D5.1

Training and Education Programme

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LIST OF ABBREVIATIONS

COE: Centre of Excellence

NCC: National Competence Centre

HPC: High Performance Computing

CSA: Coordination and Support Action

SME: Small and medium-sized enterprises

JU: Joint Undertaking

EUMaster4HPC: European Master in High Performance Computing

MHPC: Master in High Performance Computing

KPI: Key Performance Indicators

WP: Work Package

EC: European Commission

D5.1 Training and Education Programme

Table of Contents

1   Executive Summary

Deliverable 5.1 focuses on the plan for specialised training, education, and support in computational materials science, with a strong emphasis on best practices for developing and running MAX lighthouse codes on HPC machines. In order to train the next generation of developers and code users, MAX will provide a diverse range of dedicated events, including workshops, courses, tutorials, schools, and hackathons, and it will also contribute to higher education through selected HPC-oriented master programs. Throughout each action, special attention will be given to young individuals and women in research and technology, ensuring an inclusive and gender-balanced representation among the lecturers and instructors. Building upon previous successful experience, the MAX-supported events will adhere to well-defined guidelines to ensure measurable impacts in terms of participant numbers, women's participation, and feedback from attendees. To maximise engagement from user communities and increase the number of trained scientists and engineers, we plan to collaborate with established organisations in this domain, such as CECAM, Psi-k, and ICTP. Additionally, we will maintain continuous coordination with National Competence Centres (NCCs) and other EuroHPC JU activities across Europe. Special consideration will be given to new user communities that are currently developing and advancing their HPC infrastructure and ecosystem in EuroHPC countries. The partners in charge of the dedicated Work Package are CNR, UNIMORE, SISSA, ICN2, CSIC, FZJ, CEA, UBREMEN, CINECA, BSC, IT4I, IJS.

2   Introduction and Objectives

The ultimate goal of the MAX training and education plan is **to enhance the number and proficiency of scientists and industrial users interested in computational methods and application optimization in the materials science domain.** MAX is committed to providing comprehensive training opportunities to the new generation of code developers and scientists in computational materials research. Furthermore, MAX aims to collaborate and integrate its proposal with other European initiatives.

To pave the way for the transition to exascale technologies, MAX recognizes the importance of education and catering to the needs of user communities. Our activities seek to expand the pool of competent users across Europe, including academia and industry, by addressing skill gaps and promoting the full deployment of European potential in this field.

WP5 *Training & community engagement within the HPC ecosystem,* led by Daniele Varsano (CNR), specifically focuses on the computational materials community, facilitating the transfer of knowledge to both developers and users. MAX will organise hands-on courses on its flagship codes and their developments, accompanied by the release of related documentation and training materials. These training events aim to engage new developers and foster expertise.

Through effective collaboration with European educational institutions and a continuous coordination with the CASTIEL2 CSA and the National Competence Centres (NCCs) across Europe, our training and education activities will nurture a new generation of proficient developers and users. By fully supporting our research and development staff, we ensure the continuous advancement of MAX activities and tools.

In line with the past phases of MAX, our key training priorities encompass comprehensive education across various levels of user knowledge, with a focus on real effectiveness. We will closely monitor the uptake of user know-how and evaluate user satisfaction after each activity. All MAX initiatives will be guided by principles of inclusivity and gender balance. Furthermore, MAX maintains transparency throughout the process, ensuring that scientists and organisations involved are aware of the realisation pathway and funding sources. This approach instils trust among stakeholders and end users.

MAX intends to organise a series of diverse initiatives that can be summarised into three distinct tasks within the WP.

Training to Foster the Next Generation of Code Developers (T5.1)

This task focuses on cultivating a pipeline of new-generation code developers. It involves specialised hands-on courses designed to equip the participants with state-of-the-art technical knowledge. Actions for this task will be taken closely with WP1, WP2, and WP3 to ensure a cohesive approach. The following initiatives will be organised:

1. **Courses**: These courses will concentrate on strategies and implementations of recent advancements in MAX lighthouse codes, enabling better utilisation of upcoming exascale architectures in MAX codes and domain-specific libraries. Workshops will also be conducted to explore new algorithms and developments generated within the Centre of

Excellence (CoE). These domain specific courses will be complementary to existing initiatives and coordinated with NCCs (see T5.3).

2. **Hackathons and Coding Events**: Hackathons and coding days/weeks will provide opportunities for participants to enhance MAX codes and domain-specific libraries. These events will bring together a diverse group of individuals, including new developers, principal developers from the CoE codes, developers from outside the consortium, and experts in high-performance computing (HPC) programming and accelerator technologies.

3. **Training through Research**: MAX labs will offer research-oriented training to new developers interested in specific implementations within flagship codes.

By implementing these initiatives, MAX aims to foster the growth of competent code developers who can effectively utilise cutting-edge technologies and contribute to the advancements within the field. To maximise the engagement of the broader computational community in Europe and beyond, some of the above events may be organised in collaboration with community organisations, especially CECAM, Psi-k, and ICTP, with direct contributions from the MAX developing teams and experts from the HPC computing centres.

Output: at least 6 events (e.g., courses, hackathons, workshops) organized. Hosting of researchers in CoE labs.

Advanced Training for Academic and Industrial Users in Computational Materials Science (T5.2)

Task 5.2 focuses on providing advanced training opportunities to academic and industrial users in computational materials science. The goal is to expand the pool of scientists proficient in utilizing MAX lighthouse code in (pre-) exascale HPC machines within the European Union. This task employs a combination of traditional and contemporary educational approaches, with a particular emphasis on facilitating access for young researchers and companies. The following implementation strategies will be employed:

1. **Schools in Materials Science**: Organizing specialized schools in the field of materials science, with a specific focus on the new capabilities offered by (pre-) and exascale electronic structure codes. These events will typically include introductory sessions

covering concepts and methods, as well as hands-on code-specific or code-group-specific training for both new and experienced users.

2. **Training through research**: Facilitating one-on-one training opportunities by hosting selected academic and industrial researchers in CoE laboratories. These visits will serve as training/collaboration opportunities for relevant scientific projects involving the utilization of MAX flagship codes. Academic users can take advantage of the Digital Europe Program EuroHPC traineeships in Hosting Entities, Centres of Excellence and Competence Centres, SMEs and Industry to further support their training needs.

By implementing these measures, MAX aims to broaden the base of scientists proficient in computational materials science and promote the efficient utilization of (pre-) and exascale HPC codes within the EU. The focus on lowering the threshold for young researchers and companies ensures that a diverse range of users can benefit from these training initiatives.

Importantly, MAX will provide high-quality recordings of key lectures and relevant training materials. These resources will be made available through an ad-hoc developed web repository called **Lhumos** (Learning Hub Materials Simulation). The web repository, whose structure was established and developed in the previous MAX project, will be continuously enhanced in close collaboration with other European digital and HPC resources, in order to ensure the most effective contribution of MAX to the JU ecosystem. Lhumos will serve as a central platform for training in high-performance computing and simulation and modeling for materials and other related fields. Users will have access to recorded lectures and a wealth of supporting training materials to enhance their understanding and skills in these domains.

Moreover, as a part of this task, MAX lighthouse code developers will actively contribute to relevant courses organized outside the CoE when appropriate. This collaboration will ensure that expertise from MAX is shared with a wider audience, extending the reach and impact of the training activities.

Output: at least 6 schools in the field of materials science organized. Development of online teaching modules. Hosting of researchers in CoE labs.

Coordination and Contributions to Transverse Training Initiatives (T5.3)

This task involves MAX coordination and contributions to transverse training initiatives across different domains within the European HPC ecosystem through its domain specific content. MAX will actively participate in designing, structuring, and implementing these initiatives, collaborating with various stakeholders such as NCCs, HPC centres, other CoEs, and EuroHPC Training Activities and EuroHPC Professional Traineeships funded by Digital Europe Programme.

The focus is here on domain-specific content, software development know-how for exascale systems, and the integration of new knowledge into university education. The following activities will be undertaken:

1. **Contribution to Courses and Training Initiatives with National Competence Centres**: MAX will provide domain-specific content and expertise on software development for exascale systems and beyond. This contribution will enrich the training activities coordinated with National Competence Centres.

2. **Contribution to Courses and Training Initiatives with HPC Centres, and other CoEs**: MAX will actively participate in training initiatives organized by HPC centres, the EuroHPC JU training platform, and other CoEs. This collaboration will ensure the integration of MAX domain-specific knowledge and expertise into broader training programs.

3. **Contribution to Training Portals**: MAX will contribute to the training portals of NCCs and joint portals within the European HPC ecosystem. This contribution will include providing an event calendar and access to online training materials, such as in the HPC in Europe portal.

4. **Contribution to CASTIEL2 CSA training activities**: MAX will actively promote and participate in events coordinated and promoted by Coordination and Support Action (CSA) CASTIEL2, by providing domain specific content and sharing its experience in delivering training in networking events as, e.g., Virtual Training coffee breaks.

5. **Development of Flexible Teaching Modules**: MAX recognizes the importance of integrating new knowledge into university education. Flexible teaching modules based on MAX lighthouse codes will be developed and tested. These modules will target Master's/Ph.D. students and university professors interested in frontier computational methods within their respective disciplines, such as computational materials science, computational physics, computational chemistry, etc. Collaborations with institutions hosting existing Master's or Ph.D. courses based on HPC will be fostered, and

collaborations with the <u>European Master for High Performance Computing</u> (EUMaster4HPC) will be pursued on selected teaching modules based on MAX's lighthouse codes.

The outputs of this task will include contributions to training initiatives coordinated with NCCs and the wider European HPC ecosystem. Additionally, teaching modules will be developed for adoption in Master's/Ph.D. courses, ensuring the systematic dissemination of frontier computational methods and the utilization of MAX lighthouse codes in educational settings.

Outputs: contribution to training initiatives within the EuroHPC ecosystem. Development of teaching modules for Master/PhD courses.

3   Strategy

MAX is committed to providing training activities that cover the key aspects of computational materials science relevant to both end-users and software developers. These activities are designed to meet the specific needs of different audiences. Special emphasis is placed on promoting participation among young researchers and women. The primary audience for MAX training includes **software developers, academic researchers, industrial researchers, and master's and PhD students**.

To cater to these audiences, MAX offers various formats of training, including:

1. **Domain-specific courses**: These courses focus on pre- and exascale strategies and implementations, providing in-depth knowledge and possibly hands-on training related to MAX lighthouse codes and domain-specific libraries. This activity will be pursued in close collaboration with other European HPC actors as the NCCs contributing to enrich their training activities.
    Examples of this training format can be found in recent MAX activities coordinated with the NCC Sweden, 2022 (<u>Efficient materials modelling on HPC with Quantum ESPRESSO, Yambo and BigDFT</u>) or with the NCC Netherlands, 2023 (<u>MPI and OpenMP in Scientific Software Development</u>) where parallelization strategies adopted in MAX lighthouse codes were showcased.

2. **Hackathons and coding events**: Dedicated sessions are organized to enhance proficiency in MAX lighthouse codes and domain-specific libraries. These events bring together

developers, experts in HPC programming, and participants from both within and outside the consortium. These events span from a few days to a whole week and alternate lectures from HPC experts with active work on the codes.

3. **Specialized hands-on tutorials and workshops**: MAX conducts training sessions on lighthouse codes, introducing new algorithms and methods developed within the CoE. These sessions enable participants to gain expertise in advanced techniques and stay updated with the latest advancements in computational materials science. In general, in these one-week events, theoretical lectures covering concepts, methods and best-practices, are followed by practical hands-on sessions on lighthouse code usage in HPC machines. To respond to a high number of applications, MAX is able to organize schools in hybrid format (in person and online) in which it is possible to exploit a seamless cloud environment to hold modern online hands-on sessions with graphical interfaces and scientific programs running on multicores high-end computer platforms. This was setup and successfully tested in the last few years, when the pandemic outbreak permitted only online events. The used cloud platform is accessible via web browser and provides a graphical interface to a Linux desktop, that can be as powerful as a compute node, thus avoiding the need for pre-installation of software in the users' machines.

4. **Training for visiting researchers**: MAX offers opportunities to researchers to visit and receive training at its labs. These visits focus on collaboration, code development, and hands-on training related to MAX flagship codes. Tested in the previous MAX phases, such an instrument has demonstrated to be very powerful. In the following months, MAX will also explore the possibility to benefit from the interaction with EuroHPC Professional Traineeships program funded by Digital Europe Programme.

5. **Courses on HPC in Materials Science**: MAX organizes courses targeting master's and PhD students, providing them with a comprehensive understanding of HPC applications in materials science. These courses may also include the development of online modules with reusable content, allowing for self-paced skill development and adoption by universities worldwide. MAX members will contribute in existing master programs as SISSA/ICTP [Master in High-Performance Computing](#) (MHPC), University courses on computational physics (e.g., at University of Modena and Reggio Emilia, Polytechnic University of Catalonia, and University of Oviedo) with lectures on HPC and tutorials on computational materials science and contribution to the RWTH Aachen University Master Programme. Several partners of MAX participate in the European Master for High

Performance Computing (EUMaster4HPC) project, and are working to foster the collaboration of MAX and all CoEs with EUMaster4HPC.

6. **Availability of high-quality educational materials**: recordings of key lectures from schools and workshops available on MAX website and YouTube channel. Edited videos will also be uploaded on the **Lhumos** platform. Those who cannot attend the above-mentioned events will have the chance of accessing valuable training material at their convenience.

Throughout the project, MAX places significant effort on assessing the **general guidelines** (see section 5) that govern its educational actions, ensuring a cohesive framework for the training activities offered, a respect of quality standards, and a roadmap for partners organizing events.

To facilitate effective coordination and organization of training events, MAX has established different groups:

- A WP5 training team, composed of Daniele Varsano, WP5 leader, Maria Bartolacelli, Susanna Cavicchioli, and Luisa Neri, sited at the PI node, CNR, that has the role of managing the WP5 (email address training@max-centre.eu).
- A dedicated training working group with representatives from each active node involved in training activities. This group meets regularly via teleconference to discuss and monitor the progress of training events.

   It is composed of: Daniele Varsano (CNR; chair), Alice Ruini (UNIMORE), Oscar Baseggio (SISSA), José María Escartín Esteban (ICN2), Alberto García (CSIC), Gregor Michalicek (FZJ), TBA (CEA, UBREMEN), Laura Bellentani (CINECA), Julio Gutiérrez (BSC), Karina Pesatova (IT4I), Tone Kokalj (IJS).

- Furthermore, a team coordinated by SISSA, consisting of code developers and experts from supercomputing centres, is under organization and will be active by the end of the first year. It will be specifically focused on organizing hackathons to train young code developers. This task is closely aligned with the activities of WP1, WP2, and WP3.

Overall, MAX strives to provide comprehensive training opportunities, foster collaboration with other institutions and initiatives, and continuously evaluate and refine its training program to meet the evolving needs of the computational materials science community.

4   Good practices within MAX

In order to streamline the organization of training events and optimize the efficiency and the success of its training activities, MAX has prepared a comprehensive guidebook to be followed for all the events organized by the CoE. This resource has been disseminated to all our partners and encompasses a wide range of essential guidelines, whose purpose is to facilitate seamless communication about events, both internally within the CoE and externally with the broader community. Additionally, they reinforce our commitment to principles of equity and inclusion. One crucial aspect addressed in this guidebook is the dissemination of training materials produced by MAX. By following the outlined procedures, we can ensure that these valuable resources reach their intended audience effectively. This activity is performed in tight collaboration with WP6 *Communication & Dissemination* and WP7 *Management*. Moreover, the guidebook emphasizes the significance of collecting data, statistics, and user feedback. This valuable information enables us to continually enhance and refine MAX training offerings, adapting them to the evolving needs and preferences of the users and developers. An essential survey template is given as an Annex to this document.

Another important objective of the guidebook is to foster MAX active engagement within the HPC ecosystem in Europe. By adhering to the prescribed guidelines, we can establish strong connections and collaborations, contributing to the growth and development of the HPC community.

The complete set of guidelines is provided as an annex to this document. This attachment serves as a quick reference for all relevant information, ensuring that the guidelines are readily accessible to all the partners involved in the organization of training events.

As we move forward, MAX is committed to refining and expanding this guidebook, incorporating new insights and best practices as they emerge. By doing so, we strive to create an environment that supports seamless event organization and maximizes the impact of our training initiatives.

5 Planned events and KPIs

This plan features all the activities foreseen in the life of MAX. Many of them depend upon our organization, others imply our response to invitations and collaborations. For this reason, as the activities presented in this plan are under development, we constantly work to create a comprehensive and dynamic calendar of MAX events, to be continuously updated to ensure accuracy and relevance. Since the inception of the CoE, we have successfully organized several events, and many more are in the pipeline for the near future, i.e., to ensure a well-rounded training experience, we have planned at least two schools for each code in the coming years.

In the tables below, lists of planned or carried-out schools and hackathons are given.

Dates	Title Links	Venue Partner	Code
08-12/05/2023	**All electron DFT with FLEUR** ● Link to FLEUR Hands-On Workshop ● Link to CECAM Workshop Details ● Link to MAX Training events dedicated webpage	Juelich (DE) JUELICH	Fleur
22-26/05/2023	**Ab initio many-body perturbation theory: from equilibrium to time-resolved spectroscopies and nonlinear optics** ● Link to Yambo School 2023 ● Link to MAX Training events dedicated webpage	Rome (IT) CNR	Yambo
28/08-01/09/2023	**Advanced Quantum ESPRESSO school: Hubbard and Koopmans functionals from linear response** ● Link to Hubbard-Koopmans 2023 School	Pavia (IT) SISSA	Quantum ESPRESSO

	● [Link to MAX Training events dedicated webpage](#)		
02-06/10/2023	**First steps with SIESTA: from zero to hero** ● [Link to CECAM Workshop Details](#) ● [Link to MAX Training events dedicated webpage](#) ● [Link to SIESTA School page](#)	Online ICN2	Siesta

Table 1. Calendar of MAX-organized schools.

Dates	Title Links	Venue Partner	Code
28/02-01/03/2023	**Quantum ESPRESSO targeting accelerator hackathon at ICTP** [Link to ICTP Event](#)	Trieste (IT) SISSA	Quantum ESPRESSO

Table 2. Calendar of MAX-organized hackathons.

The planning and scheduling of future hackathons and coding weeks will be undertaken by a dedicated committee comprising developers and HPC centres. To this aim, requirements and needs of code developers will be thoroughly assessed and prioritized in the training offer. In this respect, MAX aims to foster collaboration and engagement within the developer community to ensure the maximum success of these events, in order to increase participation and impact both within and outside the consortium.

In this view, two training events for MAX tools have been proposed at partner IT4I and scheduled for 2024 and 2025 and another event will be organized by IJS in Lubjana. The tools under spotlight will be determined by surveying the developer community's interests. Resources will be allocated accordingly to address the highest priorities.

MAX remains committed to refining and expanding the event offerings, ensuring that they align with the evolving needs of the users and developers community. By fostering collaboration and

gathering valuable feedback, we strive to deliver impactful and relevant training experiences that contribute to the advancement of computational materials science.

Key Performance Indicators.

In Table 3.1k "Tentative list of Key Performance Indicators (KPI)." of the Description of Action of this project, a list of KPIs is given. The final list will be provided in deliverable "D7.3 Report on the setup of the MAX CoE" (due M12). We report here our estimation for the 6-month targets, calculated on the average attendance of events and the average number of events from the previous MAX phase.

KPI no.	KPI definition	WP	Target M12	Target M18	Target M24	Target M30	Target M36	Target M42	Target M48
K5.1	Number of people trained in MAX training events (in terms of person-training days), including gender statistics.	5	1500	3000	4500	6000	7500	9000	10500
K5.2	Number of collaborative actions for the HPC ecosystem	5	2	4	6	8	10	12	14

Table 3. List of Training KPIs

Internal KPIs have been set for the training activity, and are described above underneath the description of each Task. These figures represent the minimum number of events that need to be organized, while we strive for a significantly larger number of events. Experience from previous phases of MAX show that there is a great request for code-specific educational events, hackathons, and also training through research. Moreover, MAX researchers, developers, and specialists are very often invited as lecturers in events organized outside MAX.

The internal KPIs are reported here for reference.

Task	Title	KPIs
T5.1	Training to Foster the Next Generation of Code Developers	- at least 6 events (e.g., courses, hackathons, workshops) organized - at least 1 hosting of researchers in CoE labs

T5.2	Advanced Training for Academic and Industrial Users in Computational Materials Science	- at least 6 schools in the field of materials science organized - development of online teaching modules - at least 1 hosting of researchers in CoE labs
T5.3	Coordination and Contributions to Transverse Training Initiatives	- contribution to training initiatives within the EuroHPC ecosystem - development of teaching modules for Master/PhD courses

Table 4. WP's Internal KPIs

6   Conclusions

A long-standing experience in training different audiences, such as software developers, academic researchers, industrial researchers, and master's and PhD students, developed within the MAX CoE make us quite confident about the impact our training can have in the HPC ecosystem thanks to skills acquired in planning training events, in fine-tuning our offer, in terms of subjects, topics, and tools. In the previous seven years we have organized 51 schools and hackathons, trained 3980 people, hosted 81 researchers in labs. We intend to continue to offer expert and first-hand access to our lighthouse codes, by letting users meet the code developers, and to train a new generation of scientists in these fields.

Beside the technical contents of our training activity, we intend to put a lot of effort in making our training opportunities available to young researchers and to female attendees. We know from experience that women are underrepresented in this field: in MAX2 within the pool of participants, 22.8% of the total were women, while the percentage of women that delivered the training (hands-on sessions tutors and lecturers) was 33.8%. We intend to push positive actions in order to trigger a larger female attendance and address the gender imbalance, both in the phase of selection of the participants of the training events and in the list of lecturers and tutors. Furthermore, we will not accept as MAX schools or workshops any event that has no women in the lecturers and tutor panels, and will encourage and support the application of female researchers. Inclusivity of all disadvantaged categories of students will be pursued.

ANNEX 1: Training guidelines

MAX TRAINING EVENTS GUIDELINES

GUIDELINES

for the organisation of events dedicated to

Training and community engagement

within the HPC Ecosystem (WP5)

Document information

Project: MAX - Materials Design at the Exascale (GA 101093374)

Work Package: WP5 Training and community engagement within the HPC Ecosystem

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Table of Content

Introduction

MAX training activities provide domain-specific training and education in computational materials science to end-users, as well as software developers in electronic structure and materials science methods and codes. The formats include schools and training workshops, hackathons and coding days/weeks, and training through research in MAX labs.

Here below, guidelines for activities promoted by MAX drafted by the WP 5 *Training & community engagement within the HPC ecosystem* leader Daniele Varsano and his team at Cnr (Maria Bartolacelli, Susanna Cavicchioli, and Luisa Neri) are provided.

These are meant to harmonise the MAX offer and to fulfil the EC recommendations received after the previous MAX evaluations, to help the organisers in the promotion and communication campaigns, to monitor the training activities and to allow all the partners to correctly report their training activities in the due deliverables.

The WP5 training team

The WP5 training team is set in Cnr, Modena Italy, and is composed of Daniele Varsano, WP5 leader, Maria Bartolacelli, Susanna Cavicchioli, and Luisa Neri.

All members can be reached at their personal address (name.surname@max-centre.eu) and preferably at the **team email address training@max-centre.eu**

The training team collaborates for the training activities with the

- WP6 Communication team (Àlex Argemí, WP6 leader, Virginia Greco, Dámaso Torres, ICN2)

  E-mail: communication@max-centre.eu

- WP7 Management team (Luisa Neri, WP7 leader, Maria Bartolacelli, Susanna Cavicchioli, et al. CNR)

  E-mail: management@max-centre.eu

1. Internal Communication

In the following, the guidelines for the steps to follow in order to organize a training event that is compliant with MAX standards.

First of all, when they plan to organize a MAX school, the partners need to contact the WP5 leader Daniele Varsano and discuss with him the feasibility of the event.

Second, the partners are invited to list the event in the TRAINING sheet of the workbook titled "Complete list of MaX events" hosted in the MAX Repository (MAX 2023-2026/ Repository MAX 2023-2026/ 3.MAX events). The details required are useful to keep track of the event, to monitor the ongoing or planned activities, to trigger the related communication actions (in connection with WPs 6&7).

Some tips/suggestions/requirements to keep in mind when organising a training event:

- *Promotion of Gender balance is mandatory both within the speakers' panel (monogender panels should be absolutely avoided) and within the audience. A particular attention has to be paid to attract young researchers and female researchers.*

- *Fulfilment of Privacy policy: a template (to be adapted/modified/completed for each training event) for the privacy policy related to data, photos, videos, recordings is available at this link. Each node will act as data manager for its events.*

- *The MAX logo needs to be inserted in the promotional material (website, social communication, etc…). Any communication activities should be communicated to WP6 staff.*

- *The complete list of the MAX training events is available: on MAX website and on HPC Training Portal.*

2. Communication

Organisation of events, or contributions of MAX members to training events, must be communicated to the WP leader (Daniele Varsano, training@max-centre.eu), to the management team (management@max-centre.eu) and to the communication staff (communication@max-centre.eu) in due advance in order, to be properly advertised and communicated via the CoE communication channels. WP6 *Communication, exploitation, and dissemination* is in charge of creating banners for social media and websites for each training event.

The organizers shall plan with the Communication team a proper coverage of the online event, by providing the name of a contact person that can send pictures and info from the live event. These materials will be used for social media covering from the MAX channels.

3. Registration and feedback forms

3.1 Registration form - statistics

It is important to include in the registration form some fields that allow to collect data on

- Nationality
- Qualification (role)
- Gender
- Affiliation
- Provenance: academia/industry (if industry: sector)

fundamental for a proper evaluation of the training impact, especially with regards to audience, inclusivity, ecosystem. These will be used to improve the training offer and promote policies to respond to flaws and shortcomings.

The organizer is required to provide the aggregate data to the WP5 team, who will include it in the reports.

3.2 Feedback form

For each event, it is mandatory to administer a feedback questionnaire (anonymous evaluation and satisfaction questionnaire) to the event attendees.
Please check a draft of the feedback form here, in which suggested questions are presented. These are all important in order to collect feedback useful to improve events, and to report our overall activity. Moreover, in the draft form two compulsory questions are reported, that must be present in any form:

Question nr. 8	(choose an option on a scale 1 to 5, being 1 very unlikely - 5 very likely)					it is very important to have a rate between 1 to 5 in evaluation, so to make it possible to compare all different training events and calculate a final average satisfaction rate. So, however you change this question, keep a 1-5 evaluation scale)
How likely are you to recommend this tutorial / school to a colleague?		1	2	3	4	5
Question nr. 11	Open answer					
Any further comments (quality of the school, overall organization, suggestions on format, length, topics, on the code itself, ...)						important for open feedback and improvement

In case the organising institution prefers to use its own registration/feedback forms, the event organizer must collect and deliver all MAX required data, even if via additional forms.

At the end of the event, the documents as of this paragraph (participant details and evaluation feedback) need to be sent within two weeks to the WP 5 and management teams, who will upload the data in a dedicated spreadsheet.

4. Interaction and synergy with other CoEs, NCCs, and EU infrastructures

One of the key issues of the EuroHPC call is to foster collaborations, interactions, and synergy with other CoEs, National Competence Centres (NCCs), or EU initiatives. MAX will facilitate collaboration with other CoEs and NCCs, organise joint events, and define common strategies for the long term availability of the produced training materials.

It is important that partners who are invited to (training) events within this ecosystem (NCCs and CoEs) notify this to the WP5 leader, in order to organize a proper participation and to keep track of such activities. These efforts will be collected in deliverables on Collaboration, in charge of WP7.

All different steps presented above are to be followed for these events, with a special attention to highlight the collaboration.

5. User focus groups

Being MAX a user-driven CoE, the training events are an opportunity to collect input from the users. When applicable (e.g., training on the use of flagship codes in HPC environments), it is recommended to include user focus group sessions in the programme of the schools. These are meant to collect specific user needs and advise the attendees for the best use of the codes related to their specific research projects. If this happens, a short report is to be provided, including information on attendance and the topics and questions emerged from discussion.

6. Industrial participation involvement

It might be a point of interest to promote industrial participation in training events, to have a different audience, and to open the way to industrial collaborations and transfer of knowledge. "Industrial" here is intended as non-academic (from ISVs to SMEs to industries).

This can be done in several ways, e.g.

- Inviting independent software vendors to hackathons and coding weeks
- Inviting researchers or users from industries that work with partners
- Sharing the information about upcoming events to industrial addressees (e.g, via social media of fairs or congresses)
- Designing training-in-lab programmes for industrial researcher.

Data on industrial participation need to be collected according to Paragraph 3.

7. Participations from countries outside the consortium countries

It is highly recommended to involve attendees from countries outside the Consortium, especially those that are weaker in the knowledge of HPC and MAX codes.

Data on geographic participation need to be collected according to Paragraph 3.

8. Hosting researchers in CoE labs

One feature of MAX training offer is "Training through research" in MAX labs. Partners host academic and industrial researchers to train them in MAX labs on MAX flagship codes.

The host has to notify the WP5 leader team with details on the trainee and the visit (personal details, affiliation, dates of training, duration of the visit, purpose/topic of the visit, etc.) and the main information of the visit should be added to the file "Visiting researchers @ MaX" available in the Google Drive: MAX 2023-2026/Repository/2. Continuous Reporting/Visiting researchers @ MAX.

A communication campaign (social media posts on MAX pages) can be planned with the Communication team to present the trainee (if they agree of course).

To support visiting scientists, the possibility to benefit from the interaction with EuroHPC Professional Traineeships program funded by Digital Europe Programme will be explored.

9. Making training material available online

Training material, e.g. tutorials, have to be made available online to widen the attendance of users to training. Therefore, recording and making available the lectures is requested.

After the event, the organizing partner shares the educational materials with the WP5 team. The recordings are either uploaded in the website training section (http://www.max-centre.eu/training-materials), in the MAX YouTube channel, and/or in other training platforms such as the Lhumos repository.

It is very important to inform all attending people (lecturers, students, etc) that videos are being recorded and to obtain their consent to appear (if it happens).

10. Use of the Quantum Mobile other scalable tools (suggested)

The use of the Quantum Mobile virtual machine, container technology, or cloud platform is strongly encouraged in tutorial and hands-on sessions, it is suggested and should become the standard in the near future. This will allow avoiding the need of pre installation of softwares in the users' machines and have the training materials in place.

Annex 1. Checklist for Training Event Organisation

Before the event

- Define the *target audience, the format, the dates, the venue* in agreement with the WP5 leader Daniele Varsano
- Define *gender balance strategies* and promote the attendance of young researchers and female researchers
- Get in touch with *the management team and the communication team* and define a common strategy for the communication of the event. A new MAX graphic template for schools is available, it is suitable for MaX website and social channels, MAX mailing lists, etc... and the HPC ecosystem channels (HPC Training Portal).
- Create a *web page for the event*, insert all the required *logos* (don't forget MAX logo) and promote the event.
- Prepare a *dedicated feedback form* using the MAX template
- Define which data are important to collect for statistics during the event
- *Collect data for statistics (using a detailed registration form)*
    - Nationality
    - Qualification (role)
    - Gender
    - Affiliation
    - Provenance: academia/industry
        - If industry: what sector

During the event

- *Participants list* to be signed during the event.
- *Send pictures* and info to the communication team: they will post "live" some pictures and give visibility to the event topics, results, sessions. Pictures of the hands-on activities are of interest, too.
- Please, try to get a *group photo* with speakers, organisers, and students. This is the most important picture, which we can also use for the news piece.

- *Submit the feedback form and aggregate the personal data (see 3.1)*. Please send the results to the WP5 team and upload all the info to the folder "WP 6: Communication, exploitation, and dissemination" inside the dedicated folder (one for each training event).


After the event

Send the *certificate of attendance* to the participants: a template is available at this link.

Help the communication team to *produce a short news piece for the web of MAX*. The news piece will be based on the information available in the description of the training. Thus, if you like something to be highlighted or if you have some relevant details, figures (about participants or other) and/or some prizes, share this information with the communication team.

Make training material available online. Send the management/training team the training material, it will be uploaded in the MAX website training section (http://www.max-centre.eu/training-materials), made available in the MAX YouTube channel, and in other portals.

Fill in the statistics file "training stats MaX3".
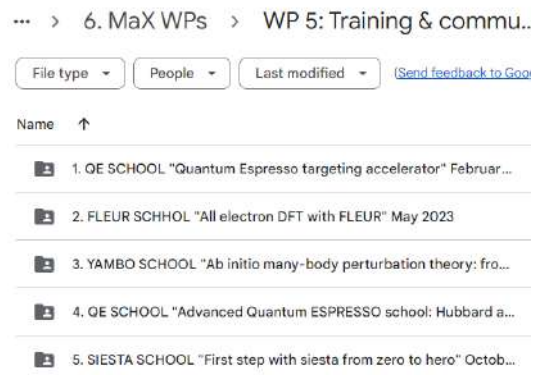
Annex 2. Feedback Form Template

Questions can be changed, those in red are compulsory					
Question n. 1	Options				
I am:	Post-doc/Researcher				
	Master/PhD Student				
	Other				
Question n. 2	Options				
I was attending:	In presence				
	From remote				
Question n. 3	(choose one option for row)				
Course Content	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Learning objectives were clear					
The course content was satisfying					
I learnt what I had expected from the course					
There was a good balance between theoretical lectures and hands-on sessions					
Question nr. 4	(choose one option for row)				
Please rate the lectures	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The lectures were of high quality					
The lectures were easy to follow					

Question nr. 5	(choose one option for row)				
Please rate the Hands-on sessions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The Hands-on sessions were useful					
The Hands-on sessions were easy to follow					
Question nr. 6	(choose one option for row)				
Skill and responsiveness of the instructors	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Instructors were knowledgeable and prepared					
Instructors were available and helpful					
Instructors stimulated participants' interest					
Question nr. 7	(put the name of the code - choose one option for row)				
The *xy* code	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Code name is simple to use					
Code name is a powerful tool for computational scientist					
Code name can help me for my research					
Question nr. 8	(choose an option on a scale 1 to 5, being 1 very unlikely - 5 very likely)				

How likely are you to recommend this tutorial / school to a colleague?	1	2	3	4	5

Note: it is very important to have a rate between 1 to 5 in evaluation, so to make it possible to compare all different training events and calculate a final average satisfaction rate. So, however you change this question, keep a 1-5 evaluation scale)

Question nr. 9	Open answer				
What aspects of this course were most useful or valuable?					
Question nr. 10	Open answer				
How would you improve this course?					
Question nr. 11	Open answer				
Any further comments (quality of the school, overall organization, suggestions on format, length, topics, on the code itself, ...)					

Note: important for open feedback and improvement