D5.4 Online Knowledge-sharing Platform

5G-DiGITs

Cross-sectorial education and talent development for beyond 5G Digital and Green Industrial Technologies.

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Reviewer 2:	Francisco Javier García Gómez (INERCIA DIGITAL)
Contributors:	ALL WP5 Partners

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Abbreviations

DoA: Description of Action

Dx.y: Deliverable No y of Work Package x

EC: European Commission

EU: European Union

GA: Grant Agreement

IoT: Internet of Things

LMS: Learning Management System

MOOCs: Massive Open Online Courses

PU: Public

SME: Small and Medium-sized Enterprises

UPV: Universitat Politecnica de Valencia

WPx: Work Package x

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Executive Summary

Deliverable D5.4 presents the first version of the *5G-DiGITs Best Practices and Lessons Learned Platform*, accessible at https://5g-digits.satrd.es. This initial release marks the setup, availability, and deployment of the platform's core functionalities and the integration of the first set of information and resources, which will be continuously expanded and updated throughout the project's duration.

The 5G-DiGITs platform serves as a collaborative environment where project partners, stakeholders, educators, students, researchers, innovators, startups/SMEs, and external users can share, document, and access knowledge related to 5G and beyond technologies. It includes repositories of best practices, case studies, and lessons learned, complemented by interactive tools that enable feedback, knowledge exchange, and ongoing improvement.

In specific, the deliverable details the objectives, technical design and implementation, taxonomy of practices, governance model, and sustainability plan for the platform. It also outlines the engagement strategies to foster active participation and long-term impact.

It is important to note that this deliverable introduces only the first operational version of the platform (released Sept 2025 internally to the 5G-DiGITs consortium), addressing initial open access content, registration, and self-enrolment procedures, and the initial 8 Student courses set up (ongoing process).

The first public release and initial promotion of the 5G-DiGITs platform are planned for the end of Year 1/beginning of Y2 of the project (M14 approximately), supported also by additional public content, finalization of the 8 Student courses (as per WP2) and also, later on, set up and finalization/availability of eight Massive Open Online Courses (MOOCs), from WP3, which will further enrich the platform's content and usability by external users and stakeholders.

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1. Introduction

According to the Description of Action (DoA) of the 5G-DiGITs project (ERASMUS-EDU-2024-PI-ALL-INNO), the **main objective of Work Package 5** (WP5: Knowledge Exchange and Collaboration) is to ***"create a platform for sharing best practices and sharing platform that allows stakeholders to access resources, connect with peers, and share experiences related to advanced 5G technologies and associated skills development."***

In alignment with this objective, 5G-DiGITs partners, and specifically the INFOLYSIS partner, leader of T5.4, focused on designing and implementing a platform that would support the exchange of knowledge, resources, and experiences among educators, learners, and industry stakeholders. The platform is needed to facilitate and support collaborative learning, foster digital and green skills development, and ensure wide accessibility for all project participants.

From the beginning, an approach was selected that would be flexible, reliable, and sustainable, avoiding the unnecessary workload and risks associated with building a fully customized Learning Management System (LMS) from scratch. Instead, we aimed for a globally well-established solution that is open-source, well supported, fully configured, and customized through front-end modifications and dynamic configuration by an admin user, minimizing the probability of platform failures, lack of support, standalone customization, while in parallel gaining and ensuring out-of-the-box stability and significantly reducing maintenance overhead.

Based on these requirements, we concluded that **Moodle LMS was the optimal choice. Moodle is an open-source, widely adopted, and pedagogically proven LMS** that offers:

- Extensive configurability without altering its core,
- Compatibility with EU data protection and GDPR standards,
- Robust community support and sustainability,
- Built-in features for modular course design, resource sharing, and collaborative learning,
- Ease of adaptation to the branding and functional needs of Erasmus+ projects.

Specifically, the Moodle platform represents a cornerstone in the development of modern digital learning environments due to its adaptability, scalability, and extensive support for pedagogical innovation. Its open-source architecture allows institutions to customize and extend functionality to meet specific educational needs while ensuring secure and efficient course management. Equally critical is the role of strategic collaborations with partner organizations, educational consortia, and technology providers, which significantly enhance the platform's effectiveness. Such collaborations facilitate the integration of complementary tools, the sharing of best practices, and alignment with international standards, thereby fostering a more interconnected, high-quality, and sustainable learning ecosystem.

Prestigious universities such as the University of Cambridge leverage Moodle to deliver flexible, scalable, and learner-centered educational experiences. In the corporate sphere, global companies like Microsoft, Shell, and Coca-Cola utilize the platform to provide comprehensive training and professional development programs to their employees. Non-profit organizations also rely on Moodle to expand access to educational resources and

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training initiatives. These diverse applications underscore Moodle's versatility and its pivotal role in fostering effective learning across multiple contexts

Thus, the selection of Moodle ensures that the 5G-DiGITs project can meet its objectives under WP5 and the rest of the WPs, providing a scalable, secure, and user-friendly platform to advance knowledge exchange and skills development in next-generation 5G technologies.

In addition to the WP5 main objectives addressed by the Moodle selection as the 5G-DiGITs platform and by this deliverable, 5G-DiGITs milestone **MS16 "Online Knowledge-Sharing Platform fully designed and launched" is also addressed as per DoA requirements.** At this stage (M12 – October 2025), the platform's first version has been launched and is fully operational but only for internal use within the consortium. Currently, access has been granted only to consortium members and teaching staff for testing and course development purposes. External user registration is available, but it is expected to start by M14 (December 2025), once the first set of courses from WP2 and WP3 are finalised and fully available through the 5G-DiGITs platform. **Initial indicative engagement metrics** (*Table 1*), therefore, reflect internal usage only, which is consistent with the planned timeline for public rollout.

Metric	Description	Current Status (M12)	Comment
Registered users	Consortium members and instructors only	37 users	Pilot and internal testing phase only
Courses created	WP2 student courses under development	8 student courses	Initially setup and uploaded material / Finalisation ongoing
Case studies, success stories and lessons learned	Material related to Case studies, success stories and lessons learned	3 content uploads	Initially uploaded material (ongoing process)
Material/resources for downloading	Available material (journals, publications, files etc.) for downloading	3 content uploads	Initially uploaded material (ongoing process)
Platform uptime	Since deployment (M10–M12)	99%	Continuous operation
Planned public launch	Make the platform available to the public – Promotion starts.	M14	After full WP2 student courses release in the platform

Table 1. Initial indicative engagement metrics (from internal usage only).

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2. The 5G-DiGITs learning platform

2.1. Selection of Appropriate Platform Deployment

INFOLYSIS, in close collaboration with the Universitat Politecnica de Valencia (UPV), and taking into account the specific requirements of the project, decided to **deploy the Moodle platform within a Docker environment rather than on a physical machine.**

This approach was chosen for the following reasons:

- Flexibility and portability: Docker containers allow seamless deployment across different environments (development, testing, production).
- Security: Containerization isolates services, reducing vulnerabilities and allowing stricter control over data access.
- Scalability: The platform can easily be scaled up with additional containers to accommodate a larger number of users or courses.
- Maintainability: Upgrades, backups, and rollbacks can be handled in a more controlled manner.

This decision ensured that the platform could remain both secure and adaptable to the evolving needs of the 5G-DiGITs project.

2.2. Platform Configuration

The **5G-DiGITs platform (https://5g-digits.satrd.es)** was designed to follow the standard Moodle structure, with minimal modifications to the Moodle core. This guarantees maximum compatibility with future updates and ensures uninterrupted functionality.

2.2.1 Access Framework of the Moodle Platform

When designing and configuring the Moodle platform within the scope of WP5, particular attention was given to aligning the technical solution with the pedagogical and collaborative objectives of the 5G-DiGITs project. From the outset, it was essential to ensure that the platform would not only host structured courses for enrolled participants but also serve as an open knowledge-sharing environment accessible to the wider community. This dual approach guarantees that the platform fulfills its mission of supporting both formal training and broader dissemination of knowledge.

To achieve this, **the platform was structured around two complementary access levels**:

a) **Public Free-Access Sections**

These sections are openly publicly available without the need for registration and are intended to present the platform as a hub for knowledge exchange from the very first interaction for any type of visitor/user. These public free-access sections include:

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- **A News and Announcements section**, highlighting project updates, 5G-related developments, and relevant opportunities for stakeholders.
- **An Events Calendar**, displaying both internal and external activities (workshops, webinars, project milestones) to encourage participation and visibility.
- **General information pages** about the project objectives, the consortium, and links to external resources.

These public-facing sections demonstrate openness, transparency, facilitate outreach beyond the immediate project community, and position the platform as a resource for stakeholders, industry actors, learners, and the general public who may not yet be directly involved in the learning process to be offered by the 5G-DiGITS courses.

b) Enrollment-required Course Sections

In contrast to public free-access sections, **the structured courses, covering advanced 5G technologies, digital and green skills, and entrepreneurial competencies, require registration and enrollment**. This approach ensures that sensitive educational content is delivered within a controlled environment where teachers can manage participants (students or professionals), protect intellectual property, and monitor learning progress. **Self-enrollment with access keys was chosen as the most GDPR-compliant and flexible mechanism, balancing openness with the need for privacy and pedagogical control.**

By clearly separating the public knowledge-sharing services from the upon registration structured learning environment, the platform reflects the vision of 5G-DiGITs as described in the DoA: an accessible and collaborative space where resources can be freely shared while advanced training takes place in a guided, secure setting. This logic guided every design decision, from theme customization and course structuring to user management and tutorial development, ensuring that the Moodle platform is both a dissemination tool and a high-quality learning environment.

2.2.2. Platform Implementation Based on WP2 Courses Guidelines

Following mainly at this stage the WP2/T2.2 Student Courses Guidelines (MOOCs will follow at a later stage of the project through the WP3 tasks and activities), the Moodle platform currently provides eight core course areas:

1. Introduction to Advanced 5G Technologies
2. Network Architecture and Protocols
3. IoT, Industry 4.0, and Smart Cities
4. Energy Efficiency and Sustainability in Advanced 5G Technologies
5. Entrepreneurship and Innovation in Advanced 5G Technologies
6. Digital Skills for Beyond 5G Technologies
7. Green Skills for Beyond 5G Technologies

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8. Entrepreneurial Skills for Beyond 5G Technologies

Each course was further structured according to the recommendations in section 1.1 of the T2.2 Guidelines:

- Modules (3–4 recommended per course)
- Units within each module
- Sections within each unit (the smallest granularity for students)

Additionally, in line with the information provided in Section 5 - Annexes, courses were developed using nested subsections to ensure logical organization and consistency of content and functionality.

More specifically, the WP2 Student courses' categories and subcategories were created as follows (*Table 2*):

Categories and Subcategories	
Introduction to Advanced 5G Technologies	1. Evolution of mobile communications and fundamentals of 5G
	2. Enabling technologies at the 5G access and core networks
	3. 5G Applications, Vertical Challenges, and future trends
Network Architecture and Protocols	1. Introduction to 5G Networks
	2. 5G Radio Interface and RAN
	3. 5G CN and Network Slicing
	4. B5G/6G Concepts and Future Trends
IoT, Industry 4.0, and Smart Cities	1. Fundamentals of IoT in 5G
	2. Industry 4.0 Technological and Vertical challenges
	3. Smart Cities
Energy Efficiency and Sustainability in Advanced 5G Technologies ls	1. Fundamentals of Energy Consumption in 5G Network
	2. Energy Efficiency Techniques and Network Optimization
	3. Renewable and Hybrid Energy Integration in 5G
	4. Regulatory, Policy, and Market Perspectives
Entrepreneurship and Innovation in Advanced 5G Technologies	1. From Ideas to Opportunities – Innovation in the 5G Landscape
	2. Building & Funding a 5G Startup
	3. IP, Compliance, and Competitive Positioning in 5G Ventures
	1. Advanced digital skills for working with 5G technologies

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Digital Skills for Beyond 5G Technologies	2. Machine learning, AI integration, and data analytics in 5G
	3. Cybersecurity challenges and solutions in 5G networks
Green Skills for Beyond 5G Technologies	1. Sustainable Design and Principles in 5G
	2. Circular Economy and Life Cycle Thinking in ICT
	3. Energy Efficiency and Carbon Reduction Strategies
	4. Regulatory, Ethical, and Business Perspectives on Green 5G
Entrepreneurial Skills for Beyond 5G Technologies	1. Innovation & Creativity
	2. Problem Solving & Leadership opportunities in the 5G market
	3. Business Fundamentals for 5G Ventures
	4. Building Resilience in Entrepreneurship

Table 2. Table of categories and subcategories of courses.

This modular structure ensures that all courses share a pedagogically coherent framework, simplifying navigation for both teachers and learners.

2.2.3 Technical details: CSS and HTML Customization

To enhance usability and branding, the Moove theme was selected, offering modern design and stability. Specific modifications included:

- Footer redesign (via additional HTML) to include project details, Erasmus+ funding acknowledgement, and links to the platform's social media channels.
- Visual improvements (via Raw CSS) such as background images for the homepage, customized navigation bar design, and accessible content styles.
- Header adjustments (H1, H2 typography) and dropdown menu redesign for both functional clarity and improved aesthetics.

These changes improved not only the visual identity but also the accessibility of the platform, in line with WCAG standards, ensuring inclusiveness for all learners.

2.3 Course Assignments and User Management

Following the T2.2 guidelines regarding the characteristics and structure of the courses to effectively address students' needs, the following configurations and actions were implemented on the 5G-DiGiTs Moodle platform:

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- Public Free/Guest Access: The platform has been designed to balance open accessibility and controlled participation. Certain sections are open to all visitors without the need for registration, promoting transparency, openness, and outreach to the wider public of the 5G-DiGITs content (however control for upload/approval remains to the Administrator users of the consortium) . Other areas, such as the courses and interactive learning spaces, require user registration to ensure a personalized and secure learning experience.
- Teacher/Instructor accounts were created and enrolled in their respective courses with the teacher role.
- Student enrollment was managed through the self-enrollment feature, with teachers generating unique access keys. This approach ensured:
  - GDPR compliance by avoiding unnecessary handling of personal data by administrators.
  - Greater autonomy for teachers in managing their course communities.
  - Flexible and scalable student registration.

This user management strategy empowered teachers/instructors while protecting user privacy in compliance with EU data protection standards.

2.4 5G-DiGITs learning platform manual

The following section provides a comprehensive navigation guide to the 5G-DiGITs platform (initial platform status as of Sept 2025). It covers in detail how the platform can be accessed and used both from the perspective of a free-access user, a regular registered user (student/participant), and from the perspective of an administrator or course manager, highlighting the available features, tools, and functionalities for each role.

2.4.1 Main Screen – Page content and Navigation

To start with, by accessing the 5G-DiGITS platform at https://5g-digits.satrd.es, a visitor firstly views the main page of the platform (*Figure 1*).

Figure 1. Home page of 5G-DiGITS Moodle platform

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As per Figure 2, the platform's main page contains various informational sections, which will be examined in greater detail further below in this section.

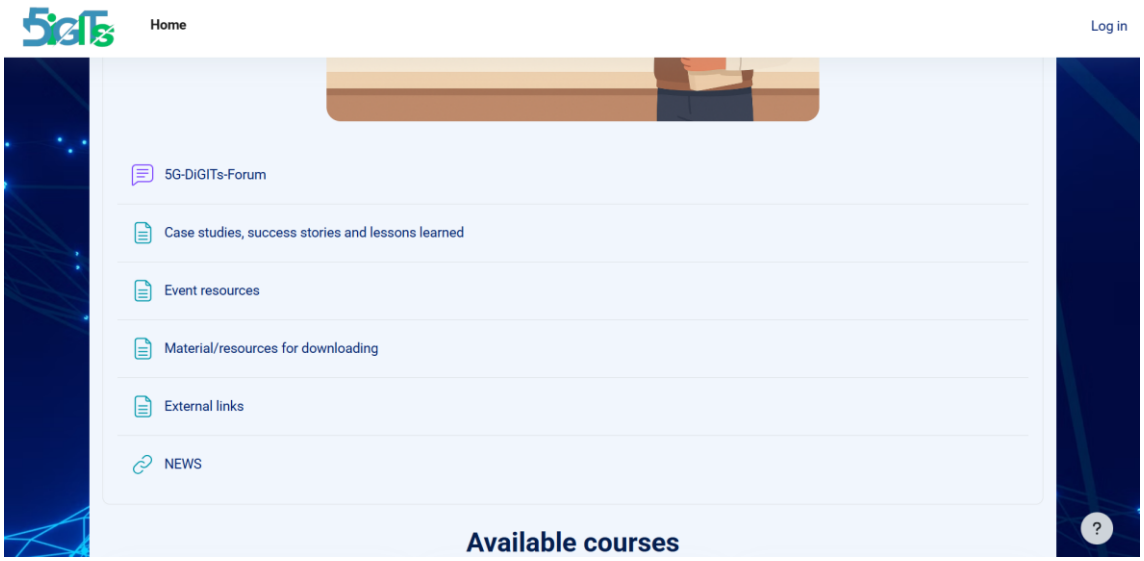

Figure 2. Home page activities

By scrolling down the main screen of the home page, the courses section appears too (*Figure 3* and *Figure 4*). In this area, the courses are presented, giving users a quick overview of the learning opportunities offered on the platform.

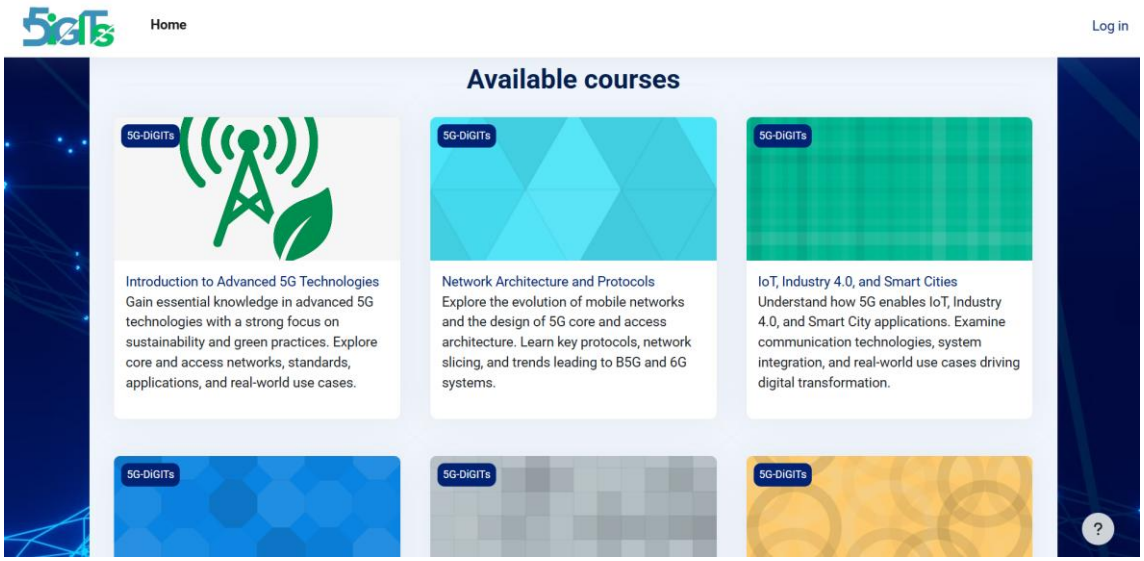

Figure 3. Available courses (part 1)

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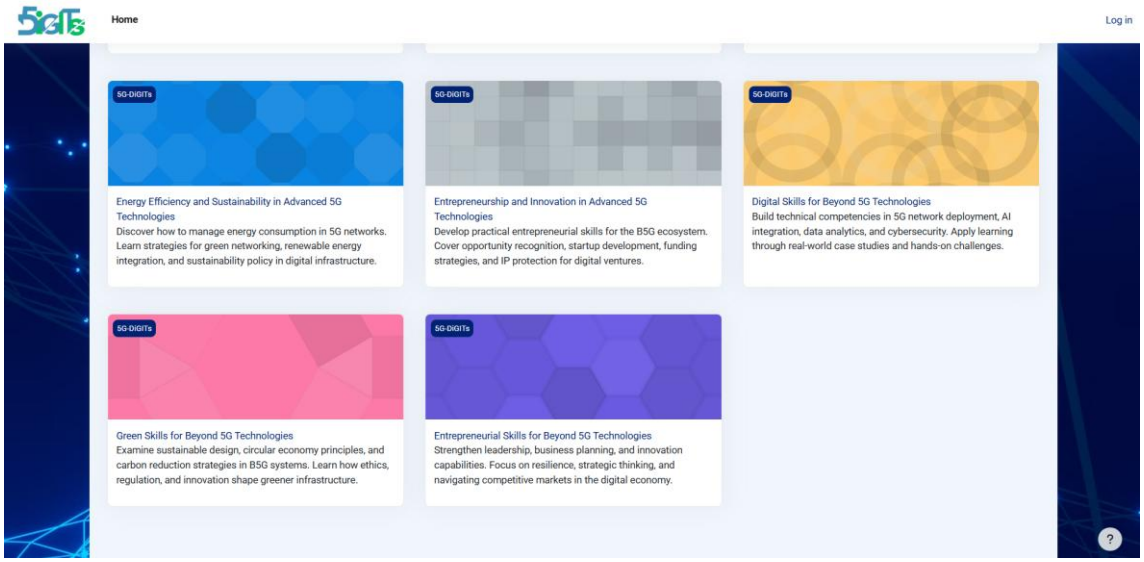

Figure 4. Available courses (part 2)

Finally, the website footer (*Figure 5*) provides comprehensive information, including links to the project's official website and social media channels, as well as key details regarding the funding source, call identifier, project topic, duration, type of action, and associated services. Indivisible, part of the platform's Moodle, is the co-funded icon of the EU (*Figure 6*).

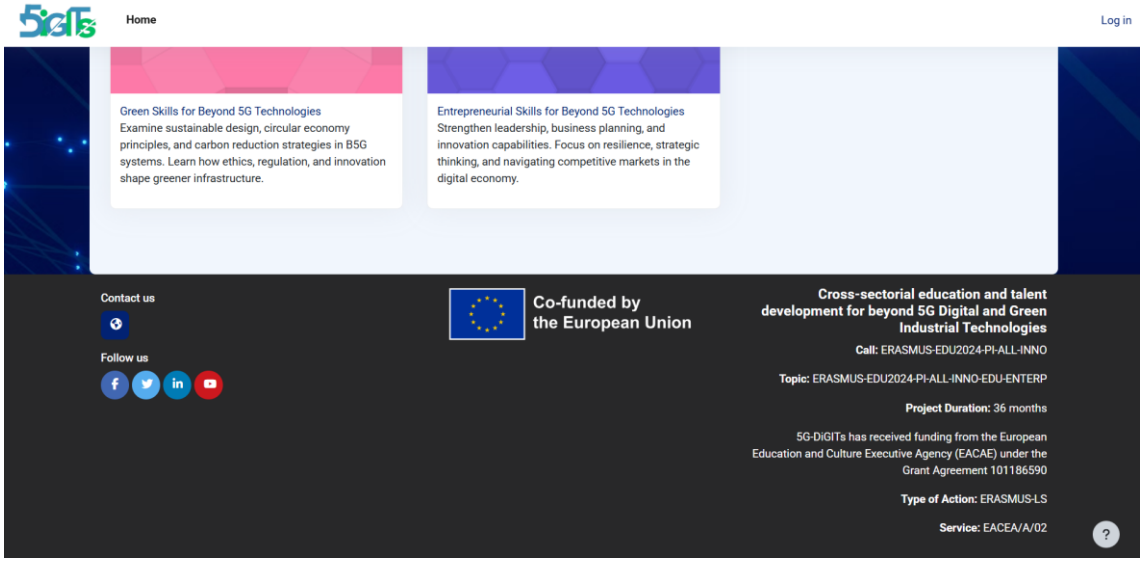

Figure 5. Site footer

Figure 6. European Union co-financing mark

In the top right screen corner of the main screen is located the Log in option, which will redirect the user to the Login page (Figure 7).

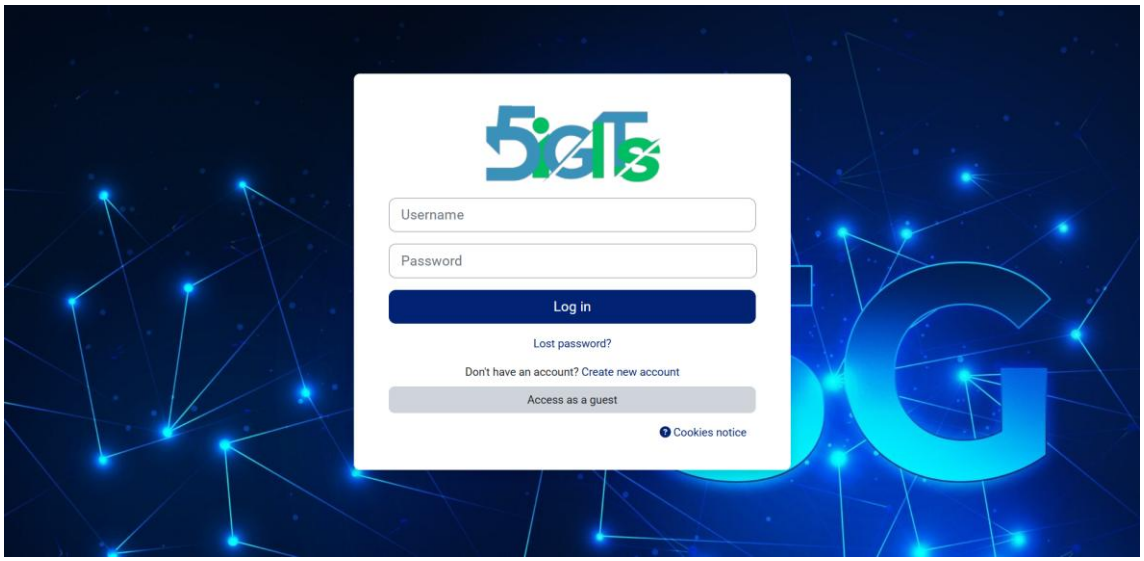

Figure 7. Log in page

Additionally, for registered users, the platform calendar with events is available, which allows both teachers and students to keep track of important academic activities (*Figure 8*).

The calendar supports the scheduling of course deadlines (such as assignment submissions and quizzes), live sessions, workshops, and project milestones. Teachers can create course-specific events visible only to their enrolled students, while administrators can add global events (e.g., Erasmus+ project meetings or cross-course deadlines) accessible to all users. The calendar is fully synchronized across the platform, ensuring that participants receive timely notifications and reminders, thus improving time management, course organization, and overall engagement.

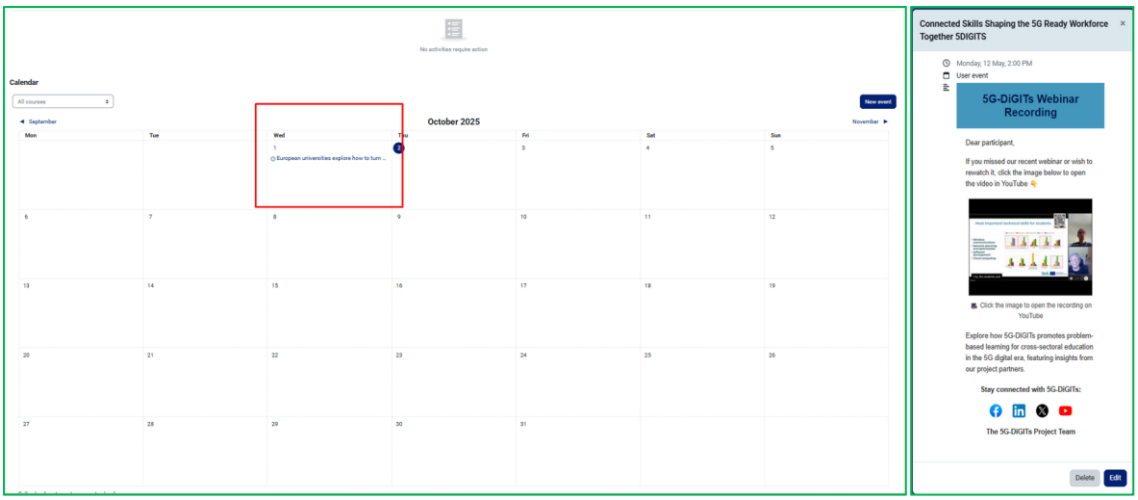

Figure 8. Calendar with marked events

Concluding the available sections' presentation, the platform also includes the *Preferences* page (*Figure 9*), which provides each user with a personal space to configure their account according to their needs. Through this page, users can update their profile information, manage passwords and security settings, and adjust language and time-zone preferences. In addition, it allows the customization of notification methods (email, pop-up, mobile

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alerts), enabling learners and teachers to stay informed about course activities in a way that best suits them. The *Preferences* page also gives access to messaging settings, forum tracking, and activity report visibility, ensuring that every participant can tailor the platform to their learning or teaching style while maintaining full compliance with privacy and GDPR regulations.

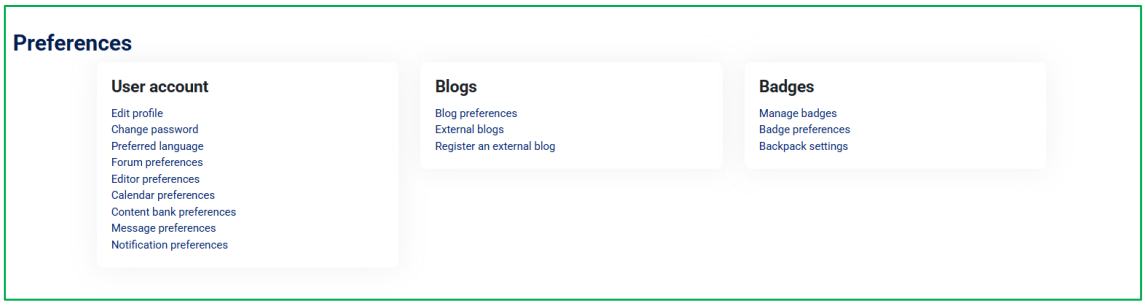

Figure 9. Preferences page

2.4.2 Self-Enrollment – Registration process

Elaborating further on the access and registration process, if we choose "Access" as a guest option on the Registration Screen presented before (*Figure 10*), we will see the same main page as we described earlier but when we choose a course, we will notice that we can't access the course simply with the guest role but only if we log in for proceeding with the self -enrolment to the course (*Figure 10*).

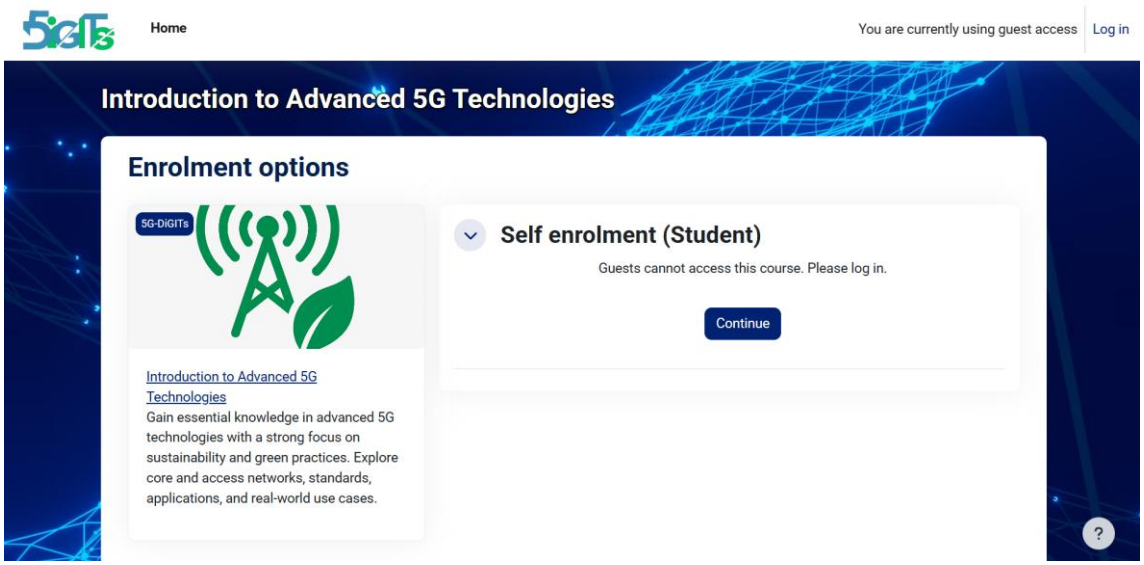

Figure 10. Enrolment page (for guest users)

As a guest or unregistered user, initiate the registration process by clicking the "Create my new account" button. (Figure *11*).

This option allows you to set up your personal Moodle account, providing access to courses, resources, and activities.

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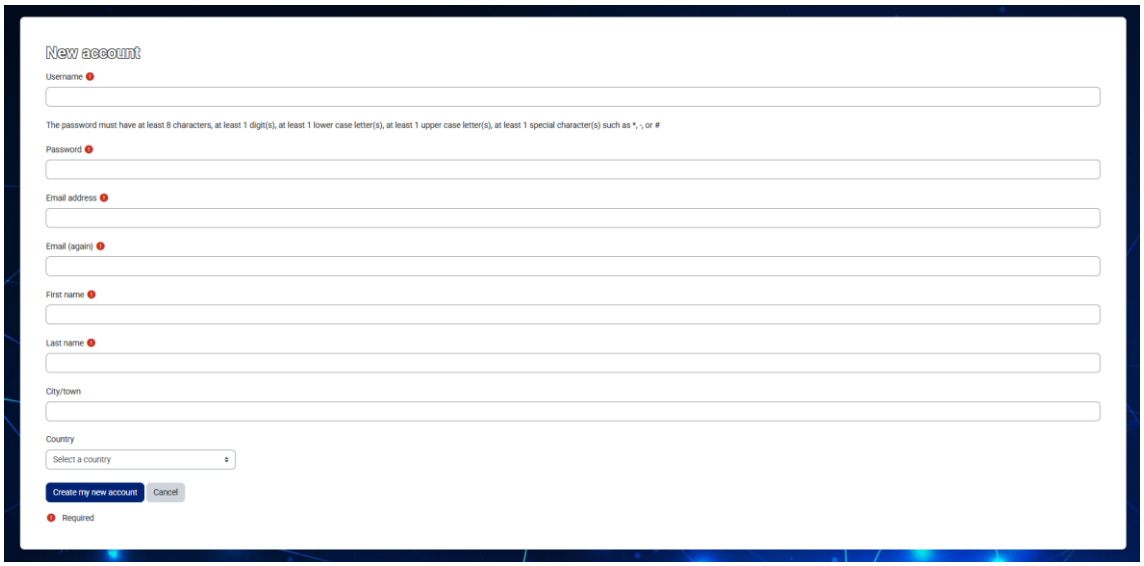

Figure 11. Registration form

A confirmation message is displayed within the platform upon the successful submission of your data or information (*Figure 12*).

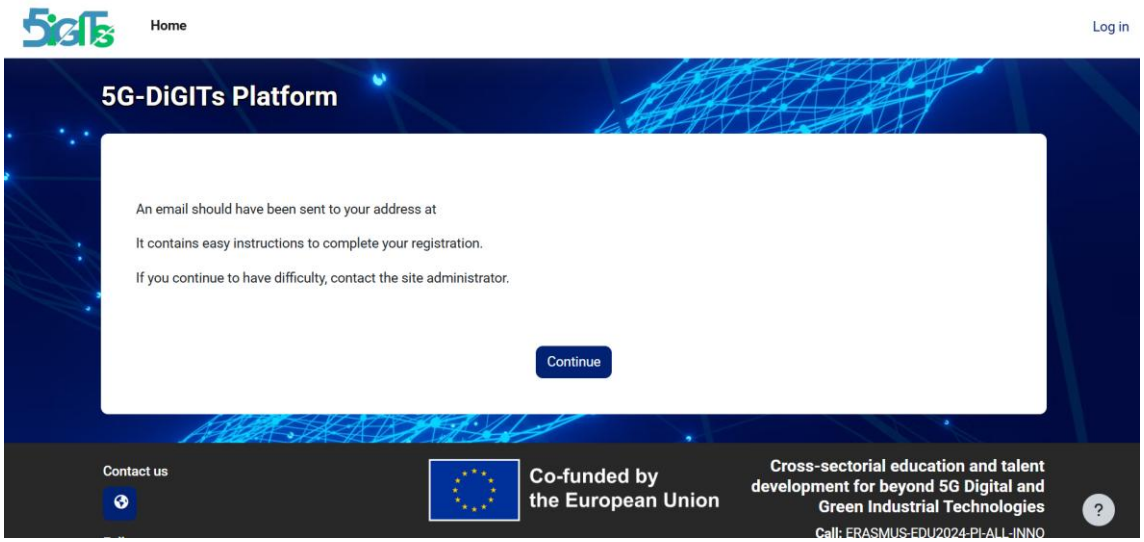

Figure 12. Confirmation message inside the platform.

After submitting your registration details, a confirmation email (*Figure 13*) will be sent to the address you provided. This message is generated automatically by our system and delivered through your email service provider. Please check your inbox (and spam or junk folder, just in case). To complete your registration and activate your Moodle account, simply click the confirmation link included in the email (*Figure 13*).

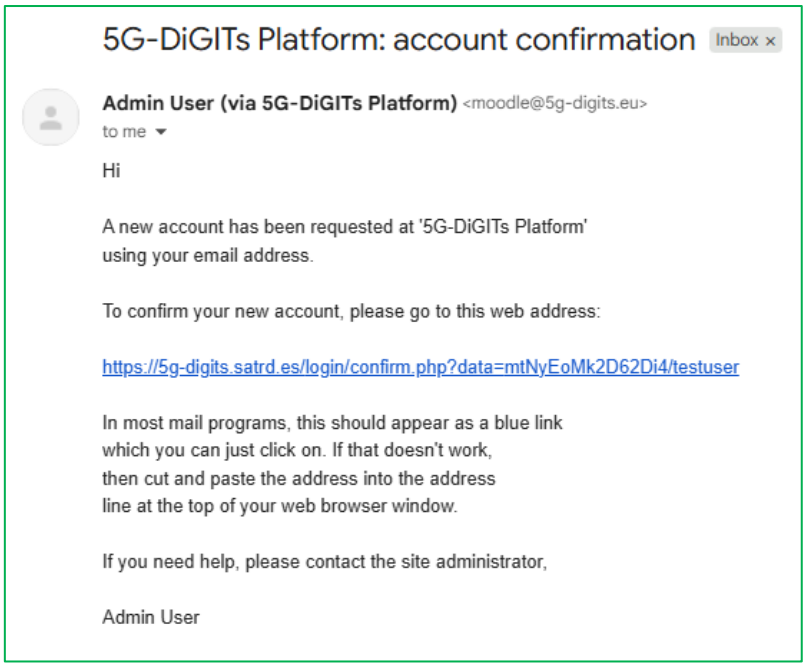

Figure 13. Confirmation email

Successful registration is confirmed by a corresponding message inside the platform (*Figure 14*).

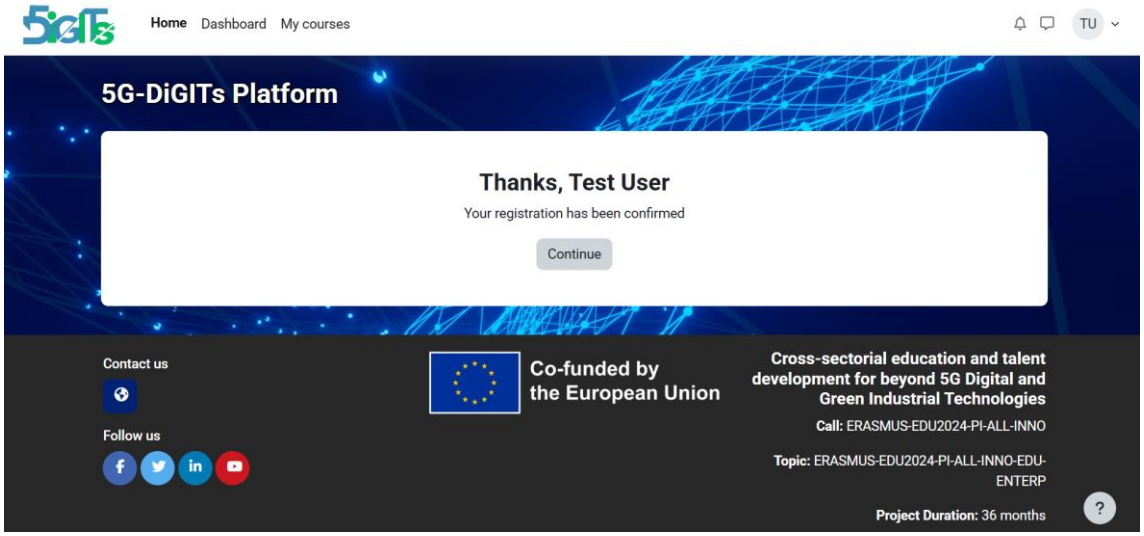

Figure 14. Successful registration

2.4.3 User Access – Content and Navigation

Upon returning and logging in, the user can once again view and access the same publicly available, access-free information presented earlier on the home page (*Figure 15*).

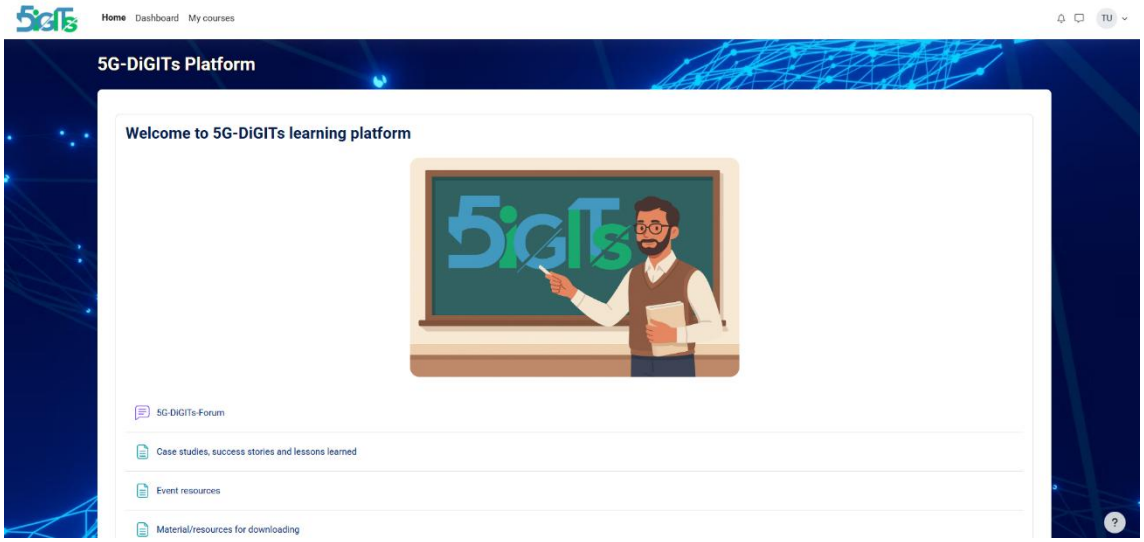

Figure 15. Main page (as a logged-in user)

Specifically, these sections, also freely accessible (but content-wise administered by the consortium), are intended for public informational purposes. For example, the Forum section is designated for general communication and interaction among users. (*Figure 16*).

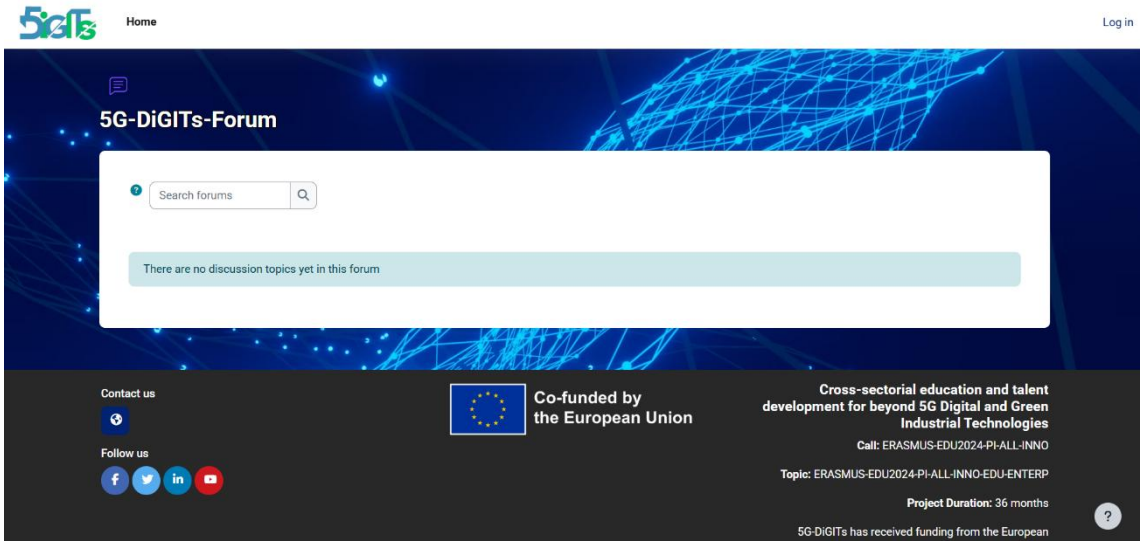

Figure 16. Platform's forum section

Similarly, the Case studies, success stories, and lessons learned section is dedicated to sharing in public real-world applications, achieved results, and valuable experiences that can serve as guidance and inspiration for other users who can freely access/download the content made available by the consortium in these public access sections (*Figure 17*).

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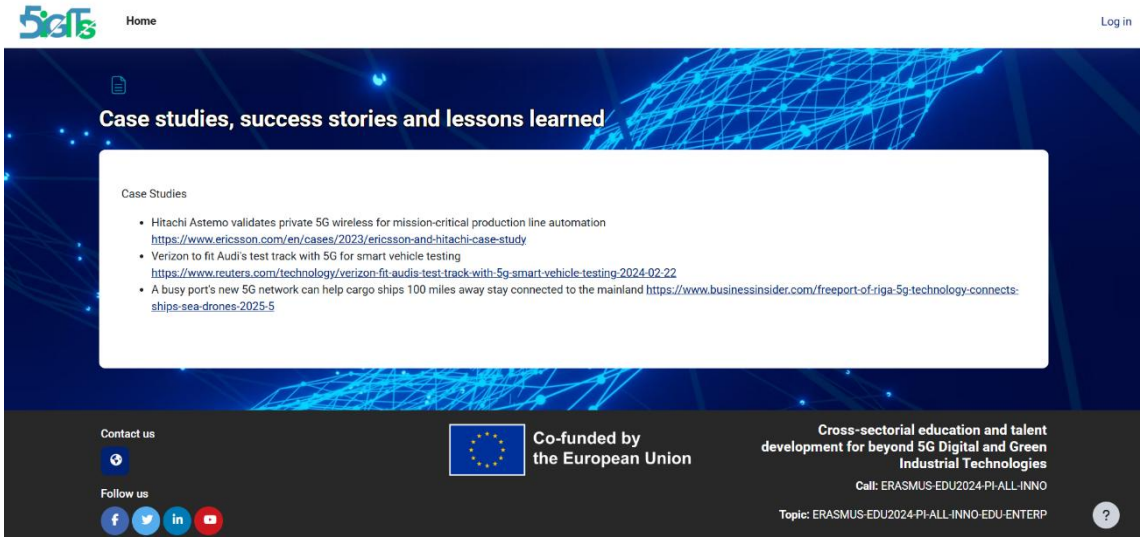

Figure 17. Training platform's case study section

The Event resources area provides material related to videos, presentations and recordings from past events, webinars, workshops, and conferences related to the project (*Figure 18*).

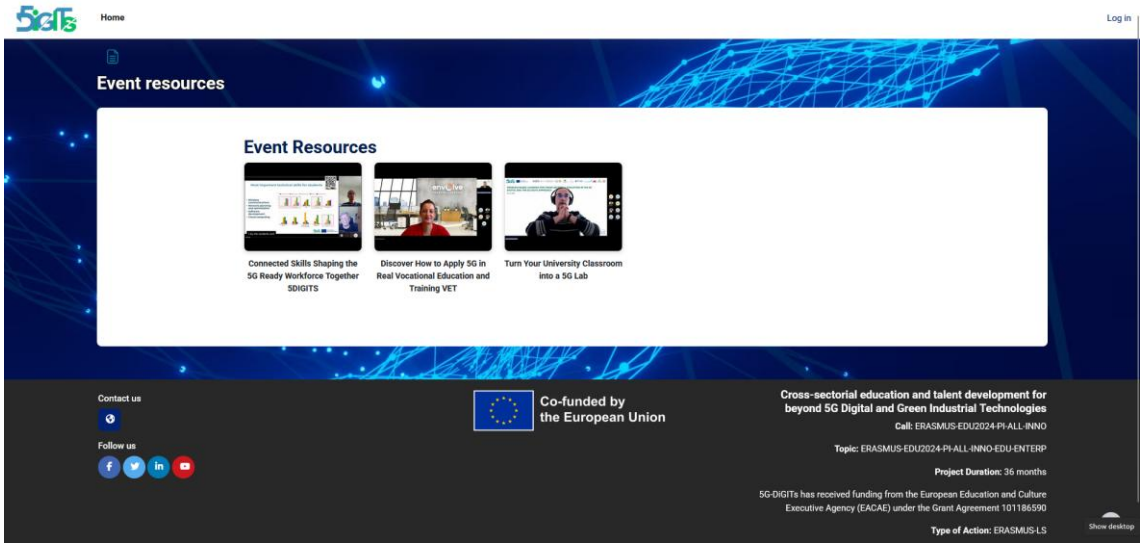

Figure 18. Training platform's event resource section

Similar to the above areas/sections, the *Material/Resources for Download* section (*Figure 19*) serves as a centralized repository of essential project-related content. It provides users with access to a wide array of downloadable material (made available by the 5G-DiGITs consortium), including technical documents, research reports, guidelines, and other supporting resources. This functionality not only facilitates the dissemination of knowledge and project outputs but also ensures that stakeholders, including educators, learners, and collaborators can readily obtain authoritative and up-to-date information. By consolidating these resources in a single, easily navigable location, the platform enhances both usability and overall learning experience, promoting informed engagement and efficient access to critical project materials.

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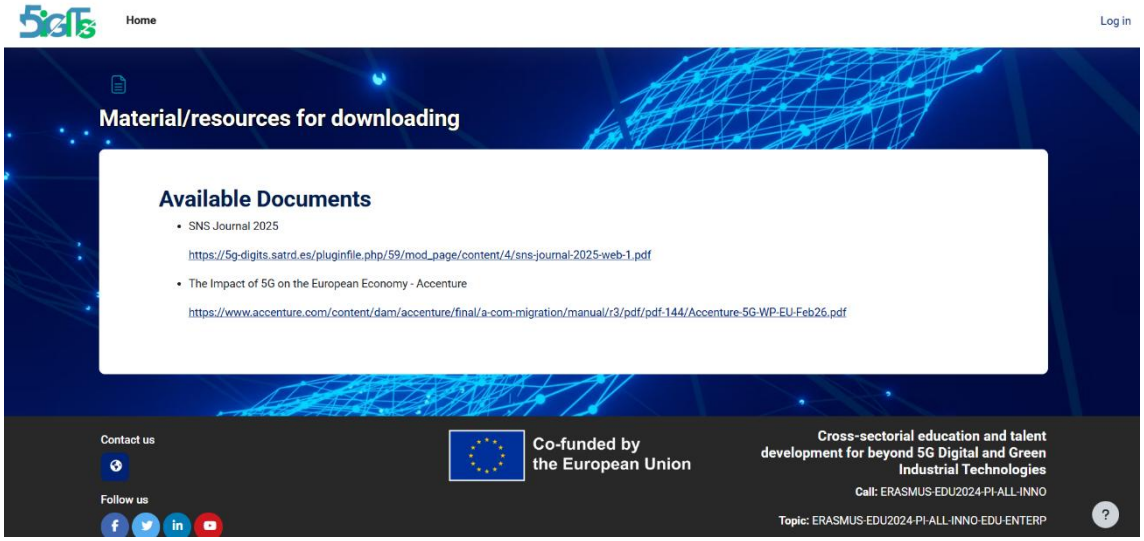

Figure 19. Training platform's material/resources for downloading

The External Links section (*Figure 20*) serves as a dedicated gateway to supplementary resources by providing direct access to associated initiatives, partner organizations, and other relevant online sources. This feature not only fosters connectivity with the wider ecosystem in which the project is situated but also encourages learners to explore complementary materials, expand their understanding, and engage with external stakeholders. In doing so, it strengthens the integration between the course content and the broader network of knowledge and practice.

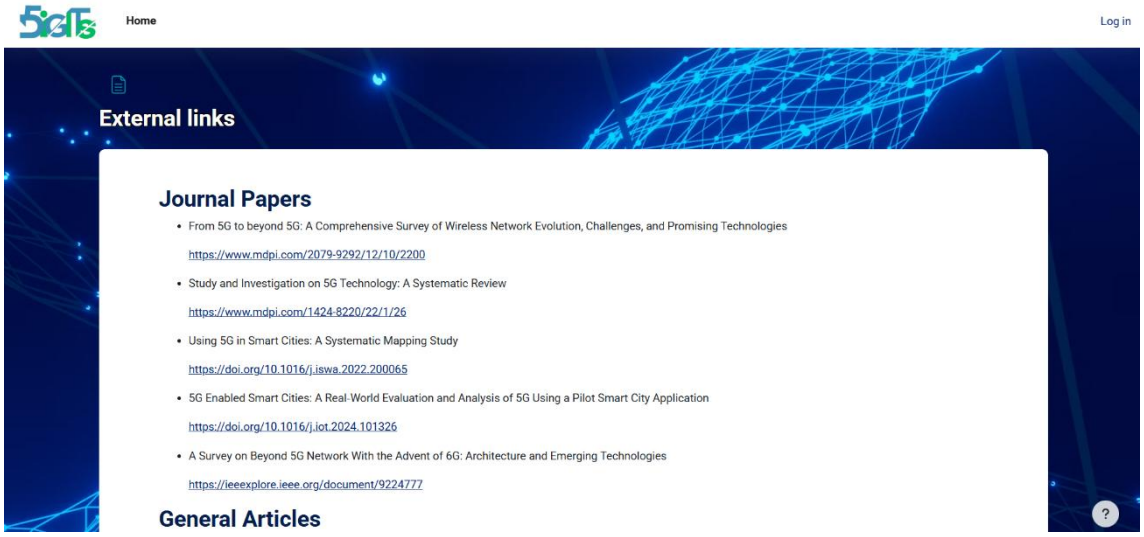

Figure 20. Training platform's external links section

The News area (*Figure 21*) integrates the corresponding News page from the official project website, displaying all the latest news, achievements, developments, announcements, activities and results of the 5G-DiGITs project.

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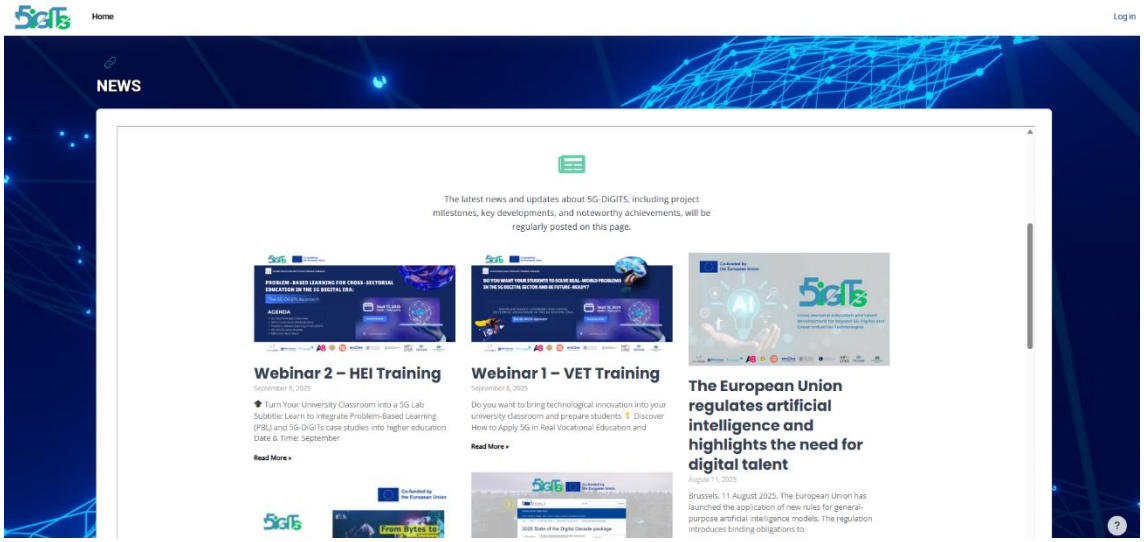

Figure 21. Training platform's news section

Concluding this section and having presented all the open-access sections, the deliverable will present in the next section the courses' details and self-enrolment, as a requirement for accessing courses, and the restricted to users sections/areas/pages of the 5G-DiGITS platform.

2.4.4 Courses Self-enrolment – Process, Courses content and Navigation

To enroll in a course (*Figure 22*), each user first contacts the instructor to obtain the enrollment key. Once the key is available, access to the course is granted to the user/student.

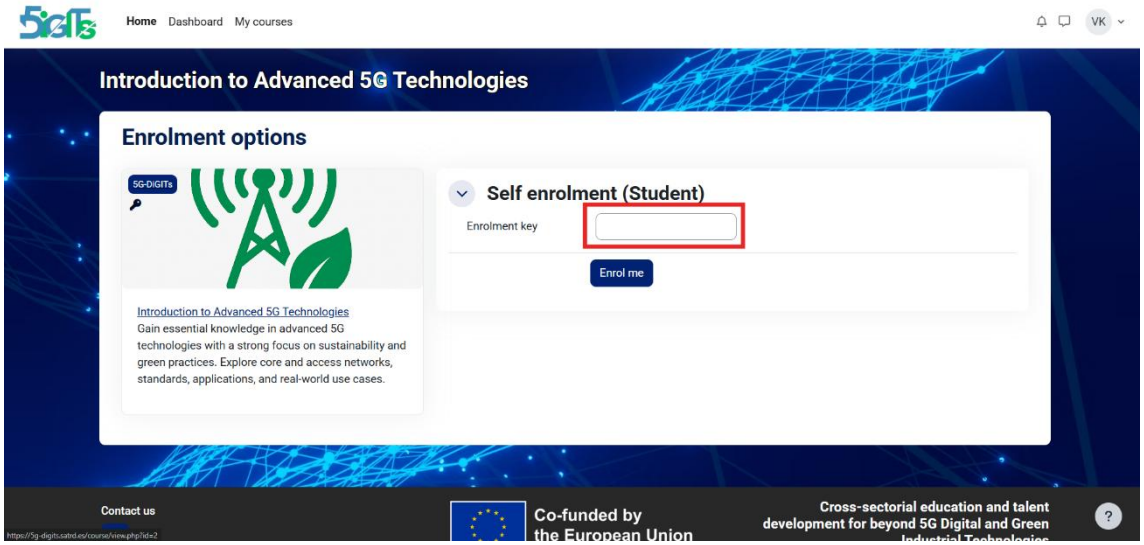

Figure 22. Enrolment page (for logged-in users)

Upon entering the course, users immediately encounter its main thematic sections (chapters) and their structured sub-sections, each enriched with engaging activities designed to drive participation and knowledge building (*Figure 23*).

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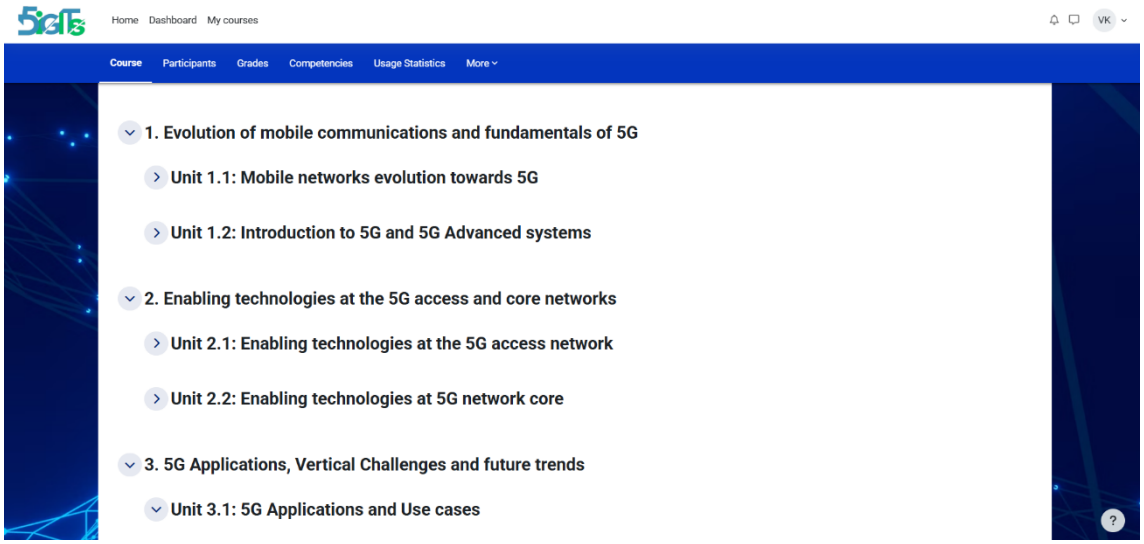

Figure 23. Basic structure of the courses (as a student)

A brief course description, video presentation, downloadable learning materials, and a self-evaluation quiz are also provided to support the learner's understanding and engagement. (*Figure 24*).

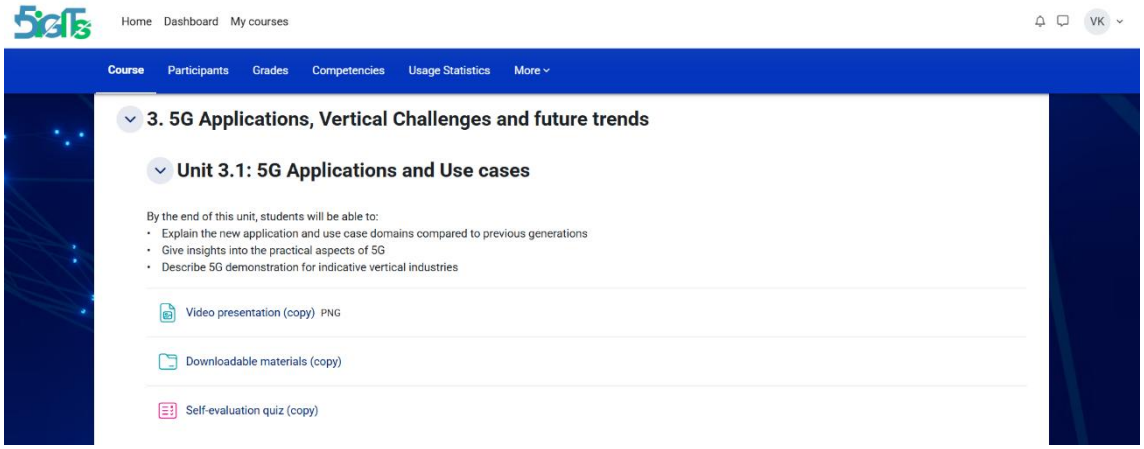

Figure 24. Standard sections of every unit

During the preparation of this deliverable, preliminary placeholders have been created for all courses and activities, and it is expected that the course leaders will add their material (to be completed by M13). However, particular emphasis must be paid to the fact that, although a recommended structure exists, on some courses we may see additional subcategories and customizations as per the instructor's preferred set-up. This is due to the flexible functionality of the platform, which allows the inclusion of supplementary teaching material in order to enhance the pedagogical objectives of each individual course.

Additionally, on the Dashboard menu, there is a timeline of the courses and a calendar (*Figure 25*).

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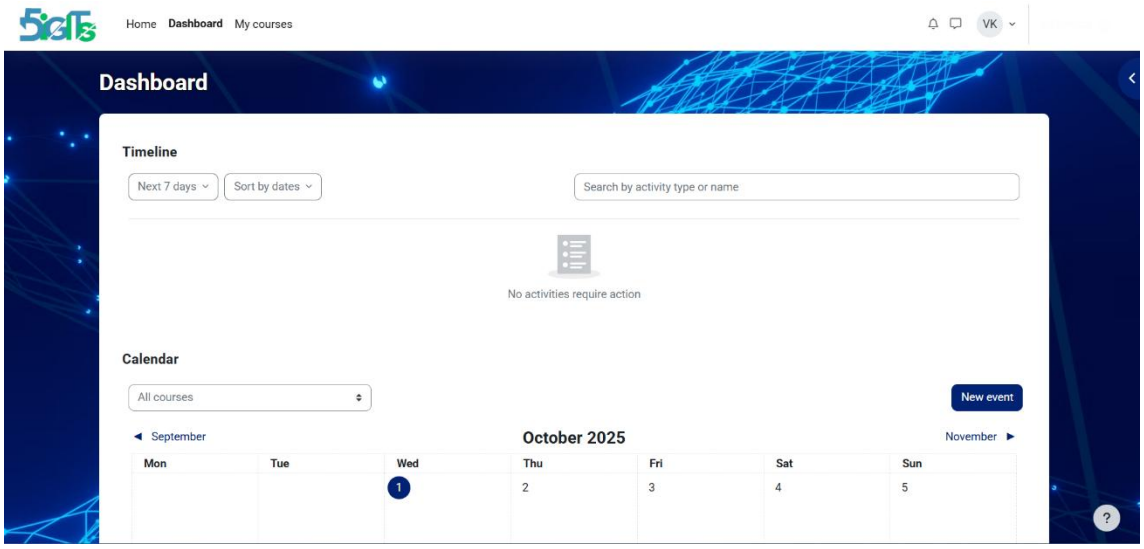

Figure 25. Platform's Course Dashboard

The "My courses" section (*Figure 26*) displays all the courses a student is currently enrolled in. From here, you can easily access your learning materials, assignments, grades, and course updates. This personalized dashboard helps you keep track of your progress and quickly navigate to any of your active courses.

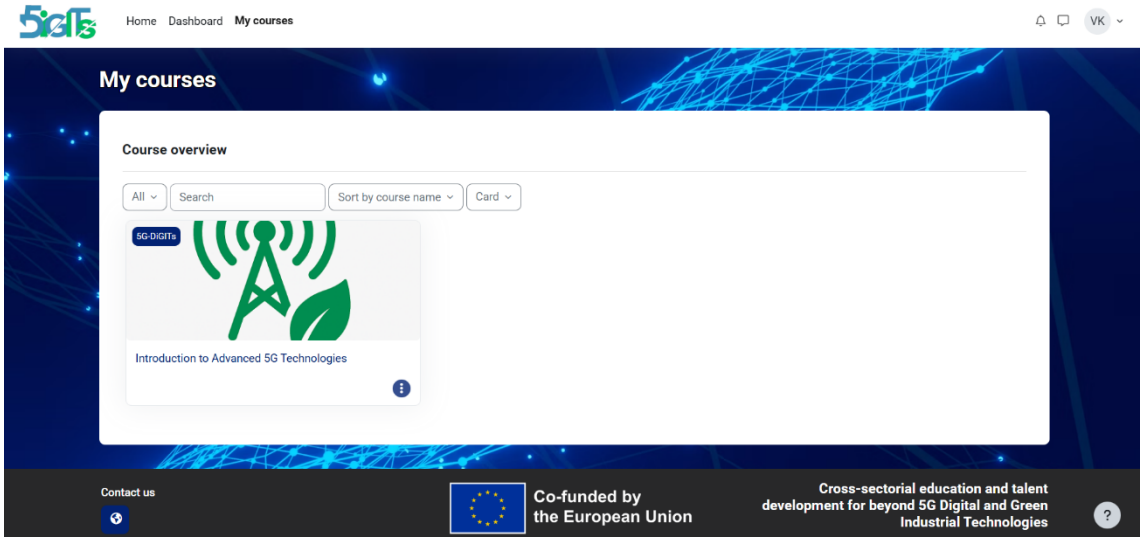

Figure 26. Platform's My courses

2.4.5 Teachers/Instructors Access – Courses Content Set Up and Navigation

Users who have been assigned the "teacher" role by the administrators share similar rights/capabilities as students, such as accessing course content and participating in activities. However, teachers have additional permissions that allow them to create, edit, and manage the courses they are responsible for. This includes uploading materials, setting up assignments and quizzes, grading student work, and customizing the course layout to support effective learning (*Figure 27*).

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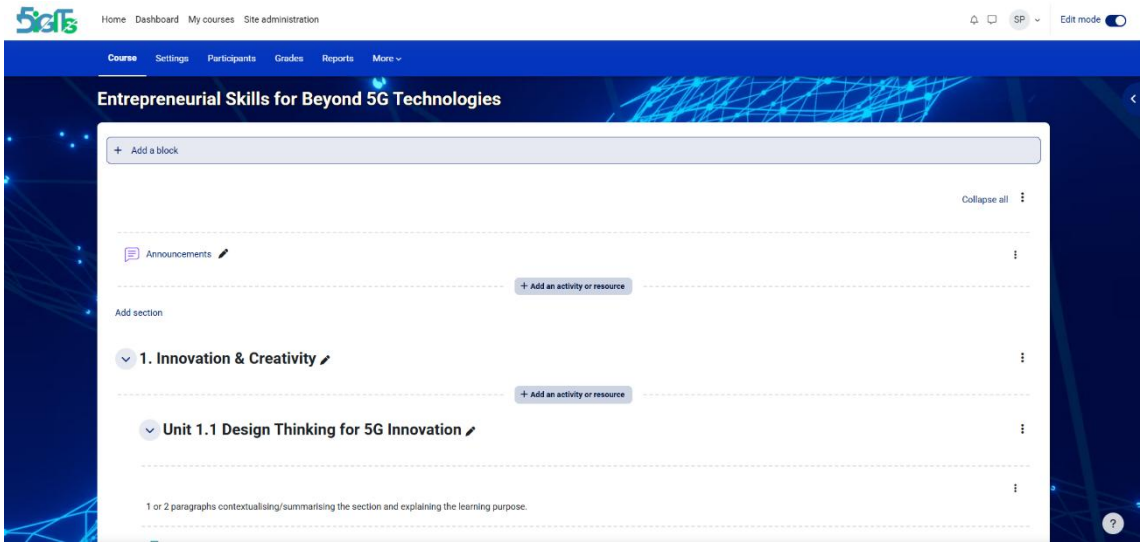

Figure 27. Basic structure of the courses (as a teacher)

Editing a course by its teacher can be done by opening the settings menu for each activity or resource. To access it, click the three-dot icon located next to the specific item. From this menu, you can edit settings, update content, duplicate, move, or delete the activity or resource as needed, allowing you to efficiently manage your course materials (*Figure 28*).

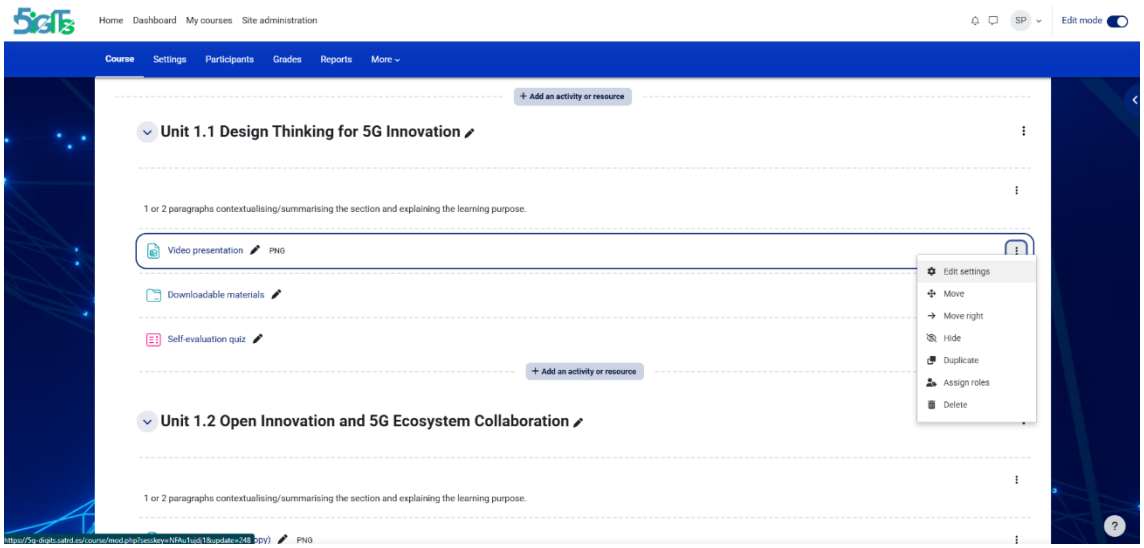

Figure 28. Editing Course Content

In addition, teachers have access to a range of course management tools (*Figure 29*). They can view statistics to monitor learner engagement and progress, and configure key course settings such as managing participants, setting passing grades, assigning deadlines, and adjusting course availability. These features provide teachers with the flexibility to design and maintain an effective and organized learning environment.

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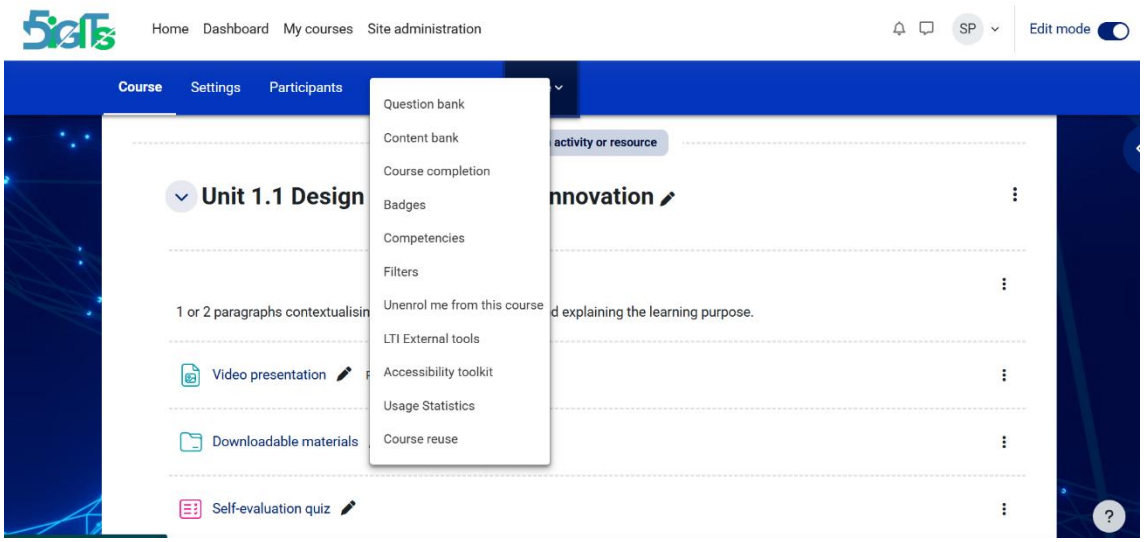

Figure 29. Additional capabilities for teachers

2.4.6 Administrator Access – Users, Roles and Content set up

For the administrator of the website, by accessing the *Site Administration* section, it is possible to manage users and roles, configure courses and categories, customize the platform's appearance and theme, install and update plugins, and adjust security and privacy settings (including GDPR compliance). In addition, the administrator can monitor overall system performance, schedule and perform backups, and ensure the stability and smooth operation of the platform through ongoing maintenance tasks (*Figure 30*).

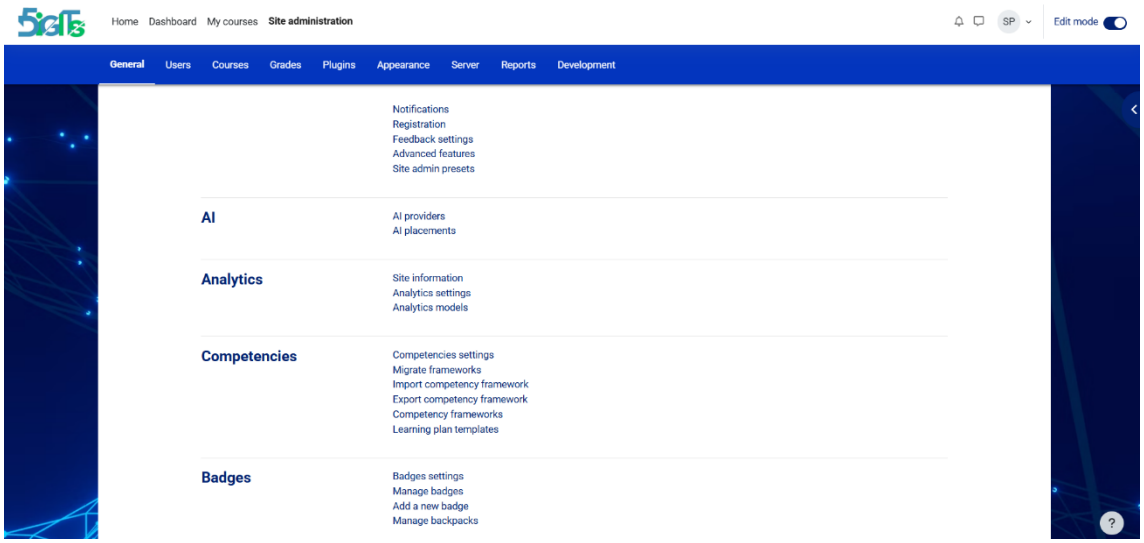

Figure 30. Training platform's Site Administration page (restricted to platform admins)

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3. Future improvements

3.1 Maintenance

The long-term stability and sustainability of the 5G-DiGITs Moodle platform depends on a structured and forward-looking maintenance strategy. Although the current deployment on Docker provides flexibility and portability, regular updates will remain essential to ensure security, performance, and compatibility. This includes the timely application of Moodle and plugin upgrades, the refresh of Docker images, and the continuous monitoring of logs and system health to identify and address vulnerabilities at an early stage.

As the platform evolves, particular attention will be given to the management of plugins and extensions, ensuring that they remain stable and aligned with future Moodle releases. The expected expansion of course material by instructors will further highlight the importance of performance monitoring and scalability. Resource allocation, caching, and, if necessary, the adoption of orchestration solutions such as Kubernetes will be considered to maintain smooth operation as the learning content grows.

Data management will continue to be a priority, with automated backup procedures, regular disaster recovery testing, and strict adherence to GDPR and other relevant data protection regulations. At the same time, user support mechanisms will be reinforced to facilitate the continuous addition of content by instructors. Training and technical assistance will be provided to teaching staff, while a helpdesk and feedback system will enable rapid resolution of technical issues and the incorporation of user input into future improvements.

Finally, the platform's maintenance strategy will progressively integrate more practices, streamline deployments and updates, while monitor tools will support proactive rather than reactive maintenance. Through these measures, the 5G-DiGITs Moodle platform will remain live, secure, scalable, and adaptive to the evolving needs of the 5G education ecosystem, even after the project's end, as one of the long living main outcomes of 5G-DiGITs.

3.2 Upcoming additions - Courses and Content

In the coming period (mainly during Y2), and in alignment with the objectives outlined in WP3 and DoA, the platform will be expanded with the development of Massive Open Online Courses (MOOCs). These courses are designed to inform and educate professionals and domain experts, thereby broadening both the scope and the impact of the 5G-DiGITs learning environment (as per WP3 objectives).

The integration of MOOCs will not only enrich the range of available content but also enhance the quality and diversity of the existing courses. By offering structured, accessible, and high-quality learning materials, the platform will provide participants with advanced insights into 5G technologies and related fields.

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This expansion with additional courses and content will strengthen the platform's role as a comprehensive training hub, facilitating knowledge transfer, fostering professional development, and supporting the continuous dissemination of expertise across the wider community.

Finally, content in sections other than courses, especially the free/public access ones such as the 5G-DiGITs-Forum, Case studies, Success stories and lessons learned, Event resources, Material/resources for downloading, External links, and News, will be continuously enriched by 5G-DiGITs consortium to properly ensure a constant provision of an integrated and up-to-date source of knowledge-sharing to the end user.

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4. Conclusion

The deployment and configuration of the Moodle platform as the 5G-DiGITs online knowledge sharing platform represented a critical step in establishing a robust and sustainable digital learning ecosystem for the project while addressing specific project objectives and milestone. The implementation was achieved through Docker-based architecture, ensuring not only portability and modularity but also enhanced security and maintainability of the platform. Such an approach aligns with current best practices in educational technology infrastructures, allowing for seamless system updates, scalable resource allocation, and rapid recovery in case of system failure.

The platform was further enriched with course structures designed in accordance with the project's pedagogical framework and international guidelines on digital learning environments. This instructional design process emphasized learner-centered approaches, modularity, and progressive knowledge acquisition. Additionally, CSS/HTML customizations were introduced to tailor usability and reinforce project branding, thereby improving both user experience and platform identity. These design elements highlight the dual focus on functionality and accessibility, ensuring that the platform accommodates diverse user needs while maintaining visual coherence with project objectives.

A systematic distribution of courses among teachers was implemented, combined with GDPR-compliant enrollment mechanisms, ensuring both the scalability of the platform and the protection of personal data. This design choice underscores the importance of aligning technological solutions with ethical and regulatory frameworks, an increasingly critical consideration in digital education.

Finally, to strengthen faculty engagement and platform adoption, a series of video tutorials was developed. These resources empower educators to autonomously manage course content, assessment tools, and communication channels, thereby fostering digital literacy and instructional innovation. By providing clear guidance and practical demonstrations, the tutorials reduce technological barriers and enable teachers to focus on pedagogical enhancement. Ultimately, this integration not only improves teacher confidence but also contributes to enriched learning outcomes for students.

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5. Annexes

To guarantee smooth adoption of the platform, two dedicated video tutorials were developed for teachers. These provided guidance on basic operations and advanced resource management.

ANNEX 1: 5G-DiGITs – Moodle Tutorial for Teachers

This tutorial focused on essential teacher operations:

- Logging into the platform: Step-by-step instructions for secure login and profile management.
- Adding content to a course: Guidance on uploading files, embedding multimedia, and structuring course modules.
- Additional notes: best practices for navigating Moodle, managing participants, and using the activity completion features.

Link for the video: https://5g-digits.eu/wp-content/uploads/2025/07/5GDIGITS-MOODLE-TUTORIAL-TEACHERS.mp4

Transcript content (concisely):

The video demonstrates how teachers access the platform using their assigned credentials, navigate the dashboard, and enter their course. It then explains how to enable editing mode, add course sections, and insert different types of resources (files, links, labels). The tutorial concludes by showing how to preview course materials from a student's perspective, ensuring the uploaded resources are displayed correctly.

This tutorial emphasizes practical orientation, equipping teachers with immediate skills for content creation and course management.

Transcript (explicit):

In this tutorial, we will go through a brief overview of the 5G-DiGITs learning platform. More specifically, we will cover how to log into the platform, how to add content to your course, and some additional notes about using the platform.

First, we visit the platform's homepage. To access your account, click the "Login" button located at the top right corner. Using the credentials provided by the platform administrator, you can log in as a teacher. If you have not received your login credentials, please contact the administrator to request them. Once logged in, you will see your teacher's dashboard displaying the courses you are assigned to. Select the course you wish to edit or add content to.

Each course contains specific sections, as outlined in T2.2 Management. To modify the content of a particular section, click "Edit mode" in the top right corner. Each section contains four categories: a short description, a presentation video, study material, and quizzes.

To edit the course description, click the three dots to the right of the section, select "Edit settings," update the title and the description text, and then click "Save and return to course" to apply your changes. To add or change the presentation video, click the three

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dots, select "Edit settings," update the title and description, if necessary, delete the existing video under "Select file," upload the new one, click "Update," and finally select "Save and return to course."

To upload study material, click the three dots, select "Edit settings," update the title and description, and then upload the desired file by clicking the plus icon and selecting it from your directory. Once the file is uploaded, click "Save and return to course."

To edit a quiz, select the "Self-evaluation quiz" (or its customized name), click "Add question," then choose "A new question." Select from a variety of question types; in this example, "True/False" is selected. Enter the question name and text, define whether the answer is true or false, and save your changes. The new question will then be visible in the quiz.

It is important to note that all courses come pre-filled with these four content categories as placeholders. Teachers must delete the demo content before adding their own. Each teacher is responsible for the unit they manage, and any modifications should be coordinated among the teachers of the course. The platform supports self-enrollment for students, making it easier for them to join courses without requiring manual enrollment by the teacher. The default self-enrollment key for all courses is "12345." However, the teacher responsible may change this code in agreement with the other instructors.

To change the enrollment key, go to "Participants," select "Enrolled users," then "Enrollment methods." Click the edit icon next to "Self-enrollment (students)," set your new enrollment key, and click "Save changes."

Uploading your content to the platform is a simple process. However, if you have any questions, please reach out to the teacher responsible for your course. That teacher will collect all inquiries and forward them to the administrator if necessary.

Thank you for attending.

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ANNEX 2: 5G-DiGITs – Moodle Tutorial on Adding Resources

This second tutorial was developed to address supplementary resource management, beyond the four core components of each course (brief description, video, files, quiz).

Link for the video: https://5g-digits.eu/wp-content/uploads/2025/10/5GDIGITS-MOODLE-TUTORIAL-ADD_RESOURCE.mp4

Topics covered:

- Adding additional resources such as presentations, PDFs, and external links.
- Embedding multimedia content from external platforms (e.g., YouTube, Vimeo).
- Organizing supplementary material into folders for better student navigation.

Video Transcript content (concisely):

The tutorial begins by guiding teachers to the "Add an activity or resource" button, demonstrating the available options (File, Folder, Page, URL, Book). It shows how to upload a PDF or PowerPoint file, rename it for clarity, and set display options (inline, download, embedded). It further illustrates the process of embedding external videos via URL, adding descriptive labels, and grouping related materials into structured folders.

By integrating these practices, teachers are encouraged to enhance their courses with dynamic and diversified content, supporting different learning styles and improving overall student engagement.

Video Transcript (explicit):

In this tutorial, we will discuss the Activities and Resources of the 5G-DiGITs learning platform. More specifically, we will cover how to add Activities and Resources.

After logging in with our credentials, we navigate to the course where we want to add content and select the unit in which the activity will be added. We then choose "Add an activity or a resource." From the available options, we select the activity we want to include. In this example, we will add a file. We provide a title and then upload the file. Finally, we click "Save."

By clicking on the newly created activity, we can view the file that was uploaded. If we want to add another activity, we once again select "Add an activity or a resource" and choose the option of our preference.

Thank you for attending.

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