Registration is open until 6 October.

KSETA Topical Courses, October 13 – 24, 2025

Scientific presentation (better)/ all	**Max. 10 people**	**Erika Magyarosi (IMPETUS)**	**13.10.2025** **14.10.2025**	**09:00 – 17:00** **09:00 – 17:00**	**Bldg. 30.23, room 03/01 (CS)** **Bldg. 30.23, room 03/01 (CS)**

This is an activity-based workshop with plenty of opportunities for you to practice, discuss, give and receive feedback. It is imperative that you attend the full session. The Scientific Presentation workshop aims to provide you with the necessary skills to successfully and dynamically present the relevance of your work and the core message of your talk. It imparts necessary skills to successfully and appealingly present scientific papers at conferences, and to be able to confidently defend research results during discussions. It also addresses non-verbal communications such as appropriate and fluid body language; the ability to listen and react generously; and to integrate focusing techniques which magnify the power of the speaker.

Active Bystander (better)/all	**Max. 24 people**	**Markus Klute (KIT)**	**14.10.2025** **15.10.2025**	**09:00 – 11:00** **13:30 – 15:30** **09:00 – 11:00**	**Bldg. 30.23, room 06/01 (CS)** **Individual groups** **Bldg. 30.23, room 06/01 (CS)**

In challenging situations such as harassment, discrimination, or unethical behavior, bystanders often witness what happens but remain passive due to uncertainty, fear, or lack of tools. This training empowers participants to become active bystanders who recognize problematic behavior and respond effectively. Over three sessions, participants will (1) explore the psychological and social dynamics of bystander behavior and learn practical intervention strategies, (2) develop case studies reflecting on real-life challenges, and (3) present and critically discuss solutions with their peers. The course aims build confidence and equip participants with concrete skills to intervene safely, constructively, and appropriately.

Collaborative Software Design (broader)/all	**Max. 20 people**	**Manuel Giffels (KIT)**	**15.10.2025** **16.10.2025**	**13:15 – 16:45** **13:15 – 16:45**	**Bldg. 50.19, room 1 (CS)** **Bldg. 50.19, room 4 (CS)**

This course introduces PhD students in Physics, Computer Science, and Engineering to modern practices in collaborative software development. Participants gain hands-on experience with tools and workflows through a lightweight project. Topics include an overview of Git and collaborative workflows, Agile practices, Test-Driven Development (TDD), Continuous Integration (CI/CD), and documentation. The course equips students with practical skills for developing reliable, maintainable software in research and engineering. No prior experience is required, though basic knowledge of a programming language is advantageous.

Concepts First: A Guide to Learning Python in the Age of AI (broader)/all	**Robin Hofsaess (CERN)**	**16.10.2025** **17.10.2025**	**09:00 – 12:15** **13:30 – 16:45**	**Bldg. 30.23, room 03/01 (CS)** **Bldg. 30.23, room 03/01 (CS)**

With increasingly powerful generative AI and AI-assisted coding tools, the way we tend to learn programming is changing fundamentally. Even without actually knowing any of a language's syntax, one can easily build complex programs (with all risks included!). Python always has been more of a hands-on programming language than a purely syntax-driven one, but with AI, the focus for beginners is shifting even more today. As a result, memorizing syntax is less important, while understanding the concepts and how to apply them correctly has become crucial for learning to code in the era of AI.
This Python course is designed for everyone interested in the language, with or without prior programming/Python experience. It will prioritizes the language concepts, "how to learn", and practical tips/ best practices over learning the actual syntax. Accordingly, the only requirement is a laptop to participate in the hands-on parts of the course.
So if you are interested in exploring the following questions, this course might be interesting for you:
- What's the concept behind Python? Why is it so popular?
- When should I use Python, and why? Is it the right choice for my project(s)?
- How can I get started in efficiently learning and using Python for my research?
- What tools do Python developers typically use?
- Is vibe coding a good idea*? Or: How can I efficiently integrate AI into my learning process?

The Swampland — an outsider's perspective	**Benjamin Knorr (University Heidelberg)**	**20.10.2025** **21.10.2025**	**13:30 – 16:45** **09:00 – 12:15**	**Bldg. 50.19, room 4 (CS)** **Bldg. 50.19, room 4 (CS)**

The taming of quantum gravity — that is, finding a unified description of both quantum and gravitational effects that works in all physical scenarios — has fascinated physicists for many decades, so far without final resolution. At the centre lie some deep questions about our universe, e.g., what is really inside black holes, and how did the big bang actually play out? The problem is that we cannot directly answer these questions experimentally, which leaves a lot of room for speculation.
One interesting idea to make some systematic progress in narrowing down the search for potential theories of quantum gravity is that of the swampland programme. There, we ask a more general question: given a non-gravitational theory, can you consistently couple gravity to it at all scales? In string theory, the answer is "almost always no", but other approaches to quantum gravity might find different answers.
In this course, you will get an overview of the swampland programme from someone who is not a string theorist. We will first cover what the issue is with quantum gravity. Then we discuss the swampland in some general terms. Finally, I will present one specific approach to quantum gravity — asymptotic safety — and discuss what it has to say about the swampland.

Particle accelerators (broader)/all	**Bastian Härer (KIT)** **Matthias Fuchs (KIT)**	**20.10.2025** **21.10.2025**	**13:30 – 16:45** **09:00 – 12:15**	**Bldg. 50.19, room 1 (CS)** **Bldg. 50.19, room 2 (CS)**

High-energy charged particle beams are essential tools in modern science, enabling a wide range of applications from probing the fundamental constituents of matter to advancing materials science and energy research.
This lecture course provides an introduction to the physics and technology of particle accelerators, starting with an overview of various accelerator types and their applications in research, industry and medicine.
Key concepts in beam dynamics are introduced, providing the foundation for understanding how particle beams are described, generated, accelerated, focused, and controlled.
The course also highlights the differences between accelerators optimized for producing synchrotron light, and those designed for beam collisions for high-energy particle physics experiments.
The Large Hadron Collider (LHC) is briefly discussed as the most powerful collider currently in operation, as well as the Future Circular Collider (FCC), a potential next-generation machine with complex design challenges.
Special attention is given to laser-plasma accelerators, a promising new technology for building compact and cost-effective accelerator systems.
The course concludes with an overview of accelerator research at the Karlsruhe Institute of Technology (KIT).

Particle & Astroparticle Physics for non-Physicists (broader)/ engineers	**Frank Simon (KIT)**	**22.10.2025** **23.10.2025**	**14:00 – 17:15** **14:00 – 17:15**	**Bldg. 425, room 206 (CN)** **Bldg. 425, room 206 (CN)**

This course will give an introduction to particle and astroparticle physics, with the aim of providing context and background information for students engaged in research on technical topics related to experiments in those fields. It will cover:
- Fundamental particles and their interactions
- The basic structure of the Universe
- Open Questions
- Particle acceleration in the Laboratory and in the Universe
- The basics of high energy physics and astroparticle physics experiments

The discussions will be on a qualitative level, without diving into mathematical details

Trouble Shooting	**Max. 15 people**	**Jana Bachmann (Diversity Company)**	**24.10.2025**	**09:00 – 17:00**	**Bldg. 11.40, room 231 (CS)**

Our "Troubleshooting for Scientists" workshop equips researchers with the necessary skills to remain effective in challenging situations within their scientific work and to communicate solutions-oriented.
Key aspects include:

- Interactive workshop focused on real-world challenges from the research field
- peer-to-peer case discussion as a structured method for reflection and solution finding
- Practical tools for self-management in difficult communication situations
- Space for exchange, perspective shifts, and testing new strategies