	Dr. N.G.P. ARTS AND SCIENCE COLLEGE (An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore) Approved by Government of Tamil Nadu & Accredited by NAAC with 'A++' Grade (3 rd Cycle-3.64 CGPA) Dr. N.G.P.- Kalapatti Road, Coimbatore-641 048, Tamil Nadu, India. Website: www.drngpasc.ac.in Email: info@drngpasc.ac.in. Phone: +91-422-2369100	BoS
		18th

Department of Medical Physics
Board of Studies Meeting-Minutes
Academic Year: 2024-25 (Even Semester)

The minutes of the 18th meeting of the Board of Studies held on 04.11.2024 at 10.30 a.m. through Google Meet (meet.google.com/efh-fzid-avs).

Members Present:

S. No.	Name	Category
1.	Mr. D. Sivakumar, Assistant Professor & Head	Chairman
2.	Prof. Dr. J. Velmurugan, Professor & Head, Anna University, Chennai.	University Nominee
3.	Mr. Prabakar Victor, Assistant Professor of Radiological Physics, Coimbatore Medical College and Hospital, Coimbatore.	Subject Expert
4.	Dr. A. Saravanakumar, Associate Professor, Head – Medical Physics, PSG Institute of Medical Sciences and Research, Coimbatore.	Subject Expert
5.	Mr. S. Antovaz, Chief Medical Physicist & RSO, Kovai Medical Center and Hospital, Coimbatore.	Industrial Expert
6.	Mr. S. Sankar, Medical Physicist, PSG Institute of Medical Sciences and Research, Coimbatore	Meritorious Alumni
7.	Dr. R. Subramaniam, Head, Radiation Oncology, Kovai Medical Center and Hospital, Coimbatore.	Co-opted Member
8.	Mr. T. Velmurugan, Senior Medical Physicist, Kovai Medical Center and Hospital, Coimbatore.	Co-opted Member
9.	Dr. R. Sowrirajan, Professor & Head, Department of Mathematics	Co-opted Member
10.	Mrs. K. Indhumathi, Assistant Professor	Member
11.	Mrs. G. Daisy, Assistant Professor	Member
12.	Mr. S. Arun Kumar, II M.Sc. Medical Physics	Student Representative

The HoD and Chairman of the department of Medical Physics welcomed and introduced all the members and appreciated them for their continuous support, contribution for the development of academic standard and enrichment of the syllabus.

Further Chairman informed the inability of the following member's to attend the meeting and requested to grant leave of absence.

1. Dr. A. Saravanakumar, Subject expert, not attended the meeting as he had an official work.

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

Item 17.1: To review and approve the minutes of the previous meeting held on **03.04.2024**

The chairman of the Board presented the minutes of the previous meeting held on 03.04.2024 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 03.04.2024

Item 17.2 : To consider and approve the syllabi for II semester for the students admitted during the academic year 2024-2025.

The chairman presented the regulation, detailed scheme and syllabus for the II semester for the students admitted for the academic year 2024-2025. The details of the changes made are also presented as follows.

Changes Made:

Course Code	Course Name	Changes and Reason
24MPP2CA	RADIATION DETECTORS AND INSTRUMENTATION	The syllabus recommended by the Atomic Energy Regulatory Board was discussed and the following changes have been made accordingly. The following changes have been made as suggested by Prof. Dr.Velmurugan and Mr. S. Antovaz. Unit IV: Title changed from, Protection Instruments to Radiation Safety and Monitoring Instruments.

24MPP2CB	PHYSICS OF RADIATION THERAPY	Unit II: Title changed from, Central Axis Dosimetry Parameters to Dosimetry Parameters as per the suggestion given by Mr. Prabakar Victor and Mr.T.Velmurugan.
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After discussion 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 2024-25 onwards.

Item 17.3: To consider and approve the changes, if any, in the syllabi for IV semester for the Students admitted during the academic year 2023-2024.

The chairman presented the syllabus for the IV semester to the students admitted for the academic year 2023-2024 onwards. The details of the changes made are also presented as follows.

Changes Made:

Course Code	Course Name	Changes and Reason
232MP2A4DA	QUALITY CONTROL, ACCEPTANCE TESTING AND CALIBRATION OF RADIATION SYSTEMS	The following topics were included in the unit II as per suggestion given by Mr. S. Antovaz and Mr. S. Sankar. Unit II: Quality Assurance for Helical Tomotherapy: TG 148 - Daily, Weekly, Quarterly and Annual.

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

Resolution:

Resolved to approve the syllabus for the IV semester for the students admitted from the academic year 2023-24 onwards.

Item 17.4: To approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2024-25.

The Chairman presented the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2024-25.

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 2024-25.

Item 17.5: 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 contribution in enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was closed with formal vote of thanks proposed by Mrs. K. Indhumathi.

Date: 04/11/2024


04/11/2024
(Mr. D. Sivakumar)

BoS Chairman/HoD
Department of Medical Physics
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Syllabus Revision

Faculty: Basic and Applied Sciences

Board: Medical Physics

Semester: II

Course Code / Name: 24MPP2CA - Radiation Detectors and Instrumentation

Unit	Existing	Changes
I	<p>Introduction to Radiation Measurements and Gas Filled Detectors Radiation- Statistical nature of radiation emission- Accuracy and Precision of measurements - Error -Types of errors- Random error and Systematic error. Basic principle of radiation detection and detector properties - Detector types -Principle of gas filled detectors- Voltage and current characteristic of gas filled detectors -Ionization chamber, Thimble chamber, Condenser type chamber and its construction and working - Gas multiplication - Proportional counters, Geiger-Muller counters - Dead time and recovery time – Quenching -Characteristics of organic and inorganic counters – Calorimetry –Principle and application for absolute dosimetry.</p>	-
II	<p>Principles of Radiation Detection Using Scintillation and Other Detectors Principle of scintillation- Scintillator and its properties - Organic and Inorganic scintillator - Relationship between pulse height and energy and type of incident particle - Photomultiplier tube - Assembly of a scintillation counter and role of light pipes - Dead time of scintillation counters – Sources of background in a scintillation counter - Resolving time-Resolving power- -Liquid scintillator. Semiconductor detectors: Diode, Metal oxide semiconductor field effect transistor (MOSFET) - Voltage current characterization -Thermoluminescence dosimeters (TLD) – Detection process - Glow curve and dose response - Common TLD materials and their characteristics – Fading-Residual TL - Annealing Process –Reuse - Optically stimulated luminescence dosimeters(OSLD). Radiographic and Radiochromic films - Film characteristic and calibration –Radiophoto luminescent dosimeters - Neutron detectors – Nuclear track emulsions for fast neutrons – Solid state nuclear track detectors (SSNTD).</p>	-
III	<p>Dosimetry Instruments: ISecondary standard therapy level dosimeters: Farmer type, Parallel Plate and Well type chambers (Re entrant, Sealed chamber) – BF3 Proportional Counter – Pocket dosimeters – Multipurpose dosimeters – Different types of electrometers – String electrometer -MOSFET, Vibrating condenser and Varactor bridge types – Phantom– Classifications (Water, Solid, Anthropomorphic phantom) - Characteristics–Radiation field analyzer (RFA) Thermoluminescent dosimeter reader for medical applications - Calibration and maintenance of dosimeters.</p>	-
IV	<p>Protection Instruments Film Badge –Film densitometers - TLD badge and reader – Glass dosimeter readers– Digital pocket dosimeters using solid state devices and GM counters –Teletector-Survey meter - GM type and Ion chamber type – Industrial gamma radiography survey meter–Gamma area (Zone) alarm monitors. Contamination monitors for alpha, beta and gamma radiation – Hand and foot monitors - Laundry and portal monitors - Scintillation monitors for X and gamma radiations – Neutron monitors, Tissue equivalent survey meters – Flux meter and Fluence - Dose equivalent monitors – Pocket neutron monitors -Teledose systems.</p>	Radiation Safety & Monitoring Instruments
V	<p>Nuclear Medicine Instruments Radioisotope calibrator– Thyroid uptake probe -Instruments for counting and spectrometry– Portable counting systems for alpha and beta radiation – Gamma ray spectrometers Multichannel analyzer– Liquid scintillation counting system – RIA counters – Whole body counters – Air monitors for radioactive particulates and gases - Details of commercially available instruments and systems.</p>	-

PERCENTAGE OF SYLLABUS REVISED: NIL

COURSE FOCUSES ON:



Skill Development



Employability



Intellectual Property Rights



Social Awareness/ Environment



Entrepreneurial Development



Innovations



Gender Sensitization



Constitutional Rights/ Human Values/ Ethics

Syllabus Revision

Faculty: Basic and Applied Sciences

Board: Medical Physics

Semester: II

Course Code / Name: 24MPP2CB –Physics of Radiation Therapy

Unit	Existing	Changes
I	<p>Therapy Beam Generators Kilovoltage therapy X-ray units – Grenz ray therapy, Contact therapy, Superficial therapy, Deep therapy and Supervoltage therapy – Spectral distribution of kV X-rays and effect of filtration -Thoraeus filter - Telecobalt units: Construction and working,Source design, Beam shutter mechanisms – Radiation field - Beam collimation, Penumbra and its types, Trimmers and Breast cones - Beam directing devices – Front and Back Pointers, Pin & arc ODI, Laser - Isocentric gantry. Linear accelerator - Design - Principle and function of klystron and magnetron, traveling and standing waveguide, pulse modulators and auxiliary systems, Bending magnet systems, Treatment head - Electron beam, X-rays, Beam collimation,Asymmetric collimator, Multileaf collimator, Dose monitoring systems - Interlocks –Output calibration procedure - Relative merits and demerits of kV X-rays, gamma rays, MV X-rays and electron beams.</p>	--
II	<p>Central Axis Dosimetry Parameters Collimator scatter factor, Phantom scatter factor and Total scatter factor – Percentage depth dose (PDD) - Factors affecting PDD - Maynord factor - Tissue air ratio (TAR), Backscatter factor/ Peakscatter factor (BSF/PSF) - Tissue phantom ratio (TPR) - Tissue maximum ratio(TMR) - Relationship between TAR and PDD and its applications –Relationship between TMR and PDD and its applications – Scatter air ratio (SAR)–Scatter maximum ratio (SMR) - Off axis ratio and field factor - Surface dose and buildup region - Isodose chart - Measurements of Isodose curves – Characteristic of isodose curves – Dosimetric data resources for treatment calculation – Concept of dose calculation for equivalent square field.</p>	Dosimetry Parameters
III	<p>Beam Modification and Shaping Devices Bolus and its types – Beam spoilers -Wedge filters – Individual, Universal, motorized and dynamic wedges – Shielding blocks - Field shaping, Custom blocking –Styrofoam cutting machine -Tissue compensators – Design of compensators, 2D compensators,3D compensators – Multileaf collimator (MLC).</p>	-
IV	<p>Treatment Planning in Teletherapy Electron contamination, Dmax, Buildup Dose, Entrance dose, Exit dose, Target volume definition and Dose prescription criteria – ICRU 29, ICRU 50, ICRU 62 and ICRU 83 - Treatment planning in teletherapy - Positioning/Immobilization - 2D and 3D localization techniques - Conventional simulator and CT simulator – Contrasts - Markers - Patient data acquisition – DICOM- Relative electron density – Image registration and segmentation using CT, MRI, US and PET. SSD and SAD set ups – Extended SSD - Field arrangements – Single, Parallel opposed and Multiple fields – Corrections for tissue inhomogeneity, Contour shapes and beam obliquity– Integral dose-Arc/Rotation therapy and Clarkson technique for irregular fields – Mantle and inverted Y Fields. Conventional and Conformal radiotherapy-Gradient Index, Treatment time and Monitor unit calculations for Co-60 and Linear accelerator – SSD and SAD/Isocentric techniques - Dose prescription and normalization - Virtual simulation – Digitally</p>	--

	reconstructed radiographs (DRR)- Beam's Eye view - Plan evaluation - DVHs – Differential and Cumulative.	
V	Electron Beam Therapy Energy specification - Depth dose characteristics of electron beam (Dmax, Ds, Dx,dmax, R90, R50, Rp and Bremsstrahlung Tail) - Characteristic of clinical electron beams- Collimation - Electron cutouts, Electron applicator - Determination of absorbed dose - Applicator factor - Cut out factor- Monitor unit calculations – Output factor formalisms - Planning and dose calculation effects of patient and beam geometry -Internal heterogeneities - Treatment planning techniques – Field abutment techniques– Photon and electron mixed beams – Electron arc therapy - ICRU71.	

PERCENTAGE OF SYLLABUS REVISED: - NIL

COURSE FOCUSES ON:



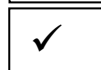
Skill Development



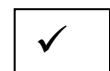
Entrepreneurial Development



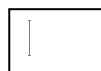
Employability



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: IV

Course Code / Name: 232MP2A4DA- Quality Control, Acceptance Testing and Calibration of Radiation Systems

Unit	Existing	Changes
I	<p>Quality Assurance Purpose for quality assurance, Goals of QA, Personnel Requirements for Clinical Radiation Therapy, Roles and Responsibilities of Medical Physicists. Documentation and Quality Assurance, Definition of Terms - Quality Control, Quality Assurance, advantages of a Code of Practice based on standards of absorbed dose to water, Expression of uncertainties, The International Measurement System, The IAEA network of SSDLs, Standards of absorbed dose to water..</p>	--
II	<p>Dosimetric Protocols and QA for Radiation Therapy Different Protocols For Dosimetry - TRS 277, TRS-398, TG 51 and TG-43, Correction for the Radiation Quality Of The Beam (K_q), Ionization Chambers, Phantoms and Calibration of Ionization Chambers. Co-60: Mechanical Checks, Electrical checks, Radiation Checks, Radiation Protection survey, Linear Accelerator: Photon beam characteristics, Electron beam Characteristics, Dose monitoring system, Treatment table, Leakage radiation measurements, Survey of installation. Brachytherapy – Machine Tests, QC of Applicator, QA of sources, Leakage and Contamination, Source Strength Verification, Uniformity and Symmetry, Dwell Position Verification, QC of treatment Unit, Radiation Safety, HDR Source Transport, Type A package, Source Transfer Process and safety Concern in HDR.</p>	<p>QA for Helical tomotherapy : TG 148- Daily, Monthly, Quarterly and Annual</p>
III	<p>Quality Assurance tests in Diagnostic Radiology QA tests for diagnostic X-ray machine: Purpose of QA tests, test procedures, Congruence of optical and radiation fields, Central beam alignment, Focal spot size, Exposure time, Applied tube potential, Total filtration, Linearity of timer, Linearity of mA, Consistence of radiation output, Radiation leakage through tube housing exposure rate at table top, Resolution of the imaging system, Radiation protection survey, Intensifying Screen Cleaning Procedure, Darkroom Integrity or Fog Test. Computed Tomography (CT) Unit: Tools required for QA tests of CT equipment, Categories of QA tests – Mechanical Tests-Alignment of table to gantry, Gantry tilt, Tests for high frequency generators, Radiation Dose test (CTDI), Image Quality Parameters, Radiation leakage tests and Radiation protection survey. Quality assurance tests of Mammography Unit, Magnetic resonance imaging (MRI): Phantom materials, resonance frequency, signal to noise ratio, image uniformity, spatial linearity, high contract spatial resolution, slice thickness, slice position/separation, image artifacts.</p>	-
IV	<p>Quality Assurance tests for TPS Acceptance, commissioning and quality assurance of radiotherapy treatment planning systems using IAEA TRS 430 and other protocols. Digitizer Accuracy, Image Acquisition and Display, Hardcopy Output Accuracy, Monitor Unit Check – Open and Wedge Fields, Isodose Checks, Clinical Isodose/Monitor Unit Check, Electron Monitor Unit and PDD Check, Operating Consistency of IMRT Dose Optimization Software, HDR Treatment</p>	--

	Planning QA, Prostate Seed Treatment Planning QA.	
V	Acceptance tests, Commissioning, and Decommissioning Procedures Acceptance tests for Medical linear Accelerators and Remote Afterloader Brachytherapy. Commissioning: Linear accelerator – Central axis depth dose tables, Isodose curves, Monitor unit calculations, Multileaf collimators (MLC), Treatment Planning computer system, Essential Equipments for Commission and Decommission. Decommissioning Process for Radioactive Sources, Medical Linacs and Brachytherapy.	-

PERCENTAGE OF SYLLABUS REVISED: - 1 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics

ATTENDANCE OF THE EIGHTEENTH BOARD OF STUDIES MEETING

Faculty : Basic and Applied Sciences

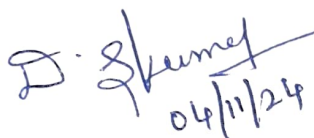
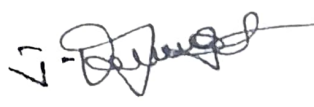



Board: Medical Physics







Venue : B1 Block, Room No. 1516

Date : 04/11/2024

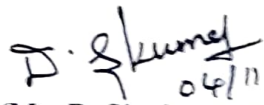
Time : 10.30 a.m.

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

S. No.	Name	Designation	Signature*
1.	Mr. D. Sivakumar Assistant Professor & Head Department of Medical Physics Dr.N.G.P. ASC	Chairman	 04/11/24
2.	Dr. J. Velmurugan PhD Professor and Head Department of Medical Physics Anna University Chennai - 25	VC nominee	
3.	Mr. Prabakar Victor M.Sc., RSO Assistant Professor of Radiological Physics Coimbatore Medical College and Hospital Trichy Road, Coimbatore - 641018	Subject Expert	
4.	Dr. A. Saravana Kumar PhD Head - Medical Physics PSG Institute of Medical Sciences and Research, Peelamedu Coimbatore - 641004	Subject Expert	Absent
5.	Mr. S. Antovaz M.Sc., RSO Chief Medical Physicist Cum RSO Department of Radiation Oncology Kovai Medical Centre & Hospital Coimbatore-641014	Industrial Expert	
6.	Mr. S. Sankar M.Sc., RSO Medical Physicist Department of Radiation Oncology PSG Institute of Medical Sciences and Research, Peelamedu Coimbatore - 641004	Alumni	

7.	Dr. R. Subramanian M.D. Head, Department of Radiation Oncology Kovai Medical Centre & Hospital Coimbatore - 641014	Co-opted Member	
8	Mr. T. Velmurugan M.Sc. RSO Senior Medical Physicist Department of Radiation Oncology, KMCH Coimbatore - 641014	Co-opted Member	
9	Dr. R. Sowrirajan Professor & Head Department of Mathematics Dr.N.G.P. ASC	Co-opted Member	
10.	Mrs. K. Indhumathi Assistant Professor Department of Medical Physics Dr.N.G.P. ASC	Internal Member	
11.	Mrs. G. Daisy Assistant Professor Department of Medical Physics Dr.N.G.P. ASC	Internal Member	
12	Mr. S. Arunkumar II M.Sc. Medical Physics Dr. N.G.P. ASC	Student Representative	

Date: 04/11/2024


04/11/2024
(Mr. D. Sivakumar)

BoS Chairman/HoD
Department of Medical Physics
Dr. N. G. P. Arts and Science College
Coimbatore - 641 048