

Report on the IARP Workshop on Beneficial Effects of Radiation and the Indian Nuclear Energy Programme

Inaugural Session



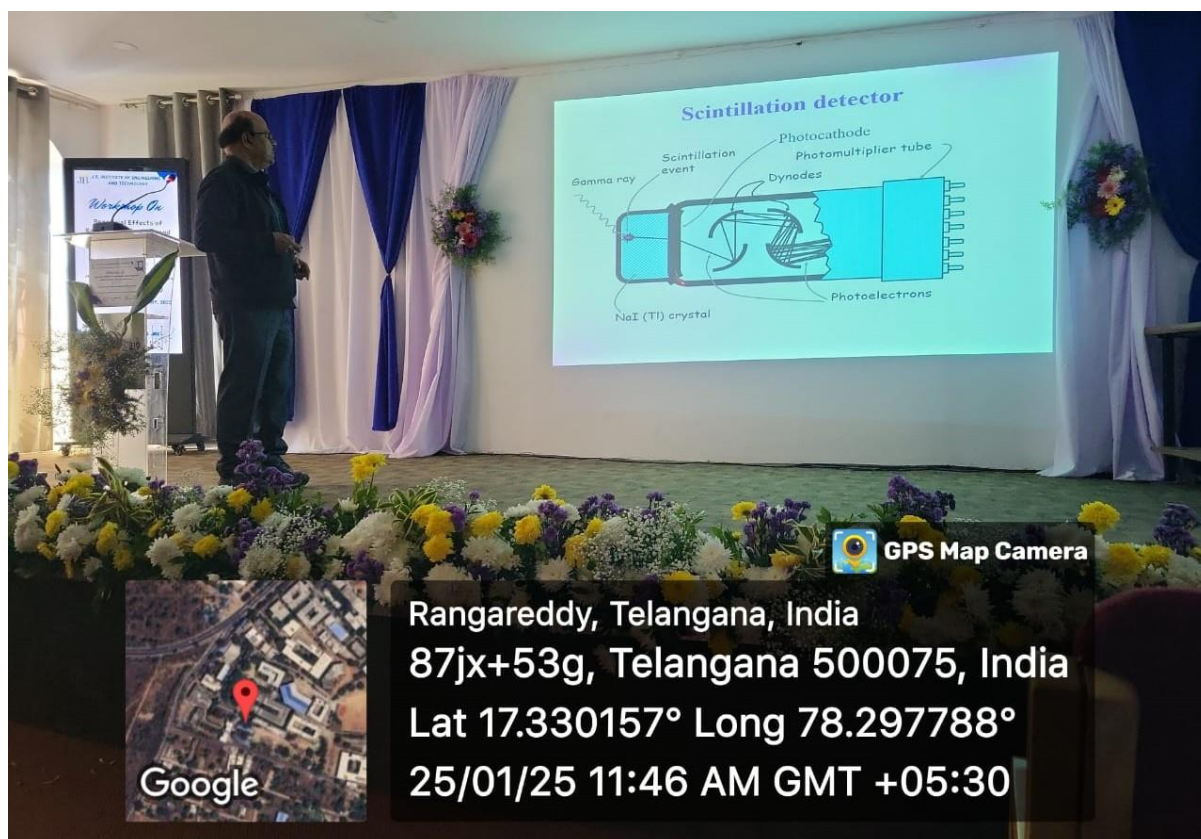
The IARP Workshop on "Beneficial Effects of Radiation and the Indian Nuclear Energy Programme" was successfully conducted at JBIET on January 25th, Saturday, 2025. Sponsored by the Indian Association for Radiation Protection (IARP), the event brought together experts, faculty, and over 150 registered participants for an insightful and engaging experience.

The event commenced with a warm welcome by Ms. Keerthana K and Ms. Annie S Dev, Assistant Professors in the Department of Sciences and Humanities, who invited the dignitaries onto the dais and addressed the participants. Dr. P. C. Krishnamachary, Principal of JBIET, delivered the welcome address, expressing his enthusiasm for the workshop and his optimism for future collaborations with IARP. This was followed by an address from Prof. Ch. Sanjay, Director of JBES, who reflected on his previous association with IARP and BARC employees and extended his best wishes for the workshop's success. Dr. Seshadri Murali, an Ex-Senior Scientist at BARC, then provided a comprehensive overview of IARP's activities and outlined the workshop agenda. The inaugural session concluded with a Vote of Thanks by Dr. L. Vaikunta Rao, Dean of R&D, acknowledging the efforts of all involved, after which the participants proceeded for a tea break.

Technical Sessions

Post-tea, the workshop transitioned into a series of technical lectures delivered by:

Dr. D. Vidya Sagar, Former Senior Scientist, BARC, handled the initial sessions.



Dr. D. Vidya Sagar delivered two insightful lectures on “Introduction to Radioactivity, Radiation Quantities, Units and Effects, and the Principle of Radiation Detection.” He began with the fundamentals of nuclear physics, explaining the atomic structure and why certain elements exhibit instability and radioactivity. He then introduced the concept of radiation, detailing its quantification and classification into ionizing and non-ionizing types. The lecture further explored various radiation sources, both natural and man-made, highlighting Radon (Rn) as a particularly hazardous radioactive element due to its long half-life.

A key focus of the lecture was ionizing radiations—alpha, beta, and gamma—which can penetrate human tissue and cause significant health effects. Dr. Vidya Sagar explained the origin and characteristics of each type of radiation, emphasizing how their range is influenced by their mass. He elaborated on shielding techniques, noting that while alpha particles can be blocked by a sheet of paper, gamma radiation requires dense materials like thick concrete for effective protection.

The session then shifted to radiation quantification, introducing the Sievert (Sv) as the standard unit for measuring ionizing radiation exposure and its biological effects. Participants learned that the average annual radiation exposure for humans is approximately 27 mSv and that alpha

particles, due to their greater mass, cause more damage to human tissue. The discussion also covered radioactive decay, half-life, and activity measurement, with 1 Curie (Ci) representing the activity of 1 gram of ^{226}Ra , expressed as activity per unit mass or volume.

The second part of the lecture focused on Radiation Detection and Measurement. Dr. Vidya Sagar explained key radiation-matter interaction phenomena such as the photoelectric effect, Compton effect, and pair production. He then introduced various radiation detection techniques, starting with gas detectors, which utilize inert Argon gas to detect ionizing events. He explained the working principles of Geiger-Müller (GM) counters, which detect alpha, beta, and gamma radiation, and teletectors, whose adjustable length makes them useful in nuclear accident scenarios. Other detection methods discussed included scintillation detectors, personal radiation detectors, radiation identifiers, and aerial gamma detectors, which can identify underground radiation sources.

The session concluded with an engaging Q&A, where participants posed insightful questions about radiation and its effects. Dr. Vidya Sagar addressed all queries with clarity, ensuring that attendees left with a comprehensive understanding of radiation physics and detection techniques.

Dr. Seshadri Murali delivered a series of insightful lectures on radiation protection, India's nuclear energy program, and the beneficial applications of radiation technology.

The first session, "Introduction to Radiation Protection," focused on the fundamental concepts of radiation exposure, safety measures, and detection techniques. Dr. Murali emphasized that radiation cannot be perceived by human senses and must be detected using specialized instruments. He explained that exposure to radiation can be both external and internal, with potential health effects ranging from immediate reactions to long-term consequences like cancer. However, he reassured participants that radiation is not inherently dangerous if proper precautions are taken. He outlined three key strategies for minimizing exposure: reducing exposure time by working efficiently or in shifts, using appropriate shielding, and maintaining a safe distance, as intensity decreases with the square of the distance. He concluded by debunking common misconceptions, asserting that working inside a nuclear reactor, with stringent safety measures in place, is often safer than living near one.

Following this, the session on "Indian Nuclear Energy Program" delved into India's advancements in nuclear technology. Dr. Murali provided a comprehensive overview of the nation's nuclear energy initiatives, governance structure, and strategic goals. He highlighted

the immense potential of nuclear power, citing that just 1 gram of uranium could generate enough electricity to power a colony of 1,000 families for a day—an astonishing fact that captivated the audience. He detailed India's three-stage nuclear power program: Stage 1 utilizes Pressurized Heavy Water Reactors (PHWRs), Stage 2 employs Fast Breeder Reactors (FBRs) that produce plutonium, and Stage 3 focuses on advanced thorium-based reactors, aiming for a sustainable nuclear fuel cycle by reprocessing spent fuel. He also addressed concerns about nuclear waste, explaining that it is securely stored in solid form within thick underground containers, ensuring environmental safety.

The final lecture, "Beneficial Effects of Radiation Technology," explored the wide-ranging applications of radiation in various fields. Dr. Murali demonstrated how radiation, often feared for its risks, plays a crucial role in medicine, agriculture, industry, and national security. In healthcare, low doses of radiation are used for imaging, while higher doses help destroy harmful cells in cancer treatment. In agriculture, radiation-induced mutations enhance crop quality, while food sterilization through irradiation ensures safer exports. Industrial applications include gamma scanning for detecting material defects and field radiography for identifying underground pipeline leaks. He also discussed its role in national security, from developing lightweight bulletproof jackets for soldiers to night vision cameras using fluorescent materials.

Dr. Murali's lectures provided a balanced perspective on radiation, emphasizing its risks while showcasing its immense benefits. The sessions left participants with a deeper understanding of radiation science, its practical applications, and the critical role of nuclear technology in India's future. The technical session was continued by Dr. Seshadri Murali, Ex-Senior Scientist, BARC.

Following the lecture series, an engaging discussion and Q&A session allowed participants to address their concerns about nuclear radiation and its perceived risks. The experts provided well-informed responses, dispelling common fears and misconceptions surrounding radiation exposure and the occupational hazards of working in the nuclear field. They emphasized the stringent safety protocols in place, the minimal risks when proper precautions are followed, and the vast benefits of nuclear technology. By the end of the session, participants gained a more balanced and informed perspective, realizing that nuclear energy and radiation, when managed responsibly, are not only safe but also essential for various scientific and industrial advancements.

After the lunch break, Dr. Seshadri Murali conducted a special lecture on “Career Opportunities in the Scientific Field”, inspiring participants to explore research and scientific professions.

In the session titled “Career Opportunities: Science and Research”, Dr. Seshadri Murali emphasized the significance of discipline, determination, and hard work in achieving one's goals. He provided insights into various career and research opportunities available in the scientific domain, offering valuable guidance on how to navigate and excel in these fields. The session concluded on a motivating note with his powerful statement: “Be successful and remain successful.”

Dr. Murali also provided a comprehensive overview of the career pathways in scientific research, focusing on organizations like BARC, DRDO, ISRO, and other national and private research institutions. He elaborated on the application process, examination patterns, and selection criteria for these prestigious scientific bodies.

The discussion included insights into the recruitment process, including the importance of competitive exams like the BARC Online Exam, GATE, and other national-level qualifying tests. He detailed the various stages of selection, such as written tests, technical interviews, and personal interviews, emphasizing the skills and knowledge required to excel.

Additionally, Dr. Murali highlighted the pay scales and benefits associated with careers in these organizations, discussing entry-level salaries, career progression, and research opportunities. He also addressed the potential for working in private research firms, emphasizing the growing demand for skilled professionals in nuclear science, radiation technology, and allied scientific domains.

Through this session, participants gained valuable knowledge about the structured pathways to secure a career in the scientific field and the rewarding prospects it offers.

Demonstrations and Practical Sessions



The workshop continued with a hands-on segment led by Mr. Praveen Kumar, Senior Engineer at Nucleotech Solutions, Hyderabad, who guided participants through practical demonstrations on Gamma Spectrometry, Half-Life and Activity Estimation, and the use of Radiation Monitoring Kits and Protective Gear. The final part of the session was particularly engaging, as participants were taught how to interpret readings from the devices and were challenged to find hidden radioactive materials within the venue, blending learning with an interactive and fun experience.

Valedictory and Felicitation





The workshop concluded with a feedback session, followed by a Valedictory Ceremony where certificates were presented to the participants. The dignitaries were honoured by the JBIET team for their invaluable contributions. Dr. B V Swarnalathamma, Dean of 1st Year and Head of the Department of Sciences and Humanities, delivered the Vote of Thanks on behalf of the Department and JBIET, expressing gratitude to all the speakers, participants, and organizers for making the event a success. This marked the end of a productive and insightful workshop, leaving attendees with valuable knowledge and experiences.

Registration and Attendees List

J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY					
ATTENDANCE SHEET FOR IARP WORKSHOP PROGRAMME					
BENEFICIAL EFFECTS OF RADITION AND INDIAN NUCLEAR ENERGY PRORAMME					
DATE: 25/01/2025					
S.No	Name of the Participant (In capital)	Department	Faculty/Student	Mobile Number	Signature
1	DR G ARUN SAMPAUL THOMAS	AI&ML	Faculty	9585511808	[Signature]
2	BEULAH J KARTHIKEYAN	AI&ML	Faculty	8606518574	[Signature]
3	BIYYALA AKSHITH KUMAR	AI&ML	Student	9121735882	[Signature]
4	NOVERA HABEEB	AIML	Faculty	7093658897	[Signature]
5	CHARAN	Aiml	Student	9392642783	[Signature]
6	KARNATHAM RAKESH	AIML	Student	9014952163	[Signature]
7	M BHAVANA REDDY	AIML	Student	9493841674	[Signature]
8	DUBBA MAHATHI	AIML	Student	9704760571	[Signature]
9	SHIVA SAI	AIML	Student	6302872442	[Signature]
10	K SIDDARTHA	AIML	Student	7801007293	[Signature]
11	RAVULAKOLA SANJANA	AIML	Student	8008638587	[Signature]
12	CORRE PRIYA DHARSHINI	AIML	Student	8978993506	[Signature]
13	S BHANUSRI	AIML	Student	9014184724	[Signature]
14	AKULA KESHAV	AIML	Student	9398312959	[Signature]
15	KOUSHIK J	AIML	Student	8978530131	[Signature]
16	N CHAITANYA	AIML	Student	6305491087	[Signature]
17	A MANIDEEP REDDY	AIML	Student	6305118020	[Signature]
18	SARVIGARI MADHUSMITHA REDDY	AIML	Student	7075461770	[Signature]
19	SAKSHI BASNURE	AIML	Student	9392330821	[Signature]
20	B G G KRISHNAM RAJU	Chemistry	Faculty	8106364001	[Signature]
21	KESHAPALLY VINETHA	Chemistry	Faculty	9959323150	[Signature]
22	MR. G. RAVI KUMAR	Chemistry	Faculty	9912148256	[Signature]
23	DR.P. KARTHEEK	Chemistry	Faculty	9701577399	[Signature]
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25	BOMMAKANTI RAJENDRACHARY	Civil	Student	8919242590	[Signature]
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27	RENUKA	CIVIL	Faculty	6302360769	[Signature]
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29	L MADHU SUDHAN REDDY	Civil	Student	8247561900	[Signature]
30	MARUTHI SHIVAGAL	Civil Engineering	Faculty	9663931324	[Signature]
31	BAYYA GANESH	Civil Engineering	Student	8179366756	[Signature]
32	M AKSHAYA	Civil engineering	Student	9292351662	[Signature]
33	P MANIDEEPAK	Civil engineering	Student	8096335218	[Signature]
34	BACHALAKURI THARUN TEJA	CIVIL ENGINEERIN	Student	8555970679	[Signature]
35	VIDYA	Cse	Student	8790310655	[Signature]
36	SOWMYA	Cse	Student	9381827088	[Signature]
37	SAI ABHIGNA PAGIDIMARRY	CSE	Student	9391275840	[Signature]
38	RISHIKA	CSE	Student	6281311646	[Signature]
39	CHANDRIKA REDDY	CSE	Student	86392 83948	[Signature]
40	SUMERA FATIMA	CSE	Student	6309603686	[Signature]
41	K GANGALAXMI	CSE	Student	8125650599	[Signature]
42	K ANUSREE	CSE	Student	8074883411	[Signature]
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44	SADA HARSHITH REDDY	Cse	Student	9063584721	[Signature]
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47	JAGABATTUNI SUJANA	CSE	Student	6302808286	[Signature]
48	BANOTHU SHAILAJA	CSE	Student	7093533149	[Signature]
49	K SAMYUKTHA	CSE	Student	9000736746	[Signature]
50	TALLA JAGADISH	Cse (ai-ml)	Student	9347596753	[Signature]
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57	R SAHITHI REDDY	ECE	Student	7036514026	Sahithi
58	M AKHILA REDDY	ECE	Student	9491498179	Akhila
59	GANLA ANUROOP KUMAR	ECE	Student	9392422703	Anuroop
60	M PRADEEP KUMAR	ECE	Student	9381627074	Pradeep
61	JAHNAVI LAKSHMI MACHIRAJU	ECE	Student	9154366148	Jahnavi
62	DESHETTI NARESH	ECE	Student	8179311096	Naresh
63	K ANUSHA	ECE	Student	9676604303	Anusha
64	BODOLLA RAHUL YADAV	ECE	Student	9381863926	Rahul
65	K SAI SPURTHI	ECE	Student	7207694437	Spurthi
66	SANJIVINI AMBEGAR	ECE	STUDENT	6281614793	Sanjivini
67	STHITIPRAGYAN PRADHAN	ECE	STUDENT	8825636514	Pradhan
68	NIDHI SHERKHANE	ECE	STUDENT	7989878784	Nidhi
69	PONNAM RISHWANTH	ECE	STUDENT	7893136201	Rishwanth
70	KESHAGONI UDAY KIRAN GOUD	ECE	STUDENT	9989718539	Keshagoni
71	BINGI PRADHAMESH	ECE	STUDENT	6303717517	Pradhamesh
72	DEMULAWADA SHESHADRI	ECE	Student	6309397193	Sheshadri
73	VINITHA RALLAPALLI	ECE	Student	9063456497	Vinitha
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75	Y. UMA RANI	ECM	Student	9581782522	Uma Rani
76	P YASHASWINI	ECM	Student	8074232676	Yashaswini
77	K SAI MEGHANA	ECM	Student	9392341876	Meghana
78	KAMANUR VENKATA MOHAN	ECM	Student	8977214586	Venkata Mohan
79	K SANJANA REDDY	Ecm	Student	7673928851	Sanjana
80	A LIKHITHA SREE	Ecm	Student	8985780915	Likhitha
81	SHRIJA	ECM	Student	8374397691	Shrija
82	KONA KUSUMANJAI	Ecm	Student	9059643769	Kusumanjai
83	K DIKSHITHA	ECM	Student	7671006793	Dikshitha
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85	VADLAMANI SASHANK	ECM	Student	8179927009	Sashank
86	GANGULA GANESH	ECM	Student	9022731885	Ganesh
87	N MADHURI	ECM	Faculty	9885020231	Madhuri
88	M RISHITHA	ECM	Student	7569173295	Rishitha
89	THAKUR TARUN SINGH	ECM	Student	7995590012	Tarun Singh
90	DUSAKANTI HARSHITHA	ECM	Student	9121882816	Harshitha
91	SAMALA NILOHITHA	Ecm	Student	9618320387	Niloitha
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100	UDUTHALA MADHUMOHAN	EEE	Student	8374845034	Madhumohan
101	TAISEEN FATHIMA	EEE	Student	9704162805	Fathima
102	GOUTHAM REDDY KONGARI	EEE	Student	6300730498	Goutham
103	KAWLE PRATHAMESH	EEE	Student	9550587069	Prathamesh
104	GOUDA ARAVIND	EEE	Student	8247052137	Aravind
105	RANGAMPETA BHANU PRAKASH	EEE	Student	7659922438	Bhanu Prakash
106	CHIDURA SWATHI	EEE	Student	6281166376	Swathi
107	SYED ABDUL RAHMAN	EEE	Student	6304117681	Abdul Rahman
108	CHAKALI PAVAN	EEE	Student	8096112547	Pavan
109	E SAI SRUJAN	EEE	Student	9505493805	Sai Srujan
110	MOHAMMED ATA UR RAHMAN	EEE	Student	9100417471	Mohammed
111	DR P DURAIPANDY	EEE	Faculty	8760918360	Duraipandy
112	A LAVANYA	EEE	Faculty		Lavanya

113	KODANGAL AKHILANDESHWARI	EEE	Student	7702727796	Abhilash
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119	DR RAJU DINDIGALA	Mathematics (S &	Faculty	9908621213	Abhilash
120	BOYA POOJITHA	S & H	Faculty	8978561720	Abhilash
121	KURRI VAISHNAVI	S & H	Faculty	8074687508	Abhilash
122	AJAZ AHMAD MAGRAY	S and h mathemati	Faculty	7889506927	Abhilash
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124	RANJIT KUMAR CHIMATA	S&H	Faculty	9491827401	Abhilash
125	PRASANNA PARCHURI	S&H	Faculty	8978193634	Abhilash
126	N PADMASRI	S&H	Faculty	9908982020	Abhilash
127	MRS.M. SANGEETHA	S&H	Faculty	9030831545	Abhilash
128	T.SHRAVANI	S&H (CHEMISTRY)	Faculty	8897757376	Abhilash
129	J VENKAT REDDY	S&H (Physics)	Faculty	9666569569	Abhilash
130	S SRINIVAS	S&H CHEMISTRY	Faculty	8309393688	Abhilash
131	MALAPATI BALIREDDY	Science and huma	Faculty	9491729920	Abhilash
132	TASLEEM SULTANA	Science And Huma	Faculty	8297230934	Abhilash
133	DR.AMIT GUPTA	AIML	Faculty	9785741277	Abhilash
134	DR HIMANSHU SHARMA	ECE	Faculty	7799978345	Abhilash
135	B BARGAVI	CSE	Student	8008087909	Abhilash
136	K LAXMINARAYANA	S&H	Faculty	9849782776	Abhilash
137	INDROJU SRI VAMSHI KUMAR	IT	Student	9347137225	Abhilash
138	R. VIKAS	IT	Student	9032818642	Abhilash
139	J. EVANGEELINA	IT	Student	9063004797	Abhilash
140	N.RAMAKRISHNA TPO	S&H	Faculty	8374543322	Abhilash
141	DR NILAM PANDA	S&H	Faculty	9515488997	Abhilash
142	DR D GOWTHAMI	S&H	Faculty	7396299723	Abhilash
143	G.H.SRAVAN	S&H	Faculty	9705277018	Abhilash
144	G NAGADHAR	S&H	Faculty	9703699858	Abhilash
145	DR ANOOP KUMAR	MECH	Faculty	9966903701	Abhilash
146	A HARI KRISHNA	EEE	Student	6303577709	Abhilash
147	J.MARIA SHANTI	CSE	Faculty	9600012958	Abhilash
148	G ABHIJEETH	CSM	Student	8790368134	Abhilash
149	K VINAY KUMAR	IT	Student	6300311646	Abhilash
150	MAYANTH KUMAR DUSEY	IT	Student	8019774755	Abhilash

PRINCIPAL

Circular



J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC AUTONOMOUS)

(Accredited by NBA & NAAC, approved by AICTE & Permanently Affiliated to JNTU, Hyderabad)

Yenkapally (Vi), Moinabad (M), P.O. HimayatNagar, R. R. District, Hyderabad -500 075.

Phone No: 08413-235127, 235053, Fax: 08413-235753

Ref: *JB/ET/IARP Workshop /2025*

Date: 20-01-2025

CIRCULAR

This is to inform that the **BARC & JBIET** Jointly organizing a one-day workshop in association with **Indian Association of Radiation protection (IARP)** on **25th January 2025** at **MNR Auditorium** from **9:30 AM onwards**. Free registration is available for the faculty members and students who wish to attend the workshop. The students and faculty participants will be provided Workshop kit, Participation certificate and lunch.

The google form for registration as participant is given below. It is requested to fill in and submit before 22.01.2025 for only the limited mentioned number of participants.

Google link for details submission:

<https://docs.google.com/forms/d/e/1FAIpQLSeO5OJRt2cO3Ca69EXpfPmKcaHoQm8OV5Fold7j8841tNd9A/viewform?usp=dialog>


PRINCIPAL

Copy to: *All Deans and Functional Heads
HODs for circulation among faculty and students
CE, AO, Director CT, Librarian, IT Manager, Physical Director
The Director JBES for information
The Secretary for information*

HEAD OFFICE: 63-248/1/1/A, 4th Floor, Bhaskar Plaza, Road No. 1, Banjara Hills, Hyderabad – 500 034. Phone:
040 – 23391979, Fax: 040 – 2330403

Brochure



Chief Patron

Sri J.V. Krishna Rao
Secretary, JBES

Patron(s)

Dr. P.C.Krishnamachary
Principal, JBIET
Prof. Ch. Sanjay
Director, JBES

Program Director(s)

Dr. B. V. Swarnalatha
Dean 1st Year

Dr. L. Vaikuntha Rao
Dean, R&D

Convener(s)

Dr. Anindya Jana
Dr. Prasanta Kumar Pradhan

Organizing Secretary(s)

Dr. Himanshu Sharma
Mrs. Kiran Pakmode

To Register
Contact
Dean R & D

JB

**IARP WORKSHOP
ON
BENEFICIAL EFFECTS OF
RADIATION AND NUCLEAR
ENERGY**

Organized by
**JB INSTITUTE OF ENGINEERING
AND TECHNOLOGY, HYDERABAD**

SPONSORED BY
INDIAN ASSOCIATION FOR RADIATION PROTECTION

ABOUT THE WORKSHOP

This workshop will cover recent development in Radiation, Technology and Applications Society is deriving tremendous benefits out of various applications of radiation sources in research, medical and industrial fields. The positive uses of nuclear energy such as non-electric applications and production of carbon free electricity to protect air quality. The theme of the workshop is to hold an open deliberation on the benefits of radiation technology and nuclear energy for research and development. The workshop is aimed at bringing together the scientific and technical community to share their knowledge with the participants. It is focused to provide the participants with comprehensive in the areas to be covered in the workshop. This workshop is organized to motivate the faculty and young researchers from science and engineering towards high quality research. Scientific and Technical talks will be delivered by eminent scientists from IARP, BARC.

ABOUT THE COLLEGE

As one of the top ten most preferred institutions in Telangana, JBIET continues to strive to impart technical (engineering) and professional education of very high standards. The aim of JBIET is to mould young learners into globally competitive professionals who are professionally deft, intellectually adept and socially responsible. The expert faculty at JBIET inculcate the best values and principles, ascribing to a modern curriculum; while the students imbibe pragmatic perception and a pro-active nature, which spurs them towards exploration and advanced inquiry, resulting in valuable insights. The Placement record of JBIET over the years is proof of our right efforts in enabling the best in class engineering, technical and professional education to aspirants.

Scope of the workshop:

- Radiation Quantities, Units and Effects
- Principle and Radiation Detection
- Radiation Protection and Monitoring
- Nuclear Energy
- Applications of Radiation Technology
- Applications of Nuclear Technology In Medicine
- Beneficial effects on Radiation Technology

Certificate

INDIAN ASSOCIATION OF RADIATION PROTECTION

CERTIFICATE

This is to certify that
Narayanan Nambodri P.
participated in the IARP Workshop on
“Beneficial Effects of Radiation Technology and Indian Nuclear Energy Programme”
conducted by
Indian Association for Radiation Protection, Mumbai
and hosted by
J. B. Institute of Engineering and Technology
on 25th January, 2025.

L. Vaikuntha Rao
Dr. L. Vaikuntha Rao
Dean R & D
JBIET, Hyderabad

P. C. Krishnamachary
Dr. P. C. Krishnamachary
Principal,
JBIET, Hyderabad

Dr. S. Murali
Dr. S. Murali,
Convener of IARP Workshop,
Ex. Secretary, IARP, Mumbai