Radiation monitoring systems · Mirion Experience Centre, Mumbai

MIRION EXPERIENCE CENTRE · MUMBAI

Hands-on nuclear training for universities and plant operators

Twelve structured gamma-ray experiments for teaching laboratories, and radiation monitoring system courses for nuclear plant teams — on Mirion instruments, delivered at the Mirion Experience Centre in Mumbai or at your site.

12

Laboratory experiments, basic to advanced

2-day

RMS operations core course for plant teams

Mumbai

Mirion Experience Centre, or at your campus or plant

WHY NOW

Building India's next generation of nuclear manpower

The SHANTI Act (2025) opens India's civil nuclear sector to new participants. That growth depends on graduates who understand radiation detection from first principles, and on plant teams who can run radiation monitoring systems with confidence.

PROGRAMMES

Who we train

ACADEMIC

Universities and institutes

For physics, nuclear and engineering departments at undergraduate and postgraduate level.

- The twelve-experiment laboratory programme
- Gamma-ray detection and spectroscopy fundamentals
- Counting statistics and error analysis
- Faculty orientation on the laboratory manual
- Support to set up or refurbish your own teaching lab

RESEARCH

Research laboratories

For research groups and radioisotope users who need deeper gamma-spectrometry skills.

- High-resolution HPGe spectroscopy
- Efficiency calibration, source-based and mathematical
- Coincidence counting and list-mode data
- True coincidence summing corrections
- Interpretation and defence of spectroscopy results

PLANT

Plant operators

For radiation protection and RMS teams at nuclear facilities.

- RMS operations core course
- Area, liquid and particulate/iodine/gas monitoring
- Calibration and maintenance practice
- Advanced RAMSYS and CAMSYS training

SCIENTIFIC GUIDANCE

SCIENTIFIC ADVISOR

Dr. Mukund Kulkarni

Guides the scientific direction of ACPL's nuclear education programmes.

NUCLEAR PHYSICIST

Dr. Jehan Nicholson

Leads radiation detection physics, sensor characterisation and radiometric calibration algorithms.

CURRICULUM

The twelve experiments

Experiments 1–5 form the foundation course. Experiments 6–12 complete the advanced programme.

	EXPERIMENT	WHAT STUDENTS DO	LEVEL
01	**Gamma-ray detection with scintillators**	Identify photoelectric, Compton and pair-production features in a NaI spectrum; perform an energy calibration.	BASIC
02	**Counting statistics and error prediction**	Take background and gamma-ray measurements and apply statistical principles to them.	BASIC
03	**Gamma-ray absorption in matter**	Measure attenuation through aluminium, copper, lead and polyethylene absorbers.	BASIC
04	**Compton scattering**	Demonstrate Compton scattering and its angular dependence on a dedicated scattering table.	BASIC
05	**Half-life measurement**	Determine the half-life of a short-lived nuclide by multichannel scaling.	BASIC
06	**Digital signal processing**	Observe the effect of processing parameters on the MCA's built-in digital oscilloscope.	ADV.
07	**High-resolution HPGe spectroscopy**	Introduce semiconductor detection and compare HPGe resolution with NaI.	ADV.
08	**Gamma-ray efficiency calibration**	Measure detection efficiency as a function of energy for NaI and HPGe detectors.	ADV.
09	**Coincidence counting techniques**	Acquire and interpret time-stamped list-mode data from synchronised detectors.	ADV.
10	**Positron annihilation**	Explore the geometry of annihilation events with coincidence counting and angular correlation.	ADV.
11	**Mathematical efficiency calibration**	Generate efficiency calibrations by modelling and compare them with source-based results.	ADV.
12	**True coincidence summing**	Observe coincidence summing and quantify its effect on measured count rates.	ADV.

DELIVERY FORMATS

Foundation course

Experiments 1–5 for a student batch, at the centre or on campus.

Advanced course

Experiments 6–12 for postgraduate and research participants.

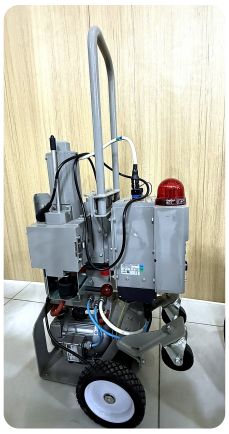
Semester partnership

Lab sessions aligned to your academic calendar, with faculty support.

PLANT OPERATORS

Radiation monitoring systems training

Practical courses on Mirion radiation monitoring systems (RMS) for the teams who run them — delivered with Mirion Technologies at the Experience Centre in Mumbai or at your plant.



AT THE CENTRE

Working Mirion RMS installations, set up for hands-on operation, calibration and maintenance practice.

CORE · 2 DAYS

RMS Operations Course

Operational and descriptive overviews of current and legacy Mirion RMS — detectors, ratemeters, control panels and tracking software.

COVERS

- Area Monitoring Systems
- Liquid Monitoring Systems
- Particulate, Iodine and Gas (PIG) monitoring configurations

OUTCOME

Practical skills for accurate deployment, calibration, maintenance and facility risk management.

ADVANCED

RAMSYS & CAMSYS System Training

Hands-on operation of Mirion's flagship RMS software and hardware ecosystems, critical to nuclear facility safety compliance.

KEY COMPONENTS

- Integration with the Vital® connected digital ecosystem
- iCAM™ mobile particulate monitors
- Noble gas monitors
- Steam generator leakage monitoring

COURSE STRUCTURE

Who should attend

Radiation protection staff, RMS operators, maintenance technicians and shift supervisors.

Progression

Start with the 2-day core course; move to RAMSYS and CAMSYS training for system-level depth.

Where

At the Mirion Experience Centre in Mumbai, or on site on your own installed systems.

EQUIPMENT

Mirion laboratory instruments

The Experience Centre runs on Mirion's two laboratory kits — the same instruments found in research and industry laboratories worldwide.

LABKIT-BASIC · EXP. 1–5

- **Osprey** digital MCA tube base
- **ProSpect** gamma spectroscopy software
- **2″×2″ NaI(Tl)** scintillation detector
- **Scattering table** with shielding, collimation and absorber holder
- **Absorber set** — aluminium, copper, lead, polyethylene

LABKIT-ADVANCED · EXP. 6–12

- **Lynx** digital signal analyser
- **HPGe detector system** with preamplifier
- **LabSOCS** mathematical efficiency software
- **Second NaI(Tl)** detector for coincidence work
- **Source holders** and detector shielding

TWO ROUTES FOR YOUR INSTITUTION

Train at the centre

Send student batches to the Mirion Experience Centre in Mumbai for the full twelve-experiment programme on Mirion NaI and HPGe systems.

Equip your own lab

Set up permanent workstations on campus with the Advancetech NaI LABKIT — compact, USB-powered and ready in minutes. See next page.

HOW WE ENGAGE

1
Scope
Batch size, level, timeline and location.

2
Plan
Experiments and schedule agreed with your faculty.

3
Deliver
Theory and hands-on sessions led by ACPL engineers.

4
Assess
Lab reports reviewed and certificate of completion.

WHY THE MIRION EXPERIENCE CENTRE

Industry instruments

Students work on the same Mirion detectors, digital MCAs and software used in laboratories worldwide.

A proven curriculum

Built on Mirion's established laboratory manual, with each experiment set out as purpose, equipment, theory and step-by-step guide.

Local delivery

Run in Mumbai by Advancetech engineers, with three decades of nuclear instrumentation experience in India.

EQUIP YOUR OWN LABORATORY

Advancetech NaI Gamma Spectroscopy LABKIT

A complete teaching-lab kit built around the BrightSpec FLINT digital NaI(Tl) spectrometer: crystal, SiPM readout, bias supply and digital MCA in one USB-powered unit. No NIM crates, no external high voltage — a station is ready in minutes.

< 7.6 %	4096	1 cable	8
resolution at 662 keV	channels, 32-bit depth	USB for power and data	guided experiments

IN THE KIT

- **FLINT-NAI-2** — 2″×2″ NaI(Tl) with integrated digital MCA
- **Acquisition software** — PHA and MCS modes (Windows)
- **Compton scattering table** with collimator and shielded source holder
- **Absorber set** — Al, Cu, Pb, polyethylene
- **Laboratory manual** — objectives, theory, procedure
- **USB cable** and accessories

Options: bGamma analysis software (FLINT-NAI-2-PRO), 3″×3″ crystal, SDK for Windows and Linux.

EIGHT EXPERIMENTS

1	Gamma-ray detection with scintillators	BASIC
2	Counting statistics and error prediction	BASIC
3	Gamma-ray absorption in matter	BASIC
4	Compton scattering	BASIC
5	Half-life measurement	BASIC
6	Digital signal processing	ADV.
7	Energy resolution and linearity	ADV.
8	Detection efficiency calibration	ADV.

Radioactive sources are procured separately in line with applicable regulatory requirements.

Plan a programme for your institution or plant

Tell us your batch size, level and timeline. We will propose a programme and schedule.

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