Department of Medical Physics

Board of Studies Meeting-Minutes

The minutes of the 17th meeting of Board of Studies held on 03.04.2024 at 10.30 a.m. at Tumour Board Room, Department of Radiation Oncology, KMCH.

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, Department of Radiation Oncology, Sri Ramakrishna Hospital, 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. V. Gopalakrishnan, Professor & Head i/c, Physics	Co-opted Member
10.	Mrs. K. Indhumathi, Assistant Professor	Member
11.	Mrs. G. Daisy, Assistant Professor	Member
12.	Mr. R. Isaivannan, 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. Prof. Dr. J. Velmurugan, VC nominee attended the meeting through online as he had an official auditing in Anna University.

2. Mr. Prabakar Victor, Subject expert, not attended the meeting as he had an official meeting in the hospital.

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 **17.10.2023**

The chairman of the Board presented the minutes of the previous meeting held on 17.10.2023 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 17.10.2023.

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

The chairman presented the regulation, detailed scheme and syllabus for the I 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
24MPP1CB	RADIATION PHYSICS	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. Unit I: Title changed from, Ionizing Radiation to **Electromagnetic Spectrum.** Unit II: **Mammography, Automatic Exposure Control -Automatic Brightness Control - Measurement of kV and mA-Timers.**

		Reference Book: **Todd Pawlicki, Daniel J Scanderbeg, George Starkschall, 2016, "Hendee's Radiation Therapy Physics", 4th Edition, Wiley-Blackwell Publisher,** instead of MarkolfNeimz. H, 1996, "Laser-Tissue Interactions", 3rd Edition, Springer Verlag publisher.
24MPP1CC	BIOMEDICAL ELECTRONICS AND INSTRUMENTATION	Prof. Dr. Velmurugan Suggested to include a Text Book, **"Biomedical Instrumentation" authored by M. Arumugam, 2014,** instead of Santanue Chattopadhyay, 2006, "A text book of Electronics", 1st Edition, New Central Book Agency publisher. Kolkata.
24MPP1CD	RADIOLOGICAL ANATOMY, PHYSIOLOGY AND TUMOUR PATHOLOGY	Title of the paper modified as - **Radiological Anatomy, Physiology and Tumour Pathology** instead of Radiological Anatomy, Physiology and Pathology as suggestion given by Prof. Dr. Velmurugan. The following contents added as suggested by Dr. A. Saravana Kumar. **Unit II: Magnetic Resonance Imaging (MRI), Single Photon Emission Computed Tomography (SPECT), and Positron Emission Tomography (PET) Scans.** In unit V, the following changes have been made. **The followings topics were moved from unit III to unit V as unit III is vast.** **Unit V: Cancer Treatment Modalities** **Treatment Intent – Curative & Palliative -Types of Treatment – Surgery, Radiation Therapy, Chemotherapy, Biological Therapy, Hormone Therapy, Transplantation, Targeted Therapy, Radiolabelled Immunotherapy, Gene Therapy and other Treatment Methods -Cryosurgery, Laser Therapy, Photodynamic Therapy, Hyperthermia- Cancer Clinical Trials-- Patient Management on Treatment – Monitoring and Common Management of Side Effects –**

		Information and Communication- Cancer Prevention and Public Education. **The following topics have been removed from unit V as the same topics are covered in Professional Ethics and Legal aspects paper in semester IV.** Unit V: Professional Aspects and Role of Medical Physicists General Patient Care - Principles of Professional Practice – Medical Terminology – Research & Professional Writing – Patient Privacy – Ethical & Cultural Issues - Legal Aspects – Confidentiality, Informed Consent, Health and Safety.
24MPP1CP	CORE PRACTICAL-I BIOMEDICAL ELECTRONICS AND INSTRUMENTATION LAB	The following modifications were made as per suggestion given by Mr. S. Antovaz and Dr. A. Saravana Kumar. **Experiments Included;** **1. MOSFET characteristics** **2. Microprocessor LED interfacing** **3. Microprocessor – Timing and Control Unit** **Experiments Combined;** **1. OP-Amp applications - Adder and Subtractor.** **2. OP-Amp applications - Differentiator and Integrator.** **3. OP-Amp applications – Inverting and Non - Inverting** Experiments Removed; 1. UJT characteristics 2. Construct analog to digital conversion using IC-74148

New Courses Introduced:

Course Code	Course Name	Reason
NIL		

Courses Removed

Course Code	Course Name	Reason
NIL		

Courses Offered:

Course Code	Course
24MPP1CA	Nuclear Physics
24MPP1CB	Radiation Physics
24MPP1CC	Biomedical Electronics and Instrumentation
24MPP1CD	Radiological Anatomy, Physiology and Tumour Pathology
24MPP1CP	Biomedical Electronics and Instrumentation Lab
24MPP1DA	Solid State Physics
24MPP1DB	Non-Ionizing Radiation in Medicine
24MPP1DC	Programming in C++

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

Resolution:

Resolved to approve the syllabus for the I 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 III semester for the Students admitted during the academic year 2023-2024.

The chairman presented the syllabus for the III 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
232MP2A3CA	ADVANCED RADIOTHERAPY PHYSICS	Unit I: Title changed from, Conformal & Intensity Modulated Radiation Therapy to **Conformal Radiation Therapy, Intensity Modulated Radiation Therapy & Volumetric Modulated Arc Therapy** as per the suggestion given by Prof. Dr. Velmurugan for sequence. The following topics were included in the unit II as per suggestion given by Dr. A, Saravana Kumar since the topics are new techniques. Unit II: **Surface Guided Radiation Therapy (SGRT) - Basic Principle – Implementation- Limitations.**
232MP2A3CB	PHYSICS OF NUCLEAR MEDICINE	The following changes have been made as per the suggestion given by Prof. Dr. Velmurugan and Mr. S. Antovaz. Unit III: Title changed to "**Radionuclide Imaging Systems & Tomographic Techniques"** from Emission Tomography Techniques. Unit IV: Title changed to **"Radionuclide Imaging and Therapeutic Applications"** instead of Applied Positron Emission Tomography Imaging. The followings topics were included as per the suggestion given by Dr. A. Sarava Kumar and Mr. S. Antovaz. **Unit IV: Radionuclide imaging measurements - functions of brain, thyroid, lung, cardiac, and renal. Sr-89, Sm-153, Treatment of liver cancer and Non-Hodgkin's Lymphoma.**
232MP2A3CC	RADIATION BIOLOGY	The followings topic was included as per the suggestion given by Mr. S. Antovaz. **Unit IV: Partial Tolerance**

New Courses Introduced:

Course Code	Course	Reason
NIL		

Courses Removed

Course Code	Course	Reason
NIL		

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

Resolution:

Resolved to approve the syllabus for the III 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 2023-2024.

The Chairman presented the panel of examiners for question paper setting and evaluation of answer scripts for the odd semester of the academic year 2023-2024.

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the odd semester of the academic year 2023-2024.

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: 03.04.2024

(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: I

Course Code / Name: 24MPP1CB - Radiation Physics

Unit	Existing	Changes
I	~~**Ionizing Radiation:**~~ Electromagnetic Radiation and its Properties – Electromagnetic Spectrum - Radio waves, Microwaves, Infrared, Visible light, UV, X-rays and Gamma rays – Particulate Radiation – Properties of alpha, beta, neutrons and positrons – Classification of Radiation – Directly Ionizing Radiation – Electrons, Positrons, Heavy charged particles and Pions - Indirectly Ionizing Radiation – X-rays, Gamma rays and Neutrons.	**Electromagnetic Spectrum**
II	**X-Ray Generators:** Discovery - Production - Properties of X-Rays - Characteristics and Bremmstralung - Design of Hot Cathode X-Ray Tube - Basic Requirements of Medical Diagnostic, Therapeutic and Industrial Radiographic Tubes - Rotating Anode Tubes - Hooded Anode Tubes - ~~X-Ray Tubes for Crystallography~~ - Rating of Tubes - Safety Devices in X-Ray Tubes : Ray Proof and Shockproof Tubes - Insulation and Cooling of X- Ray Tubes - Fixed X-ray machines, Portable X-ray machines and Mobile X-ray machines - C-Arm, **Mamography** and Dental Unit – Maintenance of X-Ray Tube Unit. Filament and High Voltage Transformers – High Voltage Circuits - Half-Wave and Full Wave Rectifiers - Condenser Discharge Apparatus - High Frequency Generators - Voltage Doubling Circuits - Current and Voltage Stabilizers - Control Panels **Automatic Exposure Control-Automatic Brightness Control- Measurement of kV and mA-Timers**- X-Ray Circuits - Image Intensifiers and Closed Circuit TV Systems – Flat Panel Technology.	**Mamography –** **Automatic Exposure Control-Automatic Brightness Control-Measurement of kV and mA-Timers**
III	**Interaction of Photons with Matter** : Ionization and Excitation - Attenuation - Linear Attenuation Coefficient - Mass Attenuation Coefficient - Energy Transfer and Mass Energy Absorption Coefficients - HVL – Rayleigh Scattering – Thomson Scattering - Photoelectric Effect - Compton Effect – Pair Production – Positron Annihilation - Photo disintegration -Relative Importance of Various Types of Interactions - Importance of Interaction in Tissue.	-
IV	**Interaction of Charged Particles with Matter** : Classical Theory of Inelastic Collisions with Atomic Electrons – Energy Loss Per Ion Pair by Primary and Secondary Ionization – Dependence of Collision Energy Losses on the Physical and Chemical State of the Absorber – Cerenkov Radiation – Electron Absorption Process – Radiative Collision – Range Energy Relation –Continuous Slowing Down Approximation (CSDA) – Straight ahead Approximation and Detour Factors – Transmission and Depth Dependence Methods for Determination of Particle Penetration - Empirical Relations Between Range and Energy – Back Scattering. Interaction of Heavy Charged Particles - Energy Loss by Collision – Range Energy Relation – Alpha bragg curve and Proton bragg curve – Specific Ionization – Stopping Power – Bethe Bloch Formula.	-
V	**Interaction of Neutrons with Matter** : Neutron Sources – Properties – Energy Classifications - Fast neutron, Slow neutron and Thermal Neutron and its interactions with matter, Neutron capture – Elastic and Inelastic Scattering Coefficients and Cross Sections – Energy Transfer and Logarithmic Energy Decrement - Nuclear Reactions –Dependence on E and Z – (n,p), (n,2n), (n,γ) and other Reactions – Neutron Activation - Radio Isotope Production.	-

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: I
Course Code / Name: 24MPP1CD - Radiological Anatomy, Physiology and Tumour Pathology

Unit	Existing	Changes
I	**Human Anatomy and Physiology:** Introduction to Human Body - The Cells, Tissues and Organization of Body - Blood Skin - Lymphatic System - Skeletal System - Nervous System - Endocrine System - Cardiovascular - Respiratory System - Digestive System - Gastro-Intestinal - Excretory System - Reproductive System - Special Senses	-
II	**Radiographic Anatomy** : Anatomy of Human Body Nomenclature - Surface Anatomy - Radiographic Anatomy - Cross Sectional Anatomy – Identify the Different Organs/Structures on Plain X-rays, CT ~~scans and other available Imaging Modalities -~~ Magnetic Resonance Imaging (MRI), Single Photon Emission Computed Tomography (SPECT), and Positron Emission Tomography (PET) Scans - Normal Anatomy and Deviation for Abnormalities.	Magnetic Resonance Imaging (MRI), Single Photon Emission Computed Tomography (SPECT), and Positron Emission Tomography (PET) Scans
III	**Tumour Pathology and Cancer Screening ~~and Treatment Modalities~~** Tumour Pathology and Carcinogenesis - Basic Pathological Features of Cancers and Interpretation of Clinico-Pathological Data - Benign and Malignant Disease - Methods of Spread of Malignant Disease - Staging and Grading Systems - Treatment Intent – Curative & Palliative - Cancer Prevention and Public Education- Patient Management on Treatment – Monitoring and Common Management of Side Effects – Information and Communication - Screening - Definition, Principles, Evaluating Screening Tests, Developing and Evaluating a Cancer Screening Programme - Different Kind of Screening Tests - Screening for Specific Types of Cancer - Genetic Counseling - Treatment – Essential Terms, Surgery, Radiation Therapy, Chemotherapy, Biological Therapy, Hormone Therapy, Transplantation, Targeted Therapy, Radiolabelled Immunotherapy, Gene Therapy and other Treatment Methods (Cryosurgery, Laser Therapy, Photodynamic Therapy, Hyperthermia)- Cancer Clinical Trials.	**The III unit is split into two units: III and V**
IV	**Site Specific Signs, Symptoms, Diagnosis and management** : Head and Neck, Breast, Gynecological, Gastro-Intestinal Tract, Genito - Urinary, Lung and Thorax, Lymphomas, Leukemias & other Cancers including AIDS Related Cancers.	-
V	~~**Professional Aspects and Role of Medical Physicists :**~~ ~~General Patient Care – Principles of Professional Practice – Medical Terminology – Research & Professional Writing – Patient Privacy – Ethical & Cultural Issues – Legal Aspects – Confidentiality, Informed Consent, Health and Safety~~	**Cancer Treatment Modalities:** Treatment Intent – Curative & Palliative - Types of Treatment – Surgery, Radiation Therapy, Chemotherapy, Biological Therapy, Hormone Therapy, Transplantation, Targeted Therapy, Radiolabelled Immunotherapy, Gene Therapy and other Treatment Methods - Cryosurgery, Laser Therapy, Photodynamic Therapy, Hyperthermia- Cancer Clinical Trials-- Patient Management on Treatment – Monitoring and Common Management of Side Effects – Information and Communication- Cancer Prevention and Public Education.

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 (Practical)

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

Semester: I

Course Code/ Name: 24MPP1CP - Biomedical Electronics and Instrumentation Lab

Experiments	Existing	Changes
1	Zener regulated power supply and percentage of regulation.	-
2	Transistor characteristics- CB and CE configuration	-
3	Single stage R-C coupled transistor amplifier	-
4	Single stage FET amplifier- CS configuration.	-
5	FET characteristics.	-
6	OP-Amp applications - Adder and Subtractor.	OP-Amp Parameters – Adder and Subtractor, Differentiator and Integrator.
7	OP-Amp applications - Differentiator and Integrator.	OP-Amp applications – Inverting and Non -Inverting
8	Logic gates OR, AND, NOT, NOR and NAND Gates.	-
9	Half adder and Full adder	-
10	NAND gate as a universal gate.	-
11	A/D and D/A converters.	-
12	~~UJT characteristics.~~	MOSFET characteristics
13	Photosensitive diodes.	-
14	Verification of De-morgan's theorem.	-
15	~~Construct analog to digital conversion using IC 74148~~	Microprocessor LED interfacing -
16	OP-Amp applications – Inverting and Non -Inverting	Microprocessor – Timing and Control Unit

PERCENTAGE OF SYLLABUS REVISED: 20 %

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: III

Course Code/ Name: 232MP2A3CA - Advanced Radiotherapy Physics

Unit	Existing	Changes
I	**Conformal Radiation Therapy, Intensity Modulated Radiation therapy and Volumetric Modulated Arc therapy** 3D Conformal Radiotherapy Techniques - IMRT Principles –MLC based IMRT – step and shoot and sliding window techniques –Volumetric modulated arc therapy (VMAT).- Compensator based IMRT – Planning process – Inverse treatment planning – Immobilization for IMRT – dose verification phantoms, dosimeters, protocols and procedures – machine and patient specific QA.	Radiation Therapy, Volumetric Modulated Arc therapy
II	**Image Guided Radiotherapy And Tomotherapy** Image Guided Radiotherapy (IGRT)- concept - imaging modality - kV cone beam computed tomography (KVCT)- MV cone beam computed tomography (MVCT)- Image registration- Plan adaptation- QA protocol and procedures - special phantom- 4DCT. Surface Guided Radiation Therapy (SGRT)-Tomotherapy - Principle - ~~Commissioning~~ - Imaging - Planning and Dosimetry - Delivery - Plan adaptation	Surface Guided Radiation Therapy (SGRT) – Basic principle – Implementation - Limitations.
III	**Stereotactic Radiosurgery & Radiotherapy (SRS/SRT)** Cone and mMLC based X-knife – Gamma Knife -Frame and Frameless based SRS/SRT – Small Field Dosimetry (TRS-483) and planning procedures – evaluation of SRS/SRT treatment plans – QA protocols and procedures for X and Gamma knife units – patient specific QA- physical, planning, clinical aspects and quality assurance of stereotactic body radiotherapy (SBRT) and Cyber knife-based therapy	-
IV	**Special Techniques In Radiation Therapy** Total Body Irradiation (TBI) – large Field Dosimetry – Total Skin Electron Therapy (TSET) – Electron arc treatment and dosimetry – Intraoperative Radiotherapy. Particulate beam therapy: Neutron captures therapy– Carbon ion therapy –Proton Therapy – Hadron Therapy- Flash Radiotherapy.	
V	**Introduction To Treatment Planning System And Dose Calculation Algorithm** Scope of computers in radiation treatment planning – review of algorithms used for treatment planning computations – pencil beam, double pencil beam, Clarkson method, convolution superposition, lung interface algorithm, fast Fourier transform, Inverse planning algorithm, Monte Carlo based algorithms. Treatment planning calculations for photon beam and electron beam – factors to be incorporated in computational algorithms-plan optimization – direct aperture optimization – beamlet optimization – simulated annealing – dose volume histograms – indices used for plan comparisons – hardware and software requirements – beam & source library generation-networking, DICOM and PACS.	-

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: III
Course Code/ Name: 232MP2A3CB - Physics of Nuclear Medicine

Unit	Existing	Changes
I	**Radionuclide and Its production** Introduction to nuclear medicine- unsealed Sources- production of radionuclide used in nuclear medicine- reactor based radionuclide, accelerators based radionuclide, photonuclear activation, equations for radionuclide production, radionuclide generators and their operation principles- various usages of radiopharmaceuticals.	
II	**In -vivo and In-vitro Techniques** Thyroid uptake measurements- renogram- life span of RBC, blood volume studies etc- general concept of radionuclide- imaging and historical developments-In-vitro techniques- RIA/IRMA techniques and its principles.	-
III	**Emission Tomography Techniques** Radionuclide imaging: other techniques and instruments- the rectilinear scanner and its operational principles- basic principles and design of the anger Camera / scintillation camera- system components, detector system and electronics- different types of collimators- design and performance characteristic of the parallel hole, converging, diverging and pin hole collimator- image display and recording systems- digital image processing systems- scanning camera- limitation of the detector system and electronics Different imaging techniques: basic principles- two dimensional imaging techniques- Three Dimensional imaging techniques –Basic principles and problems- focal plane tomography- Emission computed tomography-Single Photon Emission Computed Tomography- Positron Emission Tomography-Image reconstruction techniques -Back projection and Fourier based techniques- iterative reconstruction method and their drawbacks- attenuation correction, scatter correction, resolution correction, other requirements or sources of error- Image quality parameters: spatial resolution, factor affecting spatial resolution, methods of evaluation of spatial resolution, contrast, noise- NEMA protocols followed for quality assurance / quality control of imaging instruments	Unit III : Title Radionuclide Imaging Systems & Tomographic Techniques
IV	**Applied Positron Emission Tomography Imaging** Principles of SPECT, PET, PET instrumentations- annihilation coincidence detection- PET detector scanner design- data acquisition for PET- data corrections and quantitative aspect of PET- working of medical cyclotron - radioisotopes produced and their characteristics - radionuclide imaging measurements – functions of brain, thyroid, lung , cardiac, and renal. treatment of thyrotoxicosis - thyroid cancer with I-131, use of P-32, Sr-89, Y-90 and Sm-153 for palliative treatment - treatment of live cancer and Non-Hodgkin's Lymphoma - radiation synovectomy and the isotopes used.	Unit IV : Title Radionuclide Imaging and Therapeutic Applications Radionuclide imaging measurements - functions of brain, thyroid, lung , cardiac, and renal. treatment of live cancer and Non-Hodgkin's Lymphoma - Sr-89, Sm-153, treatment of live cancer and Non-Hodgkin's Lymphoma
V	**Internal Radiation Dosimetry** Different compartmental model- single compartmental model- two compartmental model with back transference- two compartmental model without back transference-classical methods of dose evaluation: beta particle dosimetry- equilibrium dose rate equation, beta dose calculation specific gamma ray constant- gamma ray dosimetry-geometrical factor calculation- dosimetry of low energy electromagnetic radiation- MIRD technique for dose calculations- Basic producer- cumulative activity, equilibrium dose constant, absorbed fraction, specific absorbed fraction, dose reciprocity theorem, mean dose per unit cumulative activity and problems related to the dose calculations- limitation of MIRD technique.	-

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: III

Course Code/ Name: 232MP2A3CC - Radiation Biology

Unit	Existing	Changes
I	**Cell Biology** Cell physiology and biochemistry – structures of the cell - types of cells and tissue, their structures and functions - organic constituents of cells – carbohydrates, fats, proteins and nucleic acids – enzymes and their functions – functions of mitochondria, ribosomes, golgi bodies and lysosomes – cell metabolism – DNA as concepts of gene and gene action – mitotic and meiotic cell division – semi conservative DNA synthesis, genetic variation crossing over, mutation, chromosome segregation – heredity and its mechanisms.	-
II	**Interaction of Radiation With Cells** Action of radiation on living cells – radiolytic products of water and their interaction with biomolecule – nucleic acids, proteins, enzymes, fats – influence of oxygen, temperature – cellular effects of radiation – mitotic delay, chromosome aberrations, mutations and recombinations – giant cell formation, cell death recovery from radiation damage – potentially lethal damage and sublethal damage recovery - pathways for repair of radiation damage- Law of Bergonie and Tribondeau. Repair misrepair hypothesis – dual action hypothesis – modification of radiation damage – LET, RBE, dose rate, dose fractionation – oxygen and other chemical sensitizers – anoxic, hypoxic, base analogs, folic acid, and energy metabolism inhibitors – hyperthermic sensitization – radio-protective agents.	-
III	**Biological Basis of Radiotherapy** Physical and biological factors affecting cell survival, tumor regrowth and normal tissue response – non-conventional fractionation scheme and 5R's of fractionated radiotherapy repair, repopulation, redistribution, reoxygenation and radiosensitivity in the cell cycle – high LET radiation therapy.	-
IV	**Radiobiological Models** Cell population kinetic models- survival curve parameters – model for radiation action – target theory – multihit, multitarget –time dose fractionation – basis for dose fractionation in beam therapy – concepts for nominal standard dose (NSD)- Roentgen equivalent therapy (RET), cumulative radiation effects (CRE) -**Partial Tolerance** – gap correction, – Time dose fractionation (TDF) factors -TCP and NTCP evaluation-Linear ~~and linear~~ Quadratic models.	**Partial Tolerance -**
V	**Biological Effects of Radiation** Somatic effects of radiation – physical factors influencing somatic effects – dependence on dose, dose rate, type and energy of radiation, temperature, anoxia - acute radiation syndrome– LD50 dose, LD50,30 LD50,60 – effects of radiation on skin and blood forming organs- digestive track – sterility and cataract formation – effects of chronic exposure to radiation – induction of leukemia – radiation carcinogenesis – risk of carcinogenesis – animal and human data – shortening of life span – in-utero exposure – genetic effects of radiation-Radiation effects on Embryo and fetus – factors affecting frequency of radiation induced mutations – dose-effects relationship – first generation effects – effects due to mutation of recessive characteristics – genetic burden – prevalence of hereditary diseases and defects – spontaneous mutation rate – concept of doubling dose and genetic risk estimate	-

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 SEVENTEENTH BOARD OF STUDIES MEETING

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

Venue : Board Room, KMCH

Date : 03/04/2024

Time : 10.00 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	D. Sivakumar 03/4/24
2.	Dr. J. Velmurugan PhD Professor and Head Department of Medical Physics Anna University Chennai - 25	VC nominee	Online Google Meet
3.	Mr. Prabakar Victor M.Sc., RSO Assistant Professor of Radiological Physics Coimbatore Medical College and Hospital Trichy Road, Coimbatore - 641018	Subject Expert	ABSENT
4.	Dr. A. Saravana Kumar PhD Head – Medical Physics PSG Institute of Medical Sciences and Research, Peelamedu Coimbatore - 641004	Subject Expert	3/4/24
5.	Mr. S. Antovaz M.Sc., RSO Chief Medical Physicist Cum RSO Department of Radiation Oncology Kovai Medical Centre & Hospital Coimbatore-641014	Industrial Expert	S. Antovaz 03/04/2024

6.	Mr. S. Sankar M.Sc., RSO Medical Physicist Department of Radiation Oncology Sri Ramakrishna Hospital Siddhapudur, Coimbatore – 641 044	Alumni	03/04/24
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	3/4/24
9	Dr. V. Gopala Krishnan PhD Assistant Professor & Head Department of Physics Dr.N.G.P. ASC	Co-opted Member	3/4/24
10.	Mrs. K. Indhumathi Assistant Professor Department of Medical Physics Dr.N.G.P. ASC	Internal Member	3/4/24
11.	Mrs. G. Daisy Assistant Professor Department of Medical Physics Dr.N.G.P. ASC	Internal Member	3/4/24.
12	Mr. R. Isaivannan II M.Sc. Medical Physics Dr. N,G.P. ASC	Student Representative	

Date: 03/04/2024

(Mr. D. Sivakumar)

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