Department of Medical Physics

Board of Studies Meeting-Minutes

Academic Year: 2025-26 (Even Semester)

The minutes of the 20th meeting of the Board of Studies held on 10.11.2025 at 02.00 p.m at B1-Block, Room No.1516, Dr.N.G.P. Arts and Science College.

Members Present:

S. No.	Name	Category
1.	Mrs. K. Indhumathi Assistant Professor & Head (i/c), Department of Medical Physics	Chairman
2.	Dr. S. Thirunavukkarasu Ph.D Senior Assistant Professor in Radiological Physics cum RSO Department of Radiology and Imaging Sciences, Government Medical College Hospital, Cuddalore, Chidambaram.	University Nominee
3.	Dr. S. Sathiyan Ph.D Professor of Radiation Physics Kidwai Memorial Institute of Oncology, Bengaluru,	Subject Expert
4.	Mrs. Renugadevi M.Sc., RSO Assistant Professor of Radiological Physics Coimbatore Medical College Hospital, Coimbatore	Subject Expert
5.	Mr. S. Antovaz Chief Medical Physicist & RSO, Kovai Medical Center and Hospital, Coimbatore.	Industrial Expert
6.	Mrs. Vidyalakshmi K. Assistant Professor Department of Radiology KG College of Allied Health Sciences, Coimbatore	Meritorious Alumni

7.	Dr. R. Subramaniam M.D., Head, Department of Radiation Oncology, Kovai Medical Center and Hospital, Coimbatore	Co-opted Member
8.	Mr. T. Velmurugan M.Sc. RSO Senior Medical Physicist Kovai Medical Center and Hospital, Coimbatore	Co-opted Member
9.	Ms. Gifty Jebina T II M.Sc. Medical Physics	Student Representative

The HoD (i/c) of the department of Medical Physics welcomed the members and appealed for their continued support and contributions toward the development of academic standards and enrichment of the syllabus.

Further, the members were informed that Mr. D. Sivakumar, HOD and Chairman of the Board of Studies in Medical Physics, is currently undergoing a three-month International Internship Pilot Program (short-term research) offered by the National Science and Technology Council (NSTC), Taiwan. Hence it was requested to the grant him leave of absence and Mrs. K. Indhumathi was nominated to act as Chairman and preside over the meeting.

After brief discussion, the items of the agenda were taken one by one for discussion and the following resolutions were passed.

Item 20.1: To review and approve the minutes of the previous meeting held on 28.06.2025

The chairman of the Board presented the minutes of the previous meeting held on 28.06.2025 and requested the members to approve. After brief discussion the following resolution was passed.

Resolution:

Resolved to approve the minutes of the previous meeting held on 28.06.2025

Item 20.2: To consider and approve the syllabi for II semester for the students admitted during the academic year 2025-26.

The chairman presented the regulation, detailed scheme and syllabus for the II semester for the students admitted for the academic year 2025-26. The details of the changes made are also presented as follows

Changes Made:

Course Code	Course Name	Changes and Reason
25MPP2CC	PHYSICS OF RADIOLOGY IMAGING	The following contents added as per suggestion given by Dr.S.Thirunavukkarasu and Mrs. Renugadevi Unit I: **Laser based film and Non-Laser based films** Unit II: **Glandular Dose** Unit III: **Slip Ring technology, Slice Width, Slice Configuration, Pitch, Window Width and Window Level** Unit IV: **Types of Magnets and Coils, Specific Absorption Rate (SAR), Chemical shift, Echo Planar Imaging, Multinuclear MR Spectroscopy, MR safety , RF Safety** Unit V: **Types of Probes, Techniques : Pulsed, Continuous, Spectral, Color, and Power Doppler**
25MPP2DB	RADIATION DOSIMTERY AND STANDARDIZATION	The following topics were included in the unit as per suggestion given by Dr.S.Thirunavukkarasu and Mr. S. Antovaz Unit V: **Gel Dosimetry: Principles, Advantages and Limitations.**

After the discussions, the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the syllabus for the II semester for the students admitted from the academic year 2025-26 onwards.

Item 20.3: To consider and approve the changes, if any, in the syllabi for IV semester for the Students admitted during the academic year 2024-2025.

The chairman presented the syllabus for the IV semester to the students admitted for the academic year 2024–2025 onwards.

The courses for the IV semester of the M.Sc. Medical Physics program for the academic year 2024–2025 were discussed by the board, in accordance with the Atomic Energy Regulatory Board (AERB) recommended syllabus.

After discussions, the board approved the existing syllabus for students admitted in the academic year 2024-2025 without any changes and modifications.

After the discussions, the following resolution was passed.

Resolution:

Resolved to approve the syllabus for the IV semester for the students admitted from the academic year 2024-25 onwards.

Item 20.4: To approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2025-26.

The Chairman presented the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2025-26.

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2025-26.

Item 20.5: To consider and approve any other item brought forward by the Chairman and the members of the board.

No other item was brought forward.

Finally, the Chairman thanked all the members for their cooperation and contributions toward enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was concluded with the vote of thanks.

Date: 10.11.2025

(Mrs. K. Indhumathi)
BoS Chairman/HoD
Department of Medical Physics
Dr. N. G. P. Arts and Scienc
Coimbatore – 641 048

Syllabus Revision

Faculty: Basic and Applied Sciences **Board: Medical Physics**

Semester: II

Course Code/ Name: 25MPP2CC – Physics of Radiology Imaging

Unit	Existing	Changes
I	**Principles of X-Ray Diagnosis & Imaging** Principle - Interactions of X-rays with human body - Differential transmission of x -ray beam -Spatial image formation - Visualization of spatial image - Limitations of projection imaging technique viz. superimposition of overlying structures and scatter - Application of contrast media and projections at different angles to overcome superimposition of overlying structures Prime factors kVp, mAs and SID/SFD and its influence on Image quality - Filters and its types - Beam restrictors and its types – Scatter reduction - Grid and its types – Air gap technique - Cassettes - Intensifying screen - Absorption efficiency and conversion efficiency - Structure of x-ray film, Types of films- Laser based film and Non-Laser based films. Characteristics of x-ray film, Film processing, Manual and Automatic film processing - ~~Computerized radiography~~- Film handling and storage, influence of temperature and time, Replenisher, dark room - Safe light - Image quality, Spatial and contrast resolution, noise, geometric factors, optimal quality image, artifact - QA of diagnostic x-ray. Different Radiography Techniques: Xeroradiography, Intra and Extra oral radiography – Orthopantomography (OPG), Dental CBCT – Bone mineral densitometer (BMD) – ~~Conventional~~ Computerized radiography (CR) and Digital radiography(DR)..	Laser based film and Non-Laser based films
II	**Mammography and Fluoroscopy** Mammography: Mammographic X-ray tube design, Filter, Spectra, Compression paddle, Grids and AEC. Collimation, Filtration and HVL - Magnification – Screen film mammography – Digital mammography – Tomosynthesis -Display of digital mammography - Glandular Dose - QA. Fluoroscopy: Conventional fluoroscopy, Cine and Fluoro mode - Dark room adaptation, Image intensifiers, Closed circuit TV systems, Flat panel detectors - Modern trends in interventional radiology – Single and Bi-plane imaging, Rotational angiography, Cardiac imaging, Real time imaging characteristics – Filtration, Continuous and pulsed fluoroscopy, High dose-rate fluoroscopy, Spot imaging, Digital Subtraction acquisition technique, Road mapping, Image magnification, Lastimage hold, Automatic exposure control, Automatic brightness control, Brightness gain - Image quality - Radiation dose management: Dose area product (DAP) meters, Peak skin dose, Cumulative dose and Dosimetric techniques in interventional radiology - Dose management for pediatric and pregnant patients in interventional imaging, Diagnostic reference levels and guidelines – QA and Radiation protection.	Glandular Dose
III	**Computed Tomography** Principle of Computed tomography - CT Equipment, System design, Gantry and Couch, X-ray tubes, Filters and Collimation, Detector array, Generations of CT- Slip Ring technology--Dual energy CT - Modes of CT acquisition: Axial acquisition, Helical acquisition, Cone beam acquisition, Cardiac CT, CT angiography, CT perfusion-CT number-Image display - Slice Width, Slice Configuration, Pitch, Window Width and Window Level —CT image reconstruction: Back projection, Filtered back projection, Fourier reconstruction, Cone beam reconstruction, Iterative reconstruction, Post processing tools, Volume rendering, Multiplanar reconstruction (MPR), Maximum	Slip Ring technology-,Slice Width, Slice Configuration, Pitch, Window Width and Window Level

	intensity projection (MIP) - Image quality - factors influence on image quality – Contrast, Spatial resolution, Noise, Unsharpness, Magnification, Distortion and Artifacts - Quality assurance - Image artifacts, Radiation dose management: factors affecting patient dose CTDI, CTDIvol, Dose length product(DLP),Multiple scan average dose(MSAD)-QA of CT.	
IV	**Magnetic Resonance Imaging** Basic Physics of MRI, Magnetism, Nuclear characteristics, Hydrogen characteristics, Magnetization vector, Precession, Radiofrequency and Resonance, MRI signal, Flip angle - Relaxation time: T1 relaxation time, T2 relaxation time, Comparison of T1 and T2 -MR instrument –Types of Magnets and Coils- Specific Absorption Rate (SAR), MR signal localization, Gradient field, Slice selection, Phase encoding gradient, Frequency encoding gradient, Composite signal, K-space –Chemical shift- MR imaging sequences - Spin echo sequence, T1 weighted image, T2 weighted image, Spin density weighted image, Inversion recovery, Gradient recalled echo– Specialized MR sequences, Echo Planar Imaging, MR angiography, Perfusion imaging, Diffusion imaging, Functional imaging, MR spectroscopic imaging, Multinuclear MR Spectroscopy - Biosafety: MR safety , RF Safety- Image quality and artifacts - QA of MRI.	Types of Magnets and Coils, Specific Absorption Rate (SAR), Chemical shift ,Echo Planar Imaging, Multinuclear MR Spectroscopy, MR safety , RF Safety
V	**Ultrasound** Basics of Ultrasound, Propagation of sound, interaction of Ultrasound with matter - Ultrasound transducer, Piezoelectric material, Transducer design, Transducer array , Types of probes-Beam properties - Near field , Far field , Side lobes , Spatial resolution - 2D, 3D and 4D Ultrasound-Data acquisition systems –ADC , Receiver, Echo display modes, Scan converter - Image data acquisition and Pulse echo acquisition - Ultrasound image display: Amplitude mode, Motion mode, Brightness mode-Doppler ultrasound and its techniques: Pulsed, Continuous, Spectral, Color, and Power Doppler - Ultrasound image quality - Image artifacts -Bio-effects of ultrasound- QA of ultrasound.	Types of Probes, its techniques: Pulsed, Continuous, Spectral, Color, and Power Doppler

PERCENTAGE OF SYLLABUS REVISED: 5 %

COURSE FOCUSES ON:

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision

Faculty: Basic and Applied Sciences **Board: Medical Physics**

Semester: II

Course Code/ Name: 25MPP2DB – Radiation Dosimetry and Standardization

Unit	Existing	Changes
I	**Radiation Quantities and Units** Radiation quantities and units - Radiometry - Particle flux and fluence – Energy flux and fluence - Cross section - Linear and mass attenuation coefficients – Mass energy transfer and mass energy absorption coefficients - Stopping power - LET- Radiation chemical yield – W-value - Dosimetry- KERMA- CEMA - Exposure - Air kerma rate constant - Energy imparted -Absorbed dose - Charged particle equilibrium (CPE) - Relationship between kerma, Absorbed dose and Exposure under CPE - Radiation and tissue weighting factors, Equivalent dose, Effective dose, Committed equivalent dose, Committed effective dose - Concepts of collective dose - Dose equivalent - Ambient and directional dose equivalents [(H*(d) and H'(d)] - Individual dose equivalent penetrating Hp(d) - Individual dose equivalent superficial Hs(d).	-
II	**Dosimetry & Standardization of X and Gamma Rays Beams** Dosimetry Standards: Primary and Secondary standards, Traceability, Uncertainties in measurements. Two stage energy transfer process - Electronic equilibrium: Charged particle equilibrium (CPE), Transient charged particle equilibrium (TCPE). Cavity theories- Brag Gray, Burlin and Spencer Attix cavity theory. Free air Ionization chamber (FAIC) – Design, Measurement of exposure and limitations. Cavity ion chambers: Cylindrical, Parallel plate and spherical - Dose in free space (Dgas), Dose in medium (Dmed), Expression for sensitivity, - General definition of calibration factors – Nx, Nk, NDair, NDw - IAEA TRS-398: Dw, NDW, NDWQ, KQ, KQ QO and TPR20,10. Measurement of Dw for external beams from ^{60}Co teletherapy machines: Reference conditions for measurement, Type of ion chambers, Phantom, Waterproof sleeve, Derivation of an expression for machine Timing error, Procedure for evaluation of temperature and pressure correction. Measurement of Dw for high-energy photon and electron beams from linear accelerators: Beam quality, Beam quality index, Beam quality correction coefficient, Cross calibration of ion chamber. Reference conditions, Various correction factors and steps involved in absorbed dose to water (Dw) calculations for Telecobalt machines and Linear accelerators - Cross calibration of ion chamber. IAEA TRS-277, AAPM TG-51, TECDOC 1274, TRS 483 and other dosimetric protocols - Calorimetric standards – Inter comparison of standards	-
III	**Neutron Standards & Dosimetry** Neutron classifications, Neutron sources, Neutron quality factor -Neutron standards – Primary standards, secondary standards - Neutron yield and Fluence rate measurements -Manganese sulphate bath system - Precision long counter - Activation method - Neutron spectrometry - Threshold detectors - Scintillation detectors - Multispheres - Neutron dosimetry - Neutron survey meters - Calibration - Neutron field around medical accelerators.	-

IV	**Standardization of Radionuclide** Methods of measurement of radioactivity – Defined solid angle and 4Л counting – Beta gamma coincidence counting – Standardization of beta emitters and electron capture nuclides with proportional, GM and Scintillation counters – Standardization of gamma emitters with scintillation spectrometers – Ionization chamber methods – Extrapolation chamber – Routine sample measurements – Liquid counter – Windowless counting of liquid samples – Scintillation counting methods for alpha, beta and gamma emitter – Reentrant ionization chamber methods – Methods using (n, ŕ) and (n, p) reactions – Determination of yields of neutron sources – Space integration methods – Solids state detectors.	-
V	**Radiation Chemistry and Chemical Dosimetry** Definitions of free radicals and G-Values - Kinetics of radiation chemical transformations – LET and dose-rate effects – Radiation chemistry of water and aqueous solutions, Peroxy radicals, pH effects – Radiation chemistry of gases and reactions of dosimetry interest – Radiation polymerization - Effects of radiation on polymers and their applications in dosimetry – Description of irradiators from dosimetric view point – Dosimetry principles. Chemical dosimetry – Basic principle, Definitions of optical density - Molar absorption coefficient - Beer –Lamberts law- spectrophotometry – Dose calculations – Laboratory techniques – Reagents and procedures - Requirements for an ideal chemical dosimeter – Fricke dosimeter – FBX dosimeter – Free radical dosimeter – Ceric sulphate dosimeter Gel Dosimetry: Principle, Advantages and Limitations-Other high and low level dosimeters – Applications of chemical dosimeters in radiotherapy and industrial irradiators. Biological Dosimetry - Chromosome aberration analysis.	Gel Dosimetry: Principle, Advantages and Limitations

PERCENTAGE OF SYLLABUS REVISED: 1 %

COURSE FOCUSES ON:

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

ATTENDANCE OF THE TEWENTIETH BOARD OF STUDIES MEETING

Faculty : Basic and Applied Sciences **Board:** Medical Physics

Venue : B1 Block, Room No. 1516

Date : 10/11/2025

Time : 02.00 p.m.

The following members were present for the board of studies meeting.

S. No.	Name	Designation	Attendance Status
1.	Mrs. K. Indhumathi Assistant Professor & Head (i/c) Department of Medical Physics Dr.N.G.P. ASC	Chairman	PRESENT
2.	Dr. S. Thirunavukkarasu PhD, Sr. Asst. Professor in Radiological Physics cum RSO, Department of Radiology and Imaging Sciences, Government Medical College Hospital Cuddalore, Chidambaram, Tamil Nadu - 608002	VC nominee	PRESENT
3.	Dr. S. Sathiyan PhD., Professor of Radiation Physics, Kidwai Memorial Institute of Oncology Bengaluru, Karnataka - 560029	Subject Expert	PRESENT
4.	Mrs. Renugadevi M.Sc. RSO Assistant Professor of Radiological Physics, Coimbatore Medical College Hospital, Coimbatore -641018	Subject Expert	PRESENT
5.	Mr. S. Antovaz M.Sc., RSO Chief Medical Physicist Cum RSO Department of Radiation Oncology Kovai Medical Centre & Hospital Coimbatore-641014	Industrial Expert	PRESENT

6.	Mrs. Vidyalakshmi K, Assistant Professor, Department of Radiology, KG College of Allied Health Sciences, Coimbatore – 641035	Alumni	PRESENT
7.	Dr. R. Subramanian M.D. Head, Department of Radiation Oncology Kovai Medical Centre & Hospital Coimbatore – 641014	Co-opted Member	PRESENT
8	Mr. T. Velmurugan M.Sc. RSO Senior Medical Physicist Department of Radiation Oncology, KMCH Coimbatore – 641014	Co-opted Member	PRESENT
9.	Ms. Gifty Jebina T II M.Sc. Medical Physics Dr. N.G.P. ASC	Student Representative	PRESENT

Date: 10/11/2025

(Mrs. K. Indhumathi)
BoS Chairman/HoD
Department of Medical Physics
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