MANGALORE UNIVERSITY
and
JSS ACADEMY OF HIGHER EDUCATION AND RESEARCH

Training Programme on

Applications of Radiation and Radioisotopes in Physical, Materials, Chemical and Biological Science Research

Sponsored by

Department of Science and Technology - Synergistic Training program
Utilising the Scientific and Technological Infrastructure (STUTI) Scheme

October 10 - 17, 2022

Organised by

Centre for Application of Radioisotopes and Radiation Technology (CARRT)
Centre for Advanced Research in Environmental Radioactivity (CAREER)
Promotion of University Research and Scientific Excellence (DST-PURSE)

About DST-STUTI

The Department of Science and Technology (DST), Ministry of Science and Technology, Government of India, was established in May 1971 to promote and coordinate Scientific and Technological activities in the country. It plays a pivotal role in promoting science and technology in the country. The **"Synergistic Training Program Utilizing the Scientific and Technological Infrastructure (STUTI)"** programme of DST intends to build human resources and knowledge capacity through open access to S&T Infrastructure across the country. As a complement to the various schemes of DST funding for expansion of R&D infrastructure at academic institutions, the STUTI scheme envisions (i) imparting hands-on training programmes to the researchers, (ii) sensitising about the availability of state-of-the-art equipment at different universities and institutions and (iii) ensuring transparent access to the facilities. In particular, through the STUTI programme, the DST aims to extend the research facilities established through IST/PURSE/ CURIE/ SAIF/ SATHI schemes to the researcher across the country.

About Mangalore University

Mangalore University was established in 1980 to fulfil the aspirations of the people of the undivided Dakshina Kannada and Kodagu districts of Karnataka. The campus of Mangalore University is located about 20 km to the southeast of the coastal town of Mangalore. The picturesque campus "Mangalagangothri" is treated to the grand sight of the river Nethravathi meeting the Arabian Sea on one side and the cloud-capped Western Ghats on the other, setting the tone for educational endeavours of Dakshina Kannada, Udupi and Kodagu districts. Mangalore University has grown impressively since its inception. At present, it has 206 affiliated degree colleges, six constituent colleges and five autonomous colleges under its jurisdiction. The University has 29 postgraduate departments offering 40 Post Graduate programmes and 31 PhD programmes. The University has established a P.G.Centre at Chikka Aluvar (Cauvery campus), Coorg district. Mangalore University has been recognised nationally and internationally for its excellence in research in radiation physics. It has established three centres of excellence for radiation physics research: (i) Centre for Advanced Research in Environmental Radioactivity (CARER), (ii) Centre for Application of Radioisotopes and Radiation Technology (CARRT), and (iii) Microtron Centre. In addition, the University has established a research centre with sophisticated instrumentation facilities through the Department of Science and Technology (DST) funded Promotion of University Research and Scientific Excellence (DST-PURSE) programme. These centres cater to the needs of researchers from all over the country.

For more details: https://mangaloreuniversity.ac.in/

Ultra low background liquid scintillation counter

About JSS Academy of Higher Education & Research

JSS Academy of Higher Education & Research (JSS AHER), formerly known as JSS University, is a Deemed to be University established in the year 2008 with four constituent colleges - JSS Medical College and Hospital, JSS Dental College and Hospital, JSS College of Pharmacy, Mysuru and JSS College of Pharmacy, Ooty. In addition, JSS AHER has taken initiatives to enhance community health education and outreach activities by establishing departments of Water and Health (2011) and Health System Management Studies (2012). JSS AHER has established several applied science departments and research centres in basic sciences and health and life sciences. JSS Mahavidyapeetha has been a guiding force providing support and encouragement to the JSS AHER and its initiatives. JSS AHER is accredited by NAAC with A+ Grade (3.48 CGPA) and ranked 34th in the India Rankings 2022, NIRF-MHRD, Government of India. The Institute has received funding from the DST-STUTI programme and is now organising training programmes in collaboration with institutions all over the country.

NAAC	nirf	THE WORLD UNIVERSITY RANKINGS ASIA	QS WORLD UNIVERSITY RANKINGS BY SUBJECT | 2022	QS I-GAUGE DIAMOND	QS I-GAUGE Advanced E-Learning Excellence for Academic Digitisation (E-LEAD) certificate 2022	THE WORLD UNIVERSITY RANKINGS 2022	THE YOUNG UNIVERSITY RANKINGS	THE Impact Ranking	THE WORLD UNIVERSITY RANKINGS EMERGING ECONOMIES 2022	ACPE ACCREDITATION COUNCIL FOR PHARMACY EDUCATION	ARIIA
A+	34th (University Category)	65 in the WORLD; 2nd in INDIA	(Pharmacy & Pharmacology) 101- 150; (Medicine) 601- 650	QS I-GAUGE Diamond rated ★★★★★ 5 stars for Excellence	QS I-GAUGE Institution of Happiness	351- 400 in INDIA; Subject Ranking 93 Clinical & Health 1st in INDIA	Young University 70 in the WORLD 1st in INDIA	Impact Ranking 301-400; SDG 3 - Good Health & Wellbeing 3rd in INDIA	73 in the WORLD 2nd in INDIA	1st in the Asia Pacific; ACPE certified Pharm.D Program	2022 Band "Excelent"

nirf 2022 | JSS Medical College - 34th ★ JSS Dental College & Hospital - 12th ★ JSS College of Pharmacy, Mysuru - 8th ★ JSS College of Pharmacy, Ooty - 6th

About CARRT, CARER & DST-PURSE

The **Centre for Application of Radioisotopes and Radiation Technology (CARRT)** was set up at Mangalore University through financial support from the Board of Research in Nuclear Sciences (BRNS) and scientific support from the Board of Radiation and Isotope Technology (BRIT). The mandate of the CARRT is to undertake research and development in the application of radiation technology for social benefits, generate human resources and provide a platform for interaction of scientists, academicians and industrialists for collaborative R&D programmes. The centre has advanced facilities such as a high dose gamma chamber, low dose gamma irradiator, ^{14}C urea breath test facility, UV-Visible spectrophotometer, liquid scintillation counter, BOD incubator, ultra sonicator, CO_2 incubator, fluorescent and inverted microscopes, digital autoclave, ultra-pure (type I) water system, and photosynthesis system etc. The centre is extending support to researchers from about 50 institutions and has research collaborations with many institutions from within and abroad.

For more details: https://mangaloreuniversity.ac.in/carrt

The Mangalore University established the **Centre for Advanced Research in Environmental Radioactivity (CARER)** as a NATIONAL FACILITY through the financial support of the Board of Research in Nuclear Sciences (BRNS), Department of Atomic Energy, Govt. of India, and technical support from the Bhabha Atomic Research Centre (BARC). This is the most advanced laboratory/centre for radioecological and radiation protection research in the University system in India. The centre is engaged in developing technology for radiation protection and frontline research on radioecology and environmental radioactivity in collaboration with BRNS, BARC, Indira Gandhi Centre for Atomic Research (IGCAR), and Nuclear Power Corporation of India Ltd. (NPCIL). It is a matter of pride to mention that the CARER has been established as a truly international research centre and is collaborating with about 100 institutions within the country and about 20 institutions worldwide. Important facilities at the centre are high purity germanium gamma spectrometers, NaI(Tl) gamma spectrometer, ultra low-level liquid scintillation counter, alpha spectrometers, low background beta counting system, radon calibration chamber, sample oxidiser, pyrolyser, microwave digestion system etc.

For more details: https://mangaloreuniversity.ac.in/carer/ **&** https://youtu.be/Vv-VZ2nX6To

DST-PURSE instrumentation centre at Mangalore University is equipped with various high-end equipment such as single crystal X-ray diffractometer, liquid chromatography mass spectrometer, amino acid analyser, field emission scanning electron microscope, energy dispersive spectrometer, thermogravimetric analyser & differential scanning calorimeter/ differential thermal analyser, RF/DC-magnetron sputtering unit, UV-Vis spectrophotometer, laser particle analyser, cytogenetic workstation, logic analyser, confocal microscope, gas chromatograph mass spectrometer and other types of equipment for research. In addition to this, NMR facility has been established through MHRD-RUSA grant. These facilities are accessible to researchers from all over the country.

For more details: https://mangaloreuniversity.ac.in/purse
https://mangaloreuniversity.ac.in/about-facility

Thematic Area of the Training Programme

Developments in nuclear technologies in medicine, industry, agriculture, energy, and other scientific and technological fields have immensely benefited the society. Today, nuclear applications can be found in every social, economic sector and every corner of the world. Radiation and radioisotopes are emerging as essential tools for research in physical, chemical, materials and life sciences. Ionizing radiation technologies bring together a unique set of equipment, methods, and procedures through which the molecular structure of materials can be tailored for a particular application on demand, and functionalize new novel materials. The benefits of radiation and radioisotopes in medicine for diagnosis and treatment are enormous. Three out of every four patients hospitalized in industrial countries benefit from some form of nuclear medicine. The radioisotopes in radiopharmaceuticals and radioimmunoassay are commonly used to produce images of organs or tissues, detect diseases and help visualize the growth and shrinking of tumours. Nuclear techniques are used to measure pollution levels, sterilize and disinfect components/commodities, and optimize industrial processes.

The CARRT is involved in (i) advanced research in several areas of radiation and radioisotopes applications, (ii) training the young scientists to take up research, and (iii) providing a platform for interaction for researchers and academicians from academic institutions, industries and national laboratories. With objective of continuing these ongoing programmes to promote research in radiation and radioisotopes technology, the CARRT is organizing a training programme on “Applications of Gamma Irradiation Facility in Physical, Materials, Chemical and Life Science Research” in collaboration with JSS AHER through the DST-STUTI scheme.

Training will be imparted in the following thematic areas:

- ^{14}C urea breath test for *Helicobacter pylori* detection.
- Radiation dosimetry.
- Irradiation assisted synthesis of nanocomposites.
- Radioimmunoassay (RIA).
- Linear accelerators and brachytherapy systems for radiation therapy.
- Effect of gamma irradiation on materials and characterisation using ultra low level HPGe gamma spectrometers, liquid scintillation spectrometer, FESEM, single crystal XRD, NMR spectrometer, laser scanning confocal microscope, TGA/DSC, LCMS/MS and GCMS.
- Applications of radiations and radioisotopes in health care, industry and agriculture.

Target Participants, Eligibility & Funding support

Who should attend:
Faculty/ scientists/ post-doctoral fellows/ Ph.D. fellows/ scientists from industries who are actively involved in research and development (R&D) in biological/ chemical/ physical/ health sciences.

Eligibility:
- Person of Indian origin.
- Minimum qualification: M.Sc./M.Tech./ M.Pharm.

Selection of Participants:
- Total number of participants is limited to 30 (from all over India).
- Not more than 3 participants from one Institute other than the host institute.
- Applicants will be selected based on their area of research and future research plan.
- Applicants must fill the registration form using the link provided https://forms.gle/skHUtSTh64zQcxdR7 (only the online form will be accepted). Include a statement (within 100 words) explaining how participation in this DST-STUTI programme will enhance your research programmes.
- The last date for registration is **15.09.2022**.

Encouragement for M.Sc. Medical Physics Students: Motivated students studying in the fourth semester M.Sc. Medical Physics programme or students who are in internship programme are encouraged to participate in this training programme since the thematic area is expected to be useful for them.

Funding:
- Accommodation will be provided free of cost for outstation participants.
- Travel support will be available for a few deserving participants (limited to 3 tier AC fare or bus fare by shortest distance).
- No registration fee will be charged. Session tea and lunch will be provided.


Low dose gamma irradiator


High dose gamma irradiator

About Mangalore, India

The historic coastal city of Mangalore is famous for its educational institutions. Also, it is recognised as one of the most well-known port cities of south India as early as six century AD. Mangalore exports many items, including coffee and cashew. Mangalore is also renowned for its roof tiles and seafood and is a busy commercial city. The scenic landscape is dominated by distinctive coconut palms set against a backdrop of rolling hills and majestic streams flowing towards the Arabian Sea. The picturesque location contains many ancient buildings roofed with the renowned Mangalore tiles of red clay.

How to Reach Mangalore

Mangalore International Airport is located nearly 10 km away from the heart of the city. Mangalore airport is connected to many cities in India. Regular flights are available from Mangalore to Delhi, Mumbai, Bangalore, Hyderabad and Chennai. Taxi services are available from the airport to city.

Though Mangalore has its railway station (Mangalore Central), trains destined to other places through Mangalore stop at the Mangalore Junction (Kankanady station) located 5 km from Mangalore.

Well linked by smooth roads to nearby important places like Bangalore, Goa, Mumbai and Calicut.

Programme Committees

Patrons
Prof. P. S. Yadapadithaya, Vice Chancellor, Mangalore University
Dr. Surinder Singh, Vice Chancellor, JSS AHER, Mysore
Dr. B. Manjunatha, Registrar, JSS AHER, Mysore
Prof. Kishore Kumar C.K., Registrar, Mangalore University

DST-STUTI PMU Coordinator
Dr. Prashant Vishwanath, Director (Research) & IQAC Coordinator, JSS AHER, Mysore

Scientific Programme Committee
Prof. Karunakara N., Coordinator, CARER, CARRT & Medical Physics Division, Mangalore University
Prof. Manjunatha Pattabi, Dean, Faculty of Science and Technology, Mangalore University
Prof. K. Bhasker Shenoy, CARRT, Mangalore University
Prof. Vishalakshi B., Coordinator, DST-PURSE, Mangalore University
Prof. Boja Poojary, Faculty In-charge, NMR Instrument Centre, Mangalore University
Prof. Prashantha Naik, Radiological Safety Officer, CARRT, Mangalore University
Dr. Dhanya B. E., Project Coordinator, DST- STUTI Programme, JSS AHER, Mysore
Dr. Shanmukhappa B. Kaginelli, Associate Professor, Division of Medical Physics, School of Life Sciences, JSS AHER, Mysore

Organising Team
Dr. Yashodhara I., Scientific Officer, CARRT
Dr. Sudeep Kumara K., Scientific Officer, CARER
Dr. Rashmi Nayak, Research Consultant, CARER
Dr. Murari M. S., Scientific Officer-II, DST-PURSE
Dr. Mahesh K. K., Scientific Officer-II, DST-PURSE
Mr. Praveen P., Scientific Officer-I, DST-PURSE
Dr. Sathisha K. R., Scientific Officer, DST-PURSE
Mrs. Vinitha D'Sa, Research Assistant, NMR Instrument Centre

Contact us:
Prof. Karunakara N.: (+919980775012)
Dr. Yashodhara I.: (+919480761396)
E-mail: **mucarrt@gmail.com**

HPGe and NaI(Tl) gamma spectrometers

Radon calibration chamber