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

WP4

- # T4.4: Embedding Open Science in Formal and Non-formal Curriculum

D4.2: Open Science Formal and Non-formal Curriculum Report (Led by ISSBS, due 30 September 2025)

The aim of D4.2 is to document the integration of Open Science (OS) education programmes across Partner Consortium Higher Education Institutions (PCHEIs). It will provide an overview of how OS courses are embedded in formal and non-formal curricula, outline the relevant regulatory frameworks, and present a timeline for course design and implementation. The report will serve as a resource for stakeholders, guiding the ongoing adoption of OS in higher education.

Report Content
The report will present the Open Science (OS) education programmes, both formal and non-formal, of each Partner Consortium Higher Education Institution (PCHEI). Key sections include:

- A detailed description of how OS courses have been embedded into both formal and non-formal curricula.
- An overview of the regulatory frameworks at the partner and/or relevant local/national levels.
- A timeline outlining when OS courses will be officially introduced at each partner institution.

Language and Accessibility

- The report will be written in English and must be at least 50 pages long.
- It will be made available in digital format on the Erasmus+ project results platform, the project website, and Trello.

Embedding Open Science Courses in Curriculum

The following text represents ISSBS's proposal, outlining the core principles, guidelines, and procedures for the design and implementation of Open Science courses.

General Principles

- Open Science should be integrated into university curricula by aligning with international standards, national policies, and institutional frameworks, incorporating both:
  - Formal academic programmes
  - Non-formal learning opportunities
- Partner universities must recognize the importance of equipping students and researchers with Open Science skills, which are increasingly encouraged or required by funding agencies and accreditation bodies.
- A blended approach, combining formal coursework, non-formal workshops, and online resources, is recommended for programme delivery to ensure a comprehensive and effective integration of Open Science in higher education.

Timeline and Key Activities:

1. Identifying Course Content and Topics (February 2024 - December 2024)

- Planned activities for 2024 will include surveys, self-evaluation tools, forums, and study visits.
- ISSBS will propose course content and topics for discussion during the Study Visit in Slovenia (November 2024). This discussion will also address delivery methods, target audiences, and, if necessary, the formation of expert teams for each course to ensure high-quality content development (see Annex A).
- Simultaneously, partners will need to identify and develop the regulatory framework at partner or local and national level. ISSBS will provide a proposed structure for documentation of this framework (see Annex D).

2. Developing Open Science Courses (January 2025 - May 2025)

- ISSBS will create the Instructions for Developing WP4 Open Science Courses, to be discussed during the Study Visit in Slovenia (November 2024, see Annex B).
- ISSBS has already developed the course Open Science: Principles and Overview, a 5 ECTS course consisting of 7 lessons, that will be available as OER via elearningproject.eu (see Annex C for the Course Execution Plan).
- A detailed roadmap for the pilot implementation, covering the number of courses, ECTS credits, and delivery methods, will be prepared based on project indicators.
- Expert teams will be assembled at the partner or consortium level for each course to ensure high-quality development.
- Course materials, including videos, student tasks, and other resources, will be created during this period to support effective course delivery.

3. Course Accreditation and Pilot Implementation Plan (June 2025 - August 2025)

- The accreditation process will involve discussions with each partner's senate, following university and national regulations, to formally integrate these Open Science courses into the curriculum and non-formal learning catalogues.
- A comprehensive pilot implementation plan will be developed, outlining how the courses will be introduced as both formal curricula (compulsory and elective) and non-formal learning opportunities.

4. Final Report: Open Science Formal and Non-formal Curriculum (D4.2, September 2025)

- Each partner will prepare institutional reports on T4.4 activities, following a reporting template provided by ISSBS. These reports will detail the course development process, accreditation, and the integration of new or updated Open Science courses into both formal and non-formal curricula.
- Partners will submit final pilot course implementation plans (for both formal and non-formal curricula) covering the period from September/October 2025 to March/April 2026.
- ISSBS will compile these contributions into a comprehensive formal and non-formal curriculum report, documenting the course development process, integration challenges, and the applicable regulatory framework.

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5. Piloting activities, evaluation of piloting and continuous improvement

The aim of the Course Piloting and Feedback activities (September/October 2025 to March/April 2026) is to test the integration of Open Science courses at PCHEIs and gather feedback for refinement. Promotional efforts will target student registration for non-formal and elective courses, with each partner piloting at least one formal course and four online non-formal courses. Feedback from students, staff, and instructors will be collected, and course implementation will be monitored. The Evaluation and Continuous Improvement phase (April/May 2026 to 31 July 2026) will focus on compiling evaluation reports, making improvements, and preparing for the official implementation of courses in 2026/27, with ISSBS consolidating the findings into a final report. The following activities will be carried out within the outlined framework:

Course Piloting and Feedback at Each Project Partner – September/October 2025 to March/April 2026

- Promotion activities will be conducted, particularly for non-formal curricula and elective courses, to encourage student/participant registration.
- Courses will be piloted, with each PCHEI integrating at least one formal course and four online courses, alongside life-long learning courses as part of the non-formal curriculum.
- Feedback will be collected through surveys from students, staff, participants, and course instructors to assess the course's effectiveness.
- The course implementation process will be monitored with guidance from P8-EPDRI.

Evaluation (Pilot Implementation) and Continuous Improvement Report, Planning for the Official Use of Open Science Courses – April/May 2026 to 31 July 2026

- Evaluation reports will be compiled based on the performance of the pilot courses, with recommendations for improvements included.
- Partners will have the opportunity to refine their courses and prepare for the official implementation of Open Science courses in the 2026/27 academic year.
- Each partner will prepare institutional reports on T4.4 activities, using a reporting template provided by ISSBS. These reports will include details on pilot implementation, evaluation results, course improvements, and the sustainability of the courses in both formal and non-formal curricula.
- ISSBS will compile a final report summarizing the pilot implementation, course evaluation, improvements, and strategies for ensuring the sustainability of these Open Science courses.

Annexes

- Annex A1 – ISSBS's proposal of courses/contents (formal curricula) – for discussion during Study visit Slovenia (November 2024)
- Annex A2 – ISSBS proposal of courses/contents (non-formal curricula) – for discussion during Study visit Slovenia (November 2024)
- Annex B – Instructions for Developing WP4 Open Science Courses (for discussion)
- Annex C – Course execution plan - example
- Annex D – Regulatory framework at partner level and/or at the relevant level (local/national), *ISSBS proposal of the structure of the document*
- Annex E – WP4 overview and Study visit Slovenia on Oscar 2.0 and Open Asia

Annex A1

ISSBS's proposal of courses/contents (formal curricula) – for discussion during Study Visit Slovenia (November 2024)

No.	Suggested Name of the Course	»Creator«	Proposed Contents
1	**Open Science: Principles and Overview** **Type:** 6 ECTS course – formal curricula + some topics can be delivered also as non-formal training **Target group:** for MA, PhD students, for univ. staff	**ISSBS,** already prepared this course/content	This course provides an overview of Open Science practices, focusing on open access to scientific publications, research data management, and Open Educational Resources (OER). Participants will learn to use and develop Open Research Tools, such as software and open hardware, and explore the role of virtual and physical repositories in supporting collaboration. The course also covers engaging societal actors through crowdfunding, crowdsourcing, and participatory science, and emphasizes integrating diverse knowledge systems, including indigenous and marginalized perspectives, into research for inclusivity.
2	**Open Scientific Knowledge: Scientific Publications and Research Data**		Detailed exploration of open scientific knowledge, focusing on the importance of open access to scientific publications and research data. Practical guidance on managing, sharing, and preserving research data to ensure reproducibility and compliance with FAIR principles.
3	**Open Educational Resources (OER)**		Comprehensive guide on Open Educational Resources (OER), including creation, licensing, and dissemination. Focus on using OER to enhance educational quality and access, along with best practices for integrating OER into formal and non-formal learning environments.
4	**Open Research Tools: Software, Source Code, and Hardware**		Overview of Open Research Tools including software, source code, and open hardware. Practical sessions on how to use, develop, and contribute to open-source tools and repositories, emphasizing reproducibility, collaboration, and innovation.
5	**Open Science Infrastructures: Virtual and Physical Repositories**		Examination of Open Science infrastructures, including virtual and physical repositories, incubators, and laboratories. Discussion on how these infrastructures support research, innovation, and collaboration, with practical case studies from global initiatives.
6	**Engagement of Societal Actors: Crowdfunding and Crowdsourcing**		Introduction to the engagement of societal actors in science through crowdfunding and crowdsourcing. Detailed analysis of case studies and practical exercises on how to pitch ideas, manage projects, and effectively engage communities in scientific research.
7	**Engagement of Societal Actors: Scientific Volunteering and Participatory Science**		Focus on scientific volunteering and participatory science. Discussion on the importance of engaging citizens in scientific research and decision-making, with practical examples and guidelines for organizing and managing volunteer-driven scientific projects.
8	**Dialogue with Other Knowledge Systems: Indigenous, Marginalized, and Local Communities**		Exploration of dialogue with other knowledge systems, including indigenous knowledge, contributions from marginalized scholars, and local community wisdom. Practical approaches to integrating diverse knowledge systems into scientific research and ensuring inclusivity.

Annex A2

Integrating Open Science Principles in University Practices – possible topics for different target groups (life-long-learning, non-formal curricula)

1. Academic Staff - Title: "Embracing Open Science in Research and Teaching"

Objectives:	– Understand the principles and benefits of Open Science. – Learn how to integrate Open Science practices in research methodologies. – Explore tools and platforms for sharing open research data. – Strategies for incorporating Open Science principles into curriculum and teaching practices.
Content:	– Overview of Open Science and its importance. – Practical guide to open data, open access publishing, and open peer review. – Case studies of successful Open Science implementations in academia. – Workshops on using Open Science tools (e.g., data repositories, preprint servers).

2. Administrative Staff - Title: "Supporting Open Science: Best Practices for University Administration"

Objectives:	– Gain knowledge of Open Science policies and mandates. – Learn administrative roles in facilitating Open Science practices. – Develop skills to support researchers in Open Science compliance. – Explore data management and repository services.
Content:	– Introduction to Open Science policies and legal frameworks. – Best practices for managing institutional repositories. – Data management plans and their importance. – Case studies on administrative support for Open Science initiatives.

3. PhD and MA Students - Title: "Navigating Open Science: A PhD Student's Guide to Research and Collaboration"

Objectives:	– Understand the fundamentals of Open Science and its relevance to early-career researchers. – Learn how to incorporate Open Science in thesis research. – Explore open access publishing and data sharing opportunities. – Develop skills for collaborative and transparent research practices.
Content:	– Overview of Open Science principles and benefits for PhD students. – Practical sessions on open access publishing and data sharing. – Workshops on using collaborative tools and platforms. – Guidance on ethical considerations and intellectual property in Open Science.

4. University Management - Title: "Strategic Leadership in Open Science: Policies and Implementation"

Objectives:	– Understand the strategic importance of Open Science for the institution. – Learn how to develop and implement Open Science policies. – Explore funding opportunities and partnerships related to Open Science. – Strategies for fostering a culture of Open Science within the university.
Content:	– The role of university leadership in promoting Open Science. – Developing institutional policies and frameworks for Open Science. – Case studies of universities successfully implementing Open Science strategies. – Funding and partnership opportunities for Open Science initiatives.

5. University Community - Title: "Building a Culture of Open Science: Engaging the University Community"

Objectives:	– Raise awareness of the benefits and principles of Open Science. – Encourage community-wide participation in Open Science practices. – Promote understanding of open access and public engagement in science. – Develop community-based projects and initiatives supporting Open Science.
Content:	– Introduction to Open Science for the broader university community. – Benefits of Open Science for students, researchers, and society. – Interactive sessions on open access, citizen science, and public engagement. – Examples of community-driven Open Science projects.

Annex B

Instructions for Developing WP4 Open Science Courses (for discussion)

Objective: To develop both formal (Master's/PhD level) and non-formal (open online) courses on Open Science (OS) for integration into Partner Consortium Higher Education Institutions (PCHEIs). These courses will align with the roadmap for OS training and course development, and be piloted in the third project year.

Step-by-Step Instructions:

1. **Course Requirements Gathering**:
   - Review the outcomes from CBW2 (T4.4) on OS training requirements and the identified skills gaps.
   - Align your course design with these findings to ensure the content addresses the specific needs of the PCHEIs.

2. **Course Structure and ECTS Allocation**:
   - Each formal OS course should account for at least **5 ECTS** and consist of **125 hours** of total workload, including a mix of in-person or online learning, self-learning, and group work (e.g., [22†course execution example]).
   - Non-formal OS online courses should account for at least **3 ECTS** each, with a workload reflecting that credit requirement.

3. **Topics and Lesson Plan**:
   - Suggested topics for OS courses may include:
     - Open Principles and Collaborations
     - Reproducible Research and Data Analysis
     - Open Research Data and Software
     - Open Access to Research Papers
     - Public Engagement with Science
     - Open Advocacy
   - Use the Course Execution Plan (see Annex C) as a guide to break the course into lessons. For example, each course could include **7 lessons**, with the final lesson dedicated to a capstone project.

4. **Learning Activities**:
   - Incorporate diverse activities such as:
     - **Self-learning**: Reading materials, quizzes, and individual exercises (e.g., writing essays or creating mind maps).
     - **Instructor-led sessions**: Presentations, discussions, and collaborative group work.
     - **Group activities**: Group presentations or analysis of case studies to apply the learned concepts.
     - **Capstone project**: A significant final project investigating OS implementation in each student's country.

5. **Course Execution Plan**:
   - Plan to deliver the course either **fully online, in-person, or hybrid** based on your institutional capabilities. Courses must be structured to include:
     - Preparatory studies (self-learning)
     - Instructor-led sessions (either online or in-person)
     - Group activities (in-person or via an LMS)

By following these steps and using the provided templates and examples, partners can develop OS courses that meet the project goals and provide meaningful training in Open Science practices for MA, PhD students and young researchers.

Annex C

Course execution plan - example

Course 1: Open Science: Principles and Overview (5 ECTS course with 7 lessons)

Open access course developed by ISSBS on https://elearningproject.eu/

Objective:

This course introduces students to the fundamental principles, values, policies, and ethical considerations of Open Science. It is an essential foundation, providing an overview of various Open Science activities. By the end of this course, students will have a practical understanding of the Open Science landscape and be prepared to engage with specific aspects such as open-access publishing, Open Data, and Open Educational Resources in their future studies.

Target Group: PhD and MA students, university staff

Structure of the course:

ECTS		5
STUDENT WORKLOAD		125 hours
CONTACT HOURS	In-person	20 hours
	Online	0 hours
SELF-LEARNING		42 hours
GROUPWORK	In-person	0 hours
	Online	63 hours

Lessons:

- **The course consists of 7 lessons**, out of which the last one is dedicated to execution of capstone project.
- The student workload in each content related lessons is 13 hours, and the workload in the lesson with the capstone project is 47 hours, which in total brings 125 hours of the workload of **5 ECTS**.
- The lessons are executed as a combination of self-learning and teacher-led approach. Both approaches can be delivered either online (through an LMS and videoconferences) or in-person or a combination of both. Altogether 7 instructor-led session are planned in the duration of 2 to 3 hours.

1. Introduction to Open Science (13 hours)

- *Topics:* Definition, history, and evolution of Open Science.
- *Practical Focus:* Students will learn the basics of Open Science, including key concepts and terminology. This module will cover the movement's origins and growth, as well as its impact on the scientific community and society at large.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 1.1.	Self-Study	Online	1
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 1.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 1.1* (as a preparation before the lecture session): Write a short essay (500 words) on the evolution of Open Science, highlighting key milestones and their significance.
- *Group Exercise 1.2* (implemented after the lecture session): In small groups, students will analyze a case study of a research project adopting Open Science practices. Each group will present their findings, focusing on how Open Science transformed the research process and outcomes.

2. Core Values and Principles (13 hours)

- *Topics:* Transparency, reproducibility, collaboration, accessibility.
- *Practical Focus:* This module focuses on the values that drive Open Science, such as transparency in research processes, reproducibility of results, and collaboration across disciplines and borders.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 2.1 or Exercise 2.1a.	Self-Study	Online	1 hour
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 2.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 2.1* (as a preparation before the lecture session): Create a visual map (e.g., mind map or infographic) that connects the core values of Open Science to specific benefits in research, such as increased transparency and greater trust in scientific findings.
- *Individual Exercise 2.1a* (for implementing the course in an online self-learning format). In an online exercise, students drag and drop the correct words into a text, linking the core values of Open Science to specific benefits in research.
- *Group Discussion 2.2* (implemented after the lecture session): Students will participate in a roundtable discussion on how these values can be applied in their own research contexts. Each student will provide a brief example of incorporating one of these values into their current or future work.

3. Open Science Policies and Initiatives (13 hours)

- *Topics:* Global, regional, national, and institutional Open Science policies.
- *Practical Focus:* Students will examine current Open Science policies and initiatives at various levels, from international frameworks to local government or institutional efforts.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 3.1. or Exercise 3.1a.	Self-Study	Online	1 hour
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 3.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 3.1*: Research and prepare a brief report on Open Science policies in your country, highlighting key initiatives and any gaps or challenges.
- *Individual Exercise 3.1a:* (for implementing the course in an online self-learning format). In this online exercise, students drag and drop the correct words into a text describing general insights on Open Science policies in the EU.
- *Group Exercise 3.2*: Students will compare Open Science policies from different countries or regions in small groups. Each group will prepare a comparative analysis and present its findings, discussing how different policy approaches impact the adoption and success of Open Science.

4. Introduction to Key Open Science Activities (13 hours)

- *Topics:* Open Access publishing, Open Data, Open Educational Resources, Open Software, and Open Hardware.
- *Practical Focus:* This module provides a practical overview of various Open Science activities, including open-access publishing, the importance of Open Data, and the role of open-source software and hardware in research.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 4.1 or Exercise 4.1a.	Self-Study	Online	1 hour
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 3.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 4.1:* Explore an Open Access journal or data repository of your choice. Write a report (500 words) on how the platform supports Open Science principles and discuss any challenges or limitations you observed.
- *Individual Exercise 4.1a* (for implementing the course in an online self-learning format). In an online exercise, students drag and drop the correct words into a text, describing an example of selected platforms supporting Open Science principles.
- *Group Exercise 4.2*: This group exercise aims to explore and understand the different areas of Open Science in small groups. By working collaboratively, your group will analyze the various aspects of Open Science, discuss their significance, and create a visual representation (e.g., a mind map or flowchart) that connects these areas.

5. Ethical and Legal Considerations (13 hours)

- *Topics:* Ethics, intellectual property, open licensing.
- *Practical Focus:* This module covers the ethical and legal challenges in Open Science, including issues around intellectual property, data privacy, and the use of open licenses.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 5.1 or Exercise 5.1a.	Self-Study	Online	1 hour
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 3.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 5.1*: Analyze a case study involving an ethical dilemma in Open Science (e.g., data sharing vs. privacy concerns). Write a reflection (500 words) on how you would resolve the issue, considering both ethical and legal perspectives.
- *Individual Exercise 5.1a*: Analyze a case study involving an ethical dilemma in Open Science (e.g., data sharing vs. privacy concerns). In this online exercise, students drag and drop the correct words into the text.
- *Group Exercise 5.2*: Students will work in groups to apply different open licenses (e.g., Creative Commons) to various research outputs, such as data sets, publications, and software. Each group will present their licensing choices and discuss the implications for accessibility and reuse.

6. Open Science for PhD Students and Young Researchers (13 hours)

- *Topics:* Benefits, challenges, and practical guidelines for implementing Open Science practices for PhD students and young researchers.
- *Practical Focus:* This lesson focuses on the unique context of early-career researchers, discussing how Open Science can enhance their research visibility, collaboration opportunities, skill development, and societal impact. It also addresses young researchers' challenges, such as institutional resistance, lack of training, and IP concerns.
- *Activities:*

Preparatory Study	Students should review the assigned readings and additional materials provided in the e-classroom.	Self-Study	Online	4 hours
Preparatory exercise	They are also required to complete Individual Exercise 5.1 or Exercise 5.1a.	Self-Study	Online	1 hour
Knowledge Check	Students should complete the quiz available in the e-classroom to assess their understanding and knowledge of the material. They should review the study materials if needed to clarify any uncertainty or confusion.	Self-Study	Online	2 hours
Lecture Session	Students attend the lecture based on the PowerPoint presentation.	Instructor-Led Learning	Online or in-person learning	3 hours
Group Activity	After the lecture, the students will form groups to discuss and collaborate on Group Exercise 3.2. Each group will then prepare and deliver a presentation on their findings.	Groupwork	Online or in-person learning	3 hours

- *Individual Exercise 6.1* (for implementing the course in an online self-learning format and in-person delivery). In an online exercise, students drag and drop the correct words into a text, exploring the benefits and responsibilities of Open Science for the PhD students and young researchers.
- Group Exercise 6.2: Students will form groups of 4-5 to analyze the benefits, challenges, and practical guidelines for implementing Open Science for PhD students and young researchers. Each group will:
  - Analyze the benefits of Open Science for early-career researchers (e.g., increased visibility, collaboration, skill development).
  - Identify and discuss challenges (e.g., institutional resistance, IP concerns).
  - Develop practical guidelines tailored to PhD students and young researchers, focusing on effective strategies for Open Science publishing, data sharing, and advocacy.
  - Prepare a group presentation summarizing their analysis and present it to the class, followed by a Q&A session.
  - Reading and Discussion: Assigned reading material will provide a deeper understanding of the Open Science landscape specifically for young researchers. Discussions will focus on how these insights can be applied to their own academic contexts.
  - Materials Needed*:* Access to the assigned reading material, presentation tools (e.g., PowerPoint), and tools for note-taking and brainstorming.

7. Country-Specific Lesson (47 hours)

- *Topics:* Local Open Science policies, initiatives, and case studies from each student's country.
- *Practical Focus:* Students will investigate how Open Science is implemented in their countries, analyzing local policies and initiatives. This module will help students contextualize the global principles of Open Science within their regional or national frameworks.
- *Activities:*

Work on the student's project	Students or individuals engage in investigative activities and produce a report (only in the case of Instructor-Led Learning delivery)	Groupwork	Online or in-person learning	45 hours
Project's presentation	The projects are presented orally at a public event.	Instructor-Led Learning	Online or in-person learning	2 hours

- The last lesson will be delivered using a self-learning approach; however, only in the case of Instructor-Led Learning delivery. Students and individuals will produce a report, which will be checked and, if approved, posted as OER in the last section of the e-learning classroom.
- Final Assignment: Students will conduct an in-depth analysis of the Open Science environment in their home country, region, or university. This project will investigate Open Science's current state, including existing policies, initiatives, and practices.
- Output: A detailed report or presentation that includes an overview of the current Open Science landscape, identifies key challenges and opportunities, and provides recommendations for enhancing Open Science practices locally.
- Assessment Criteria: Depth of analysis, practical applicability of recommendations, understanding of local context, clarity of presentation, and use of relevant case studies.

Annex D

Regulatory framework at partner level and/or at the relevant level (local/national)

ISSBS proposal of the structure of the document

The integration of Open Science courses into formal and non-formal university curricula involves a combination of regulatory frameworks at international, national, and institutional levels. These frameworks aim to promote openness, transparency, and collaboration in scientific research. The main regulatory mechanisms that shape how Open Science is embedded in the curriculum are:

1. International Guidelines and Frameworks

UNESCO Recommendation on Open Science (2022): This global recommendation encourages member states to adopt and promote Open Science principles, emphasizing inclusivity, transparency, and open access to scientific knowledge. It also encourages the inclusion of Open Science courses in higher education curricula.
European Commission and Horizon Europe (2021-2027): Open Science is one of the core principles of Horizon Europe, and the European Commission encourages universities to implement Open Science training for researchers, particularly PhD students. Through funding incentives, the EU promotes embedding Open Science in formal education, ensuring researchers acquire skills in open access publishing, data sharing, and citizen science.

2. National Higher Education Policies

National policies have to be presented

EXAMPLE

Many countries have integrated Open Science principles into their national higher education policies. For example, countries like the Netherlands, Finland, and France have national Open Science plans that include explicit measures to incorporate Open Science training at universities. This includes the development of national frameworks that encourage universities to include Open Science as a key component of research training.

Research Councils and Funders: National research funding bodies often require researchers and universities to adopt Open Science practices as part of their funding conditions, which drives universities to include Open Science in formal and non-formal curricula to ensure compliance.

3. Institutional Policies and Curricula Design - Open Science courses embedded in formal and non-formal curriculum
Your university policies have to be presented

EXAMPLE

Type of the curriculum

- **Formal Curriculum:** Universities, particularly in Europe, have begun to integrate Open Science into their formal curricula, especially in postgraduate research programs (PhD and Master's levels). This includes courses on open data, open access publishing, reproducibility of research, and ethical considerations in Open Science. (**Case - The University of Cambridge** offers a dedicated Open Science program as part of their research skills training for PhD students, covering topics like open access publishing, data management, and intellectual property in Open Science.)
- **Non-formal Curriculum:** Open Science is also promoted through workshops, seminars, and online resources that students and staff can access outside formal degree programs. Many universities have established **Open Science Labs** or centers for Open Science, offering non-formal courses and training on topics such as data management plans, open software, and collaboration tools like GitHub. **(Case - The University of Amsterdam** organizes non-formal workshops and seminars through its Open Science program, open to students and faculty alike.)

Accreditation and Quality Assurance Bodies

- In some countries, **accreditation bodies** may require or encourage universities to integrate Open Science skills into their research training programs as part of broader quality assurance processes. For example, some European countries use the **European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)**, which emphasizes research integrity and transparency, aligning well with Open Science practices.

Open Science Platforms and Collaboration Tools

- **Repositories and Data Management Plans:** Many universities have implemented repositories and tools to encourage open data sharing, such as institutional repositories or dedicated platforms for managing research outputs. These platforms often require researchers to follow specific training, which forms part of both formal and non-formal curricula.
- **MOOCs and Online Platforms:** Several universities offer **Massive Open Online Courses (MOOCs)** on Open Science topics. These are non-formal learning opportunities that allow a wider audience, including professionals outside academia, to engage with Open Science practices. (**Case - Leiden University** offers a MOOC on Open Science through Coursera, which introduces learners to key concepts and tools of Open Science.

Annex E

WP4 overview and Study visit Slovenia on Oscar 2.0 and Open Asia

Oscar 2.0 WP4: UNIVERSITY TRANSITION TO OPEN SCIENCE PRACTICES, WP4 Leader: P3-BOTHO

- T4.1. Elaboration of OS-Infrastructure development plan
- T4.2. Design and maintenance of University Open Science platform
- T4.3. Purchase of equipment for strengthening OS- infrastructure
- **T4.4. Embedding OS in formal and non-formal curriculum**

Open Asia WP4: ADVANCING UNIVERSITY OPEN SCIENCE INFRASTRUCTURE AND PRACTICES, WP4 Leader: P2-TIET

- T4.1. Elaboration of OS-Infrastructure development plan
- T4.2. Design and maintenance of University Open Science platform
- T4.3. Purchase of equipment for strengthening OS- infrastructure
- **T4.4. Embedding OS in formal and non-formal curriculum**

<table>
<tr><th colspan="4">WP4 OWERVIEW</th></tr>
<tr><th colspan="2">OSCAR 2.0</th><th colspan="2">Open Asia</th></tr>
<tr><td colspan="2">main partner: UNZA</td><td colspan="2">main partner: NMIMS</td></tr>
<tr><td>MS12
BOTHO
M21

Report Requirements for OS-formal and non-formal curriculum</td><td>This report summarizes findings from CBW2 (T4.4) on gathering requirements for introducing Open Science (OS) training to PCHEIs and presents a roadmap for implementation. It develops recommendations for OS training implementation and outlines a roadmap for OS course development for PCHEIs. This roadmap is based on the Benchmark Report on Best Practices of OS Implementation in Higher Education (see MS6) and the Survey Report on OS Skills Gaps in Partner Countries (see MS7).</td><td>MS12
UNIMAS
M21

Report …
… …</td><td>This report summarizes findings from CBW2 (T4.4) on gathering requirements for introducing Open Science (OS) training to Partner Consortium Higher Education Institutions (PCHEIs) and presents a roadmap for implementation. It develops recommendations for OS training implementation, including a detailed roadmap for OS course development for PCHEIs. This roadmap is based on the Benchmark Report on Best Practices of OS Implementation in Higher Education (see MS6) and the Survey Report on OS Skills Gaps in Partner Countries (see MS7).</td></tr>
<tr><td colspan="2">OS Curriculum OSCAR:</td><td colspan="2">OS Curriculum Open Asia:</td></tr>
<tr><td colspan="2">Integration of OS Courses in Formal and Non-formal Curriculum (Master’s and PhD Levels):

All partners are jointly involved in drafting, circulating, and preparing the Requirements for OS formal and non-formal curriculum (MS12).

One OS course (draft version: OS Principles and Citizen/at least 5 ECTS) will be jointly designed by PCHEIs. The course will be integrated into the existing formal curriculum (Master’s or PhD level) as either obligatory or optional courses in each PCHEI. This will involve modernizing at least four existing programs and obtaining</td><td colspan="2">Integration of OS courses in formal and non-formal curriculum (Master and PhD levels):

All partners are jointly involved in drafting, circulating, and preparing the Proposal of OS courses for formal curriculum and non-formal open online courses on OS, with task leader P1-NMIMS. The Requirements for OS formal and non-formal curriculum will be elaborated by P6-UNIMAS (MS12).

After identifying the study programme, OS courses (at least 5 ECTS each) will be integrated into the existing formal curriculum as either obligatory or optional courses, modernizing at</td></tr>
</table>

approval from the Institutional Academic Committee. Following the identification of topics for open online courses on OS (as results of CBW2), at least four online courses (each worth at least 3 ECTS) will be developed jointly by co-authors from PCHEIs in English and translated into the national language if applicable. The topics to be covered include: Open Principles, Open Collaborations, Reproducible Research and Data Analysis, Open Research Data, Open Research Software and Open Source, Open Access to Research Papers, Open Evaluation, Public Engagement with Science, Open Educational Resources, and Open Advocacy. These courses will be included in the University LLL courses catalogue (institutional e-learning platform) of each PCHEI. The newly created OS courses (both formal and non-formal) **will be piloted during the third project year by each PCHEI (T7.4).** The P8-EPDRI will monitor the delivery of these courses in close cooperation with the Q-team. The evaluation reports will be included in the final reports. **Target groups/beneficiaries of the OS courses will be invited to complete the Satisfaction Survey (T7.6).**	least five existing programmes (Master's or PhD level), one at each PCHEI, and approved at the institutional level. Following the identification of topics for open online courses on OS (based on results from CBW2), at least five online courses (each worth at least 3 ECTS) will be developed jointly by co-authors from PCHEIs in English and translated into national languages if applicable. The topics to be covered include: Open Principles, Open Collaborations, Reproducible Research and Data Analysis, Open Research Data, Open Research Software and Open Source, Open Access to Research Papers, Open Evaluation, Public Engagement with Science, Open Educational Resources, and Open Advocacy. These courses will be included in the University LLL courses catalogue. The newly created OS courses (formal and non-formal) **will be piloted during the third project year by each PCHEI (T7.4).** The P8-EPDRI will monitor the delivery of these courses in close cooperation with the Q-team. Evaluation reports will be included in the FINAL reports. **Target groups/beneficiaries of the OS courses will be invited to complete the Satisfaction Survey (T7.6).**

ISSBS role			
ISSBS: **Open Science formal and non-formal curriculum report**	The report will present OS-Education programmes (formal and non-formal) of each PCHEI. It will be elaborated in English and available in a digital version (minimum 50 pages). The report will be accessible on the Erasmus+ project results platform, the project web page, and the Trello platform. QA responsibility lies with P2-UBL (see 2.1.2).	**ISSBS: Open Science formal and non-formal curriculum report**	The report will present OS-Education programmes (formal and non-formal) of each PCHEI. The report will be elaborated in English and will be available in a digital version (minimum 50 pages). It will be accessible on the Erasmus+ project results platform, the project web page, and the Trello platform. QA responsibility lies with P4-UM (see 2.1.2).

P7-ISSBS will prepare the Open Science formal and non-formal curriculum report (D4.6), which will include the following:

- Description of how Open Science courses have been embedded in formal and non-formal curriculum.
- Regulatory framework at partner level and/or at the relevant level (local/national).
- Start of the official use of Open Science courses at each partner.

Capacity Building Workshop - SLOVENIA	
OSCAR 2.0	**Open Asia**
Members of the UWG3 will take part in the Capacity Building Workshop Nr. 3 (CBW3) to support Open Science policy development at institutional and national levels in PCs. The CBW3 will be organized and conducted by Maribor University/Slovenia (P7-ISSBS). **Period:** 5 working days + 2 travel **Delivery Date:** M11/Nov `24 (E5.1) **Mobility:** • PCHEIs: each 3 experts; (altogether 14 PC-EU flows) • Non-academic partners: 2 experts each (4 PC-PC flows) • EU experts: 1 expert each partner (3 EU-EU flows) • P7-ISSBS: 5 experts (altogether at least 26 participants/event) **Programme Structure:** • 1-2 days: intensive training session • 3rd day: individual working day/networking/visit PhD schools, faculties, libraries • 4-5 days: interactive and collaborative workshops • Concluding Panel: each participant will be awarded a Certificate of Participation All partners are jointly involved in drafting, circulating, and preparing the Requirements for OS policy development at the institutional level (MS13). **Each PCHEI will develop an institutional OS regulatory framework**, which will include the following main strategic documents: • University Open Science Strategies • Institutional Open Access Policy • Data Management Plan • OS-Recognition and Rewards Programme (including OS monitoring indicators) **The document will be elaborated in English, translated into national languages, and adopted by the Senates.** Digital copies will be available on the project web page and each institutional PCHEI web page.	Members of the UWG3 will take part in the Capacity Building Workshop Nr. 3 (CBW3) to support Open Science policy development at institutional and national levels in PCs. The CBW3 will be organized and conducted by the International School for Social and Business Studies (P7-ISSBS) in Slovenia. **Period:** 5 working days + 2 travel **Delivery Date:** M11/Nov `24 (E5.1) **Mobility:** • PCHEIs: altogether 18 PC-EU flows • EU experts: 3 EU-EU flows • P7-ISSBS: 4 experts (altogether 25 participants/event) **Programme Structure:** • 1-2 days: intensive training session • 3rd day: individual working day/networking/visit PhD schools, faculties, libraries • 4-5 days: interactive and collaborative workshops • Concluding Panel: each participant will be awarded a Certificate of Participation All partners are jointly involved in drafting, circulating, and preparing the Requirements for OS policy development at the institutional level (MS13). **Each PCHEI will develop an institutional OS regulatory framework** (D5.1 - D5.5), which will include the following main strategic documents: • University Open Science Strategies • Institutional Open Access Policy • Data Management Plan • OS-Recognition and Rewards Programme (including OS monitoring indicators) **The document will be elaborated in English, translated into national languages, and adopted by the Senates.** Digital copies will be available on the project web page and each institutional PCHEI web page.