

Department of Medical Sciences

MSc Radiation & Medical Oncology Semester-wise layout of Courses

First Semester					
Sr.#	Code	Course Title	Credit	Status	Prerequisite
1	MSb521	Principles of Systemic Therapy in Clinical Oncology	3	C	None
2	MSa523	Radiation and Medical Physics for Oncologists	3	C	None
3	MS524	Tumor and Radiation Biology	3	C	None
4	MS506	Clinical Radiology	3	C	None
5	MS528	Biostatistics	2	C	None
6	MS615	Tumor Pathophysiology and Staging	2	C	None
7	CMS501	Communication Skills	1	C	None
8	CMS111	Grooming and Sprucing-I	NC	IR	None
Second Semester					
9	MSa527	Clinical Oncology Laboratory	0+2	C	None
10	MS613(T+L)	Management and Treatment of Individual Cancers	4(2+2)	C	None
11	MS611(T+L)	Treatment Planning in Radiation Oncology	4(2+2)	C	None
12	MS614(T+L)	Advanced Therapeutics in Oncology	4(2+2)	C	None
13	MS510	Introduction to Nuclear Technology	NC	IR	None
14	MS211	Grooming and Sprucing-II	NC	IR	None
Third Semester					

15	MS697	Thesis Project	10	C	Subject to departmental approval
Fourth Semester					
16	MS691	Intensive Clinical Training in Radiation & Medical Oncology-I	10	C	Subject to departmental approval
Fifth Semester					
17	MS692	Intensive Clinical Training in Radiation & Medical Oncology-II	10	C	Subject to departmental approval
Note: 'C' and 'O' stand for 'Compulsory' and 'Optional', respectively					

Detailed Course Contents of the MSc Radiation and Medical Oncology

MSb521 Principles of Systemic Therapy in Clinical Oncology

Course Details:

Status	Compulsory
Credit Hours	3
Pre-requisite	Nil
Course Format	Three hours of lectures per week

Course Objective:

This course equips the students with required knowledge for clinical use of systemic therapy including chemotherapy, targeted and immunotherapy, hormone therapy as well as supportive medications required in cancer patients. The pharmacokinetics, pharmacodynamics, indications, side effects and their management are covered in detail.

Course Contents:

Classification of chemotherapeutic agents, Hormone Therapy, Targeted and Immunotherapy agents; Their mode of action; Their Pharmacokinetics and pharmacodynamics including volume of distribution, metabolism and excretion and important drug interactions; Their side effect profile and basic management of common side effects; administration protocols; clinical indications; Introduction and indications of Supportive Therapy options: Analgesics, anti-emetics, steroids in cancer patients, Colony stimulating factors and Growth factors.

References:

1. Devita V. T., Hellman S., Rosenberg S. A. "Principles and Practice of Oncology", 12th edition, LWW, 2022.
2. Chu, E., DeVita, V. T. "Physicians' Cancer Chemotherapy Drug Manual 2023", Jones & Bartlett Learning, 2023.
3. Karp, D. D., Falchook, G. S. "Handbook of Targeted Cancer Therapy and Immunotherapy" 3rd edition, LWW, 2022.

Teaching Methodology:

- Lectures (Power point presentations)

- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted

Assessment:

- Written coursework/project assignments, two written sessional exams completed during term-time worth 50% of the total course marks.
- Unseen written terminal examination comprising of MCQs/ SEQs worth 50% of the total course marks.

MSa523 Radiation and Medical Physics for Oncologists

Course Details:

Status	Compulsory
Credit Hours	3
Pre-requisite	Nil
Course Format	Three hours of lectures per week

Course Objective:

This course provides the students with basic knowledge of physical principles involved in radiotherapy. The practical aspects of medical physics applied in radiotherapy are also focused in this course.

Course Contents:

Introduction to types of Radiation; the Measurement of Ionizing Radiation and Roentgen ;; Basic concept of dosimetry, various methods (calorimetry, films, TLDs, diodes, gel dosimeters etc.), Free air chamber, thimble chamber (both to be very brief), desirable chamber characteristics; Dosimetry of internal exposures; Radiation protection; Introduction to LINAC, Co-60, Simulators and their Components; Radiotherapy with heavier particles and Shielding Considerations ; Co-60 versus LINAC comparison; Brachytherapy equipment; Physics of brachytherapy and techniques

Beam modification (block, MLC, compensator, beam spoiler, wedge filters, bolus, breast cone, penumbra trimmers, electron applicator etc.); Dose distribution, phantoms, PDDs, Isodose curves & charts, beam profile, penumbra, measurement of isodose curves, parameters of isodose curves; Combination of Radiation Fields, Iso-centric Techniques, Wedged Techniques, Tissue Lateral Effect, Edge Effect, Integral Dose etc.; Tumor Dose Specification, DVH, Dose Conformity; Modern Radiotherapy (3D-CRT, IMRT, SRS);

Treatment planning steps, Patient data, Corrections and setup, Field shaping; Skin dose and field separation, Electron beam therapy; Quality assurance, quality control, routine tests, acceptance testing, commissioning (introduction only); Health physics, personal dosimetry, waste management and IAEA/PNRA regulations; Calibration, PSDL, SSDL, etc.

References:

1. Khan, F. M., Gibbons, J. P. “Khan's The Physics of Radiation Therapy”, LWW, 6th edition, 2019.
2. Khan, F. M., Gibbons, J. P., Sperduto, P. W. “Treatment Planning in Radiation Oncology”, LWW, 5th edition, 2021.
3. Barrett, A., Dobbs, J. “Practical Radiotherapy Planning”, 4th Edition, CRC press, 2009.

Teaching Methodology:

- Lectures (Power point presentations)
- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted

Assessments:

- Written coursework/project assignments, two written sessional exams completed during term-time worth 50% of the total course marks.
- Unseen written terminal examination comprising of MCQs/ SEQs worth 50% of the total course marks.

MS524 Tumor and Radiation Biology

Course Details:

Status	Compulsory
Credit Hours	3
Pre-requisite	Nil
Course Format	Three hours of lectures per week

Course Objective:

This course aims for understanding carcinogenesis and biological characteristics of malignant tumors. It highlights cytotoxicity of ionizing radiation and factors affecting it. This course also

develops understanding of DNA Damage Response (DDR) of cells to ionizing radiation. It covers quantifying radiation induced cytotoxicity and learning to use these quantification principles for clinical decision making in radiotherapy treatments

Course Contents:

Hallmarks of carcinogenesis; Types of ionizing radiation and their mechanism of cytotoxicity; concept of absorbed dose and LET; DNA Damage Response (DDR): cell and tissue kinetics in context of tumors; DDR: sensors, transducers and effectors; DDR: DNA repair pathways; DDR: Cell death pathways; 5 Rs of Radiation Biology; Biological dosimetry; Dose fractionation and altered fractionation protocols; Cell survival curves and their mathematical modeling; clinical decision making based on Quantitative Radiation Biology principles.

References:

1. Hall, E. J., Giaccia, A. J. "Radiobiology for the Radiologist", 8th edition, Lippincott Williams & Wilkins, 2018.
2. Joiner, M. C., Kogel, A. J., "Basic Clinical Radiobiology", 5th edition, CRC Press, 2019.

Teaching Methodology:

- Lectures
- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted

Assessments:

- Each student is required to prepare their own lecture notes and be prepared to submit notes on selected topics on a date notified during the final third of the course in the form of an assignment which will be considered as an alternative to sessional I. Students should be prepared for surprise, open book Quiz examinations (up to 2) at any time during lecture hours which will serve as an alternate to sessional II. There will be one terminal examination at the end of course according to date sheet announced by Controller, PIEAS.

MS525 Clinical Radiology

Course Details:

Status	Compulsory
Credit Hours	3
Pre-requisite	Nil

Course Format	Three hours of lectures per week
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Course Objective:

This course main objective is to familiarize the students with the basic principles of radiological imaging with emphasis on CT. This course is designed to familiarize the students with basic principles of radiological imaging with emphasis on CT. This course teaches the underlying principles behind conventional radiography, computerized axial tomography (CT), magnetic resonance imaging (MRI), and ultrasound including contrast enhancement and basic MRI sequences. Main objective of the course is to develop the abilities of the students to recognize the normal anatomical structures of brain, head & neck, abdomen & pelvis and bones using X-Ray plain films, CT and MRI (brain & pelvis) and to apply this knowledge to recognize potential pathology in areas affecting the normal anatomy. This course equips the students with the abilities to interpret imaging studies especially cross sectional imaging in various diseases with emphasis on the radiological appearance of various common tumors and to develop interpretative skill when reading CT performed in conjunction with PET and SPECT. One part of this course is to provide hands on training in ultrasound with emphasis on ultrasound of thyroid.

Course Contents:

Introduction of the physical principles of radiography (x-ray), computed tomography (CT), magnetic resonance (MR) and ultrasound imaging. Basics of CT protocols (contrast enhanced CT, dynamic CT), Basics of MRI (T1, T2 and other).

Plain films:

- Chest x-ray
- Abdomen & pelvis
- Spine
- Long bones

Mammography

CT: Location and identification of structures and organs, major lymphatic groups, relevant vascular anatomy and pathological correlation on CT images of the following regions.

- Brain
- Head & Neck
- Chest
- Abdomen & pelvis
- Bones

MR: Location and identification of normal structures and organs on MR images and recognition of pelvic tumors of the following regions

- Brain
- Pelvis

Ultrasound: Hands on training on Ultrasound abdomen/pelvis and thyroid

Common pathological Conditions: Appearances of benign and malignant processes on plain X-Rays CT and MRI.

Teaching Methodology:

- Lectures (Power point presentations)/ Board Interactive sessions
- Hands on training sessions.

Assessments:

- Two written /OSCE based sessional exams completed during term-time worth 50% of the total course mark.
- Unseen written Final examination comprising of OSCE, ESQs worth 50% of the total course mark.

References

- Adrian Dioxin,David J,Harold J Elles, "Human Sectional Anatomy: Pocket Atlas of Body Sections, CT and MRI Images", Fourth Edition,2017.
- P.Butler,A.Michell,J. Helly."Applied Radiological Anatomy"Cambridge University Press 2nd Edition, 2012.

- H.Ellis. "Clinical Anatomy: Applied Anatomy for Students and Junior Doctors".14th Edition, Wiley 2019.
- Sarah McWilliams. "Practical Radiological Anatomy," 1st edition 2011
- Pete Bridge and J. Tipper. "CT Anatomy for Radiotherapy", 2nd edition 2017
- Pocket Atlas of Sectional Anatomy- Volume I: Head and Neck; Vol. II: Thorax, Heart, Abdomen and Pelvis, 4th edition by Moeller and Reif (2013).

MS528 Biostatistics

Course Details:

Status	Compulsory
Credit Hours	2
Pre-requisite	Nil
Course Format	Two hours of lectures per week

Course Objectives:

This course aims to provide basic knowledge of biostatistics as well as its practical utility in clinical research work.

Course Contents:

Uses and abuses of medical statistics; Data: Types and its presentation; Frequency distributions; The mean, median and mode; Standard deviation and variance; Probability and decision making; Error propagation; Common pitfalls in medical statistics, Applied statistics for clinical research, Sampling techniques, Calculation of sample size, Study Designs, Statistical tests used in different study designs; Survival Analysis: Kaplan-Meier curves, Log-rank test; Cox proportional hazards regression; Effective use of SPSS.

References:

1. Zar, J. H. "Biostatistical Analysis", 6th edition, Pearson, 2019.
2. Rosner, B. "Fundamentals of Biostatistics", 8th edition, Cengage Learning, 2015.

Teaching Methodology:

- Lectures (Power point presentations)
- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted

Assessments:

- Written coursework/project assignments, two written sessional exams completed during term-time worth 50% of the total course marks.
- Unseen written terminal examination comprising of MCQs/ SEQs worth 50% of the total course marks.

MS615 Tumor Pathophysiology and Staging

Course Details:

Status	Compulsory
Credit Hours	2
Pre-requisite	Nil
Course Format	Two hours of lectures per week

Course Objective:

This course aims to equip students with basic knowledge of tumors. It covers the risk factors, pathology, symptoms & signs, workup and staging of tumors site-wise.

Course Contents:

Introducing concept of classifying Solid tumors from perspective of tissue and site of origin; relevant anatomy of different tumors, including their risk factors, common presentation, histopathological variants, natural history and metastatic potential and lymphatic drainage; TNM staging of common tumors; FIGO staging of Gynecological Tumors; Relating staging with disease prognosis.

References:

1. Kumar, V., Abbas, A. K., Aster, J. C. “Robbins Basic Pathology”, 11th edition, Elsevier, 2022.

2. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. “Principles and Practice of Radiation Oncology”, 7th Edition, LWW, 2018.
3. Devita V. T., Hellman S., Rosenberg S. A. “Principles and Practice of Oncology”, 11th edition, LWW, 2018.
4. Amin, M. B., Edge, S. B., Greene, F. L. “AJCC Cancer Staging Manual”, 8th Edition, Springer, 2018.

Teaching Methodology:

- Lectures (Power point presentations)
- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted

Assessments:

- Written coursework/project assignments, two written sessional exams completed during term-time worth 50% of the total course marks.
- Unseen written terminal examination comprising of MCQs/ SEQs worth 50% of the total course marks.

CMS-501 Communication Skills

Course Details:

Status	Compulsory
Credit Hours	1
Prerequisite	Nil
Course Format	One hour of lecture per week

Course Contents:

Writing Module: Preparation of a project proposal or technical report, Writing letters, Mission statements, Office memos etc. **Speaking Module:** Presentation of the project proposal or technical report. **Listening Module:** Simulations of interviews, lectures and question-answer sessions. **Reading Module:** Reading of a suitable fiction novel (approximately 30-50 pages a week) with the use of vocabulary support, completion of assigned tasks and discussions.

References:

1. Communication Skills for Medicine, Margaret Lloyd, Robert Bor, 2009
2. Academic Writing for Graduate Students, John M. Swales and Christine B. Feak., 2012

CMS-111 Grooming & Sprucing – I (Self Awareness)**Course Contents:**

Student home town, School education, Performance in school, College Education, Performance in college, University Education, Religious tolerance ,Extra –Curricular Activites, Favourite Subjects, Something special done for family, Personal impressions about studying in PIEAS, University dress code, Basic Conversation skills including a brief self-introduction ,tolerance and emission control in discussion, responsible behavior on social media ,nonverbal communication

MSa527 Clinical Oncology Laboratory**Course Details:**

Status	Compulsory
Credit Hours	0+2
Pre-requisite	Nil
Course Format	Six hours per week

Course Objective:

This lab provides practical experience to students with respect to radiation planning and contouring of different solid tumors. It also gives them experience of applied aspects of medical physics in radiotherapy as well as quality control of radiotherapy machines.

Course Contents:

1. Routine Quality control tests for radiotherapy equipment
2. Mould room practical work.

3. Port Film acquisition
4. Brachytherapy Procedure in Cervical tumors
5. Immobilisation equipment and Procedure
6. Interpretation of Dose Volume Histograms
7. Graphical Understanding of Iso-dose Curves for various field sizes and effect of wedges
8. Contouring of Locally advanced Oropharyngeal Tumor
9. Contouring of Nasopharyngeal Tumors
10. Contouring of Prostate Cancer
11. Contouring of inoperable GBM
12. Contouring of post-op thoracic Esophageal tumor
13. Contouring of pancreatic tumor
14. Contouring of Cervical tumor

Teaching Methodology:

- Practical lab session at Medical Centres

Assessments:

- Assessment is done at the end of semester at Medical Centre. Written paper is taken and practical aspects are evaluated.

MS613 (T+L) Management and Treatment of Individual Cancers

Course Details:

Status	Compulsory
Credit Hours	4 (2+2)
Prerequisite	Nil
Course Format	Two lectures per week + 6 hospital contact hours per week

Course Objective:

This course gives through understanding of stage- wise management of common solid tumors. In hospital contact hours, students shall participate in management of all the cases of solid tumors presenting to medical centres.

Course Contents:

Diagnostic and staging work-up of common solid tumours; These include: Tumors of Central Nervous System (brain , spine), Head and Neck (Paranasal Sinuses, Salivary Glands, Oral Cavity, Nasopharynx, Oropharynx, Hypopharynx, Larynx, Thyroid, Orbit), Lung (Non-small cell, small cell), Breast (Early, Locally advanced, Metastatic, Pregnancy), Gastrointestinal Tract (Esophagus, Gastric, Colorectal, Anal, Hepatobiliary, Pancreatic), Genitourinary (Urinary Bladder, Kidney, Prostate, Penile), Testes, Gynaecological (Cervix, Endometrium, Ovary, Vagina, Vulva), Lymphoma (Hodgkins, Non-Hodgkin), Sarcomas (Soft tissue, Bone, Retroperitoneal), Miscellaneous (Plasma Cell Neoplasms, Skin, Leukaemias, Trophoblastic Tumors) and common Paediatric solid tumors; Their Stage-wise management plans in terms of treatment intent, modalities to be used for treatment and their sequencing; stage-wise prognosis; management of residual and recurrent disease; Impact of performance status and medical/surgical fitness on management plan.

In hospital contact hours, students shall participate in management of all the cases of solid tumors presenting to medical centres with regards to Applied Anatomy, Risk factors, Histopathology, Symptoms/ Signs, Workup and Staging to Management and management-related issues. They will be participating in simulation and brachytherapy as well as chemotherapy administration and radiotherapy.

References:

1. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. “Principles and Practice of Radiation Oncology”, 7th Edition, LWW, 2018.
2. Devita V. T., Hellman S., Rosenberg S. A. “Principles and Practice of Oncology”, 11th edition, LWW, 2018.
3. Bartosz Chmielowski, Territo, M. “Manual of Clinical Oncology”, 8th edition, LWW, 2017.
4. Latest Guidelines in Oncology.

Teaching Methodology:

- Lectures (Power point presentations)
- Practical experience at Medical centre by attending OPDs, MDMs, Wards, Chemotherapy Daycare

Assessments:

- Written sessional exam and clinical exam worth 50% of the total course marks.

- Unseen written terminal examination and clinical exam worth 50% of the total course marks.

MS611 (T+L) Treatment Planning in Radiation Oncology

Course Details:

Status	Compulsory
Credit Hours	4 (2+2)
Prerequisite	Nil
Course Format	Two lectures per week + 6 hospital contact hours per week

Course Objective:

This course covers radiation planning of common solid tumors. In hospital contact hours, students shall participate in radiation planning of all the cases of solid tumors presenting to medical centres.

Course Contents:

Stage-wise Radiotherapy Planning of individual tumors in terms of target volumes and OARs, patient treatment set up, immobilisation, beam type and energy selection, beam arrangement, choosing between SSD and SAD technique, Shielding techniques, Phases of treatment; Therapeutic and tolerance doses; Means of Treatment Plan verification.

In hospital contact hours, students shall participate in management of all the cases of solid tumors presenting to medical centres with regards to Applied Anatomy, Risk factors, Histopathology, Symptoms/ Signs, Workup and Staging to Management and management-related issues. They will be participating in simulation and brachytherapy as well as chemotherapy administration and radiotherapy.

References:

1. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. "Principles and Practice of Radiation Oncology", 7th Edition, LWW, 2018.
2. Devita V. T., Hellman S., Rosenberg S. A. "Principles and Practice of Oncology", 11th edition, LWW, 2018.

3. Barrett, A., Dobbs, J. "Practical Radiotherapy Planning", 4th Edition, CRC press, 2009.

Teaching Methodology:

- Lectures (Power point presentations)
- Practical experience at Medical centre by attending Radiation Planning Room

Assessments:

- Written sessional exam and clinical exam worth 50% of the total course marks.
- Unseen written terminal examination and clinical exam worth 50% of the total course marks.

MS614 (T+L) Advanced Therapeutics in Oncology

Course Details:

Status	Compulsory
Credit Hours	4 (2+2)
Prerequisite	Nil
Course Format	Two lectures per week + 6 hospital contact hours per week

Course Objective:

This course covers the applied aspects in the management of cancer patients. Students are taught the management of oncological emergencies, management of complications of cancer treatment, supportive and advanced aspects in management of solid tumors.

Course Contents:

Oncological emergencies; Acute and late complications of cancer treatment along with their management; Supportive care for cancer patients: Cancer pain palliation, Nutritional support, Cancer cachexia, Psychological issues and counselling; Genetic counselling; Newer approaches in cancer treatment in light of current research publications; second and third line treatment options; Theranostics; Bone marrow transplantation.

In hospital contact hours, students shall participate in management of all the cases of solid tumors presenting to medical centres with regards to Applied Anatomy, Risk factors, Histopathology, Symptoms/ Signs, Workup and Staging to Management and management-

related issues. They will be participating in simulation and brachytherapy as well as chemotherapy administration and radiotherapy.

References:

1. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. “Principles and Practice of Radiation Oncology”, 7th Edition, LWW, 2018.
2. Devita V. T., Hellman S., Rosenberg S. A. “Principles and Practice of Oncology”, 11th edition, LWW, 2018.
3. Chu, E., DeVita, V. T. “Physicians' Cancer Chemotherapy Drug Manual 2023”, Jones & Bartlett Learning, 2023.
4. Karp, D. D., Falchook, G. S. “Handbook of Targeted Cancer Therapy and Immunotherapy” 3rd edition, LWW, 2022.

Teaching Methodology:

- Lectures (Power point presentations)
- Practical experience at Medical centre by attending OPDs, MDMs, Wards, Chemotherapy Daycare

Assessments:

- Written sessional exam and clinical exam worth 50% of the total course marks.
- Unseen written terminal examination and clinical exam worth 50% of the total course marks.
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MS510 Introduction to Nuclear Technology

Course Details:

Status	Compulsory, Institutional Requirement
Credit Hours	Nil
Prerequisite	Nil
Course Format	One hour of lectures per week

Course Objective:

This course familiarizes students with the basis of nuclear technology, nuclear reactor and application of nuclear technology in various scientific fields.

Course Contents:

Developments in physics leading to the discovery of nuclear fission, Development of nuclear technology, Review of nuclear reactors and fuel cycle facilities, Present status of nuclear power in Pakistan and in the world, Current problems and future prospects of nuclear power.

References:

1. Lamarsh J.R., Barrata A. "Introduction to Nuclear Engineering", 4th edition, Prentice Hall, 2017.
2. Knief R. A. "Nuclear Engineering: Theory and Technology of Commercial Nuclear Power", 2nd edition, Hemisphere, 1992.
3. Rahman, I.U., P.S. Sheih, P. S. "Introduction to Nuclear Engineering", Krieger Pub. Co., 1981.

Teaching Methodology:

- Lectures
- Written Assignments/ Quizzes if required: There will be assignments /quizzes during session. Late submission and copied assignments will not be accepted.

Assessments:

- Written coursework/project assignments, written sessional exam completed during term-time worth 50% of the total course marks.
- Unseen written terminal examination comprising of MCQs/ SEQs worth 50% of the total course marks.

CMS-211 Grooming & Sprucing – II (Personality Development)**Course Contents:**

Personal impressions about life at PIEAS: Academic progress achieved, extracurricular activities, Difficulties /problems faced by students, any observation and /or suggestion, Social etiquette comprising of dress code, ethical behavior of dress code, eating manners, stress management.

Habits of effective people, be proactive ,begin with the end in mind ,put first things first ,think win-win, seek first to understand then be understood ,synergize and keep improving, power point presentation on topic of choice.

References:

- Stephen R. Covey, The 7 habits of highly effective people powerful lessons in personal change, Simon and Schuster, 2004.

Sean Covey, The 7 Habits of highly Effective teens: Work book, Mango Media Inc, 2015

MS697 Thesis Project

In collaboration with a project supervisor each student carries out a clinical project for the MS thesis.

Course Details

Status	Compulsory
Credit Hours	10
Prerequisite	Subject to departmental approval
Course Format	Minimum of 30 hours of clinical work per week (Duration 14 weeks)

Course Objective:

The purpose of the project is to acquaint the students with the techniques of research in clinical oncology. Students will be attached with a Medical Centre, which include all PAEC Medical Centres with radiation cancer treatment facility, oncology centres of the Armed Forces, Shaukat Khanum Memorial Cancer Hospital etc., in Pakistan for work on their respective research/thesis project. This project does not necessarily have to be a completely original study but should exhibit a thorough knowledge of the subject and should be an exhaustive review of the literature on that particular topic. The aim of the project is to train the students in planning and conducting research projects and writing scientific papers.

Assessments:

Project theses are sent to experts in field of clinical oncology medicine for final assessment.

- Final defense presentation and VIVA VOCE worth 50% of the total course marks.
- Written evaluation report and grading collected from panel of examiners worth 50% of the total course marks

MS691 Intensive Clinical Training in Radiation & Medical Oncology-I

Course Details:

Status	Compulsory
Credit Hours	10
Prerequisite	Subject to departmental approval
Course Format	Minimum of 30 hours of clinical work per week (18 weeks)

Course Objective:

This course comprises of training in the field of clinical oncology. Students manage cancer patients in OPDs & wards under supervision. They also make radiation plans required for radiotherapy of solid tumors.

Course Contents:

For clinical training, each student is attached to an Oncology medical center, (NORI, INMOL, KIRAN, AEMC, CMH, SKMCH, Shifa and AKUH). The HoD there is responsible for supervision of clinical training and clinical know how with regards to Applied Anatomy, risk factors, Histopathology, Symptoms/ Signs, Workup and Staging of all solid tumors presenting to the center. These include: Tumors of Central Nervous System (brain , spine), Head and Neck (Paranasal Sinuses, Salivary Glands, Oral Cavity, Nasopharynx, Oropharynx, Hypopharynx, Larynx, Thyroid, Orbit), Lung (Non-small cell, small cell), Breast (Early, Locally advanced, Metastatic, Pregnancy), Gastrointestinal Tract (Esophagus, Gastric, Colorectal, Anal, Hepatobiliary, Pancreatic), Genitourinary (Urinary Bladder, Kidney, Prostate, Penile), Testes, Gynaecological (Cervix, Endometrium, Ovary, Vagina, Vulva), Lymphoma (Hodgkins, Non-Hodgkin), Sarcomas (Soft tissue, Bone, Retroperitoneal), Miscellaneous (Plasma Cell Neoplasms, Skin, Leukaemias, Trophoblastic Tumors) and common Paediatric solid tumors.

References:

1. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. “Principles and Practice of Radiation Oncology”, 7th Edition, LWW, 2018.
2. Devita V. T., Hellman S., Rosenberg S. A. “Principles and Practice of Oncology”, 11th edition, LWW, 2018.

MS692 Intensive Clinical Training in Radiation & Medical Oncology-II

Course Details:

Status	Compulsory
Credit Hours	10
Prerequisite	Subject to departmental approval
Course Format	Minimum of 30 hours of clinical work per week (Duration 18 weeks)

Course Objective:

This course comprises of training in the field of clinical oncology. Students manage cancer patients in OPDs & wards under supervision. They also make radiation plans required for radiotherapy of solid tumors.

Course Contents:

For clinical training, each student is attached to an Oncology medical center, (NORI, INMOL, KIRAN, AEMC, CMH, SKMCH, Shifa and AKUH). The HoD there is responsible for supervision of clinical training and knowhow with regards to Management and management-related issues of all solid tumors presenting to the center. These include: Tumors of Central Nervous System (brain , spine), Head and Neck (Paranasal Sinuses, Salivary Glands, Oral Cavity, Nasopharynx, Oropharynx, Hypopharynx, Larynx, Thyroid, Orbit), Lung (Non-small cell, small cell), Breast (Early, Locally advanced, Metastatic, Pregnancy), Gastrointestinal Tract (Esophagus, Gastric, Colorectal, Anal, Hepatobiliary, Pancreatic), Genitourinary (Urinary Bladder, Kidney, Prostate, Penile), Testes, Gynaecological (Cervix, Endometrium, Ovary, Vagina, Vulva), Lymphoma (Hodgkins, Non-Hodgkin), Sarcomas (Soft tissue, Bone, Retroperitoneal), Miscellaneous (Plasma Cell Neoplasms, Skin, Leukaemias, Trophoblastic Tumors) and common Paediatric solid tumors.

References:

1. Perez, C. A., Brady, L. W., Edward, C. Halperin, E. C., Wazer, D. E. “Principles and Practice of Radiation Oncology”, 7th Edition, LWW, 2018.
2. Devita V. T., Hellman S., Rosenberg S. A. “Principles and Practice of Oncology”, 11th edition, LWW, 2018.