COURSE BROCHURE | ERASMUS+ TRAINING

Computational Thinking and Programming (Python) in Math Classes

Develop computational thinking and use beginner-friendly Python to explore mathematical problems, data, probability, patterns and classroom STEM activities.

LOCATION	LANGUAGE	FORMAT	DURATION	COURSE FEE	OID
Porto	English	On-site	6 days	€580	E10201112

€580 per participant for 6 days in Porto, Portugal. Check current editions, fee and inclusions before booking.

Course description

Computational thinking helps learners decompose problems, identify patterns, design algorithms and test solutions. In mathematics, programming can make abstract relationships visible and create opportunities for experimentation, modelling, reasoning and discussion.

This practical course introduces mathematics teachers and STEM educators to computational thinking and beginner-friendly Python programming through mathematical problems. Participants will move from unplugged algorithms to variables, conditionals, loops, lists and functions, then apply these ideas to data, probability, patterns and visualisation.

The emphasis is not on training software developers but on designing meaningful classroom activities in which code supports mathematical understanding. Participants will create, test and present a programming-based mathematics or STEM activity adapted to their learners.

Who the course is for

For educators

Mathematics teachers, STEM educators, VET teachers and trainers who want to introduce computational thinking and Python-supported problem-solving into teaching. The course is particularly relevant for educators seeking practical ways to connect algorithms, data, probability, visualisation and programming with active mathematical learning.

At a glance

Course level: Basic to Intermediate Computational Thinking & Python

Prerequisites: No previous programming experience required. Basic digital literacy and familiarity with school-level mathematics are recommended.

Working language: English. Please **contact the team** if you are unsure about the course level or working language.

CURRICULUM FOCUS

Computational Thinking in Mathematics / Python for Mathematical Modelling / Programming-Based STEM Activities

View the course, current editions and fees

02 / INTENDED LEARNING OBJECTIVES

Learning outcomes

The following learning outcomes describe the course's intended direction and objectives. The trainer adapts activities, examples and participant work to the group's goals, experience and learning needs.

01 **Computational Thinking in Mathematics** - Apply decomposition, pattern recognition, abstraction and algorithmic thinking to mathematical and STEM problems.

02 **Algorithm Design & Problem Representation** - Translate a mathematical problem into a clear sequence of steps, inputs, decisions and expected outputs before coding.

03 **Python Programming Fundamentals** - Use variables, data types, operators, input and output to write and run introductory Python programs.

04 **Control Flow & Repetition** - Apply conditional logic and loops to model repeated processes, test cases and solve structured mathematical problems.

05 **Data, Lists & Functions** - Use lists and functions to organise information, reuse code and explore data or probability tasks.

06 **Mathematical Modelling & Visualisation** - Use code, simulations or graphical output to represent patterns, relationships and mathematical behaviour.

07 **Programming-Based Classroom Activity Design** - Design, test and evaluate a Python-supported mathematics or STEM activity with suitable learner instructions, debugging support and assessment criteria.

08 **European Peer Exchange & Institutional Transfer** - Compare computational-thinking and programming practices with European peers, exchange classroom approaches and identify strategies that can be adapted to participants' own institutions.

Transfer to practice and intended impact

The programme supports participants in connecting the course learning with their own professional context. Participants consider how relevant approaches, activities or tools could be adapted to their learners, priorities and institutional settings.

1. **Identify a relevant professional need:**
   Consider which learner need, classroom challenge or institutional priority the course learning could help address.
2. **Adapt the approach to your setting:**
   Select the activities, tools or approaches that can realistically be incorporated into your own professional context.
3. **Decide what progress would look like:**
   Consider how changes in practice, learner engagement, learning outcomes or another relevant result could be recognised.

03 / COURSE PROGRAMME | DAYS 1-3

Learning Activities & Training Schedule

SUNDAY / DAY 1

Flexible self-preparation followed by an in person European exchange session, **at 18h30.**

MONDAY - FRIDAY / DAYS 2-6

08:30 - 13h30

5h of training per day · 30h total

This is a typical timetable, subject to the provider's discretion.

DAY 1

Cross-Cultural Exchange, European Educational Context & Course Orientation

- Pre-Session work: Self Preparation to reflect and share your institution's context, cultural background & completion of the Cultural Quiz.
- Welcome, networking and cultural exchange between participants and Erasmus+ team.
- Icebreaking activities and sharing of European core values.
- Open space for participants to share ideas and discuss current challenges in the Education sector; collaborative opportunity to exchange future goals.
- Course briefing and planning.

DAY 2

Computational Thinking & Algorithmic Mathematics

- Explore decomposition, pattern recognition, abstraction and algorithmic thinking.
- Solve mathematical problems through unplugged sequences, rules and decision processes.
- Compare procedural calculation with computational exploration and modelling.
- Represent problems through inputs, steps, conditions and expected outputs.
- Design an algorithm for a selected mathematics classroom task (course project).

DAY 3

Python Foundations for Mathematical Problem-Solving

- Set up and navigate an accessible Python programming environment.
- Use variables, numeric operations, strings, input and output.
- Translate simple mathematical algorithms into Python code.
- Apply conditional statements to real-world and mathematical decisions.
- Practise reading error messages and debugging introductory programs.

04 / COURSE PROGRAMME | DAYS 4-6

Learning Activities & Training Schedule

DAY 4

Loops, Lists, Functions & Probability

- Use loops to model repetition, sequences and repeated trials.
- Store and process results using lists and simple data structures.
- Create reusable functions for mathematical calculations and investigations.
- Build and run a simple probability simulation.

DAY 5

Mathematical Visualisation & Interactive STEM Applications

- Use graphical output to explore shapes, patterns, coordinates or transformations.
- Connect visual programming with relevant mathematical concepts.
- Explore visual environment.
- Adapt a visual or interactive example for a selected learner group.

DAY 6

Classroom Project, Debugging & Transfer

- Design a programming-based mathematics or STEM learning activity.
- Prepare learner instructions, scaffolds and debugging support.
- Define criteria for evaluating mathematical reasoning as well as code.
- Test and present the activity, refine it through peer and trainer feedback.
- Complete course evaluation and Certification.

ADAPTABLE TRAINING

This programme is a planned framework. Specific activities, sequence, exercises and timings may be adapted by the trainer or provider to each group/edition.

COURSE RECORDS

Daily summary and attendance sheets record the schedule and a short account of each day's work, validated by the trainer and signed by the participants.

Edition-specific evidence: Learning Together maintains signed daily training and attendance records. This brochure describes the course framework; additional verification can be based on the records of the particular edition.

05 / LEARNING APPROACH & METHODOLOGY

Learning Together Methodology

Learning Together courses combine guided input supported by presentations and multimedia resources with practical experimentation, creative workshops, case-based learning and hands-on tools. Participants connect the learning to their own professional situations and progressively develop an applied outcome, which may take the form of a presentation, project, session plan, action idea, reflection or another relevant output.

Peer / trainer feedback supports refinement throughout the process, while European exchange encourages participants to compare practices, perspectives and approaches across different educational contexts.

Methods applied in this programme

Unplugged Computational Thinking & Mathematical Reasoning

Participants decompose mathematical problems, identify patterns and design algorithms before coding, keeping reasoning and conceptual understanding visible.

Guided Python Coding, Inquiry & Debugging

Step-by-step coding exercises introduce Python structures through mathematical tasks, with experimentation, error analysis and debugging used as learning processes.

Project-Based Mathematics & STEM Activity Design

Participants create, test and present a programming-supported classroom activity that connects code, mathematical reasoning, learner scaffolding and assessment.

Collaborative learning, peer exchange and reflection

Participants work with European colleagues, compare professional contexts, exchange approaches and reflect on how the learning can be transferred to their own institutions.

> **Illustrative example: Exploring Probability Through Python Simulation**
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> Imagine a mathematics teacher helping students investigate probability through repeated simulated events. Participants define a simple probability problem, design the algorithm, create a Python simulation, compare experimental and theoretical results and adapt the activity for classroom use. This example illustrates one possible application; actual tasks may vary according to learner level and available technology.

An adaptable learning experience

Learning Together courses are delivered by trainers with relevant professional & pedagogical experience, **who are fluent English speakers**. The trainer may vary by edition, adapting the activities to the group's professional context and learning goals.

Meet our trainers and explore our approach

06 / PRACTICAL INFORMATION & SUPPORT

Everything you need for your training

Your course materials and participant work

Participants receive access to course materials, including slides, presentations, worksheets and exercises made available for the sessions, through a dedicated online folder.

Depending on the activities, groups may also develop action plans or presentations. The output varies with the programme, trainer and group.

Materials to bring: Laptop

Course package

Includes training sessions, digital materials, practical resources, administration and course-week support, welcome kit, coffee breaks and course documentation. Cultural activities and an orientation session **depend on the edition selected** (flights, accommodation & other personal arrangements are not covered).

Check fees and inclusions for your selected course.

Documents & certification

We issue Certificate of Attendance, invoice and support agreed Erasmus+ mobility documents, including Europass Mobility records. Certificate issuance follows the attendance conditions.

Send any additional school forms to our team in advance. Explore document guidance.

Provider & quality

Learning Together operates through registered organisations in every country where services are provided, each with its own Erasmus+ Organisation ID (OID). Our programmes combine clearly defined learning outcomes, participatory methodologies and practical activities, with participant evaluation & feedback at the end of the training.

Provider OIDs: Portugal E10201112 · **Spain** E10417947 · **Poland** E10419682

FROM INTEREST TO A CONFIRMED BOOKING

01
Pre-enrol

Share your course & preferred dates. Pre-enrolment is non-binding; wait for written confirmation before making non-refundable travel bookings.

02
Confirm your place

Our team will confirm availability by email. Complete final enrolment and billing details to secure your place.

03
Plan your travel

Once your booking is confirmed, you can plan your travel. Before travelling, check materials required, timetable and activities in your selected edition.

YOUR NEXT STEP

Ready to plan your course?

Check the current dates, duration, fee and edition status on the course page, then start your pre-enrolment or contact us!

View course & editions ↗ | Pre-enrol ↗

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