



**“Radiation Biology and its Clinical Applications” (Virtual Mode)**

**Global Initiative of Academic Networks (GIAN)**

course

**March 26<sup>th</sup>-31<sup>st</sup>, 2022**

Organized by

**Special Centre for Molecular Medicine (SCMM)**

**Jawaharlal Nehru University, New Delhi**



<b>Day and Time</b>	<b>Technical Sessions</b>	<b>Resource Persons</b>
<b>Day 1: 10 am to 5:00 pm 26<sup>th</sup> March</b>	<b>Inaugural Ceremony</b> <b>10.00 – 10.10 am</b> -Welcome Address by Prof. Vibha Tandon, SCMM, JNU <b>10.10 - 10.15 am</b> – About SCMM, Prof. Gobardhan Das, Chairperson, SCMM <b>10.15 – 10.20 am</b> – Address by Prof. A. K. Dubey, Rector, JNU <b>10.20 -11.10 am</b> – Key note lecture by Prof. G. K. Rath, Ex-Chief BRAIRCH, AIIMS, New Delhi <b>11.10- 11.15 am</b> – Address by Dr. B.S. Dwarakanath, SRU, Chennai <b>11.15 – 11.20 am</b> – About GIAN by S. Patnaik, SPS, JNU	
	<b>Session 1</b> <b>Chairperson: Dr. Pratik Kumar, Department of Medical Physics, AIIMS</b>	
	<b>11:30 -1:00 pm</b> <b>Lecture 1</b> An introductory overview to radiation biology, radiation physics and radiation chemistry.	Dr. B. S. Dwarakanath
	<b>1:00 pm-2.00 pm : Lunch break</b>	
	<b>Session 2</b> <b>Chairperson: Dr. Hari Shankar Misra, BARC, Mumbai, Dr. Sunil Dutt Sharma Department of Medical Physics, AIIMS, New Delhi</b>	

	<p><b>2:00-3:30 pm</b>  <b>Lecture 2</b></p> <ul style="list-style-type: none"> <li>• Ionizing and non –ionizing radiation</li> <li>• Radiation sources, detection,</li> <li>• Radiation quantities and unit, Radiation dosimetry.</li> <li>• Low dose radiation and its effect in biological system</li> </ul>	Mr. R. Mahalingam
	<p><b>3:30-5:00 pm</b>  <b>Tutorial 1</b></p> <p>Interactive session for radiation biology basics and ionizing radiation classification, interaction of radiation with biomolecules</p>	Prof. V. Tandon Dr.B. S.Dwarakanath Dr. R. Mahalingam
<p><b>Day 2:</b>  <b>10:00 am to 5:00 pm</b>  <b>27<sup>th</sup> March</b></p>	<p><b>Session 3</b></p> <p><b>Chairperson: Prof. Sangeeta Choudhury, GRIPMER, Sir Ganga Ram Hospital, New Delhi, &amp; Prof. R. P. Singh, SLS, JNU, New Delhi</b></p>	
	<p><b>10:00 – 11:30 am</b>  <b>Lecture 3</b>  <b>Cellular effect of radiation and Clinical radiation biology</b></p> <ul style="list-style-type: none"> <li>• Overview of interactions of Radiation with the biological system: Molecules to Biosphere</li> <li>• Chemical basis of biological effects of radiation</li> <li>• Factors influencing biological radiation effects</li> <li>• Radiobiological cell death: Dose response and biophysical models</li> </ul>	Dr. A. N. Bhatt,
	<p><b>11.30 am-1.00 pm</b>  <b>Lecture 4</b></p> <ul style="list-style-type: none"> <li>• Cellular effects of radiation damage: DNA damage and repair; Chromosome damage</li> <li>• Growth inhibition and perturbations of cell cycle progression</li> <li>• Bystander effect; induction of stem phenotype and senescence;</li> </ul>	Dr. B. S. Dwarakanath
	<p><b>01:00 -02:00 pm ; Lunch break</b></p>	

	<p style="text-align: center;"><b>Session 4</b></p> <p style="text-align: center;"><b>Chairpersons: Prof. D. N. Sharma</b>, Head, Deptt. of Radiation Oncology, IRCH, AIIMS, New Delhi &amp; <b>Dr. Rakesh Tyagi</b>, SCMM, JNU, New Delhi</p>	
	<p><b>02:00-03:30 pm</b> <b>Lecture 5</b></p> <ul style="list-style-type: none"> <li>• Tumour Radiobiology</li> <li>• Radiobiological bases for fractionated radiotherapy</li> <li>• Five Rs of radiotherapy tumour microenvironment, inflammation and immune responses</li> </ul>	<p>Dr. P. Giridhar, MD</p>
	<p><b>04:00 -06:00 pm</b> <b>Lecture 6</b> <b>Radiation-induced normal tissue injury: Radioprotectors and mitigators to improve clinical outcomes</b></p> <ul style="list-style-type: none"> <li>• Acute, delayed and late radiation effects</li> <li>• Approaches to protect and mitigate radiation effect</li> </ul>	<p>Dr. Pataje G.S. Prasanna</p>
<p><b>Day 3:</b> <b>10:00 am to 5:00 pm</b> <b>28<sup>th</sup> March</b></p>	<p style="text-align: center;"><b>Session 5</b></p> <p style="text-align: center;"><b>Chairpersons: Prof. Ritu Gupta</b>, Head, Laboratory Oncology, BRAIRCH, AIIMS, New Delhi &amp; <b>Prof. R. K. Kale</b>, Ex Vice Chancellor, Gujarat Central University and faculty, SLS, JNU</p>	
	<p><b>10:00 -11:30 am</b> <b>Lecture 7</b> <b>Biological dosimetry for radiation exposure</b></p> <p>Radiation-induced cytogenetic damage : Chromosome aberrations, Micronuclei formation, Mutation assays</p>	<p>Dr. B. S. Dwarakanath</p>
	<p><b>11:30 -01:00 pm</b> <b>Tutorial 2</b></p> <p>Demonstration of tissue section showing radiation induced damage in different organs and their protection. Monitoring and damage assessment.</p>	<p>Dr. A. N. Bhatt Prof. V. Tandon</p>
	<p><b>01:00 -02:00 pm : Lunch break</b></p>	

	<b>Session 6</b> <b>Chairpersons: Dr. Amitabh Singh, Incharge of Paediatrics Hematology Oncology division , Safdurjung Hospital ,New Delhi &amp; Prof. PaulRaj Rajamani, SES, JNU</b>	
	<b>02:00 -3.30 pm</b> <b>Lecture 8</b> <b>Radiation induced responses</b> <ul style="list-style-type: none"> <li>• Assessment of radiation-induced damage to normal tissues</li> <li>• Tumor response to radiation</li> </ul>	Dr. B.S. Dwarakanath
	<b>3:30 – 05:00 pm</b> Interactive session among participants and faculty, demonstration of effect of radiation on growth kinetics, cytogenetic damage, chromosomal aberrations	Dr. A. N. Bhatt Dr. B. S. Dwarakanath Prof. V. Tandon
<b>Day 4:</b> <b>10:00 am to 05:00 pm</b> <b>29<sup>th</sup> march</b>	<b>Session 7</b> <b>Chairpersons: Prof. Vibha Tandon, SCMM, JNU &amp; Prof. S. D. Sharma , BARC,Mumbai</b>	
	<b>10:00 -10.05 am</b> – Welcome and introduction of Prof. Santishree D. Pandit, Vice Chancellor, JNU by V. Tandon <b>10.05-10.15 am</b> – Address by Vice Chancellor, JNU <b>10.15-10.25 am</b> – Address by Dr. S. D. Sharma, SO-G & Head Medical Physics Section, BARC, Mumbai	
	<b>10:30 -11:30 am</b> <b>Lecture 09</b> <b>Current status and practise of radiotherapy</b> <ul style="list-style-type: none"> <li>• Three dimensional Conformal Radiation Therapy (3DCRT)</li> <li>• Stereotactic radiosurgery</li> <li>• Intensity modulated radiation therapy (IMRT), IGRT, ARC therapy</li> </ul>	Dr. S. D. Sharma

	<ul style="list-style-type: none"> <li>• Brachytherapy</li> <li>• Particle Radiotherapy (Proton, Carbon etc.)</li> </ul> <p><b>11.30 -1.00 pm</b> <b>Lecture 10</b></p> <ul style="list-style-type: none"> <li>• Upcoming approaches in Radiotherapy (SBRT, FLASH, GRID)</li> </ul>	
	<b>01:00 -02:00 pm : Lunch break</b>	
	<p><b>Session 8</b></p> <p><b>Chairperson: Dr. Santosh Kumar Sandur</b> , Division of Radiation Biology and Health Sciences, BARC, Mumbai &amp; <b>Dr. Shailja Singh</b>, SCMM,JNU</p>	
	<p><b>2.00- 3.30 am</b> <b>Lecture 11</b> <b>Modification of cellular and systemic responses to radiation</b></p> <ul style="list-style-type: none"> <li>• Radio sensitization and radioprotection</li> <li>• Applications of radio sensitizers and radioprotectors in radiotherapy</li> </ul>	Dr. B. S. Dwarakanath
	<p><b>4.00-6.00 pm</b> <b>Lecture 12</b></p> <ul style="list-style-type: none"> <li>• <b>Radiation Medicine: Past, Present and Future</b></li> </ul>	Dr. V. Bhadrasain
<b>Day 5: 10:00 am to 05:00 pm 30<sup>th</sup> March</b>	<p><b>Session 9</b></p> <p><b>Chairperson: Prof. Baljinder Singh</b>, Head, Dep. of Nuclear Medicine, PGIMER, Chandigarh &amp; <b>Dr. Ashu Bhan Tiku</b>, SLS, JNU, New Delhi</p>	
	<p><b>10:00 -11:30 am</b> <b>Lecture 13</b> <b>Radiation safety and protection</b></p> <ul style="list-style-type: none"> <li>• Radiation emergencies and management: Leakage, transport of radioactive materials, radiation hazard evaluation and control</li> <li>• Time, distance and shielding</li> </ul>	Dr. R. Mahalingam

	<ul style="list-style-type: none"> <li>• ALARA (As Low As Reasonably Achievable) principles</li> <li>• Risk estimates of radiation exposure</li> <li>• Radiation measuring instrument for personal monitoring</li> </ul>	
	<p><b>11:30 -01:00 pm</b></p> <p><b>Lecture 14</b></p> <p><b>Radiological and Nuclear theranostic Agents for diagnosis and therapy of cancer</b></p> <ul style="list-style-type: none"> <li>• PET and SPECT</li> <li>• Contrast Agents for MRI</li> </ul>	Dr. P P Hazari
	<b>01:00 -02:00 pm : Lunch break</b>	
	<p><b>02:00-03.:30 pm</b></p> <p><b>Tutorial 3</b></p> <p>Demonstration and interactive session for radiation prevention and radiation leakage along with the interactive session with radiation safety officer explaining the precaution and steps used in accidental radiation leakage.</p>	Dr. P.P. Hazari Prof. V. Tandon Dr. S. K. Mishra RSO, JNU
<b>Day 6: 10:00 am to 05:00 pm 31<sup>st</sup> March</b>	<b>Session 10</b>	
	<b>Chairpersons: Prof S. Thulkar, Head, Onco-Radiology, IRCH, AIIMS &amp; Prof. U. C. Singh Yadav, SCMM, JNU, New Delhi</b>	
	<p><b>10.00-11.30 am</b></p> <p><b>Lecture 15</b></p> <p><b>An overview of clinical applications of non-invasive radiological imaging</b></p> <ul style="list-style-type: none"> <li>• radiography, ultrasonography,</li> <li>• mammography, CT and MRI</li> </ul>	Dr. Maria M D'souza
	<p><b>11.30 -1:00 pm</b></p> <p><b>Lecture 16</b></p> <p>Clinical Applications of hybrid imaging : PET/CT and PET/MRI</p>	Dr. Maria M D'souza
	<b>01:00 -02:00 pm : Lunch break</b>	

	<p><b>02:00 – 04:00 pm</b>  <b>Practical Session</b>          Demonstration of basic techniques used for screening of radio sensitizer and radioprotectors like clonogenic assay, survival assay followed by data interpretation.</p>	<p>Prof. V. Tandon</p>
	<p><b>4:00-5:30 pm</b>  <b>Tutorial 4</b>          Visit of radiation oncologist and Interaction session with the radiation oncologist from hospitals for the current radiotherapy techniques and patient follow up study.</p>	<p>(Assistance for hands on by)          Pragya Tripathi          Palak Parashar          Antra Kumari          Hungyo Hungharla</p>