

Program Number **Program Name**

Date / /**20**

Medical Dosimetry Curriculum Analysis

DIRECTIONS: Determine the course(s) in which each of the following content areas is covered and enter the course number(s) and/or title(s). For guidance in what should be covered for each content area, please refer to the Medical Dosimetry Curriculum Guide (2012) published by the American Association of Medical Dosimetrists.

This curriculum is designed for students who have no practical background or experience in the field of radiation oncology. The suggested curriculum contains introductory courses to the various technical and medical areas of radiation oncology, and program directors may choose to eliminate these courses for students who have had education or experience in these topics. However, program directors are encouraged to replace these introductory courses with refresher courses.

Professional Curriculum	Program Course(s)
Clinical Competencies	
Minimum Required Competencies	
Head and Neck	
Thoracic	
Abdomen	
Pelvis	
Extremities	
Brachytherapy	
Other	
Additional Recommended Activities	
Irregular Field Plan	
Brachytherapy HDR Procedure	
Proton Treatment Planning	
Stereotactic Radiosurgery/Radiotherapy	
Rotational Treatment Planning (Tomotherapy, VMAT)	
Anus or Vulva Conventional 3D Technique	

Professional Curriculum	Program Course(s)
Healthcare Ethics and Professional Conduct	
What is Ethics?	
Professional and Legal Perspectives	
Continuum of Care	
Relationships and Insurance	
Reducing Liability/Defensive Medical Dosimetry and Physics	
Professional Conduct	
Professional Development	
Accreditation of Facilities	
Educational Accreditation	
Malpractice	
Patient Care	
Communication	
Psychological Considerations	
Health Safety	
Patient Safety	
Patient Transfer	
Patient Education – Role of Medical Dosimetrist	
Radiation Protection and Safety	
Radiation Protection	
Radiation Safety	
Storage and Transportation	
Dose Limits	
Background Sources of Radiation	
Structural Shielding Design	
Personnel Monitoring	
Regulations	
Radiation Monitoring Instruments	
Radiation Surveys	
Radiation Safety and Quality Assurance Committees	

Professional Curriculum	Program Course(s)
Pathophysiology and Oncology Management	
Cancer Treatment	
Oncology Management	
Treatment and Content for Neoplasms Originating in Following Sites: <ul style="list-style-type: none"> • Head and Neck • Central Nervous System • Breast • Lymphoreticular • Hematopoietic • Respiratory • Integumentary • Gastrointestinal • Genitourinary • Reproductive • Musculoskeletal • Emergencies • Special Considerations • Metastatic and Palliative Treatment Approaches 	
Cross-Sectional Anatomy	
Anatomic Directional Terms	
Anatomic Position and Scan Planes	
Regions: <ul style="list-style-type: none"> • Brain • Head and Neck • Thorax • Abdomen • Pelvis • Extremities 	
Imaging For Radiation Oncology	
Basic Principles of Radiographic Imaging	
Computed and Digital Radiography	
Computed Tomography (CT)	
Magnetic Resonance Imaging (MRI)	
Ultrasound	

Nuclear Medicine	
Medical Image Display and Storage	
Acquisition of Patient Data and Treatment Preparation	
Simulation and Localization	
Treatment Planning Preparation	
Computers and Computer Networking	
Terminology and Data Representation	
Computer Hardware	
Computer Software	
Networking	
Atomic and Nuclear Physics	
Structure of Matter	
Atomic Mass/Energy Units	
Orbital Electrons	
Nuclear Forces	
Radiation	
Nuclear Transformations	
Radioactive Series	
Radioactive Equilibrium	
Modes of Radioactive Decay	
Nuclear Reactions	
Nuclide Activation	
Interactions of Radiation with Matter	
Dose Measurement-External Beam	
Exposure	
Absorbed Dose	
Phantom Materials	
National Standards	
Measurements	
Instrumentation – External Beam Dose	
<i>In Vivo</i> Dosimetry	
Dynamic Dose Measurement Devices	
Brachytherapy	

Professional Curriculum	Program Course(s)
Treatment Machines and Simulators	
External Beam Delivery Machine Design and Theory of Operation	
Simulators	
Isodose Distributions	
Documentation of Dose Distribution	
Central Axis (CAX) Depth Dose Distribution	
Isodose Curves	
Complex Factors Affecting Isodose Curves	
Comparison of Hand vs. Computer-Generated Curves	
Common Discrepancies found in Computer-Generated Curves	
Beam Modification	
Matching Adjacent Fields	
General Treatment Principles	
Integral Dose	
Calculation of Dose in Shielding Regions	
Clinical Application of Electron Beams	
Production of Clinically Useful Electron Beams	
Beam Parameters	
Clinical Characteristics of Electron Beams	
Electron Beam Treatment Planning	
Dosimetric Considerations with Adjacent Fields	
Beam Algorithms for Electron Beam Calculations	
Shaping of Treatment Fields	
Electron Arc Therapy	
External Beam Dose Calculations	
Dosimetric Quantities	
CAX Dose Calculations	
Irregular Field Calculation Techniques	
Set Up Calculations	
Dose Correction Calculations	

Professional Curriculum	Program Course(s)
Brachytherapy	
Introduction/History	
Brachytherapy Radionuclides/Basic Physical Characteristics	
Brachytherapy - Calculation of Dose Distribution	
Brachytherapy – Clinical Aspects	
Implant Localization/ Verification	
Clinical Applications / Gynecologic Brachytherapy	
Clinical Applications / Prostate Brachytherapy	
Clinical Applications: <ul style="list-style-type: none"> • Endobronchial • Breast • Head and Neck • Sarcoma 	
Clinical Brachytherapy – Additional Aspects	
Radiation Biology	
Introduction	
Biophysical Events	
Radiation Effects	
Radiosensitivity and Response	
Biologic Principles of Radiation Therapy	
Conformal Treatment Planning	
Patient Positioning and Immobilization	
Imaging	
Conformal Geometric Terminology and Concepts	
CT Treatment Planning	
Treatment Planning System Functionality	
Treatment Planning	
Plan/Dose Evaluation	
Plan Verification	
Chart Documentation	
Intensity Modulated Radiation Therapy (IMRT)	
New Technology	

Professional Curriculum	Program Course(s)
Image Guided Radiation Therapy (IGRT)	
Historical Development	
Rationale for Development	
Focus of Four Areas	
Managing Respiratory Motion	
Managing Inter-traction Organ Movement	
Methods to Track Dose from IGRT During Treatment	
AAPM Task Group 75	
Respiratory Motion Management	
Observing Respiratory Motion	
Management of Respiratory Motion	
Gating Methods	
Patient Training and Queues	
Breath Hold Technique for Target and Critical Structure Separation	
Professional Curriculum	Program Course(s)
Proton Therapy	
Historical Development	
Proton Beam Physics – Nature of Proton Particle	
Treatment Planning	
Treatment Equipment	
Dosimetry	
Treatment Planning	
Treatment Delivery	
Treatment Facilities	
Quality Assurance (QA)	
Reports	
Stereotactic Radiotherapy (SRT)/Stereotactic Radiosurgery (SRS)	
Historical Development	
Definitions	
Diseases Treated	
Radiobiology	
Image Acquisition	
Planning Process	
Radiation Treatment Delivery	

Physics Acceptance Testing and Commissioning	
Quality Assurance (QA)	
AAPM Task Group 42	
Stereotactic Body Radiotherapy (SBRT)/Stereotactic Body Radiosurgery (SBRS)	
Historical Development	
SBRT Definition	
SBRT Radiobiology	
Accurate/Reproducible Patient Immobilization	
Account for Tumor Motion	
Anatomic Applications	
Dose	
RTOG Protocols – Follow for Safety	
Expert Dosimetry	
SBRT Quality Assurance (QA)	
AAPM Task Group 101	
Craniospinal Irradiation (CSI)	
Diseases treated with CSI	
Patient Positioning and Immobilization	
Treatment Techniques	
Boost	
Dose Prescription	
Total Body Irradiation (TBI)	
Historical Evolution	
TBI Rationale	
BMT Types	
Diseases Treated with BMT	
Challenges of Treatment	
Methods of Treatment Delivery with Mega-Voltage Equipment	
Partial Transmission Normal Tissue Shielding	
Dose	
Pediatric TBI	
Quality Assurance (QA)	
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Professional Curriculum	Program Course(s)
Total Skin Electron Irradiation (TSEI)	
Historical Development	
Diseases Treated	
Physical and Clinical Requirements	
Selection of Treatment Techniques	
Simulation and Immobilization	
Treatment Verification	
Physics Measurements for Commissioning	
Monitor Unit Calculations	
TSEI Quality Assurance (QA)	
Continuous Quality Improvement (CQI) Program	
Continuous Quality Improvement (CQI) Program	
Quality Assurance (QA) of Equipment	
Radiographic Simulator Quality Assurance	
Quality Assurance testing for CT Simulation	
QA in the Fabrication of Radiotherapy Treatment Aids	
Linear Accelerator	
MV Imaging Quality Assurance	
Linear Accelerator Planar kV X-ray Imaging	
Linear Accelerator Cone Beam Computed Tomography (CBCT)	
Linear Accelerator Special Procedures Equipment	
Linear Accelerator SRS Quality Assurance	
Target Detection Devices	
Gamma Knife Quality Assurance	
Quality Assurance of Co ⁶⁰ Teletherapy Unit	
Quality Assurance of Superficial and Other Low Energy X-ray Treatment Units	
Brachytherapy Intracavity Sources and Applicators	
Interstitial Brachytherapy Sources and Applicators/Templates	
Quality Assurance of Brachytherapy Remote After-loaders	
QA for Trans-Rectal Ultrasound Unit	
Brachytherapy Remote Afterloader QA	
Trans-rectal Ultrasound Unit QA	
QA Program for Dose Planning Computers	
Dose Measurement Systems and Test Equipment Quality Assurance	

Educational programs in medical dosimetry are **recommended** to incorporate college-credit bearing general education courses in efforts to build a solid foundation for the medical dosimetry curriculum. It is recommended that the following postsecondary general education coursework be delivered prior to the professional curriculum.

Recommended Post-secondary General Education	Credit Hour	Course Number	Course Title
Anatomy & Physiology			
Biology			
Mathematics			
General Physics			
Written or Verbal Communication			
Total Hours for Recommended Postsecondary General Education			