



RL4Eng

Development of Remote and Virtual Laboratories for Teaching and Training Engineering Students in the South Mediterranean and Sub-Saharan Higher Education Institutions

RL4Eng Annual Newsletter - Issue 1



co-funded by the Erasmus+ programme of the European Union



■ Introduction about the project

The economic crisis and pandemic in South Mediterranean and sub-Saharan countries have put the HEIs in a challenge to accommodate for the new requirements of online teaching.

The RL4Eng project aims to improve the quality of higher education in third countries and make it more relevant into the today's digital transformation world through establishing Remote and Virtual Laboratories for Teaching and Training Engineering Students to modernize the current teaching approaches and improve the digital and entrepreneurial capacities of both students and teachers in South Mediterranean and Sub-Saharan HEIs.

The project's contribution to the priorities of the call includes the digital transformation under which digital education is the focus of the project. Online teaching for laboratories has been implemented in EU countries with successful outcomes.

The involvement of different European Universities will help integrate good practices and minimise potential risks in implementing the RL4Eng project. South Mediterranean HEIs have identified the necessity of training with numerous initiatives available in the European system. Few Research is available on the effective delivery of remote labs and take-home labs.

The project involves several workpackages in efforts made to elevate the knowledge of remote labs and take home labs in the partners institutions via capacity building for students, staff and faculty and share of experiences.

A remote lab will be established in each country of the partners institutions and a take-home lab will be established in each HEI of the partner countries.

The very nature of remote labs, and take-home labs makes them sustainable and easily scalable as they become part of the university structure and receives part of its budget.

Moreover, the nature of the remote labs makes them sustainable as they are accessible from everywhere and could be used for both teaching and for research.

UCLM hosts the RL4Eng training and consortium meeting at in Castilla-La Mancha

Castilla-La Mancha, Spain - The RL4Eng project consortium (Development of Remote and Virtual Laboratories for Teaching and Training Engineering Students in the Southern and Sub-Saharan Mediterranean Higher Education Institutions) has arrived at the University of Castilla-La Mancha (UCLM) to carry out a set of training workshops in different technologies that will allow the implementation of remote laboratories in non-European partner countries.

The attendants had workshops in the topics of Cybersecurity, Raspberry Pi, SaaS and Docker, and through these training workshops, they had several visits and tours at the university labs, which will allow the students to continue training online not only in the event of another pandemic but also in their regulated training, accompanying the infrastructure of teaching materials that be introduced into the curriculum.

The consortium, coordinated by Yarmouk University in Jordan, is made up of fifteen partners from five countries, four non-European (Jordan, Lebanon, Morocco and Tanzania) and two European (Germany and Spain). In addition, two companies participate, one from Jordan and the other from Germany.

The remote laboratories will be implemented in the next phase are: FPGAs and HPC in Jordan, Raspberry Pi in Lebanon, Cybersecurity in Tanzania and Dockers in Morocco. With this laboratory configuration, each partner, both in teaching and research, will be able to remotely access the resources of another partner's laboratory.





RL4Eng workshops and meetings at HBRS, Germany

SANKT AUGUSTIN, Germany – RL4Eng project workshops and meetings took part from 24 to 28 September at Bonn-Rhine-Sieg University of Applied Sciences.

RL4Eng focuses on establishing remote and virtual laboratories for teaching and training engineering students in higher education institutions in South Mediterranean and Sub-Saharan regions.

The event was organized by the Hochschule Bonn-Rhein-Sieg University of Applied Sciences (HBRS) in Germany as part of its role in RL4Eng Project, funded by the European Union within the Erasmus+ Program.

The RL4Eng Project aims at supporting cooperation between higher education institutions in the southern Mediterranean, sub-Saharan, and Europe in the field of engineering education, implemented by the Yarmouk University in collaboration with 15 academic and industrial partners from Jordan, Lebanon, Morocco, Tanzania, Germany, and Spain.



During the four-day program, several workshops were organized including an introduction session on remote and take-home labs. Additionally, field tours in the University's campus and laboratories were conducted for the project members and students, as well as a visit to the Digital Center in Bonn to introduce startups. Moreover, the Project's Consortium convened a meeting with all project partners, to discuss the project's achievements, as well as the establishing remote and take-home labs in Jordan, Lebanon, Morocco, and Tanzania.

RL4Eng Kickoff meeting in Jordan at Yarmouk University



Irbid, Jordan - RL4Eng project kickoff meeting took place from 20th – 22nd of March at Yarmouk University in Irbid, Jordan.

RL4Eng is a project funded by Erasmus+ Programme with the aim to developing remote and virtual laboratories for teaching and training engineering students in the South Mediterranean and Sub-Saharan higher education institutions and support cooperation between higher education institutions in the south Mediterranean and sub-Saharan region (Jordan, Lebanon, Morocco and Tanzania) and Europe in the field of engineering education.

The meeting agenda included a welcome note and project introduction from the grant holder, Prof. Mwaffaq Al-Otoom, Additionally, work package leaders introduced the project six work packages: Preparation lead by BAU, Training lead by UCLM, Remote and Take-Home Labs Establishment lead by BRSU, Quality Plan lead by PS, Dissemination & Exploitation lead by TAGITI and Management lead by YU. At the end, all members agreed on the project work plan and visited the faculty of engineering labs at Yarmouk University.



Quality Management



Based on their experience and area of expertise, Professional Start has been working on continuous monitoring of project progress also applying Key Performance Indicators, assuring the establishment of Remote Labs (RL) and Take Home Labs (THL,) the quality of the training process. Basis for KPIs are the project description and the input from the partners. Professional Start is leading the QMC and is involved in all management and committee meetings.

As support, a quality monitoring software will be used to validate the quality of deliverables and project tasks. This tool with reading and writing rights for the project partners allows a two-level consolidation of KPI and monitoring via dashboards – made available to all project partners.

The partners agreed on a detailed Quality Assurance Plan following the kick-off meeting. QMC meetings will approve frequent Quality Assurance Reports, distributed to the project partners for corrective measures.

Quality Management process so far

March 2023: Outline of the Quality Assurance KPI at the kick off in Irbid

May 2023: Quality Assurance Plan developed and distributed

May 2023: First QMC Meeting

August 2023: Second QMC meeting and Release of the first Quality Assurance Report

Nov 2023: Third QMC Meeting and release of the second Quality Assurance Report

Improving Quality Assurance Plan

Since September Professional Start has been working to enhance the Quality Assurance to keep momentum and enhance transparency

By stepping in earlier in the processes of the project Professional Start is able to support the Project Steering and the RL-Establishing Committee (RLEC). In practice this was done by

-Releasing templates to the partners to describe model(s) and specifications of RL and THL in September 2023 at the training at HBRS

-Put urgency to the procurement process for RL and THL

-Issue templates to have partners to describe in detail the status of procurement, timing for installation, impact on curriculum etc.

-This initiative was improved by HBRS with additional comments and requirements

-Partners were able to present their results at the training at UCLM in Albacete in February 2024

Students Training Experience

Training in Spain

Rawan Tarraf

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Telecommunica-
tion Engineering Department
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Feedback on SPAIN Training for Development of Remote and Virtual Laboratories. Building upon the substantial knowledge gained at my home university, the training at the Universidad de Castilla-La Mancha in Spain became a vital extension of my expertise. While delving into cybersecurity, Raspberry Pi, Docker, and Software as a Service (SaaS), I recognized the profound impact of the foundational education received at my home institution. This experience affirmed the importance of the robust background provided by my university, as it served as a solid base for comprehending and actively participating in the cutting-edge topics covered during the training. The training not only expanded my horizons but also highlighted the



Students Training Experience

Mahdi Zaraket

University: Lebanese University
Major: Electrical and Communication Engineering
The cybersecurity and Docker training in University of Castilla La Mancha, Spain has been an enriching experience, blending theoretical knowledge with practical applications to deepen my understanding of digital security and containerization technology. The course content underscores the importance of safeguarding digital assets in an increasingly interconnected world, surpassing my expectations with its relevance and depth.



Training in Germany

Rawan Tarraf

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Feedback on Training in Germany for Development of Remote and Virtual Laboratories. Having a substantial background from the Lebanese University, the training in Bonn served as a significant extension, adding depth to my already robust knowledge. While I recognized elements of the content, the program's focus on remote labs surpassed expectations, affirming the global impact of educational advancements. The hands-on experience with FPGA technology not only complemented my existing understanding but also demonstrated the practical application of my comprehensive background. This training was a testament to the substantial foundation provided by



Students Training Experience

my home institution, further enriched by the international perspective gained at Bonn-Rhein-Sieg University.

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Training in Germany

BRIEF INFO ABOUT THE PARTICIPANT:

Dyaa Al Farran, a Computer Engineering student in Hijjawi faculty in Yarmouk University

WORKSHOP ORGANIZERS WERE

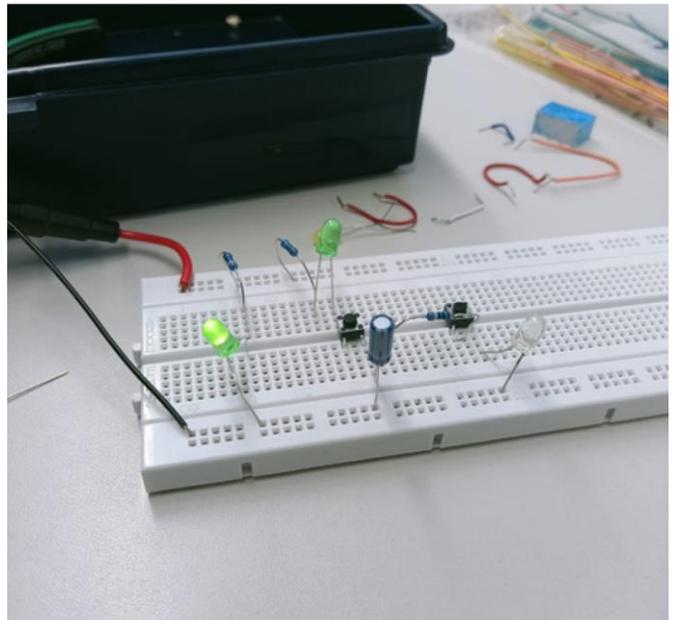
ACCOMPANIED BY:

Dr. Mwaffaq Otoom, Dr. Mohammad Alzubaidi and Dr. Dania Bani Hani.

MY EXPERIENCE

Students Training Experience

I am glad that I had opportunity to attend the RL4ENG workshop in Bonn last year! It was amazing getting hands-on with the virtual labs and connecting with educators from around the world. I especially enjoyed Take home labs. If you're interested in exploring new teaching methods or learning about cutting-edge engineering tools, I highly recommend checking out this year's workshop. It's particularly great for Computer Engineering students. Trust me, it's an experience you won't want to miss!



Training in Germany

PERSONAL INFORMATION :

- * Nagham Sawalha *
- Dept. of BioMedical Eng.
- * Yarmouk University.

MY EXPERIENCE

In a recent workshop blending innovation and technology, I immersed myself in the fascinating realm of remote labs and individualized image processing.

Through hands-on exploration, I delved into the intricacies of remote lab methodologies, discovering new ways to engage with experiments from afar.

Students Training Experience

Additionally, the journey into individual image processing techniques opened up a world of creative possibilities, empowering me to manipulate visual data with precision and artistry.

This enriching experience not only expanded my technical expertise but also fostered a deeper appreciation for the intersection of digital tools and scientific exploration.

Exploring new culture:

#It was a lovely experience visiting Germany for the first time and experiencing a new culture.

#I had the chance to visit such amazing places such as :

Cologne Cathedral,
Beethoven-House in Bonn.



Training in Spain

Brief information about participant:

Souad Abu Al-Khair, a medical systems engineering student at Al-Hijawi College at Yarmouk University

My experience:

Students Training Experience

Stepping onto the grounds of UCLM University in Albacete, Spain, marked the beginning of an unforgettable journey into the heart of academia. The picturesque campus, nestled in the historic city, immediately captivated my senses with its blend of modernity and traditional Spanish charm.

faculty, passionate about their subjects, inspired in us a love of learning that extended far beyond the confines of the lecture hall. By interacting with professors and fellow students during my visit, I gained insights into the dynamic learning environment.

I am very proud and happy to have had this experience and to have this opportunity to attend the RL4ENG workshop at UCLM Albacete - Spain this year! It was fun and inspiring to get hands-on with a Raspberry (mini-computer) and learn to program it. I particularly enjoyed the student and professor discussions on cybersecurity basics and techniques. If you are interested in exploring new teaching methods or learning about the latest engineering tools, I highly recommend joining a workshop next year.

Returning home with a changed worldview:

Since it was my first time traveling to Spain, it was unforgettable memories! When you visit Madrid and enter the city center, you will feel as if you are inside a living museum filled with antique antiques and sculptures. When you visit the city of Albacete, you should visit the cathedral (cathedral de Albacete), which is extremely beautiful.



Training in Germany

INFORMATION ABOUT THE PARTICIPATING STUDENT:

Dema Faisal Shalabi

Students Training Experience

Dept. of Electrical Power Engineering.

Hijawi for Engineering Technology.

Yarmouk University.

SOME HIGHLIGHTS OF THIS EXPERIENCE:

-Knowledge Enrichment: I worked with take home labs, also attended workshop for Image processing ,and visited Digital Hub which was very inspiring with ideas and knowledge .

-Networking: It was really a great experience for me to work on ideas and issues with great professors and professionals

-It was a pleasure to participate in the RL4Eng staff and student training workshops in Germany at BonnRhein-Sieg University of Applied Sciences during the period 25-28/9/2023 on remote and take home labs for engineering, as a part of the EU Erasmus+ funded project which led by Yarmouk University

EXPLORING NEW CULTURE:

After the training, I explored the vibrant streets of Germany. Visited the museum (HAUS BONN) and Köln CATHEDRAL.

It's amazing cultural immersion can allows for more wisdom and knowledge .Additional knowledge about any situation increases the strength of an opinion.

TRAINING WORKSHOP IN GERMANY.

The training organizers were accompanied by professors:

-Dr. Mwaffaq Otoom, Dr. Mohammad Alzubaidi and Dr. Dania Bani Hani



Students Training Experience

Training in Germany

Mark Hanna:

Computer Engineering student, University of Balamand, Lebanon

“Attending the RL4ENG project training in Germany at H-BRS University was a valuable experience. The multifaceted 4-day program broadened my technical expertise, covering topics such as image processing, circuits, sensors, welding, and take-home labs. Grateful for the hands-on learning and the opportunity to enhance my skills in diverse areas.”

Taline Ouayjan:

Computer Engineering student, University of Balamand, Lebanon

“I had the incredible opportunity to engage in a diverse 4-day training program in Germany through the RL4ENG project. Exploring diverse subjects significantly expanded my technical expertise. The hands-on approach and collaborative environment were invaluable – every session felt like a step forward. The experience was not just educational but genuinely transformative, and I’m grateful for the chance to have been part of it!”

Joe Kareh:

Computer Engineering student, University of Balamand, Lebanon

“Participating in the training program in Germany was an enlightening experience. The sessions and engaging discussions not only enhanced my technical skills but also provided valuable insights into real-world applications. I’m grateful for the opportunity and look forward to applying what I’ve learned in future projects.”

Students Training Experience



Training in Spain

Tony Saade

Computer Engineering student, University of Balamand, Lebanon

“The RL4Eng project expanded my skills in cybersecurity, Raspberry Pi, SaaS, and Docker, while showing me how remote labs revolutionize engineering education. Plus, collaborating with people from different cultures broadened my global perspective and created lasting connections.”

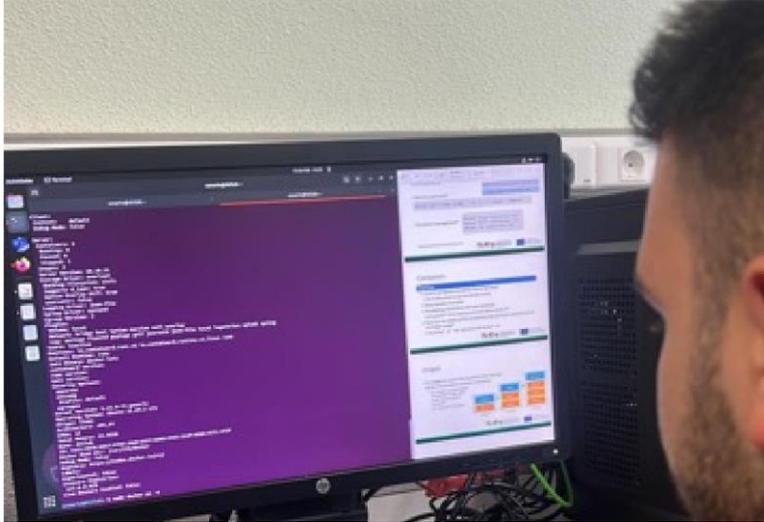


Students Training Experience

Jamil Nassar

Computer Engineering student, University of Balamand, Lebanon

“Participating in the RL4Eng project significantly enhanced my computer skills through practical experience and collaboration with peers. It was a valuable opportunity that contributed to my growth as a computer engineer.”



Training in Spain

Jad Zaiter

Computer Engineering student, University of Balamand, Lebanon

During the RL4Eng training in Spain, I gained new skills that have significantly enhanced my capabilities as an engineer. Assessing cybersecurity risks, performing exploitation techniques, working with Raspberry Pi and integrating new software concepts provided me with hands on experience. I've gained valuable skills that have truly elevated my engineering know-how. I want to thank you for this wonderful opportunity.

Students Training Experience



Training in Germany

Feedback from the students

Full Name: Loyani Loyani

University: The Nelson Mandela African Institution of Science and Technology

Major: Information and Communication Science and Engineering

What do you say about the training? Your feedback?

I had an amazing and enlightening experience during the training that was conducted as a part of the RL4Eng Project at HBRS in Germany. The training offered a diverse range of activities, including practical workshops on remote and take-home labs, as well as sessions on innovation and entrepreneurship. These opportunities provided me with valuable insights into the evolving landscape of engineering education and hands-on learning experiences. Additionally, visiting a Digital Innovation Hub in Bonn added a real-world dimension to the learning experience, highlighting the importance of industry-academia collaboration.

Students Training Experience



RL4eng

Partners



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