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Work Package 5:	Creation of a section in the project website where training and internship opportunities are listed
Title:	D5.1 Report on the training/internships website section
Lead Organization:	UNS
Participating Organization:	UNI-KLU, UC3M, UNC, UNS, UNMDP, UdelaR, UCU, INCUTEX, ALASSIO, ALENET, TEAC, EYCON, ALLIANSYS SRL, Santex, TELECOM ARGENTINA S.A, CONTROLNET S. A., ABM ingeniería y sistemas S.R.L., UTE, CONAE.
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Deliverable data	Work Package and Outcome ref.nr	WP5 D5.1
	Title	Report on the training/internships website section
	Type	☐Teaching material ☐Event ☐Learning material ☒Report ☐Training material ☐Service/Product
	Description	A report that describes the website section dedicated to training and internships will be delivered. This website section will collect all the training and internship opportunities promoted by the NoC.
	Date	20.05.2022
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Target groups	☒Teaching staff ☐Students ☐ Trainees ☒ Administrative staff ☐ Technical staff ☐ Librarians ☐ Other	
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Task	T5.1 Creation of a section in the project website where training and internship opportunities are listed (Task leader: UNS)	

Revision History				
Version	Date	Author(s)	Organization(s)	Brief description of change
1	20.5.2022	J. Cousseau	UNS	Drafts with contents of all sections
2	06.07.2022	J. Cousseau	UNS	First complete draft
3	08.07-2022	D. Carrica	UNMdP	Comments and corrections
4	17.08.2022	P. Donato	UNMDP	Adjust of table templates
5				
6				

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1. Introduction

The Work Package 5 (WP5) **Training and internship implementation** is oriented to training and internship activities organized during the ERASMUS NEON project. Training activities will mainly target students, but specialized training targeting teaching staff will also be organized. Training for students will assume fully developed training modules (developed as described in WP3 and WP4) on technical and entrepreneurial subjects within IoT.

As an additional objective, non-qualified people or general public are also aimed to be assisted by introductory courses or workshops, in the form of informative activities.

On the other hand, similar activities are proposed in the case of local industry personnel, associated with IoT, communications and related technology.

The work package will implement teacher training sessions about innovative teaching methods, such as, for example: remote lab tools, teaching practices, educational trainings, training in prototyping tools, etc.

The deliverables, and their associated tasks, related to WP5 are the following

- D5.1 Report on the training/internships website section (M6).
- T5.1 Creation of a section in the project website where training and internship opportunities are listed.

- D5.2 Report on the framework for training and internships (M11).
- T5.2 Implement framework for student training in cooperation with EU partners and industry.

- D5.3 Report on organized hackathons for students of the region (M19).
- T5.3 Implement framework for student internships in companies.

- D5.4 Report on student training modules on technical and entrepreneurial subjects (M30).
- T5.4 Offer techno-economic, entrepreneurial and IPR related training modules.

- D5.5 Report on teacher training modules (M35).
- T5.5 Implement teacher staff training on technology and modern prototyping tools for IoT.
- T5.6 Implementation of three workshops on IoT and ICT technologies.

The objective of the deliverable D5.1 is to report about the characteristics of the website section developed to promote the offer of internships and training at the network of competence (NoC). In particular, the document provides: i) a description of the general functionalities of the website of the NoC with emphasis on those related to training and internship offer. ii) a description of the planned activities for students and staff training and internships and iii) some actual offer of internships and training at the NoC.

To these purposes, a description of functionalities of the NoC website is presented in Section 2. Then, in Section 3, the planned student/staff internships and training opportunities is summarized. As an example, some actual internship and/training calls are included in Section 4. Finally, conclusions of this deliverable are given in Section 5.

2. Functionalities of the NoC website

The website of the ERASMUS NEON Network of Competences in Internet of Things (NEON NoC) is as follows: www.neon-iot.org

The home page (in its two versions: English and Spanish) shows, in addition to the cover (as illustrated in Fig.1), a menu at the top with different options:

- IoT Events: Dedicated to the dissemination of all workshops, courses and/or seminars, etc.
- **Internships/training: To publicize all internship opportunities and mobility financing for potential interested students from NoC member universities.**
- Members: General information of all members of the NoC.
- News: News fundamentally associated with thematic aspects of the NoC.
- Project: General project information: objectives, development aspects, etc.

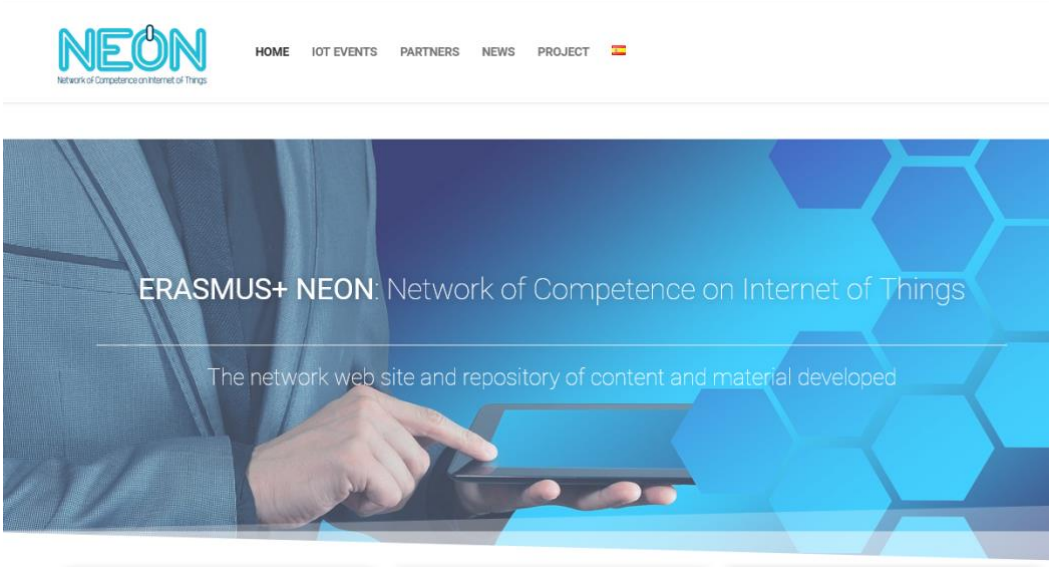


Fig. 1: NEON NoC website homepage.

Also on the cover the main objectives of the NoC are emphasized: 1) Modernization of the study programs of the participating academic institutions to include Internet of Things (IoT) content. 2) Creation of content and associated educational material, both for new courses, workshops or specific training material. 3) Creation of laboratories, based on equipment financed by NEON, in areas associated with the IoT theme in the participating academic institutions. 4**) Training and education on the subject of IoT, either through exchanges between laboratories of academic institutions as well as companies with an interest in the subject of IoT.**

The general information and dissemination of activities and results of the NoC NEON is also presented on the cover as shown in Fig. 2. There it is possible to find information on the NoC NEON of the following aspects:

- Aspects of the teaching material developed.
- Study programs and courses with IoT content.
- Events related to IoT technology.
- **Offer of undergraduate and postgraduate theses, internships and academic exchanges and/or in companies associated with IoT.**
- Contact details of NoC NEON partners

- Technological innovations associated with IoT.

As can be verified on the website, some content is already available in this table of features but it is expected to be completed in detail with the development of the ERASMUS NEON project.

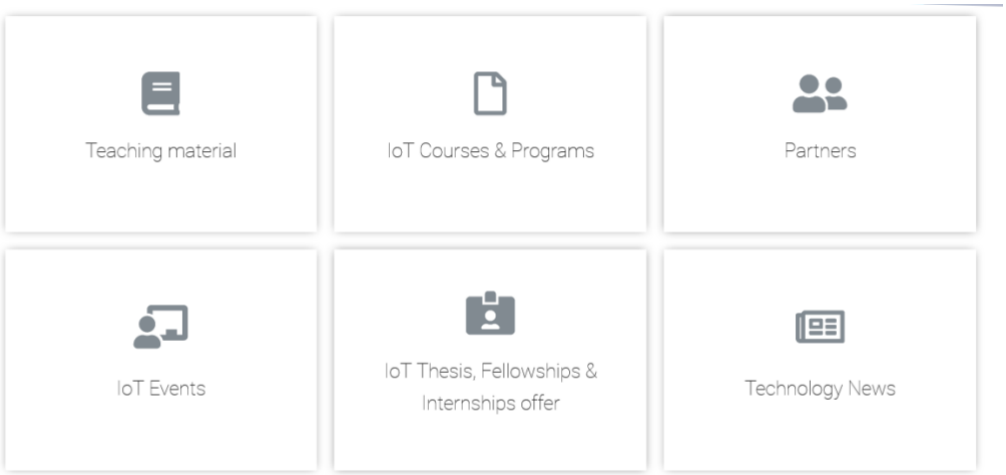


Fig. 2: Some detail of the functionalities of the NEON NoC website homepage.

As described in the following section, special emphasis in this report is put in the training and internships offer.

3. Planned activities of training/internships

The planned training and internship activities of NEON Work Package 5 are divided into:

- Training courses and/or internships for students.
- Teacher/teacher training.

The specific planned activities for students in WP5 are summarized in Table 1. These activities are organized into:

- Regular courses and/or internships for students from South American universities (UNC, UNS, UNMdP, UdelaR and UCU) in European universities (UC3M and UNI-KLU).
- Hackathon in Montevideo with the participation of students from South American universities.
- Regular courses and/or internships for Argentine students in Bahía Blanca, Argentina (from UNC and UNMdP at UNS).
- Regular courses and/or internships for Argentine students in Córdoba, Argentina (from UNS and UNMdP at UNC).
- Regular courses and/or internships for Uruguayan students in Montevideo (UdelaR and UCU).
- Regular courses and/or internships in Uruguay (UdelaR, UCU, UNS and UNMdP).
- Internships in companies in Buenos Aires, Argentina.

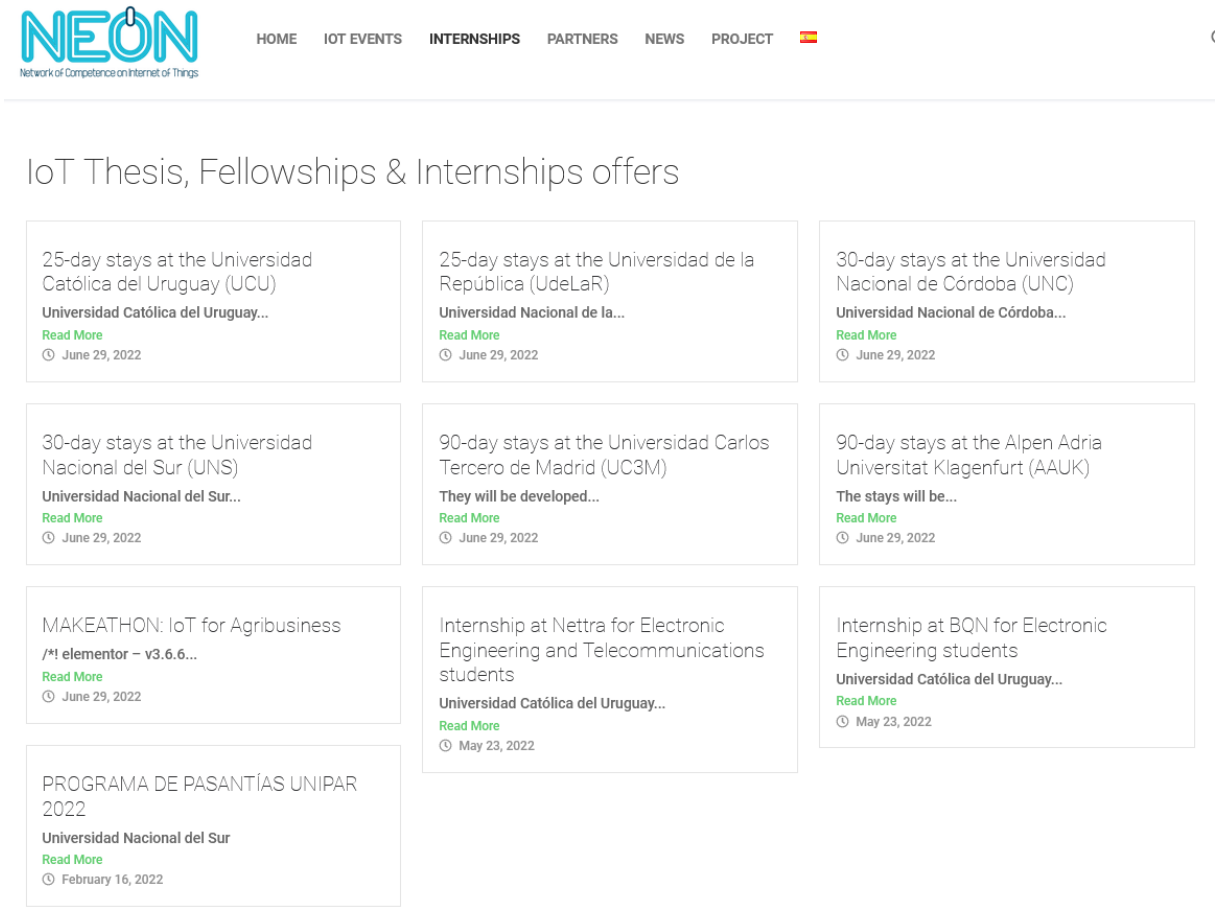
Table 1. NEON student training/internships framework

Planned activities	Partner No	Partner	Country	Origin	Destination	Number of participants	Number of days (per participant)
Regular courses and/or internships	P3	UNC	Argentina	Córdoba	Klagenfurt	2	90
	P4	UNS	Argentina	Bahía Blanca	Klagenfurt	2	90
	P5	UNMdP	Argentina	Mar del Plata	Madrid	2	90
	P6	UdelaR	Uruguay	Montevideo	Klagenfurt	2	90
	P7	UCU	Uruguay	Montevideo	Madrid	2	90
Hackathon	P3	UNC	Argentina	Córdoba	Montevideo	3	3
	P4	UNS	Argentina	Bahía Blanca	Montevideo	3	3
	P5	UNMdP	Argentina	Mar del Plata	Montevideo	3	3
Regular courses and/or internships	P3	UNC	Argentina	Córdoba	Bahía Blanca	2	30
	P5	UNMdP	Argentina	Mar del Plata	Bahía Blanca	2	30
Regular courses and/or internships	P4	UNS	Argentina	Bahía Blanca	Córdoba	2	30
	P5	UNMdP	Argentina	Mar del Plata	Córdoba	2	30
Regular courses and/or internships	P6	UdelaR	Uruguay	Montevideo	Montevideo	2	25
	P7	UCU	Uruguay	Montevideo	Montevideo	2	25
Regular courses and/or internships	P6	UdelaR	Uruguay	Montevideo	Montevideo	2	25
	P7	UCU	Uruguay	Montevideo	Montevideo	2	25
	P4	UNS	Argentina	Bahía Blanca	Montevideo	1	30
	P5	UNMdP	Argentina	Mar del Plata	Montevideo	1	30
Internships	P3	UNC	Argentina	Córdoba	Buenos Aires	1	30
	P4	UNS	Argentina	Bahía Blanca	Buenos Aires	1	30
	P5	UNMdP	Argentina	Mar del Plata	Buenos Aires	1	30
	P6	UdelaR	Uruguay	Montevideo	Buenos Aires	1	30

The activities planned within the WP5 for teacher/staff training are basically associated with the 30-day visits of the UNC and UNMdP to European universities (UNI-KLU and UC3M) and the three workshops on teaching methodologies for IoT in Klagenfurt, Madrid and Montevideo.

4. Actual offer for training/internships

As an example of the activities related to student training and internships, a website offer by the date of this report is included in Fig. 3.



Also, Table 2 details the activities offered for student courses/training to date.

Table 2. Detail of courses/internships offer for students/teachers (July 6, 2022)

Host Partner	Responsable	Type of activity	Oriented to: GS, PS, or T (*)	Brief description	Duration	Approximate start date
UC3M	Ana García Armada	Course/ training	GS, PS (from UNMdP)	This activity is scheduled with the UNMDP. It is expected that undergraduate or postgraduate students can attend a stay in the Group of Dr. Garcia Armada. It is intended to be carried out by undergraduate or postgraduate students who carry out research tasks in the field. The stay will be articulated with the teaching of courses offered by the UC3M. It is aimed that the student can carry out part of his final degree project or his doctoral thesis during the stay.	90 days	02/2023
UNC	Graciela Corral Briones	Course	GS, PS	Regular course on Digital Communications.	15 days	03/2022, 03/2023
UNC	Graciela Corral Briones	Course	GS, PS	Regular course on Cognitive Software Defined Radio	15 days	08/2022, 08/2023
UNC	Graciela Corral Briones	Teacher training	T	Seminar on Remote SDR Lab	2 days	08/2022
UNC	Graciela Corral Briones	Student training	GS, PS (from UNS, UNMdP)	SDR Lab for IoT applications. The students should take some modules (developed for the NEON project) at their own peace and work on an IoT project	30 days	08/2022, 10/2022, 02/2023
UNS	Juan Cousseau	Course/ training	GS, PS (from UNMdP)	This activity is scheduled with the UNMDP. Undergraduate or postgraduate students are expected to spend a period in the Group of the Dr. Cousseau. It is intended to be carried out by undergraduate or postgraduate students who carry out research tasks in the field. Likewise, it can be articulated with the dictation of a UNS course. In this case, it is expected that the student will be able to complete the final project for the course during the stay.	30 days	10/2022
UNS	Juan Cousseau	Course/ training	GS, PS (from UNC)	This activity is coordinated with UNC. Undergraduate or postgraduate students are expected to spend a period at UNS laboratories on IoT. It is intended to be carried out by undergraduate or postgraduate students who carry out research tasks in the field.	30 days	09/2022, 03/2023
UNS	Juan Cousseau	Course	PS, T	Regular posgraduate course: Cellular IoT Technologies	3 months (8 virtual classes + 2 labs)	09/2022, 09/2023
UNS	Juan Cousseau	Course	GS	Regular course Electronic Eng.: Fundamentals of Communication Systems	One tutorial	11/2022, 11/2023
UNMdP	Alejandro Uriz	Course	GS, T	Regular course oriented to the development of communication systems based on Software Defined Radios.	5 days	04/2023
UCU	Matias Miguez	Course/ training	GS, PS (from UNMdP)	Scheduled activity with the UNMDP. A stay is carried out in which the student will attend the IoT in Agribusiness course. Likewise, it is aimed that the student carry out activities in the participating laboratories.	30 days	02/2023
UdelaR	Julián Oreggioni	Training	GS, PS (from UNS or UNMdP)	Internship in project "System to characterize sheep activity". The system under development is based on a collar-type device that, through acceleration and geographical location data, is capable of identifying the sheep's activity (whether it is walking, running, lying down, etc.). The device uses the Icarus board from Actinius v1. Depending on the student's profile, the specific date and the duration of the stay, the activities to be carried out could include: Embedded software development for Nordic platform with Zephyr. Development of new features for the collar (for example, adding SD memory and modifying the current data storage system). Development of an alternative data recording system in sheep based on a cell phone and an App. Test of acceleration signal processing algorithms and geographical location to identify sheep activity, and may include participation in experiments with animals to record activity. Commissioning of the system in a productive site. The internship may open up opportunities for postgraduate thesis. Capacity: 1 or 2 students Student profile: undergraduate or graduate student in electronic engineering or similar, with knowledge of embedded software programming using the C language and experience in hardware development for embedded systems. Experience with Nordic devices (particularly nRF9160), real-time operating systems (particularly with Zephyr) and signal processing will be valued, but not exclusive.	3 months: 2 previous virtual, 1 in Uruguay.	08/2022

(*) GS: grade students, PS: posgraduate students, T: teacher training

Table 2. Detail of courses/internships offer for students/teachers (July 6, 2022) (Continuation)

Host Partner	Responsable	Type of activity	Oriented to: GS, PS, or T (*)	Brief description	Duration	Approximate start date
UdelaR	Leonardo Steinfeld	Course	GS, PS (from UNS or UNMdP)	Undergraduate/postgraduate course lasting 15 weeks with an average dedication of 8 to 10 hours per week.It is proposed to attend one part remotely and another part in person. Almost all of the theoretical talks and laboratories, or part of the laboratories and the final project, can be attended in person. Hardware is required but a loan can be arranged for a limited time for use at the home university. It must be combined with attendance at another course or other proposed activities that have a compatible workload.	30 days	08/2022, 10/2022
UdelaR	Leonardo Steinfeld	Course	GS, PS (from UNS or UNMdP)	Implementation of an IoT application involving device programming (ARM-Cortex microcontroller, based on Arduino and/or FreeRTOS), LoRaWAN and NB-IoT technologies with MQTT communication to an IoT platform for data visualization, etc. (ThingsBoard, Ubitdots or similar). To become familiar with the subject, the laboratories of the postgraduate and permanent education course "Technologies for IoT" will be held during the first semester of 2022. There is the possibility of accrediting the activity through the approval of the mentioned course. Depending on the student's profile, the activity may include working with the course faculty in the discussion and implementation of modifications to the course laboratories.	30 days	08/2022, 11/2022
UdelaR	Leonardo Steinfeld	Training	GS, PS (from UNS or UNMdP)	Power measurement of low-power devices, such as wireless sensor network nodes or Internet of things appliances, is crucial to estimate their lifetime when batteries power them or to design their energy harvesting system. Typically these devices have very low current consumption when they are idle (using sleep modes of a few microamps) and relatively high peak current consumption when transmitting or receiving data (tens of milliamps) for short periods (a few milliseconds). The high dynamic current range and high bandwidth make measurement a non-trivial task. Besides, the EEMBC consortium, which develops performance benchmarks for hardware and software, provides multiple test profiles (typical application software) and a methodology for measuring energy consumption and evaluating the hardware platform according to its energy efficiency. Previous works in the research group have evaluated the use of relatively low-cost equipment. The objective of the internship is to become familiar with the R&S®NGU201 source measure unit, acquired recently with funding from NEON, and characterize the power consumption of IoT devices. The EEMBC test profiles could be used as examples of applications.	30 days	08/2022
UdelaR	Benigno Rodriguez	Course/ training	PS	It is a course aimed at postgraduate students who have already taken a basic course on Antennas and Propagation. In this course the student will become familiar with antenna design techniques, using the professional tool "Computer Simulation Technology" (CST). The course is taught in mixed modality (the student chooses whether the classes are taken face-to-face or virtual, and can even alternate the modality). The course consists of 4 hours. weekly theory sessions for a month and a half (from 9/12/22 to 10/31/22), during which the student becomes familiar with the CST tool and then passes the course through the guided development of a design project of antenna and oral defense of this. In case of not taking another complementary activity to this course during the internship, the scope of the course may be extended by carrying out a deeper research and design instance on an antenna of your choice.	30 days	09/2022

(*) GS: grade students, PS: posgraduate students, T: teacher training

5. Conclusions

This report has described the functionality of the NoC website associated with the NEON project. Particular emphasis has been placed on the planned activities with student internships, the offer of internships made through the NoC website and a detail of the current course/internship offer.

From a planning perspective, the general situation of the pandemic associated with COVID-19 has forced the postponement of most face-to-face activities in 2021. This is reflected in the current offer of courses/internships.