finalized by the mid of 2021 according to the project plan.

IREEDER on Facebook

Although **WP3: "Capacity Building and Training of Trainers"** was scheduled to start by the mid of August 2020, some of its activities has been early lunched to meet the new EACEA rules. Specifically, the general equipments of the laboratories have been identified in order to establish the three laboratories at the Jordanian partners. A main feature of the equipment to be purchased is to support the remote access, which will allow for all stakeholders to access the equipment, and hence, widening the impact of IREEDER project. WP3 is led by the University of Partras- Greece, Prof. Andreas Kazantzidis, and its planned activities include holding training workshops in Europe for selected staff from the Jordanian partners.

WP4: "Quality Assurance" is led by University of Vigo, Spain – Dr. Felipe Gil-Castiñeira, and it last for the whole project lifetime. Within WP4, a committee, called Quality Monitoring Committee, has been formed which includes representatives from all IREEDER partners. The main role of this committee is to monitor all IREEDER activities, results and events, and ensuring their quality. To this end, a quality assurance plan has been elaborated in WP4 that sets a detailed procedure to monitor all project activities and to evaluate its quality.

Within the framework of WP4, an annual quality assurance report will be prepared by the partners.

WP5: "Exploitation of Results and Sustainability Plan" is led by Instituto de Telecomunicações, Portugal – Dr. Jonathan Rodriguez, and its activities will be started by the beginning of the third year of the project (November 2021).

WP6: "Dissemination" will be started by March 2021 and led by Mutah University-Jordan, Dr. Ziyad Altarawneh. However, some activities have been early commenced in order to ensure the dissemination of all activities and results of IREEDER project. This WP is responsible for disseminating project results and activities through the official IREEDER website and through the project pages on social media. Also, IREEDER bi-annual newsletter is also another means of disseminating the IREEDER project.

IREEDER Website: *http://ireeder.ahu.edu.jo/*

Said about IREEDER

Eng. Mohammad Alshammari, Chair of the Jordan Engineers Association/ Ma'an Branch, said "**IREEDER project will serve as a venue for bridging the gap between academic outcomes and Jordanian industrial requirements and provide efficient teaching platform that would certainly equip students with necessary skills in RE, IoT and CS to join the Jordanian market and create new opportunities for entrepreneurs ''**.

Dr. Qais Safasfeh from Tafila Technical University said '' **the idea of utilizing remote Labs has impressed him an innovative blended teaching methodology that allows students to carry out their experiments remotely and provide them with several advantages especially during the COVID-19 time ''.**

Laith Tradat, a fresh engineer who graduated last year at AHU, said that **"most of the related job vacancies that I have found are in renewable energy or internet of things".** She added **"To increase my chance to get a job, I am taking an extensive course in renewable energy".**

Eng. Wael Jamal, an engineer in wind energy company, said **"when started my job, I spent six months learning necessary skills in renewable energy",** and added **"I really encourage all students to attend IREEDER courses once finalized to enhance their employability in the labor market".**

Ahmad Thunibat, a student at AHU, said **"labs with remote access will be very useful for students... Last semester, most of the laboratories were stopped due to the COVID19 pandemic ... with IREEDER labs that can be remotely accessed we can easily attend them virtually".**

Dr. Omar Almousa from Jordan University of Science and Technology said**: "I had a look at the outline of the cyber security course to be prepared by IREEDER project, and I believe that it is a comprehensive course that covers all different sides of the cyber security .... If elaborated, it is gonna be useful for all of us".**

MORE INFO ABOUT THE PROJECT CAN BE READ HERE, OR CONTACT US AT IREEDER@AHU.EDU.JO

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