



**PAEDIATRICS HAEMATOLOGY & ONCOLOGY
(PHO)**

**Residency Training Program
Leading to the degree of**

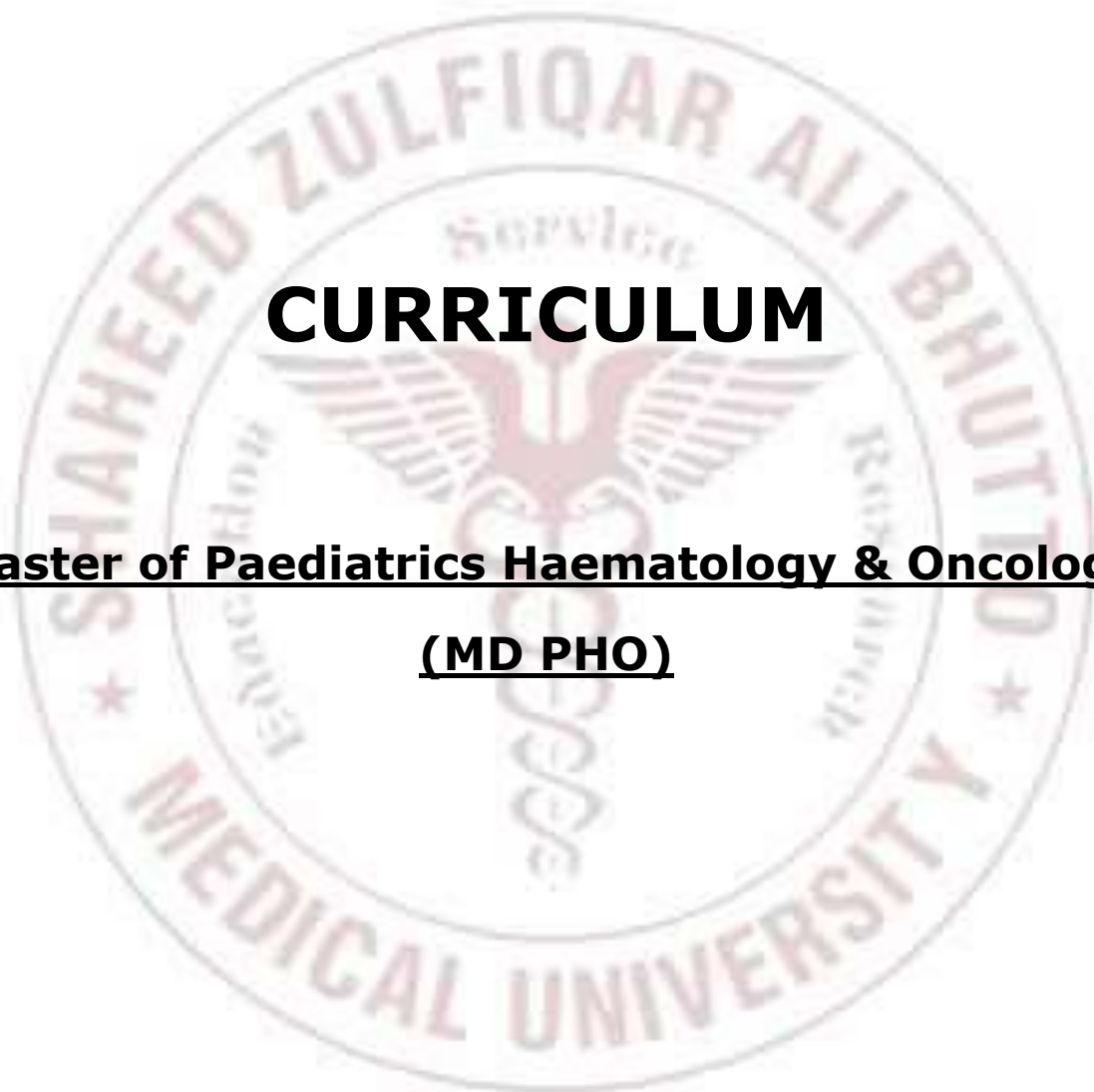
**Master of Paediatrics Haematology and Oncology
(MD)**

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UNIVERSITY ISLAMABAD**

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CURRICULUM

Master of Paediatrics Haematology & Oncology

(MD PHO)

CURRICULUM DEVELOPMENT COMMITTEE

This Curriculum is developed by the following committee

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ROAD MAP OF PAEDIATRICS HAEMATOLOGY/ONCOLOGY (A Brief Summary)

GENERAL INFORMATION AND PROGRAM GOALS

University offer a 02 year MD program in the field of Paediatrics Haematology & Oncology. This program intends to attract candidates that have an interest in Paediatric Cancers & various benign paediatric Haematological disorders and related research methodologies. The curriculum focuses on formal teaching & training as well as practical fieldwork.

This MD program aims to train and equip the post-graduate students with all the necessary knowledge & skills, at par with international standards, required to be a leader in the field of Paediatrics Haematology & Oncology. The candidates, upon graduation, will be expected to demonstrate a high level of expertise in the field of Paediatrics Haematology & Oncology.

COURSE DESCRIPTION

This is a 2 years training program in the field of "Paediatric Heamatology Oncology & Bone Marrow Transplant". A total of seventy (70) credit hours of instruction and supervised activities are distributed over four years academic period. This comprises approximately 864 contact hours of instruction and approximately 3,336 scheduled hours including formal didactic, clinical, research and laboratory experience.

TOS ID	TITLES	CREDIT HOURS
PHO-1	Molecular and genomic methodologies for clinicians and insight to immunotherapy	2
PHO-2	Hematologic manifestations of systemic illness	2
PHO-3	Classification and diagnosis of anemia in children and neonates	2
PHO-4	Nutritional anemias	2
PHO-5	Lymphadenopathy and diseases of the spleen	2
PHO-6	Bone marrow failure	2
PHO-7	General considerations of hemolytic diseases, red cell membrane, and enzyme defects	2
PHO-8	Extracorporeal hemolytic anemia	1
PHO-9	Hemoglobinopathies	2
PHO-10	Primary and secondary erythrocytosis	1
PHO-11	Disorders of white blood cells	2
PHO-12	Disorders of platelets	2

PHO-13	Disorders of coagulation	2
PHO-14	Vascular anomalies	1
PHO-15	Histiocytic disorders	2
PHO-16	Lymphoproliferative disorders	3
PHO-17	Myelodysplastic syndromes and myeloproliferative disorders	2
PHO-18	Hematological malignancies	3
PHO-19	Approach to lymphomas	3
PHO-20	Palliative care in oncology	2
PHO-21	Radiation oncology	2
PHO-22	Central nervous system tumors	2
PHO-23	Tumors of neural crest cells	2
PHO-24	Renal tumors	2
PHO-25	Sarcomas (soft tissues sarcomas and non- soft tissue sarcomas)	2
PHO-26	Malignant bone tumors	2
PHO-27	Tumors of eye	2
PHO-28	Genitourinary tumors	2
PHO-29	Hepatic tumors	2
PHO-30	Hematopoietic stem cell transplant and cellular therapy	2
PHO-31	Management of oncologic emergencies	2
PHO-32	Supportive care of patients with cancer	2
PHO-33	Evaluation, investigations, and management of late effects of childhood cancer	2
PHO-34	Psychosocial factors impacting children with cancer and their families	2
PHO-35	Pediatric blood banking principles and transfusion medicine practices	2

Grand total of first and second year = 70 credit hours

DESCRIPTION OF ROTATIONS DURING TWO YEAR TRAINING PROGRAM

FIRST YEAR

In the first year, training will be focused on acquiring clinical expertise. Trainee will be needed to get in depth knowledge regarding:

- 8 months in in-patient ward: chemotherapy instillation and knowledge of side effects.
- All inpatients consults during inpatient service
- 2 OPD clinics per week during rotation in out-patient department which includes prescription writing, protocol writing etc.
- 3 months of experience in outpatient chemotherapy unit: prescribing chemotherapy, giving intrathecal drugs, supervising intrathecal infusions and managing acute toxicities and side effects.

- Supervising inpatient issues and coordinate rounds.
- Supervising and verify all chemotherapy orders
- Perform/supervise inpatient procedures
- 1 month in thalassemia and hemophilia Center.

SECOND YEAR

- Second year mostly involve research and electives.
- 5 months in in-patient ward: apart from his duties will supervise and train year junior Residents.
- 2 out-patient clinics per week
- 4 months of outpatient chemotherapy unit
- Mandatory rotations:
 - 1 month elective rotations in other large oncology units
 - 1 month in Bone marrow transplant unit
 - 1 month in Radiation Oncology

REQUIREMENTS OF SECOND MD DEGREE FOR POST GRADUATE STUDENTS ENROLLED IN THE PROGRAM

- Fulfillment of University requirements for postgraduate study.
- Two (2) years of consecutive full time advanced study and clinical training.
- Complete and approved article based on original research during the course of study in an area related to specialty, suitable for publication in a reputable journal.
- Must complete all didactic & clinical work in the required curriculum.
- A minimum of 60% must be earned in exit/final examination attempted in the master's program. A grade below this will require re-examination.



INTRODUCTION

INTRODUCTION

The advances in treatment of different diseases in last few decades have also revolutionized Cancer treatment in children.

In mid 90's almost all cancers were fatal in children. Now most of childhood cancers have high cure rate ranging up to 90% in most of cases.

Pakistan faces challenges not only in basic health system but also in specialized care like cancer and bone marrow transplant. There are only 10 centers in the country in major cities of Pakistan which are offering treatment in this field. There are far less trained pediatric oncologists to properly diagnose and treat cancer in children.

Keeping in view the large percentage of pediatric population and potential high rate of children presenting with childhood cancer, this course has been initiated by SZABMU to training skillful pediatrics in this field.

The programme will be able to produce at the end of the course a specialist who is not only trained in the field of benign hematology but also in the field of oncology and bone marrow transplant.

This will be helpful in supervising the future unit in their own area and hence dissemination of skill to less trained facilities in the country, It will also bring the cost and dependence on private sector in due course of time.

This curriculum has been developed on the basis of SPICES model which is indicative of the competencies required at the varying levels of training within the specialty together with the knowledge, skills and attitudes achieved by the trainee in acquiring those competencies. The training has been based on the current thinking and the requirements for

- Greater protection of the public interest by providing clear information as to the level of training achieved.
- Improved access to specialty training than general practitioners.
- Greater flexibility of training through the availability of multiple instructors.

- Producing a competent workforce with the appropriate skills and knowledge necessary to meet the varying levels of treatment complexity, as well as considering the relative need and demand of potential patients.
- Acquire the experience to carry out research projects, critically evaluate scientific publications and communicate clinical and research papers in journals and conferences.





RATIONALE

NEED OF PROGRAM

CURRENT TREATMENT SITUATION OF PAEDIATRIC ONCOLOGY IN PAKISTAN

The challenge of raising survival rates of childhood cancers in Pakistan can broadly be categorized into two main areas:

- Challenges of access to care
- Challenges of effective treatment

CHALLENGES OF ACCESS TO CARE

Despite an increase in the number of treating centers, still only a small fraction of children has access to trained oncologists. There are several attributing factors to it, including poverty, population explosion, illiteracy, and political turmoil & funding.

CHALLENGES OF EFFECTIVE TREATMENT

Pakistani hospitals lack trained medical personnel and financial resources to treat a minority of paediatric oncology cases that may be diagnosed and sent to them for treatment. The specific issues can be summarized as follows:

- There are only a few trained paediatric oncologists in this country with a population of approximately 155 million. This puts an immediate limit on the number of patients who can receive competent treatment. There are currently designated paediatric wards that do not have any trained certified paediatric oncologists to staff them and are being manned by pediatricians who lack specialized paediatric oncology training necessary to achieve acceptable survival & cure rates.
- General pediatricians, adult medical oncologists, general surgeons and radiotherapists are treating most of the children with malignancies. Those who reach specialist care, using mostly outdated inadequate treatment and supportive care. As young vigorous physicians do not see an academic career in this field, recruiting

remains difficult in existing paediatric oncology departments willing to impart training.

- Other health practitioners like nurses, psychologists and social workers receive no paediatric oncology training. Those who are trained at the existing facilities are aggressively recruited by the Middle East & West.
- There is a marked shortage of diagnostic and therapeutic facilities for paediatric oncology. Those that exist are totally swamped by sheer patient load making patient care sub optimal.
- Poor transportation, both for urban and rural patients who gain access to the health care makes existing facilities inaccessible to the large majority of indigent people, since paediatric oncology treatment is intensive requiring frequent hospitalization or outpatient visits for chemotherapy radiation etc. poor transportation hinders treatment compliance and cure rates.
- Patients are diagnosed late with advanced stage disease, and with a high prevalence of co-morbid conditions like malnutrition, infectious diseases and parasitic infestations, leading to poor outcome with chemotherapy and surgery.
- Due to political and economic instability, there has been a dramatic rise in the cost of health care. Most of the hospital supplies as well as chemotherapeutic drugs in Pakistan are imported and therefore the cost of treating cancer in Pakistan will continue to spiral up.
- Blood bank products are not routinely screened for hepatitis and HIV in Pakistan and Hepatitis A, B & C are rampant in the country. Vaccination against Hepatitis B is a very recent practice, and most of the patients are still not privileged and making them suitable candidates for blood transfusion diseases.
- Pain control is the vital part of cancer treatment, but in most parts of Pakistan oral and parental Morphine and its analogues are not legally available for outpatient use.
- There are no national or regional registries so there is no awareness of cancer incidence or its impact.

- Clinical and other research is an important aspect of paediatric oncology programs to study the types of malignancies present in any local environment, and to innovate and adapt treatment protocols to local conditions. There are marked geographic variations in incidences and presentations observed in the spectrum of paediatric malignancies. In Pakistan the shortage of trained manpower makes this extremely difficult. Overcoming challenges to effective treatment requires work on a number of these fronts. We believe that expanding the number of trained paediatric oncologists in the country is the foundation on which many of the other change initiatives will be constructed. This proposal seeks to do just that. The need for Pakistan based fellowship program in Paediatric Hematology Oncology has become clear for a number of reasons.
- The number of Pakistani trained paediatric hematologists worldwide is fairly small, less than 20. A majority of them have been unable to relocate to Pakistan permanently after their training abroad, limiting the number of full time in country paediatric oncologists to 5
- In the current international political environment, where Pakistani physicians are encountering unprecedented difficulties in obtaining visas and training opportunities in the West, it is unlikely that Pakistan can find ways of sending more doctors for paediatric hematology oncology training overseas in hopes of expanding the supply that way.
- An in country training program then becomes the best way to increase the supply of in country paediatric hematologists and oncologists.

PURPOSE OF TRAINING

The purpose of this curriculum is to guide the training of an individual to the core level of competence required for specialist and consultant. This training will produce consultant who are specialists in their field.

CONTEXT OF TRAINING

To provide an organized educational program with guidance and supervision, a structured training program will be followed so that each trainee is exposed to different aspects of the subject and acquires special knowledge and skill as expected in this program. The training will provide a basis for the candidate to develop into a lifelong learner who is capable of self-reflection and self-directed learning. It will provide a basis for further ongoing development in the field.

DURATION OF TRAINING

The program leading to MD in Paediatrics Haematology & Oncology will be of 02 years full time.

FACULTY

A supervisor in the field of paediatric Oncology, having 5 years post fellowship experience in the field of Oncology.



AIMS & OBJECTIVES

AIMS OF TRAINING

The overall goal of the course is to train and groom a specialist in the field of Paediatric Oncology, who can serve the community with not only diagnostic and treatment skills, but also ethically treat a patient with curable illnesses.

Following aims will be targeted to achieve at the termination of 2 years training:

1. Candidate can diagnose and treat paediatric patients with cancer independently.
2. Candidate is able to utilize screening methods to identify malignant as well as benign disorders.
3. Candidate is familiar with the correct line of diagnostic workup in each type of cancer and has complete insight into their correct interpretation.
4. Candidate must know the right treatment protocol to be applied for each cancer and their tailoring according to needs and situation of each child.
5. Candidate should be able to take independent decisions.
6. Candidate should have sound knowledge in counseling at each stage of Cancer.
7. Candidate should be able to deal in paediatric palliative care and end of life issues.
8. Candidate should be able to plan out research, in the field of Oncology and Bone Marrow transplant.
9. Candidate should be a part of teaching and training program.

LEARNING OBJECTIVES

At the end of the training for MD in Paediatric Hematology Oncology a candidate will be able to:

1. Assess the patients seeking medical advice for their hematological and oncologic problems by:
 - Obtaining pertinent history

- Performing appropriate physical examination
 - Formulating a working diagnosis
 - Deciding whether the patient requires:
 - - Ambulatory care or hospitalization
 - - Consultation with other health professionals
2. Manage patients requiring treatment
 - Decide on appropriate investigation plan
 - Decide and implement suitable treatment
 - Enlist assistance of other specialties in providing appropriate treatment
 - Maintain follow ups of patients at required intervals
 - Maintain records of patients
 3. Under take research and publish findings
 4. Acquire new information, assess it's utility and make appropriate applications
 5. Recognize the role of team work and function as an effective member /leader of the team
 6. Advise the community on matters related to promoting health and preventing disease
 7. Train paraprofessionals and junior members of the team
 8. Organize and run a rational prescribing program for chemotherapy and hematopoietic growth factors in a hospital
 9. Participate in the care of bone marrow transplant patients
 10. Review and accurately diagnose from peripheral blood and bone marrow smear, Immunophenotyping information and molecular biologic results.

KEY ELEMENTS OF THE TRAINING

1. The curriculum will include hematologic disorders of the newborns, congenital and acquired disorders of the red blood cells, white cells and platelets, coagulation & immune problems, as well as malignant disease and solid tumors seen in all paediatric age groups including cancer biology, epidemiology and genetics.

- The Residents will have the opportunity to become familiar with all aspects of the chemotherapy including treatment protocols and management of complications, diagnosis and treatment of infections in the various blood components, plasmapheresis and bone marrow transplant. The trainee will learn the methods of physiological support of cancer patients including parenteral nutrition, control of nausea and vomiting and pain management.
 - The staging and classification of tumors , complete knowledge of the application of the multi-modal therapy (surgery, radiotherapy, and chemotherapy), learning to function as a member of oncology team, learning the epidemiology and etiology of childhood cancers, making good observations and keeping accurate patient data
2. Residents will participate in the activities of the institutional tumor board and in the provision of comprehensive care of the child with cancer
 3. Residents will have training in, supporting patient & family dealing with terminal illness.
 4. Residents will become familiar with the diagnostic services of pathology, radiology, nuclear medicine, computed tomography, sonography, angiography, clinical chemistry, microbiology, immunology and genetics in evaluation of patients with malignant disorders. They will become familiar with the normal variations in laboratory data that occurs at different ages and should know the influence of medications, toxins and systemic disease on hematological values.
 5. Residents will be trained in paediatric oncology diagnostic procedures:
 - Bone marrow biopsies
 - Lumbar puncture with evaluation for cerebro-spinal fluid
 - Insertion of central lines (like Porta catheter lines)
 - Interpretation of peripheral blood films

6. Residents will be familiarized with research protocol development, research writing & clinical trials in treatment of children with cancer and blood disorders.
7. Residents will be rotated through the different departments in the hospital and will be encouraged to rotate through other institutions approved by the University.
8. Residents will become familiar with biological principles, indications and methods of hematopoietic stem cell transplantation, expected outcomes, risks and complications.

CORE COMPETENCIES

A specialist must possess varied and complex skills. A complete list of the same necessary for trainees and trainers is given below. The level of competence to be achieved each year is specified according to the key, as follows:

1. Observed status
2. Assistant status
3. Performed under supervision
4. Performed independently

COMPETENCIES	Year 1		Year 2	
	Comp.	Min of #	Comp.	Min of #
	Level	Cases	Level	Cases
A. Patient Management				
Formulating a working diagnosis	3	30	4	30
Deciding about ambulatory care /hospitalization referral	3	30	4	30
Ordering investigations and interpreting them	3	30	4	30
Deciding and implementing treatment	3	30	4	30
Maintaining follow ups of patients	3	30	4	30
B. PROCEDURES				
Bone marrow biopsy	3	30	4	30
Lumbar puncture	3	50	4	50
Insertion of Porta cath needle	3	20	4	20
Preparation of slides and staining	3	20	4	20
Administration of intrathecal chemotherapy	3	30	4	30



ENTRY CRITERIA

ELIGIBILITY TO APPLY FOR MD PAEDIATRICS HAEMATOLOGY & ONCOLOGY

- Candidate must be medical graduate with MBBS from an institute registered with PMDC
- Candidate must have prior MD (from a registered institute) in the field of paediatric medicine; Eligible candidates will directly apply into haematology oncology Programme
- In case of foreign candidate, valid registration with Medical Council of their country of origin must be produced.
- Registration fee to be deposited before joining the course.
- Prior experience in Paediatric Oncology will be preferred.

REQUIRED DOCUMENTS

Attested photo copies of the following documents must be attached with application form:

- Computerized National Identity Card (CNIC)
- Domicile certificate
- Matric/O Level, FSc/A Level, Certificates or equivalent
- MBBS degree with detail marks certificates of all professional
- MBBS Attempts certificates of all professional
- NEB pass certificate (for foreign graduates)
- House Job certificates
- PMDC valid permanent registration certificate
- Experience Certificates (if any)
- Migration Certificate (To be produced at the time of admission)

ADMISSION PROCEDURE

- Details of admission procedure is available on university website at <http://www.szabmu.edu.pk/admission/postgraduate-admission>



LEARNING OBJECTIVES

The training program should have the following internationally recommended learning outcomes:

- Knowledge: the candidates must have general knowledge to
- Body response to disease
- Plan investigations
- Define management of medical disorder
- Apply recent advances in diagnosis and treatment

SKILLS

DOCUMENTATION SKILLS

- Medical record writing
- Treatment plan writing with program follow up instructions

COMMUNICATION SKILLS

- The candidate will be able to communicate in empathy with the patient and his relatives/ care givers
- Able to take proper history and do physical examination
- Summarize his case

DIAGNOSTIC AND MANAGEMENT SKILLS

- To logically interpret the positive findings in history and examination to reach a proper diagnosis/ differential diagnosis
- Should have the ability to find and manage the patient's problem
- Should be able to correctly correlate clinical and laboratory findings

RESEARCH SKILLS

- The candidate must be able to conduct research individually
- Have knowledge of research methodology and statistical tools
- Correctly interpret difficult articles

Apart from these skills trainee must have medical knowledge about diagnosis, management and proper staging of the following cancers

- Hematological malignancies
- Brain and spinal cord tumours
- Retinoblastomas
- Soft tissue sarcomas
- Lymphomas
- Renal tumors
- Neuroblastomas
- Bone tumors
- Langerhan's cell Histiocytosis
- Cancers of genitourinary tract
- Endocrine malignancies

CONTENT OF LEARNING

The program outline addresses both the knowledge needed in Paediatrics Haematology & Oncology and allied medical specialties in its scope. A minimum of two years of formal training through a graded system of education as specified will equip the trainee with knowledge, skill and attitude at its completion to be able to practice basic Paediatrics Haematology & Oncology competently.

COURSE OF STUDIES

BASIC SCIENCES

a) Molecular biology of cancer and other basics of oncology including oncologic pharmacology and radio diagnostics:

- The trainee shall be taught the basic cell structure and biology of cancer (including genetics). They should be aware of cell cycle and other principles of oncologic pharmacology including drug dosing, mixing, adverse effects etc. they shall be also taught the epidemiology and etiology of cancer, cancer prevention and screening.

b) Principles of diagnostic skills, staging, response criteria, treatment outcomes, etc.

- Special emphasis shall be laid on the principles of laboratory based diagnosis (including malignant hematology, immunohistochemistry) PCR, FISH, tumor markers, chromosomal analysis etc. they should also be aware of performance status scales, RECIST response criteria and should be able to define treatment outcomes such as overall survival, disease free survival, progression free survival.

c) Anatomy –clinically relevant anatomy and neuro-anatomy.

d) Cell, molecular and membrane biology

- Structure and function of components of cell and its membrane.
- How cells communicate internally and with each other by means of chemical substances and membrane receptors.

e) Physiology, biochemistry and metabolism

- Structure and function of different organs and their interactions
- Broad principle of metabolism such as the production of energy and pathways of carbohydrate, protein and lipid metabolism
- Principles of nutrition, water, electrolyte and acid base balance
- Physiology and biochemistry of each organ system

f) Genetics

- Structure and function of chromosomes and genes
- Introduction to medical genetics
- Mendelian principles of inheritance
- Chromosome disorders
- Single gene disorders
- Prenatal diagnosis of genetic disease and counselling
- Genetic basis of cancer
- Human genome project and gene therapy
- Ethical issues in medical genetics
- Carrier detection
- Risk calculation

g) Immunology

- Introduction to immunology
- Basic immunology
- Immunologic basis of cancer oncology and cancer development
- Malignant transformation of cells
- Cancer immunotherapy
- Cancer marker and antigens
- Immunodeficiency diseases
- Cancer vaccines
- Autoimmune diseases and its relationship with cancer

h) Infectious diseases and tropical medicine Microbiology

- Taxonomy of bacteria in terms of gram-staining and aerobic/anaerobic metabolism
- Virus classification for members of herpes group
- Virus replication with reference to retroviruses
- Major pathogenic protozoa and helminthes

i) Immunology of infectious diseases

- Immune deficiency states linked with types of opportunistic infections
- Principles of immunization and vaccines currently used

j) Pathophysiology

- Septic shock
- ARDS
- Role of cytokines in infection

CLINICAL PEDIATRIC ONCOLOGY

a) Principles of multidisciplinary cancer therapy and its indications:

- Trainees will spend a substantial amount of time in clinical training in pediatric oncology ward. They shall be trained in the basic aspects of cancer therapeutic agents (pharmacology) as

well as principles of cancer chemotherapy including targeted therapies (its indications and contraindications) and its related effects. They should be well accustomed to various types of cancer therapies including:

- Principles of radiation oncology
- Principles of surgical oncology
- Principles of oncologic pharmacotherapy
- Principles of targeted and biologic therapy

b) Medical emergencies, supportive care, palliative treatment and end of life issues:

Trainees should be fully conversant with anticipating, diagnosing and promptly treating medical emergencies in oncology and common conditions associated with cancer or its treatment such as:

- Cancer pain and its management
- Nausea and vomiting and its management
- Management of febrile neutropenia and septic shock
- Tumor lysis syndrome and its management
- Anemia, thrombocytopenia and its management
- Growth factors and its rational use in anemia, neutropenia and thrombocytopenia
- Disseminated intravascular coagulation
- Constipation, bowel obstruction and perforation and their management
- urinary obstruction
- Increased intracranial pressure, spinal cord compression and other CNSA related complications
- Treatment of bone metastases and skeletal related events
- Management of fatigue and dyspnea
- Prevention and treatment of extravasation
- Metabolic emergencies and para-neoplastic syndromes, tumor lysis syndrome, hypercalcemia, hypo/hyperglycemia, SVC syndrome, SIADH
- Palliative care and end of life
- Depression, anxiety, delirium and other psychological issues

c) Communication skills, medical ethics, psycho-oncology and rehabilitation

- Special emphasis shall be laid on communication skills including breaking bad news, genetic counselling, informed consent, legal issues pertaining to oncology, short and long term complications of cancer therapy, follow up visits, communicating with the patient, communicating with the relatives/attendants, communicating with the colleagues, juniors and peers. Examinations shall include the trainee's experience in these aspects.

d) Practical procedures in oncology:

Trainees should be able to perform the following practical procedures at the end of the course:

- Preparation and administration of chemotherapeutic drugs
- Bone marrow aspiration and trephine biopsy
- Lumbar puncture
- Triple intra-thecal therapy
- Pleural fluid drainage
- Ascites tapping
- CV line

e) Cancer epidemiology:

- Introduction to cancer epidemiology
- Abnormality
- Diagnosis
- Measures of occurrence of disease and other health related events
- Risk and casualty
- Prognosis
- Cancer prevention
- Cancer registry community based and hospital based registry
- Role of cancer registry and international classification of disease of oncology

BIOSTATISTICS

- Introduction and basic definitions of biostatics
- Measures of central tendency
- Measures of dispersion
- Data presentations
- Confidence intervals
- Population and sampling
- Normal distribution
- Chi-sp (χ^2) procedures
- Regression and correlation
- Paired and pulled T-Tests
- Analysis of variance
- Tests of Significance
- Screening
- Chance and null hypothesis

Study designs

- Cross sectional study
- Longitudinal study
- Case control study
- Control study
- Interventional trials

PEDIATRIC ONCOLOGY AND ALLIED AREAS

BASIC PRINCIPLES OF CHEMOTHERAPY

- Chemotherapy drugs
- Newer chemotherapeutic agents
- Basis for designing different chemotherapy schedules, standard chemotherapy schedules
- Chemotherapy practice in various malignancies
- Chemotherapy practice, results/toxicities in sequential and concomitant chemo-radiotherapy
- Supportive care for chemotherapy
- The basic principles underlying the use of chemotherapeutic agents
 - a)** Classification and mode of action of cytotoxic drugs. The principles of cell kill by therapeutic agents, drug resistance, phase specific and cycle
 - b)** Drug administration. The general principles of pharmacokinetics, factors affecting drug concentration "in vivo" including route and timing of administration, drug activation, plasma concentration, metabolism and clearance.
 - c)** Principles of combinations of therapy, dose response curves, adjuvant and neo-adjuvant chemotherapy, sanctuary sites, high dose chemotherapy.
 - d)** Toxicity of drugs. Early, in termed; site and late genetic end somatic common classes of anticancer drugs, precautions in the safe handling of drugs
 - e)** Endocrine manipulation and biological response modifiers. An understanding of the mode of action and side effects of common hormonal preparation cancer therapy (including corticosteroids)
 - f)** Use of the major biological modifiers such as interferon, interleukins and growth factors and their known side effects.
 - g)** Assessment of new agents, principles of phase I,II and III studies
 - h)** Gene therapy

PRINCIPLES OF SURGICAL ONCOLOGY:

- Basic principles of surgical oncology, biopsy, conservation surgery, radical surgery palliative surgery
- Combined treatments with radiotherapy, chemotherapy and hormone therapy

CLINICAL RADIOTHERAPY AND ONCOLOGY

- a)** Cancer epidemiology and etiology
- b)** Assessment and referral systems for radiotherapy and diagnostic workup
- c)** Care and evaluation during and after treatment

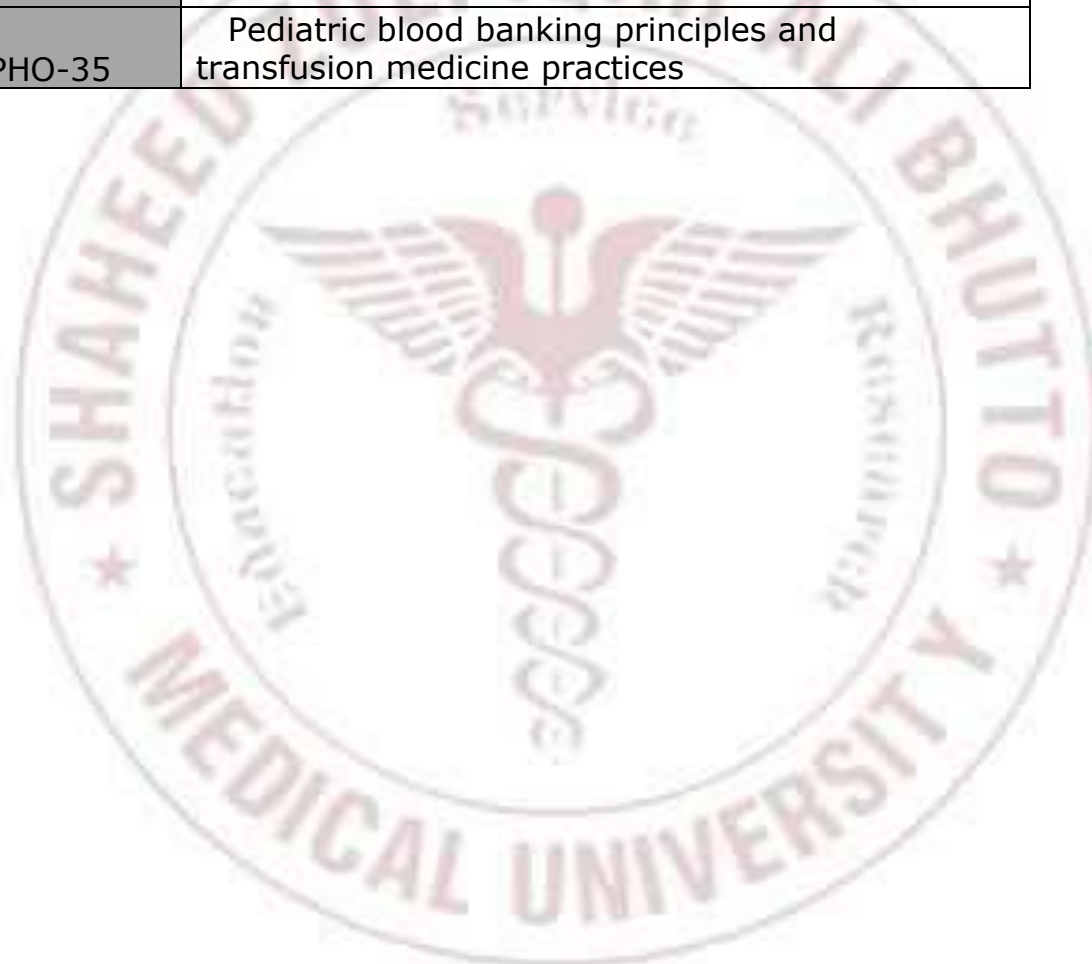
- d) Emergencies in oncology
- e) Management of different malignancies, treatment response and result
- f) Pediatric oncology
- g) Guidelines for treatment response assessment, a complete response, partial response, no response, stable diseases
- h) End points of treatment results: loco-regional control, recurrence, metastasis, survival and quality
- i) Treatment related morbidity assessment
 - Radiation morbidity
 - Morbidities of combined treatments
 - Grading systems

TOPICS

The topics are considered as under:-

ID	TITLES
PHO-1	Molecular and genomic methodologies for clinicians and insight to immunotherapy
PHO-2	Hematologic manifestations of systemic illness
PHO-3	Classification and diagnosis of anemia in children and neonates
PHO-4	Nutritional anemias
PHO-5	Lymphadenopathy and diseases of the spleen
PHO-6	Bone marrow failure
PHO-7	General considerations of hemolytic diseases, red cell membrane, and enzyme defects
PHO-8	Extracorporeal hemolytic anemia
PHO-9	Hemoglobinopathies
PHO-10	Primary and secondary erythrocytosis
PHO-11	Disorders of white blood cells
PHO-12	Disorders of platelets
PHO-13	Disorders of coagulation
PHO-14	Vascular anomalies
PHO-15	Histiocytic disorders
PHO-16	Lymphoproliferative disorders
PHO-17	Myelodysplastic syndromes and myeloproliferative disorders
PHO-18	Hematological malignancies
PHO-19	Approach to lymphomas
PHO-20	Palliative care in oncology
PHO-21	Radiation oncology
PHO-22	Central nervous system tumors
PHO-23	Tumors of neural crest cells
PHO-24	Renal tumors

PHO-25	Sarcomas(soft-tissue sarcomas and non-soft tissue sarcomas)
PHO-26	Malignant bone tumors
PHO-27	Tumors of eye
PHO-28	Genitourinary tumors
PHO-29	Hepatic tumors
PHO-30	Hematopoietic stem cell transplant and cellular therapy
PHO-31	Management of oncologic emergencies
PHO-32	Supportive care of patients with cancer
PHO-33	Evaluation, investigations, and management of late effects of childhood cancer
PHO-34	Psychosocial factors impacting children with cancer and their families
PHO-35	Pediatric blood banking principles and transfusion medicine practices





**Paediatrics Haematology & Oncology
Specialty Courses**

PRINCIPLES OF PAEDIATRIC HAEMATOLOGY & ONCOLOGY

Patient assessment, examination, diagnosis & treatment planning

Objectives	Learning Outcomes	Teaching & Learning Methods	Assessments
<p>To provide information about and experience in:</p> <ul style="list-style-type: none"> • History taking • General Physical Examination • Examination of each system thoroughly <ul style="list-style-type: none"> Examination of lumps & their description Various diagnostic tests & investigations Treatment plan sequencing Interdisciplinary considerations in treatment planning 	<p>The trainee should be able to:</p> <ul style="list-style-type: none"> • Examine the patient thoroughly • Make a differential diagnosis • Perform relevant diagnostic tests & carry out investigations to establish definitive diagnosis • Devise strategies and plans based on the likely prognosis and outcomes of the various treatment options, relating this to prognosis without treatment and establishing a resultant priority and sequence of treatment 	<ul style="list-style-type: none"> • Workplace (clinical) experience • Attend trainee seminars within department • Attendance at suitable courses • Attendance at suitable meetings • Independent study 	<ul style="list-style-type: none"> • Workplace based assessments (CBD, DOPS) • Written Examination/ VIVA

PRINCIPLES OF PAEDIATRIC HAEMATOLOGY & ONCOLOGY

Management of children as in-patients

Objectives	Learning Outcomes	Teaching & Learning Methods	Assessments
<p>To provide in depth knowledge and skill in:</p> <ul style="list-style-type: none"> • Ability to explain to a patient the hospital process. • Describe differential diagnosis when appropriate, and treatment options. • Know when to refer to or confer with other specialists. • Ability to undertake therapy in a safe manner. • Ability to recognize and deal with complications that may arise. • Describe the spectrum of general illness behavior and relate this to diseases relevant to paediatric haematology & oncology surgery practice and inpatient management. 	<p>The trainee should be able to:</p> <ul style="list-style-type: none"> • Take record and interpret an accurate history from patients of any age and communicate effectively. • Know where to refer. Seek advice if unsure. Recognize when input from another specialty is required for individual patients. • Work effectively with other health care professionals. • Describe the nature, benefits and risks of planned procedure. • Assess the likelihood of a significant underlying diagnosis and differentiate patients with urgent and non-urgent care needs. 	<ul style="list-style-type: none"> • Workplace (clinical) experience • Clinical cases for observational and personal treatment • Attend trainee seminars within department and wards • Attendance at suitable courses • Attendance at suitable combined clinic-pathological meetings • Self-directed & Independent study 	<ul style="list-style-type: none"> • Workplace based assessments (CBD, DOPS, MSF) • Written Examination/ VIVA

<ul style="list-style-type: none"> • Know and interpret the appropriate investigations needed for management of patients with complex medical histories and/or how to obtain relevant advice. • know the process for patient discharge, appropriate prescribing and arrangements for follow-up if required. 	<ul style="list-style-type: none"> •Respect patient confidentiality. Maintain cultural awareness and identity. Value patient comprehension and views. •Demonstrate willingness and ability to teach students and healthcare colleagues sound history skills where appropriate. •Show respect for others' opinions. Be conscientious and work cooperatively. Respect colleagues, including nonmedical professionals and recognize good advice. •An appreciation of when to discuss patient management with colleagues from other hospital clinical specialties. 		
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TRAINING FORMAT & ROTATIONS

The objective of the 24 months training will be divided as follows:

1. Graded responsibility in primary institution:
 - In patient services and consultations for 16 months
 - Outpatient services in pediatrics hematology and oncology including daycare chemotherapy for 4 months
2. Research: It will be continued throughout the training
3. Attend multidisciplinary tumor boards for 24 months
4. Journal clubs on monthly basis
5. Morbidity & mortality meetings monthly
6. Grand rounds monthly
7. Electives 1 month rotation in any other institution with supervisor's permission
8. 3 month mandatory rotation in:
 - Radiation Oncology 1 month
 - Hematology/Pathology including molecular/cytogenetic, blood bank coagulation for 1 month
 - Bone marrow transplant 1 month

If any of the above facility is not available in the institution, the trainee must be rotated in the centers providing these services.

*Outcomes of mandatory rotations are attached as "Annexure B"

RESEARCH

The resident would be required to undertake a research project and to present the result for examination in the form of an article. They would be encouraged to present and publish the result of the project in refereed journals.

The guideline for synopsis writing is available on University website at



ASSESSMENT



ASSESSMENT

Assessment of trainees will cover the cognitive, psychomotor and affective domains. It will take two forms

- Formative Assessment
- Summative Assessment

FORMATIVE ASSESSMENT

It is the continuous assessment of progress and competence. It will be conducted through workplace based assessment throughout the training. Assessment will be undertaken by a range of assessors and will cover a range of procedures appropriate to the stage of training. Formative assessment will include

- Directly observed practical skills (DOPS)
- Case based discussion (CbD)
- Mini clinical examination exercises (Mini-CEX)
- Multiple source feedback (MSF)

SUMMATIVE ASSESSMENT

Summative assessment will be held twice

- Final/Exit Examination(At the end of 2 Years)

The level of performance required for passing the exam will depend on the knowledge and skills necessary for acceptable performance and will not be adjusted to regulate the number or proportion of persons passing the examination. The pass point will be determined by careful analysis and judgment of acceptable performance.

RECORD OF CLINICAL CASES/LOG BOOK

The trainees will be required to keep a record of the allocated clinical work in a log book. It will be the responsibility of trainee to keep the log book up to date with the signature of the faculty certifying the work.



TABLE OF SPECIFICATION

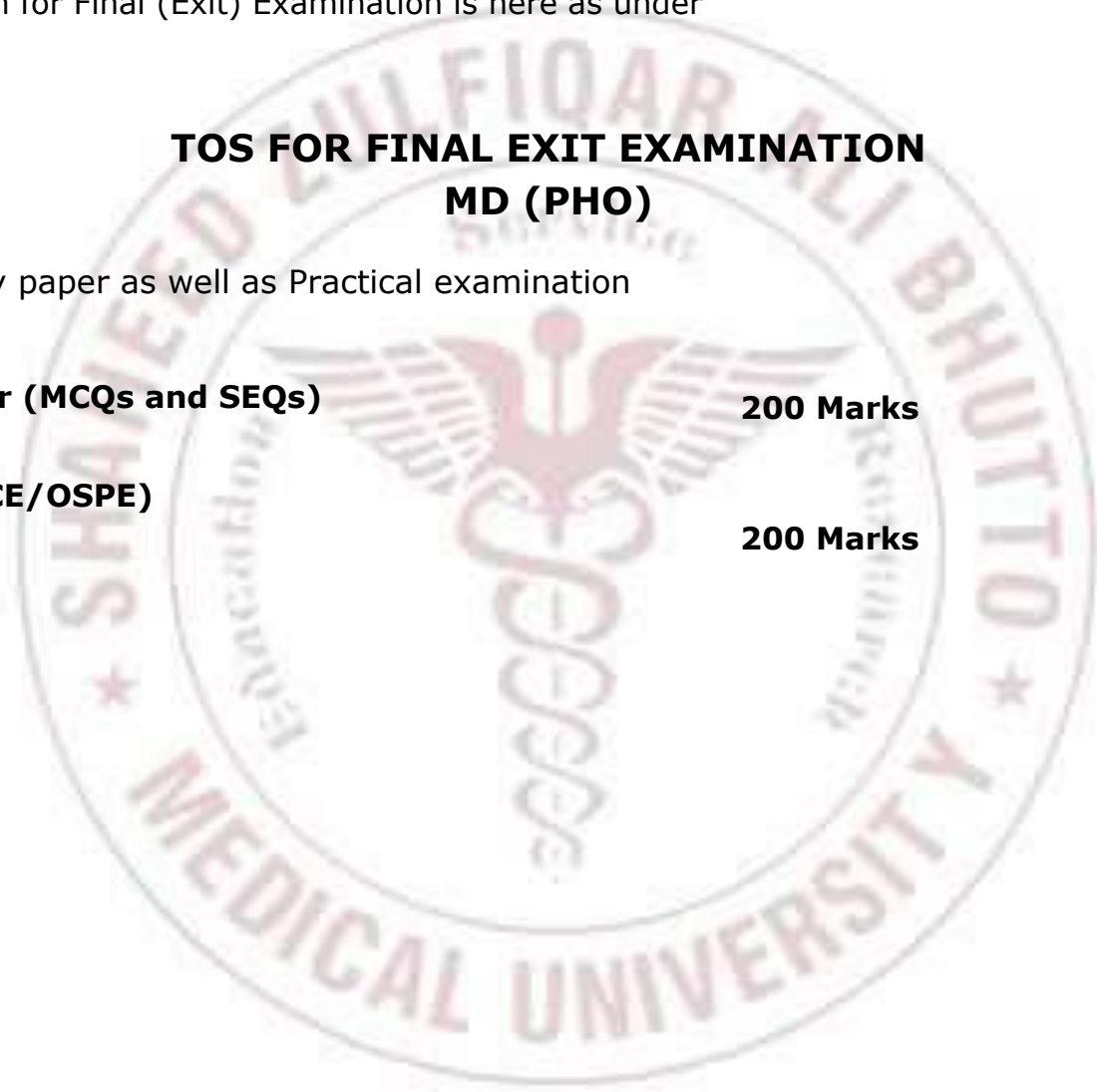
TABLE OF SPECIFICATION (TOS)

Table of specification for Final (Exit) Examination is here as under

TOS FOR FINAL EXIT EXAMINATION MD (PHO)

There will be theory paper as well as Practical examination

- Theory Paper (MCQs and SEQs)** **200 Marks**
- Clinical (OSCE/OSPE)** **200 Marks**



TOS FOR FINAL/EXIT EXAMINATION MD (PHO)

Final Examination (After completion of 2 years)

The student shall submit completion of training certificate, Log Book, mandatory workshop attendance, article on research topic approved by supervisor, through the Dean to the Controller of Examination. If the article is not approved by the supervisor, application for extension may be recommended by supervisor through Registrar to the AS&RB. The final examination of major subject and clinical examination will be conducted by board of Six (06) examiners. The candidate will be examined in major subject and article as under: supervisor will not be paper setter /Examiner of his/her candidate as per PMDC regulation 2001.

Theory Paper			200 Marks
Paper I	Specialty Course MCQs	100 Marks	
Paper II	Specialty Course SEQs	100 Marks	
Clinical Exam			200 Marks
a.	Long Case (One)	(50 Marks)	
b.	Short Case (Four, 25 marks each)	(100 Marks)	
c.	OSCE/OSPE	(50 Marks)	
TOTAL			400 Marks

TOS FOR THEORY PAPER FINAL EXIT EXAMINATION

TOS ID	TITLES	WEIGHTAGE				MCQs	SEQs
		Knowledge	Skill	Attitude	Total %		
PHO-1	Molecular and genomic methodologies for clinicians	3	1	2	5	3	
PHO-2	Hematologic manifestations of systemic illness	1	1	1	3	3	
PHO-3	Classification and diagnosis of anemia in children and neonates	1	0.5	0.5	2	3	
PHO-4	Nutritional anemias	1	1	1	3	2	
PHO-5	Lymphadenopathy and diseases of the spleen	1	0.5	0.5	2	2	
PHO-6	Bone marrow failure	1	0.5	0.5	2	2	
PHO-7	General considerations of hemolytic diseases, red cell membrane, and enzyme defects	1	0.5	0.5	2	2	
PHO-8	Extracorporeal hemolytic anemia	1	0.5	0.5	2	2	
PHO-9	Hemoglobinopathies	1	0.5	0.5	2	5	1
PHO-10	Primary and secondary erythrocytosis	1	0.5	0.5	2	2	
PHO-11	Disorders of white blood cells	1	0.5	0.5	2	3	
PHO-12	Disorders of platelets	1	0.5	0.5	2	3	
PHO-13	Disorders of coagulation	1	0.5	0.5	2	3	1
PHO-14	Vascular anomalies	1	0.5	0.5	2	2	
PHO-15	Histiocytic disorders	1	0.5	0.5	2	2	1
PHO-16	Lymphoproliferative disorders	1	0.5	0.5	2	2	
PHO-17	Myelodysplastic syndromes and myeloproliferative disorders	1	0.5	0.5	2	2	1

PHO-18	Hematological malignancy	5	3	2	10	5	1
PHO-19	Approach to lymphomas	5	3	2	10	5	1
PHO-20	Palliative care	2	2	1	5	5	1
PHO-21	Radiation oncology	1	0.5	0.5	2	2	
PHO-22	Central nervous system tumors	3	1	1	5	5	1
PHO-23	Neural crest cells	1	0.5	0.5	2	2	
PHO-24	Renal tumors	1	1	1	3	2	1
PHO-25	Sarcomas(soft tissue and non-soft tissue sarcomas)	1	0.5	0.5	2	2	
PHO-26	Malignant bone tumors	1	0.5	0.5	2	3	
PHO-27	Tumors of eye	1	0.5	0.5	2	3	
PHO-28	Genitourinary tumors	1	0.5	0.5	2	3	
PHO-29	Hepatic tumors	1	0.5	0.5	2	3	
PHO-30	Hematopoietic stem cell transplant and cellular therapy	2	2	1	5	5	1
PHO-31	Management of oncologic emergencies	2	2	1	5	5	
PHO-32	Supportive care of patients with cancer	1	0.5	0.5	2	5	
PHO-33	Evaluation, investigations, and management of late effects of childhood cancer	1	0.5	0.5	2	2	

TOTAL

100%

100

10

TOS FOR PRACTICAL/VIVA VOCE FINAL EXIT EXAMINATION

10 OSCE-Stations (50 Marks)

(5 minutes each station)

TOS ID	TITLES	STATIONS
PHO-1	Radiology (MRI/CT scan of Brain,chest)	2
PHO-2	Laboratory interpretation	1
PHO-3	Clinical scenarios benign hematology	1
PHO-4	Counselling	1
PHO-5	Long term sequelae of cancers	1
PHO-6	Haematopoetic stem cell transplant	1
PHO-7	Clinical scenario malignant disorders	1
PHO-8	Oncological emergencies	1
PHO-9	Palliative care	1

TOTAL: 10

TOACS

- It includes both static & interactive stations (15-20) of 5-8 minutes each
- Candidate will be asked written responses on the clinical data, clinical problem or research study presented at the static stations
- At interactive stations, candidate will have to demonstrate competency e.g. taking history, performing a clinical examination, counseling, assembling an instrument etc. Each station will be assigned one examiner who will rate the performance or ask questions testing reasoning and problem solving skills of candidate.

FORMAT OF LONG CASE

- Each candidate will be allotted one long case and allowed 30 minutes for history taking and clinical examination. Candidate should take a careful history from the patient (or relative) and after a thorough physical examination identify the problems which the patient presents with. During this period a pair of examiners will observe the candidate.

In this section the candidate will be assessed on the following areas:

INTERVIEWING SKILLS

- Introduces one self. Listens the patient and is polite with the him/her
- Is able to extract relevant information from the patient

CLINICAL EXAMINATION SKILLS

- Takes informed consent
- Uses correct clinical methods systematically (including appropriate exposure and re-draping)

CASE PRESENTATION DISCUSSION

- Presents skillfully
- Gives correct findings
- Discusses differential diagnosis and gives logical interpretations of findings
- Enumerates and justifies relevant investigations
- Outlines and justifies treatment plan (including rehabilitation)
- Discusses prevention and prognosis
- Has knowledge of recent advances relevant to case
- During case discussion, the candidate may ask examiners for the laboratory investigations which shall be provided, if available. Even if they are not available and are relevant, candidate will receive credit for suggestion

FORMAT OF SHORT CASES

Candidate will be examined in at least 4 short cases for a total of 40 minutes jointly by a pair of examiners for each short case. Candidate will be given a specific task to perform on a patients, one case at a time. During this part of examination, the candidate will be assessed in:

CLINICAL EXAMINATION SKILLS

- Takes informed consent
- Uses correct clinical methods including appropriate exposure and re-draping
- Examines systematically

DISCUSSION

- Gives correct findings
- Gives logical interpretations of findings
- Justifies diagnosis/es

At the time for this section is short, the answers given by the candidate should be precise, succinct and relevant to patient under discussion.



LEARNING RESOURCES

LEARNING RESOURCES

List of Essential Readings

Books:

Latest edition of the all of the following books:

- Cancer, Principles and Practice of Oncology (10th edition), Vincent T. De Vita, Jr., Theodore S. Lawrence, Steven A. Rosenberg. (Publisher; Wolters Kluwer)
- Principles and Practice of Pediatric Oncology (3rd edition), Philip A. Pizzo, David G. Poplack. (Publisher; Lippincot Raven)
- Manual of Pediatric Hematology and Oncology (4th edition), Philip Lanzkowsky. (Publisher; Elsevier academic press)



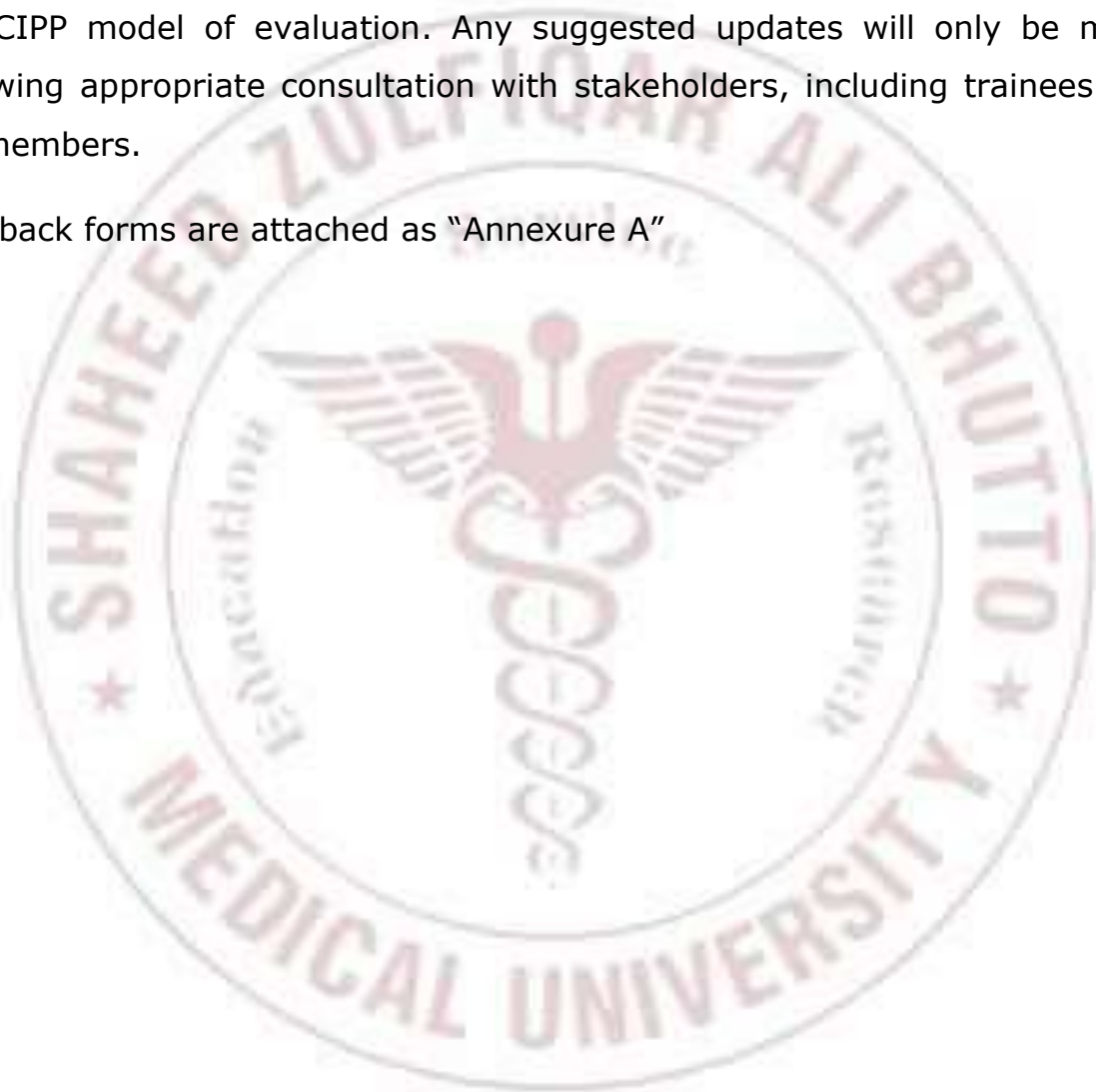


PROGRAM EVALUATION

The program director will continue to ensure that the program is fit for purpose in that it provides the trainee with the appropriate knowledge, skills, attitudes and competencies required to meet the requirements of a specialist.

Program evaluation will be carried out after one year of training according to the CIPP model of evaluation. Any suggested updates will only be made following appropriate consultation with stakeholders, including trainees and lay members.

Feedback forms are attached as "Annexure A"



ANNEXURE A

Supervisor Evaluation Form

Date _____ Supervisor's Name: _____
 Your Name: _____ Signature: _____

Evaluations of supervisors by Trainee's are an important process for providing supervisors with an assessment of the quality of their work. Annual supervisor assessments can be used to compliment a supervisor for doing a good job. Annual assessments can also identify areas for improvement.

Evaluations can strengthen communications between supervisors and trainee's.

Trainees have three options for evaluating supervisors:

- 1) Completing the Evaluation of Supervisor form.
- 2) Writing a signed memo evaluating the supervisor.
- 3) Meeting with the supervisor's department head.

Evaluations received by the deadline (January 15) will be incorporated into the annual review of the supervisor. Forms and/or signed memos should be sent to the Human Resources department.

* * *

(E=Excellent, G=Good, S=Satisfactory, N=Needs Work, U=Unsatisfactory, Ø=No Opinion)

Performs Supervisory Functions

Provides on-going positive and negative feedback	E	G	S	N	U	Ø
Makes expectations known	E	G	S	N	U	Ø
Is tactful and considerate	E	G	S	N	U	Ø
Promotes teamwork and good working relationships	E	G	S	N	U	Ø
Recognizes and addresses concerns in a timely manner	E	G	S	N	U	Ø
Delegates authority appropriately	E	G	S	N	U	Ø
Provides training of new employees	E	G	S	N	U	Ø

Provides direction of work	E	G	S	N	U	Ø
Communicates openly and honestly with peers, staff and administration	E	G	S	N	U	Ø

Comments: _____

Develops Innovative Procedures

Is receptive to new ideas	E	G	S	N	U	Ø
Is receptive to questions	E	G	S	N	U	Ø
Encourages initiative and innovation	E	G	S	N	U	Ø

Comments:

III. Maintain Positive Works Environment

Recognizes contributions	E	G	S	N	U	Ø
Motivates workers	E	G	S	N	U	Ø
Provides relaxed yet efficient work atmosphere	E	G	S	N	U	Ø
Encourages staff development	E	G	S	N	U	Ø

Comments: _____

Knows the Operations of the Department

Understands employee workload	E	G	S	N	U	Ø
Is alert to potential problems	E	G	S	N	U	Ø
Keeps staff informed about department and university developments	E	G	S	N	U	Ø

Comments: _____

Work Habits

Acknowledges own limitations and mistakes	E	G	S	N	U	Ø
Maintains a positive work attitude	E	G	S	N	U	Ø
Uses time efficiently and effectively	E	G	S	N	U	Ø
Demonstrates a good work ethic	E	G	S	N	U	Ø

Comments:

Please use the bottom and back of this sheet as space for expanding on any comments above or to make any additional comments.



Program Evaluation Form

Please use the following scale to indicate your response to the statements below:

SA = strongly agree

A = agree

N = neither agree/disagree

D = disagree

SD = strongly disagree

The information was presented effectively	SA	A	N	D	SD
The information presented was practical	SA	A	N	D	SD
The program provided a good working knowledge of the subject matter presented	SA	A	N	D	SD
The program has allowed me to acquire practical skills and knowledge to manage my business more effectively and efficiently	SA	A	N	D	SD
The program attended was sufficient for my purpose	SA	A	N	D	SD

ANNEXURE B

LEARNING OUT COMES OF MANDATORY ROTATIONS

Mandatory rotation in BMT for Paediatric Hematology/Oncology Residency Program:

Objectives: At the end of rotation the candidate should be able to:

1. Identify the different types.
2. Identify the indications for transplant/stem cell infusion
3. Interpret the basis of tissue typing
4. Know the principles of donor selection, donor counseling, stem cell manipulation, conditioning/immune suppression
5. Deliver supportive care to these patients
6. Know the principles of management of graft versus host disease
7. Identify and manage the acute and late complications Mandatory rotation in laboratory

Hematology/Oncology, Pathology for Paediatric Hematology/Oncology Residency Program:

Objectives: At the end of the rotation the candidates should be able to:

1. Know the principles of blood transfusions, indications, complications and their management
2. Review bone marrow, CSF cytology and morphology
3. Assess the basic flow-cytometry results
4. Identify the importance of immunohistochemistry stains in diagnosis
5. Know the role of cytogenetic and molecular studies in diagnosis of paediatric hematology/oncology
6. Know the types, principles of coagulation tests and their applications.
7. Interpretation of Hemoglobin electrophoresis.

Mandatory rotation in Radiation Oncology for Paediatric Hematology/Oncology Residency Program:

Objectives: At the end of the rotation the fellow will be able to:

1. Understand principles with knowledge and application of radiation therapy in childhood cancers.
2. Understand the action of radiation at the physical, molecular, cellular and organ level with effect on physiology and pathophysiology.
3. Identify the indications of XRT (radiotherapy) in Paediatric cancers.
4. Identify, recognize and manage side effects (acute and long term) of radiation therapy in children.
5. Counsel patients `families regarding XRT: its role and side effects of in children

