Hands-on exercises on the Education and Training Reactor AKR-2

The education and research reactor AKR-2 is a thermal, homogeneous, solid material moderated zero power reactor with maximum permanent power of 2 Watt. AKR-2 was completely refurbished in 2005 and is the most advanced zero power training reactor in Germany. The facility is equipped with a state-of-the-art digital I&C control system Teleperm XS.

The main purpose of AKR-2 and its design basis was and is the education of students in nuclear and reactor physics, in nuclear engineering as well as to teach fundamental knowledge and rules in radiation protection and radiation dosimetry.

Education and Training at AKR-2

- Makes use of the capabilities of the AKR-2 training reactor.
- Contributes to the development of hands-on skills in nuclear reactor physics by making use of the AKR-2 reactor.
- Provides experiments that illustrate real applications of nuclear research reactors, such as the production of radioisotopes for medical and industrial purposes or the utilization of neutron activation analysis techniques for the identification of unknown samples.
- Provides a condensed introduction to nuclear reactor physics/kinetics that helps better assimilate and understand the behaviour of nuclear reactor systems.

The **pedagogical format** of the course is based on a **hybrid flipped classroom**. In this format, you need to complete some **online self-paced preparatory work** (representing about 40 hours of work) before attending **interactive classes** organized during 5 consecutive days (representing about 40 hours of work). Those classes are given in a hybrid set-up, with participants following the classes either onsite or remotely on the web. Research in engineering education demonstrated

that flipping leads to higher student engagement, better achievement of the learning outcomes and increases the interactions between the students and the teachers.

After successfully completing the course, you will be able to:

- **Understand** fundamental problems of reactor physics.
- **Apply** this knowledge to the operation of a (zero power) reactor and **understand** its behaviour.
- **Learn** and **apply** fundamental rules of radiation protection.

The **target audience** for the course is:

- MSc students, PhD students and Post-Doc students having some background knowledge in nuclear engineering.
- Nuclear engineers.
- Reactor physicists.
- Nuclear safety analysts.
- Research scientists in the above fields.

In order to **pass the course** and be issued a **course completion certificate**, you need to obtain at least 50 points (out of 100 max. points). All activities (both during the preparatory work and the interactive classes) are graded. The certificate will briefly describe the course contents, the number of hours the different course elements represent and the number of equivalent ECTS credits (European Credit Transfer and Accumulation System). **The course is worth 3 ECTS**.

As a course participant, you get access to:

- An online **Learning Management System** with 24/7 access to all teaching resources for 4 months.
- During the **online self-paced preparatory phase**:
  - A set of **handbooks** written for the course.
  - **Video lectures** associated to the handbooks.
  - **Quizzes** to test your understanding.
- During the **interactive phase**:
  - **Engaging activities** aimed at applying the principles learned during the preparatory phase.
  - **Expert support** from the teachers.
  - Possibility to **network** with the other participants.

You can read some **testimonies** of our past attendees on our website at this **link**.

The course is given by:

- Carsten Lange and the reactor physics group of the chair of Hydrogen and nuclear engineering of TU Dresden

The course is fee-based. Fees vary according to geographical location (developed or emerging country) and participant status (student or professional). Payment of the course will be requested after having applied and having received confirmation that you have been accepted for the course. People accepted for the course will then get a link to pay online. The course fees are as follows:

- Course fee for professionals – Developed countries: 1875 EUR (VAT included).
- Course fee for professionals – Emerging countries: 300 EUR (VAT included).
- Course fee students – Developed countries: 100 EUR (VAT included).
- Course fee students – Emerging countries: 50 EUR (VAT included).

You can find more information on fees and the list of developed and emerging countries on our website at this **link**.

The course platform opens on June 12th, 2026, for the online self-paced preparatory work, and the interactive sessions are organized between July 13th, 2026, and July 17th, 2026, at the Technical University of Dresden, Dresden, Germany, and on the web.

Apply for the course between April 13th, 2026, and May 4th, 2026, at:

great-pioneer.eu/registration

Participants choosing the onsite version of the course must also cover their own expenses (travel, food, and accommodation). Possibilities, if any, to apply for financial support for onsite attendance are indicated in the application form above.

Questions can be sent to **contact@great-pioneer.eu**