

Medical research institute

Academic Reference Standards

1-Biochemistry

Master Degree in Biochemistry

- a1-Recognize the basic knowledge of enzymology, hormones, nutrition and nutrition related diseases, metabolism and metabolic disorders and molecular biology.
- a2- List the principles and methods related to practical biochemical and molecular biology techniques.
- a3- Recall the free radicals and its implications in different diseases.
- a4-Memorize the fundamental role of vitamins in health and disease.
- a5-Explain enzymes in clinical practice.
- a6-Discuss the laboratory medicine.
- a7-Recognize the effect of minerals on health and disease.
- a8- Explain the toxic effects of nanomaterials.
- a9-Review the basic knowledge of gene expression, its regulation and implications in different diseases.
- a10-Review the concepts of proto-oncogenes and tumor suppressor genes and their role in cell growth, apoptosis and cell signaling.
- a11-Recognize the recent advances in biochemistry and molecular biology fields.
- a12- State the details of ethical and legal practice and quality standards of the practice.
- a13- State the details of ethical and legal practice and quality standards of the practice.
- a14- Recall the basics of research ethics.
- b1- Analyze the basic biochemical information to solve problems through thesis.
- b2- Appraise the resulting data through thesis.
- b3- Differentiate between different biochemical or molecular pathways in different diseases.
- b4- Compare between obtained data and recent scientific publications through thesis.
- b5- Examine safety instructions during practical sessions.
- b6- Analysis of student questionnaire for professional improvement plan
- b7- Criticize the problems faced during the thesis work to take decisions based on scientific concepts.
- c1-Apply different techniques related to biochemical and molecular biology tests.
- c2- Interpret the obtained data to present it in its appropriate format.
- c3- Correspond the used methods to the recent and applicable techniques.
- d1- Develop the communication skills through group discussions, lectures and training workshops.
- d2- Use information technology to improve his professional practice (e.g. statistics programs, bioinformatics, etc.).
- d3-Determine students learning needs through student questionnaire .
- d4- Discuss different topics through assignments and lectures.
- d5- Use different sources of information to obtained data e.g. books, research articles, thesis, academic websites, etc.
- d6- Work in group through practical session and workshops, and communicate with others positively.
- d7-Set a time plan for his work during practical sessions and thesis work.
- d8-Learn independently through assignments, seminars and e-learning use.

PhD Degree in Biochemistry

- a1- Recognize the fundamental principles of biochemistry and molecular biology covering all aspect of normal cells and the abnormality that cause diseases.
- a2- Describe the importance of biochemical tests in clinical medicine and interpretation of the results of laboratory lab.

- a3- Discuss new topics in the field of research.
- a4- Recognize ethical and legal aspects of scientific research.
- a5- Recognize quality standards in biomedical laboratory.
- a6- Report to publish scientific research through thesis.
- a7- Recognize quality standards in biomedical laboratory.
- b1- Analyze the information in different and recent biochemistry and molecular biology topics to understand their relation to health and disease.
- b2- Appraise the resulting data through thesis.
- b3- Examine the recent topics that add to the existing biochemistry and molecular biology knowledge.
- b4- Examine to publish papers in scientific journals through thesis.
- b5- Compare between the existing knowledge and the recent advances of biochemistry and molecular biology.
- b6- Appraise various professional situations through practical sessions and group discussions.
- b7- Criticize the current problems in biochemistry and molecular biology to add to them creativity & innovation through thesis.
- b8- Examine biochemistry and molecular biology topics to manage discussions on basis of evidence and proofs, through discussions during lectures and thesis.
- c1- Practice biochemical and molecular biology techniques.
- c2- Interpret the obtained data to present it in its appropriate format.
- c3- Correspond the used methods to the recent and applicable techniques.
- c4- Use the available technology to advance practice of biochemistry and molecular biology.
- c5- Employ professional development courses to improve practice and enhance performance of juniors.
- d1- Develop the communication skills through group discussions, lectures and training workshops.
- d2- Use information technology to improve his professional practice (e.g. statistics programs, bioinformatics, etc.).
- d3- Teach and evaluate others through discussions during lectures.
- d4- Determine students learning needs through assignments and discussions.
- d5- Use different sources of information to obtained data e.g. books, research articles, thesis, academic websites, etc.
- d6- Solve problems on ethical scientific basis, all pave the ways to be an effective team leader during practical sessions and seminars.
- d7- Manage scientific meetings and set a time plan for practical sessions and thesis work.

2- Applied Medical Chemistry

Master Degree in Applied Medical Chemistry

- a1- Recognize established basic knowledge of medical biochemistry and related sciences
- a2- Recognize established basic knowledge of cancer biology
- a3- List the basic techniques applied in the field of medical biochemistry
- a4- Describe the principals of different techniques applied in field of medical biochemistry
- a5- Recall the different types of biomarkers and tumour markers and their clinical applications
- a6- Recognize up to date and recent developments in the field of medical biochemistry
- a7- Recognize ethical and legal principles relevant to practice medical biochemistry
- a8- Understand principles of quality assurance related to practice medical biochemistry
- a9- Understand the ethical and scientific rules of medical research

- b1- Distinguish the relationship between relevant sciences in solving and management of problems in various issues of medical biochemistry
- b2- Differentiate the elements of the problems through data analysis and evaluation (even in the absence of some data) of similar conditions related to medical biochemistry
- b3- Represent systematic approach in conducting scientific research relevant to medical biochemistry through thesis
- b4- Evaluate risks imposed during medical biochemistry practice
- b5- Employ practice-based learning and improvement skills that involves investigation and evaluation of practice, appraisal and assimilation of scientific evidence, improvements in provided services and risk management
- b6- Prepare alternative decisions in different situations in the field of medical biochemistry
- c1- Apply an integrative and multidisciplinary approach to research investigation
- c2- Apply laboratory techniques that are applied in medical biochemistry
- c3- Write and comment on reports related to medical biochemistry
- d1- Demonstrate interpersonal and communication skills that lead to effective information exchange
- d2- Use information technology to improve professional practice in field of medical biochemistry
- d3- Apply skills of teaching and evaluating others
- d4- Use different sources of information to obtain data relevant to medical biochemistry and/or related sciences to improve professional practice in the field of medical biochemistry
- d5- Work independently or in a team
- d6- Manage time and work to deadline
- d7- Learn skills for interaction
- d8- Demonstrate skills for self and continuous learning

PhD Degree in Applied Medical Chemistry

- a1- Discuss established basic and molecular knowledge of medical biochemistry and related sciences
- a2- Recognize established basic and molecular knowledge of cancer biology
- a3- List the basic and advanced techniques applied in the field of medical biochemistry
- a4- Describe the principals of different basic and advanced techniques related to the field of medical biochemistry
- a5- Recall the different types of molecular biomarkers and tumour markers and their clinical applications
- a6- Recognize recent advances in the field of molecular medical biochemistry
- a7- Recognize ethical and legal principles relevant to practice medical biochemistry
- a8- Understand principles of quality assurance related to practice medical biochemistry
- a9- Design, conduction and publishing of scientific research through thesis
- a10- Ethical considerations in different types of scientific research through thesis
- b1- Demonstrate laboratory skills relevant to medical biochemistry
- b2- Evaluate the value of different bioanalytical techniques
- b3- Analyze on the basic concept of molecular medical biochemistry
- b4- Distinguish the elements of the scientific problems through data analysis and evaluation (even in the absence of some data) of similar conditions related to medical biochemistry
- b5- Conduct research studies that add to the existing specialty knowledge through thesis and assignment
- b6- Publish scientific articles/papers (in indexed journals) through thesis

- b7- Plan and implement (or supervise implementation of) enhancement & Improvement approaches to practice through student questionnaire
- b8- Prepare alternative decisions in different situations in the field of medical biochemistry
- b9- Add to the specialty field through creativity & innovation through thesis
- b10- Take decisions in various situations of different issues covering the field of medical biochemistry on the basis of evidence and proofs
- c1- Perform different biochemical analysis and improve methods and tools used
- c2- Write and comment on reports related to medical biochemistry
- c3- Evaluate and improve methods and tools used in medical biochemistry through student questionnaire
- c4- Use technology to advance practice in medical biochemistry
- C5- Evaluate and improve methods and tools used in medical biochemistry through student questionnaire
- d1-- Develop skills in communication using all methods
- d2- Use different sources of information to obtain data relevant to medical biochemistry and/or related sciences to improve professional practice in the field of medical biochemistry
- d3- Apply skills of teaching and evaluating others
- d4- Develop skills in self appraisal & seek continuous learning
- d2- Use different sources of information to obtain data relevant to medical biochemistry and/or related sciences to improve professional practice in the field of medical biochemistry
- d5- Work independently or in a team
- d6- Manage time and work to deadline
- d7- Learn skills for interaction
- d6- Manage time and work to deadlines

3- Human Physiology

Master Degree in Clinical Physiology

- A1.Review physiological functions of different body systems at molecular, cellular and system level in health and disease.
- A2.Explain the pathophysiology of common diseases affecting different systems of the body in common
- A3.Gain knowledge of basic clinical skills.
- A4.Explain the effect of professional practice on the environment
- A5.Review main scientific advances in clinical physiology
- A6.Identify quality standards in physiology lab
- A7.Identify basic principles and ethics of scientific research
- B1. Critically analyze physiological problems and plan strategies for their solution through utilization of observational and scientific approaches.
- B7.Analyze unusual physiological problems and plan strategies for their solution.
- B8.Plan for periodic self-enhancement of his/her skills through assignments
- B9.Appraise the benefits of belonging to and participating in a professional society, select appropriate societies.
- B10.Take professional decisions, analyze, compare and illustrate medical data using appropriate statistical tests.
- B11. Conduct a scientific research through thesis.

- C1. Develop skills of observation and instrumentation used in the measurement of physiological parameters in laboratory/clinical setting (eg: ECG provocation challenge, pulmonary function tests, hormonal assays, lipid profile and kidney function tests, and interpretation of obtained data)
- C2. Analyze, interpret and write reports on different laboratory assessment used in the diagnosis of common disorders of the different body systems (e.g. ECG, spirometry, methacholine inhalation challenge, hormonal assays, lipid profile, and kidney function tests).
- C3. Evaluate methods used in measuring different physiological functions.
- D1. Communicate effectively through written and oral presentation.
- D2. Use information technology in handling physiological data, information retrieval, document preparation, presentation and communication
- D3. Develop an independent approach to learning as a preparation for continuous professional development
- D4. Share in determination of standards
- D5. Establish working relationship with colleagues, work effectively as a part of a team and develop a culture of disseminating and sharing information with peers.
- D6. Organize and manage time to plan and implement efficient and effective modes of working for evaluating others (e.g. subordinates, trainees) through journal club
- D7. Use different sources of information to obtain data and develop skills in reading, writing and research.
- D8. Work as team leader in situations comparable to his work level

MD Degree in Clinical Physiology

- A1. Realize the basic concept of homeostasis. He must have deep fluent knowledge of the normal function of each human body system and recognize how different systems work in harmony to maintain homeostasis under different conditions.
- A2. Identify traditional and recent methods for functional assessment of the body systems.
- A3. Have good knowledge about the function of different systems under variable physiological conditions and discuss the effect of environmental stressors on normal physiological function.
- A6. Review recent scientific research in clinical physiology.
- A7. Identify legal and ethical considerations in clinical physiology practice and research.
- A8. Identify quality standards in the clinical physiology laboratory.
- B1. Analyze the molecular mechanisms of normal physiological functions and evaluate their role in pathophysiology of different diseases.
- B2. Interpret abnormalities of physiological functions and plan for improving clinical physiology practice
- B3. Solve clinical problems in different fields of clinical physiology according to available data.
- B6. Design, conduct and publish scientific research that adds to the existing knowledge in clinical physiology through thesis.
- B8. Plan for periodic self-enhancement of his/her skills through assignment.
- B9. Take decisions in various clinical situations including dilemmas and controversial issues
- B10. Publish scientific articles/papers through thesis.
- B11. Add to the specialty field through creativity & innovation through thesis
- B12. Manage discussions on basis of evidence and proofs through seminars.
- C1. Perform competently, write a report, and interpret the results of pulmonary function, exercise and methacholine bronchoprovocation challenge tests.
- C2. Examine and interpret: nerve and muscle, kidney, and GIT function and test results.
- C3. Apply traditional and recent types of hormonal assays

- C4. Use available tools for diagnosis of cardiovascular and respiratory diseases and sleep related disorders and plan for improving methods of diagnosis.
- C5. Use technology to enforce his physiological knowledge, analyze data and improve his practice
- C6. Plan for enhancing professional practice and improving performance of other clinical physiologists through assignments.
- D1. Communicate effectively using different methods.
- D2. Use information technology to obtain data and improve his/her professional practice.
- D3. Perform self and peer appraisal.
- D4. To be motivated and able to seek continuous learning and help in teaching others.
- D5. Work in a team and understands the responsibilities of a team leader
- D6. Manage scientific meetings and appropriately utilize time
- D7. Use different sources of information to obtain data

4- Pharmacology

Master Degree in Pharmacology

- a1- Recognize established basic molecular biology, physiological and biochemical sciences related to pharmacology.
 - a2- Recognize the principles and theories in the basic science of Pharmacology.
 - a3- Recognize recent developments in common problems related to the field of Pharmacology.
 - a4- Identify ethical and medicolegal aspects of the effects of drugs and chemicals in practice.
 - a5- Recognize the relation between the professional practice in pharmacology and the welfare of the society.
 - a6- Identify ethical and scientific basics of research
 - a7- Recognize quality assurance principles related the good practice in the pharmacology field.
 - b1- Integrate different relevant sciences in the problem solving and management of common problems of pharmacology.
 - b2- Interpret changes in relevant pharmacokinetic parameters in patients with different diseases and special patients groups for problem solving based on data analysis.
 - b3- Distinguish systematic approach in studying common themes or problems relevant to the pharmacology field.
 - b4- Evaluate alternative decisions in different situations in the pharmacology field.
- Through student questionnaire, the student can plan professional development courses to improve practice and enhance performance of juniors.
- c1- Gain practical/laboratory skills relevant to pharmacology.
 - c2- Write and comment on reports for situations related to the field of Pharmacology.
 - c3- Apply different statistical tests for analysis of pharmacological data
 - d1- Develop team work skills.
 - d2- Present scientific topics clearly.
 - d3- Develop skills of communication.
 - d4- Develop skills of open discussion.
 - d5- Develop skills of information technology
 - d6- learn independently and seek continuous learning
 - d7- Develop skills of critical and creative thinking

Doctorate Degree in Pharmacology

- a1. Identify established and updated molecular biology, physiological and biochemical sciences related to pharmacology.

- a2. Recognize established, updated and evidence-based theories and developments in the basic science of pharmacology.
- a3. Identify ethics and principles of scientific research.
- a4. Identify the principles of quality assurance in therapy with different drugs & drug abuse.
- a5. Mention ethical principles relevant to practice in the use of drugs.
- a6. Recognize the effect of medical practice on surrounding environment.
- b1. Integrate basic and other relevant sciences to solve pharmacology related problems.
- b2. Evaluate changes in relevant pharmacokinetic parameters of the up to date drugs used in patients with common and less common diseases.
- b3. Interpret different drug related problems in clinical and/or pharmacy settings.
- b4. Evaluate alternative decisions in different situations in the pharmacology field.
- b5. Evaluate involvement in research studies related to pharmacology
- C1. Write and comment on reports for situations related to the field of pharmacology.
- C2. Apply different statistical tests for analysis of pharmacological data
- d1. Develop skills for team work
- d2. Develop skills of critical thinking
- d3. Develop skills of information technology
- d4. Develop skills for communication and interaction
- d5. Study independently to meet targets with deadlines
- d6. Present scientific topics clearly
- d7. Develop skills of open discussion

5-Hematology

Diploma Degree in blood banking and blood transfusion

- a1- Recall the indications of blood transfusion and list the basic concepts of immunology
- a2- List the blood bank equipments and recognize lab technology used in clinical blood transfusion and blood grouping
- a3- Recognize basis of disinfection and sterilization and list the infectious agents transmitted by transfusion
- a4- Discuss hematopoiesis
- a5- Recognize the fundamentals of ethical & legal practice and know the quality standards of the practice
- b1- Analyze the indications of cell separators and different laboratory tests in blood banking and solve problems
- b2 – Interpret the role of immunohematology in blood banking
- b3- Examine patients and make sheet and interpret the results of different cultures
- b4- Evaluate professional risks and solve problems in clinical transfusion
- c1- Assess different blood bank techniques and perform certain techniques
- C2- Perform proper clinical examination
- C3- Perform some blood bank techniques as cross matching and coombs test and write reports
- d1- Develop skills in self appraisal, learning and seek continuous learning
- d2-- Develop team work skills ,work as team leader as well as a member in larger teams.
- d3- Use information technology to improve professional practice and use different sources of information to obtain data.
- d4- Develop skills in communication using all methods. Manage time effectively.

Medical Doctorate Degree in Clinical Hematopathology

- a1- Recognize the basic knowledge of hematopoiesis and haemostasis
- a2- List the basic techniques in hematology
- a3 - Recognize the principals of molecular biology ,immunology and cytogenetics
- a4- Recall different benign and malignant hematological disorders and tests needed to diagnose them.
- a5- Describe the importance of pharmacokinetics of specific drug groups.
- a6- Recognize the recent advances in the field of hematology
- a7- Recognize the recent advances in the field of hematology, the details of ethical and legal practice and quality standards of the practice.
- b1- Investigate a case of anaemia, coagulation or bleeding disorder.
- b2- Evaluate the values of different hematological lab techniques. Interpret the findings in complete blood count ,bone marrow aspirate and biopsy
- b3- Analyze the basic concepts of molecular biology, immunology and cytogenetics
- b4- Solve problems in management of benign and malignant hematological diseases. Take decisions in various professional situations on the basis of evidence and proofs
- b5-Interpret drug-drug interactions in hematological chemotherapy. Conduct research studies that add to hematology .
- c1- Perform different hematological tests and improve methods and tools used
- c2- Write and appraise reports of complete blood picture and bone marrow aspirate
Evaluate and improve methods and tools used in specialty Through student questionnaire
- c3-. Use technology to advance practice.
- C4- Perform proper clinical examination and determine the diagnosis of a case of benign & malignant hematological diseases and design treatment plan for it
- d1- Develop skills in self appraisal and seek continuous learning
- d2-- Develop team work skills ,work as team leader as well as a member in larger teams.
- d3- Use information technology to improve professional practice and use different sources of information to obtain data
- d4- Develop skills in communication using all methods. Manage scientific meeting and appropriately utilize time.

6- Department of Microbiology

Master of science in Diagnostic and Molecular Microbiology

- a1. Recall and understand medical microbiology through achieving basic knowledge of the mechanisms of bacterial, viral and fungal pathogenesis from a classical and molecular perspective.
- a2. Describe Medical Virology and the fundamental basis of the virus life style, the ground rules of viral pathogenesis, covering the different areas: viral structure, replication, viral virulence and persistence. Studying virus cell interactions and oncogenesis, and finally treatment with antiviral drugs together with methods of prevention and control of viral diseases.
- a3. Recognize fungal infection focusing particularly on the practical elements of diagnosis and providing graduates with skills for working and participating in a broad-based mycology service.
- a4. Discuss the fundamentals of bacterial genetics; eukaryotic and prokaryotic genes, nucleic acids, DNA replication, the processes of transcription and translation, gene transfer, gene expression and genetic exchange and mutations.
- a5. Recognize molecular laboratory techniques used in isolation, identification of microbial pathogens including methods of DNA and RNA extraction from clinical specimen and amplification techniques, focusing on recombinant DNA technology, molecular typing, polymerase chain reaction (PCR), real time fluorescent PCR.
- a6. Illustrate different isolation methods of nucleic acid extraction and amplification and sequencing

- a7. Discuss microbial diseases of public health significance, and methods of investigation.
- a8. List the different signs and symptoms of the microbial diseases of public health significance and investigations applied for them
- a9. Understand how pathogens may be transmitted and principles to minimize the transmission of disease to patient, visitors, employees of healthcare facilities, and community at large.
- a10. Recall mode of action of different antimicrobial agents and the mechanism of bacterial resistance to these agents, the susceptibility of the organism to appropriate antimicrobial agents, the influence of technical variation on susceptibility test results and the indications for susceptibility tests in the clinical laboratory
- a11. Discuss basic knowledge of host parasite relationship, infectious process, virulence determinants and host defense mechanisms.
- a12. Define the concept of microscopic examination, aseptic techniques for the transfer and handling of microorganisms and different types of clinical samples and the principles of immunologic assays for diagnosis of important infectious diseases
- a13. Discuss current hot topics and important concepts in the field of microbiology
- b1. Demonstrate an understanding of, the causal relationship of bacterial diseases, symptoms and application of microbiological techniques in the diagnosis of infectious diseases.
- b2. Categorize viruses according to standard taxonomy, distinguish pathogenesis, clinical symptoms, signs, investigations, treatment and prognosis of the medically important viruses and formulate and evaluate appropriate management plans for different viral infections.
- b3. Interpret the pathogenic effects of fungi and the use of serological tests in diagnosing fungal infections.
- b4. Illustrate the fundamentals of bacterial genetics and differentiate between the structures of eukaryotic and prokaryotic genes and different bacterial genetic regulation processes.
- b5. Compare the different methods of nucleic acid isolation, different methods of gene cloning, conventional & real time PCR
- b6. Distinguish pathogenesis, clinical symptoms, signs, investigations, treatment and prognosis of the medically important emerging pathogens
- b7. Illustrate the microbial diseases of public health significance in the field of microbiology and ways conducted to combat them.
- b8. Evaluate and maintain a safe environment for lab personnel, explain the reason behind contamination or infection problem appeared in the lab, management infection problem depending on the strategies of Infection Control.
- b9. Appraise the different mode of action of antimicrobial agents, select the most appropriate and cost-effective antimicrobial agent leading to control of disease
- b.10. Illustrate the concept of aseptic handling of specimens and evaluate different immunologic and serologic tests used in the diagnosis of important infectious diseases
Assess the concept of aseptic handling of specimens and evaluate different immunologic and serologic tests used in the diagnosis of important infectious diseases.
- b11. Illustrate emerging health problems in the field of microbiology and ways conducted to combat them
Add to the specialty field through creativity and innovation through thesis
- c1- Acquire skills to work in safe environments and following infection control measures
- c2 Acquire skills to isolate and identify pathogens by biochemical, serological diagnosis methods (microscope, ELISA) with ability to interpret test results
- c3- Gain skills in primer designing and gene blasting and in nucleic acid (RNA/DNA) purification
- C4- Gain skills in Molecular detection of fungal, viral and bacterial pathogens using molecular techniques as PCR, to illustrate resistance and virulence genes

C5-Gain skills in interpretation of gel electrophoresis and interpretation of Real time PCR

C6- Write and review reports of culture/ sensitivity and PCR

Evaluate and improve methods and tools used in specialty through student questionnaire

C7. Use technology to advance practice

d.1. Communicate through group discussion

d.2. Work as a part of team

d.3. Develop skills in information technology

d.4. Develop skills for oral presentation

d.5. Develop skills in reading and research

d.6. Develop skills to work safely in a laboratory environment

Master Degree in Infection Control and Management

a1. Identify the key concepts and principles of IC .

a2. Recognize the Organizational structure and job description for IC positions.

a3. Define the Role of microbiology department in infection control and the microbiological testing process and the importance of close interaction between the medical microbiologist/clinical scientist and the rest of hospital employees.

a4. Outlines IC policies related to construction of hospital building and to the different aspects of hospital environment (air, water and food).

a5. Know the infection control practices provided in the different special high risk settings within the hospital

a6. List the IC aspects of occupational health and safety and the advanced occupational safety issues.

a7. outline the basis of sterilization and disinfection and a working knowledge of the policies and procedures used in local hospitals.

a8. Describe the different mechanisms of action of and bacterial resistance to antimicrobial agents.

a.9.Understand the different types and causes of Health care associated infections & its prevention

a.10.Describe the Surveillance strategies of nosocomial infections and the management of outbreaks

a.11.Know the IC strategies for the Common organisms causing HCAs including multi-drug resistant organisms

b.1.Critically analyse the relationships between human and micro-organisms

b2 - Explain the role of the infection control practioner and Evaluate risk assessment and program management.

b3- Analyze according to evidence the causal relationship of microbes and diseases, and Formulate a systematic approach for laboratory diagnosis of common infectious clinical conditions.

b4-Demonstrate the different aspects of hospital environment and illustrate the importance of construction of hospital building according to infection control policies.

b7- Apply basic principles of decontamination to clinical practice and Measure compliance with regulations and standards.

b9-Develop and recommend policies and procedures related to IC and Assess the educational needs of health care workers

b10- Critically appraise strategies suggested for surveillance and process validation and recognize and investigate outbreaks and Interpret strategies used in disaster management

b11- Formulate a systematic approach for preventing the transmission of bloodborne pathogens and other communicable diseases (TB) and for dealing with cases accidentally exposed to certain pathogens in health care settings

- C1: Gain skills in identification of different bacteria using different biochemical tests, API systems to differentiate between pathogenic and non-pathogenic strains of medically important bacteria or emergence of a new pathogen.
- C2: Acquire skills in identification of emerging new pattern of antimicrobial resistance using the disk diffusion method and subsequently alerting the clinicians
- C3: Practice and display the methods used for microbiological environmental sampling, air sampling, food sampling and for environmental surface sampling.
- C4: Perform and interpret different disinfection and sterilization process used in the decontamination of Heat resistant and Heat-sensitive objects and Gain skills to reprocess the single use care items.
- C5: Gain skills to assess the validity of sterilization process using the different physical, chemical and biologic indicators
- C6: Practice the flow of decontamination process in Central sterilization service department and solve problems of storage /release and distribution of sterile products.
- C7: Display proper Standard precautions practices including; hand hygiene, waste management and proper donning and removal of PPE and choosing the proper PPE depending on transmission based precautions, Practice respiratory etiquette, Perform proper linen management and Develop skills to prepare an isolation room.
- C8: Assess the validity of the infection control practices related to each medical health care setting including: Intensive care unit/ respiratory care, Neonatal Intensive care unit, Operating Theatre, Dentistry clinic, Hemodialysis Unit, Cardiac catheterization Unit, Endoscopy Unit, Laboratory Department and in Radiation and Oncology Unit
- d.1. Communicate through group discussion
- d.2. Work as a part of team
- d.3. Develop skills in information technology
- d.4. Develop skills for oral presentation
- d.5. Develop skills in reading and research
- d.6. Develop skills to work safely in a laboratory environment

Doctor of Philosophy in Diagnostic and Molecular Microbiology

- a1- Describe an awareness of concepts and the latest knowledge of medical bacteriology, relevant to culture techniques, biochemical tests and the susceptibility and response of the host to pathogens
- a2 - Identify basic and advanced methods available for the diagnosis and characterization of viral infections, serological and molecular methods
- a4- Describe the principles and quality standards of the lab techniques used in diagnostic microbiology and details of ethical & legal practice and quality standards of the practice
- a6. Describe current hot topics and important concepts in the field of microbiology.
- b1- Demonstrate an understanding of, the causal relationship of bacterial diseases, symptoms and application of microbiological techniques in the diagnosis of infectious diseases.
- b2- Interpret the most important signs and symptoms and laboratory findings of important viral infections to reach a proper diagnosis
- b3- Evaluate the different methods used in detecting microorganisms and manage emerging health problems as antibiotic resistance
- B4- Analyze the use of different techniques used in diagnosis of different pathogens and offer alternative tools for detection.
- b5- Manage different nucleic acid amplification and modern molecular diagnostic techniques for diagnosis and detection of public health problems with correct reporting
- b6- Illustrate emerging health problems in the field of microbiology and ways conducted to combat them

- c1- Acquire skills to isolate and identify pathogens by biochemical , serological diagnosis methods(ELISA, Fluorescent microscope)with ability to interpret test results
- c2 - Gain skills in nucleic acid (RNA/DNA) purification , PCR amplification
- c3- Gain skills in Molecular detection of viral and bacterial pathogens using molecular techniques as PCR, sequencing to illustrate antibiotic resistance, virulence genes and gene expression in addition to skills in Gene cloning
- C4-Gain skills in amplification product detection by gel electrophoresis and quantitation methods as Real time PCR. Moreover, the student will practice the principal steps of cloning including: Plasmid preparation, Restriction endonuclease, Competent cells preparation and ligation and transformation and finally he will be able to assess the DNA sequencing data
- C5- Write and appraise reports of culture and sensitivity and PCR.
- C6-Use technology to advance practice
- d1. Communicate through group discussion. Manage scientific meeting and appropriately utilize time
- d2. Work as a part of team
- d3. Develop skills in information technology
- d4. Develop skills for oral presentation
- d5. Develop skills in reading and research
- d7.Develop skills in self-appraisal and seek continuous learning

7- Parasitology

Diploma in Experimental and clinical Parasitology

- a1- Identify morphological features, different hosts, life cycle, mode of transmission of helminthes and protozoa
- a2- Describe the clinical manifestations and health consequences of different parasitic diseases.
- a3- Describe immunological methods used in diagnosis of parasitic infections
- a4-Define in vivo methods cultivation for parasites and list arthropods , snails of medical importance
- a5- Recognize the importance of parasitological laboratory techniques regarding sample collection, preparation, transportation and procedural application
- a6- Recognize appropriate therapeutic responses of different anti-parasitic drugs and define proper manipulation different types of experimental laboratory animals.
- a7- Recall the tools of quality control and explain methods and measures adopted in case detection and surveying parasites.
- a8- Define structural components of various parasites using E.M
- b1- Analyze transmission and spread of helminthes, protozoa and arthropods in different localities.
- b2- Analyze the impact of parasitic infections and relate abnormal clinical and laboratory findings of different parasitic diseases.
- b3-Evaluate different parasitological lab techniques and analyze the results.
- b4- Demonstrate importance of various immunological techniques and learn to interpret their results adequately.
- b5-Distinguish methods of collection, isolation and cultivation of parasites in laboratory animals.
- b6-Illustrate the role of experimental animals attempting to understand host-parasite relationship and select appropriate conditions for maintenance of different snail in the laboratory.
- b7- Integrate findings and construct schemes concerning epidemiological surveys to solve problems related to parasitic diseases and interpret data collected in parasitological survey.
- c2- Diagnose different parasites using various diagnostic lab techniques including certain immunological techniques.

- c4- Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications.
- c5- Collect and examine snails for trematode infection and use experimental animals in research involving parasites.
- d1- Develop skills in self appraisal and seek continuous learning
- d2-Develop team work skills.
- d3- Use information technology to improve professional practice and use different sources of information to obtain data.
- d4-Learn to manage time effectively.
- d5-Develop team work skills.

Master of Applied and Molecular Parasitology

a- knowledge and understanding:

- 1- Review main morphological features, life cycle stages and modes of transmission of helminths, protozoa and arthropods of medical importance.
- 2 - Discuss immunological and clinical aspects of parasitic infections and various methods of treatment, control and elimination.
- 3 -Recognize the general considerations for specimen collection and methods of sample preparation and examinations for detection of parasitic infections.
- 4- Understand various methods of epidemiologic investigations applicable to parasitic diseases, and review the distribution and determinants of parasitic diseases in different localities.
- 5-Describe basis and applications of different immunological and molecular methods used in the field of parasitology.
- 6- Understand the role of snails in transmission of human parasites and recognize the principles of using animals and snails in conducting parasitology research.
- 7- Recognize the concept of ethics in different types of biomedical research.
- 8- Recognize types of variables, measures and graphs used in presentation of data and explain the confidence interval and statistical significance.

.b- Intellectual skills:

- 1-Distinguish morphological features and life cycle stages of different parasites and categorize parasites according to their modes of transmission and illustrate the diversity in human immune response to parasites.
- 2-Select suitable parasitological, immunological and molecular methods for detection of parasitic infections, compare the utility of different techniques and evaluate results.
- 3- Illustrate applications of different molecular techniques in parasitology.
- 4- Differentiate symptoms and signs of parasitic diseases and select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy.
- 5- Analyze factors causing perpetuation of parasitic infections at individual and community level, Integrate findings and scientific information and construct schemes to solve problems related to parasitic diseases, interpret common graphs and confidence interval and select the appropriate test to compare between groups.
- 6- Evaluate important ethical guidelines in research involving man or experimental animals.
- 7-Design protocols for laboratory infection of experimental animals and snail vectors with parasites and illustrate the role of snail control in prevention or eradication of parasitic infections.

c- Professional and practical skills

- 1 Apply proper procedures for collection of stool, blood, urine, CSF as well as environmental samples and use different techniques in parasitology labs, including direct smears, staining, concentration and quantitative methods for detection and identification of parasites.
 - 2- Develop essential practical skills o be able to apply different types of molecular techniques and immunological methods for diagnosis and investigation of parasitic diseases.
 - 3- Implement basic quality control measures in parasitology labs .
 - 4- Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications.
 - 5- Design and conduct studies to investigate prevalence and risk factors for parasitic diseases, to determine trematode infection of snails , and to use experimental animals and snails in research involving parasites and use the suitable statistical measure or test through statistical software to present and interpret data.
- d- General and transferable skills:
- 1- Gain skills in organizing seminars with oral and written presentations and group discussion.
 - 2- Practice to use the internet and different periodicals to prepare a scientific topic.
 - 3- Work as part of a team.
 - 4-Integrate quality control standards in the laboratory .
 - 5- Develop skills in communications.
 - 6- Use the computer in statistical analysis.

Doctorate of Philosophy in Applied and Molecular Parasitology

a- knowledge and understanding:

- 1- Identify morphological features, different hosts, life cycle, mode of transmission of helminthes and protozoa , list arthropods and snails of medical importance, review information about snail taxonomy and anatomy and recognize and solve the problems of zoonotic parasitic diseases.
- 2 - Recognize the importance of field study and parasitological laboratory techniques in samples collection, preparation, transportation and instrumentation.
- 3- Describe the pathogenesis and clinical picture of different parasitic infections and define methods for prevention and control of parasite transmission and define role of history taking and clinical examination for exact management of parasitic diseases.
- 4- Recall the immunological defense mechanisms against different groups of parasites. Describe different immune responses against helminthic and protozoal parasitic infections
- 5- Design ,conduct and publish scientific research. Describe the ethical considerations in different types of scientific research.
- 6- Recognize the recent advances in the field of diagnostic medical parasitology and the details of ethical and legal practice and recognize the principals of molecular biology .
- 7- Define different types of experimental animals used for parasitic infections and describe different cultural methods and different types of media used as tools of research and diagnosis for various parasitic diseases.
- 8- Review impact of parasites in the etiology of system-oriented tropical diseases and recall the mutual relation between professional practice and effects on the environment.

b - Intellectual skills:

- 1-Interpret and analyze the impact of parasitic infections in tropical diseases and analyze factors affecting transmission of parasitic infections in the community level and select appropriate methods for prevention and control of parasitic diseases.
- 2- Evaluate the values of different parasitological laboratory techniques and analyze the results, apply quality control measures and add to the specialty through creativity and innovation.

- 3- Interpret the results of serological and coprological techniques and relate them to clinical findings and apply the basic concepts of molecular Parasitology.
 - 4- Compare the signs and symptoms, interpret host parasite relationship of different parasitic diseases and solve problems in the management of parasitic infections.
 - 5- Conduct research studies that add to the existing specialty knowledge. Publish scientific articles/papers in indexed journals and design protocols for infection of different snail vectors in the laboratory with parasites.
 - 6- Compare different immunological response to different protozoan and helminth parasites and demonstrate the interaction of parasites with the humans and its impact on pathology of the disease.
 - 7- Compare and select different anti-parasitic drugs and interpret drug-drug interactions in parasitological chemotherapy. Discuss the role of experimental animals and in vitro cultivation in the study of new therapeutics
- c- Professional and practical skills:
- 1- Apply different diagnostic laboratory techniques. Apply basic and advanced professional skills through proper stool, urine and blood sample collections, transportation and preparation.
 - 2- Design different surveys to study and control different parasitic diseases and gain experience to solve epidemiological problems related to parasitic diseases.
 - 3- Identify different snails transmitting various parasites, apply snail surveys for controlling parasitic infections and prepare experimental animals for breeding, infection and develop experience in their care.
 - 4- Perform different immunological techniques, different molecular techniques (conventional PCR, real time PCR) and interpretation of various findings.
 - 5- Perform proper clinical examination and history taking. Design treatment plans for cases infected with more than one parasite.
- d- General and transferable skills:
- 1- Develop skills in self appraisal and seek continuous learning.
 - 2- Develop team work skills ,work as team leader as well as a member in larger teams.
 - 3- Use information technology to improve professional practice and use different sources of information to obtain data.
 - 4- Develop skills in communication using all methods. Manage scientific meeting.

8- Immunology and Allergy

Diploma Degree in allergy

- A1- Recall the general description of immune system and describe different molecules that share in immunological cellular interaction.
- A2- Describe cell surface ligand interaction and explain antigen processing and presentation. Define types of T cells, their response to antigens and relationship to B cells.
- A3- Discuss the different techniques for serological diagnosis of infectious diseases as hepatitis A, B, C, EBV, TB, immunologic and molecular techniques.
- A4- Recall the immune response to infections and understand the different mechanisms of immune damages.
- A5- Understand how to present clinical data and recall national and international relevant clinical cases
- B1- Illustrate the basis of immune system and demonstrate the innate immune mechanisms
- B2- Illustrate the regulation of immune response and cellular activation in the immune system: signal transduction. Demonstrate primary and secondary immune response to defend the body against microorganisms.
- B3- Interpret results of different immunological tests in correlation with clinical and laboratory data

- B4-Distinguish between protective and hazards defense mechanisms
- B5- Illustrate how to present clinical data in case presentations
- C1-Use immunological laboratory techniques for diagnosis of cell mediated and humoral immune response and to differentiate T and B cells.
- C2- Gain skills in applying different immunodiagnostic and molecular tests
- D1- Communicate through group discussion
- D2 Work as a part of team
- D3 Develop skills in information technology

Diploma Degree in diagnostic immunology

- A1- Recall the general description of immune system and describe different molecules that share in immunological cellular interaction.
- A2- Describe cell surface ligand interaction and explain antigen processing and presentation. Define types of T cells, their response to antigens and relationship to B cells.
- A3-Discuss the different techniques for serological diagnosis of infectious diseases as hepatitis A, B, C, EBV, TB, immunologic and molecular techniques.
- A4-Recall the immune response to infections and understand the different mechanisms of immune damages.
- A5-Understand how to present clinical data and recall national and international relevant clinical cases
- B1- Illustrate the basis of immune system and demonstrate the innate immune mechanisms
- B2- Illustrate the regulation of immune response and cellular activation in the immune system: signal transduction. Demonstrate primary and secondary immune response to defend the body against microorganisms.
- B3- Interpret results of different immunological tests in correlation with clinical and laboratory data
- B4-Distinguish between protective and hazards defense mechanisms
- B5- Illustrate how to present clinical data in case presentations
- C1-Use immunological laboratory techniques for diagnosis of cell mediated and humoral immune response and to differentiate T and B cells.
- C2- Gain skills in applying different immunodiagnostic and molecular tests
- D1- Communicate through group discussion
- D2 Work as a part of team
- D3 Develop skills in information technology

Master Degree in Immunology and allergy

- a1- Recognize the basic knowledge of immune systems
 - a2- List the basic techniques in Immunology
 - a3 - Recognize the principals of molecular biology ,immunology
 - a4- Recall different immunological disorders and tests needed to diagnose them.
 - a5- Recognize the recent advances in the field of Immunology
 - b1- Investigate a case of immunodeficiency
 - b2- Evaluate the values of different Immunological lab techniques.
 - b3- Analyze the basic concepts of molecular biology, immunology
 - b4- Solve problems in management of different immunological diseases. Take decisions in various professional situations on the basis of evidence and proofs
 - c1- Perform different Immunological tests and improve methods and tools used
 - c2- Write and appraise reports of immunological tests
- Evaluate and improve methods and tools used in specialty Through student questionnaire

c3-. Use technology to advance practice.

C4 determine the diagnosis of a case of immunodeficiency and design treatment plan for it

d4- Develop skills in communication using all methods

d3- Use information technology to improve professional practice and use different sources of information to obtain data

d1- Develop skills in self appraisal and seek continuous learning

d2-- Develop team work skills ,work as team leader as well as a member in larger teams.

d3- Use information technology to improve professional practice and use different sources of information to obtain data.

d4- Develop skills in communication using all methods. Manage scientific meeting and appropriately utilize time.

Ph.D Degree in Immunology and allergy

a1- Recognize the development of cells and cellular functions at the molecular level.

a2- Understand research methodology and evidence based medical research

a3- Explain the mechanisms for the generation of antibody diversity

a4- Recall genome structure and function.

a5- Comprehend how the immunological cells and molecules interact in defending the body against invading microorganisms

a6- Recognize immune mediated diseases

a7- Review scientific information through different medical search engines.

a8- Understand the build up of scientific paper.

a9- Recall different molecules that share in immunological hypersensitivity reactions.

a10- Understand immune response to tumors, the different mechanisms of oncogenesis, evasions of the different tumors to the immune response and the diagnosis and investigations of clinical cases which have underlying immunopathology.

a11- List the evidence for use, and limitations of, the common procedures used in the diagnosis and management of patients and donors

a12- Understand the different mechanisms of haemolytic diseases, haemolytic disease of newborn and drug induced haemolytic anaemia.

b1- Interpret, analyze and evaluate basic immunologic information to solve problems

b2- Illustrate the basis of molecular cell biology

b3- Illustrate the basics of the use of new technologies in the area of immunology

b4 Illustrate the isotyping switching and its importance in immune system

b5- Differentiate the various modes of inheritance

b6- Differentiate between specific and non specific response

b7- Illustrate the immunopathology of the different diseases.

b8- Illustrate the use scientific and systemic thinking in topics presented.

b9- Identify scientific problems within the area of immunology and design strategies for investigating the problems

b10- Illustrate the basis of hypersensitivity.

b11- Distinguished between oncogene and protooncogenes and hazards defense mechanisms and illustrate the diagnostic procedures which utilize the immune response to reach the final diagnoses of different types of tumours.

b12- Evaluate disciplines related to transfusion and transplantation science in order to be able to integrate information into a wider context

b13- Demonstrate knowledge of immune-hematological principles and procedures

- c1- Gain skills to perform different techniques for protein separation, PCR and fractionation of cell extraction.
- c2- Conduct the correct handling procedure for various laboratory specimens.
- c3- Gain experience in conducting experiments to isolate the different types of cells
- c4- Perform and understand the principle of tests specific for different diseases
- c6- Gain skills in setting a research experimental model to study the role of the immune response in oncogenesis
- c7- Gain skills to differentiate self-tolerance and autoimmunity
- c8- Plan and execute safely a series of experiments on transplantation
- c9- Perform and supervise the tests and procedures necessary to provide diagnosis of haemolytic disease of newborn
- d1- Communicate through group discussion
- d2- Work as a part of team
- d3- Develop skills in information technology
- d4- Develop skills for oral presentation
- d5- Develop skills in reading and research

9-Histochemistry & Cell Biology

Master Degree in Histochemistry & Cell Biology

- a1- Select the different types of instruments in the field
- a2- Recognize the principles governing microscopic examinations.
- a3- Define tissue processing.
- a4- Know basic facts, theories of histochemistry & cell biology and related subjects.
- a5- Recognize mutual relation between professional practice and effect on environment.

- a6- Recognize main scientific advances in histochemistry.
- a7- Define quality standards of the practice.
- a8- List fundamentals of ethical and legal practice.
- b.1- Appraise different histochemical staining under the light and electron microscopes.
- b2- Analyze main scientific advances in histochemistry.
- b3- Examine different models of carcinogenesis on experimental animals under guide of the chemical safety .
- b4- Compare different statistical tests to analyze and interpret data.
- b5- Integrate different information to solve professional problems.
- b6- Evaluate the values of different histological lab techniques and the findings in different organs and tissues selected from animal and human biopsy.
- b7- Solve problems in management of histopathological parameter and take decisions in various professional situations on the basis of evidence and proofs.
- b8- Plan for professional improvement of immunohistochemical staining using tumor markers.
- b9- Choose the problem of new or development drugs through demonstrating model of experimental animals.
- c5- Employ methods and tools used in specialty for histochemistry and immunohistochemistry.
- c6- Illustrate all basic and some of the advanced professional skills in histochemistry and histopathological laboratories.
- c7- Write and appraise reports of light and electron microscope photographs.
- d1- Work effectively as a part of team work.

- d2- Evaluate reflectively on their own learning process.
- d3- Develop skills in observation and communications.
- d4- Share in determination of standards for evaluation of others
- d5- manage time effectively.
- d6- Use information technology to improve candidates professional practice
- d7- Practice self appraisal.
- d8- Use different sources of information to obtain data.
- d9- Learn independently and seek continuous learning.

PhD Degree in Histochemistry & Cell Biology

- a1- Classify cell organelles.
- a2- Discuss different branches of histochemistry.
- a3- Explain cellular disorders and their detection.
- a4- Recall the mutual relation between professional practice and effects on environment.
- a5- Recognize basic facts, theories of the specialty and recent advances in the field of practice.
- a6- Describe the details of ethical and legal practice.
- a7- Explain the guidelines governing ethics, in addition to the quality standards of the practice.
- b1- Select different histochemical staining
- b2- Compare vital processes in cell organs to keep cell life.
- b4- Conduct research studies that add to specialty and publish scientific articles and paper.
- b5- Manage discussions on basis of evidence and proofs and add to the specialty field through seminar
- b6- Plan and implement enhancement and improvement approaches to practice.
- b7- Appraise majority of problems according to the available data and take a decision in various professional situations.
- c1- Apply the available tools to detect cellular contents
- c2- Demonstrate the different uses of stains.
- c3- Perform different special stains in various branches of histochemistry.
- c4- Interpret results from both light and electron microscopes
- c6- Competent in all basic and all acquired advanced professional skills, write and appraise reports and improve methods and tools used in specialty.
- C7- Use technology to advance practice
- d1- Work effectively as a part of team work.
- d2- Evaluate reflectively on their own learning process. Develop skills, in self appraisal and seek continuous learning.
- d3- Develop skills in observation and communications.
- d4- Distinguish problem solving competency.
- d5- Teach and evaluate others and appropriately utilize time.
- d6- Use information technology to improve professional practice and use different sources of information to obtain data.

10- Pathology

Master Degree in Histopathology and Cytopathology

- A1. Recognize the basic structure of cells & tissues.
- A2. Describe the pathogenesis of various pathologic lesions & study their effects on cells & tissues.
- A3. Define tumours according to recent advances in pathology field.
- A4. Describe the legal importance of each histopathologic report and ethics in privacy of each patient's disease.

- A5. Define different methods of quality control used in histopathology laboratory and state the ethics in pathology research and confidentiality of the results.
- B1. Analyze difficult cases by the use of tumour cell morphology, panels of immunohistochemistry and ancillary techniques.
- B2. Compare the histopathologic findings with recent researches to add new prognostic markers and improve diagnosis and use student questionnaire results
- B3. Appraise the possible hazards of performing FNAC or handling fresh biopsies & fluids for Cytology.
- B4. Distinguish the proper ancillary technique required to reach a final diagnosis.
 - c1- Illustrate skills in the use of safety procedures and personal protective equipment in the laboratory.
 - c2- practice the procedure for labeling, handling and disposing of submitted surgical specimens
 - c3- Demonstrate and understanding the principle of each technique.
- C4. Demonstrate a model histopathologic report for each system and organ
 - d1- Communicate effectively using all methods
 - d2- Use information technology to improve his/her professional practice
 - d3- Practice self appraisal and determines his learning needs
 - d4- Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)
 - d5- Use different sources of information to obtain data
 - d6- Work in teams - Manage time effectively
 - d7- Work as team leader in situations comparable to his work level
 - d8- Learn independently and seek continuous learning

Doctor Degree in Histopathology and Cytopathology

- a1- Recall pathologic problems of different body systems at molecular, cellular and system level.
- a2- Recall pathology of reactive & inflammatory disorders with special reference on etiologic agents & ways of prevention.
- a3- Define and Classify neoplasms with the use of ancillary technique as electron microscope, immunohistochemistry & translocation studies.
- a4. Explain possible medicolegal ethics in research & routine pathology fields.
- a5- Recognize the quality standards in pathology practice & research.
- b1- Appraise recent tools for diagnosis of diseases whether neoplastic, inflammatory or degenerative diseases.
- b2- Categorize different cases by using ancillary techniques.
- b3- Differentiate between various anaplastic tumours by using research results.
- C1. Practice research and ancillary molecular techniques independently and as a part of a team.
- C2. Apply immunohistochemical and ancillary techniques reports using recently approved scoring methods
- C3. Apply most recent tumour classifications & recent research techniques.
- C4. Practice regular scientific meetings to review difficult cases & use of proper techniques to reach a final diagnosis
 - d1- Communicate effectively using all methods
 - d2- Use information technology to improve his/her professional practice
 - d3- Teach and evaluate others
 - d4- Perform self appraisal & seek continuous learning
 - d5- Use different sources of information to obtain data
 - d6- Work in teams as well as a member in larger teams
 - d7- Manage scientific meetings and appropriately utilize time

11-Radiation Sciences

Master Degree in Radiobiology

- A1. Review the basics underlying the process of radioactivity and radiation kinetics.
- A2. Recognize the major applications of radioactive isotopes
- A3. Identify the nature, types and significance of radioactive waste.
- A4. Review the impact of contamination on the environment.
- A5. Review the recent industrial, medical and agricultural uses of radioactive sources.
- A6. Identify basic principles and ethics of scientific research
- A7. Recognize quality standards in handling radioactive materials.
- B1. Assess the risk/benefit ratio of radiation use.
- B2. Derive dosimetric calculations involving internal and external doses.
- B3. Analyze events that require an effective and careful response to a radiological emergencies.
- B4. Apply different types of decontamination dealing with each type of accidents for personnel and workplace.
- B5. Understand the cumulative nature of scientific knowledge.
- B8. Plan for periodic self-enhancement of his/her skills
- C1. Practice radiation measurement using various survey meters and counters (as gamma scintillation counter and GM survey meter).
- C2. Analyze, interpret and write reports on radioactive decay modes.
- C3. Enhance the skills of the student in handling radioactive materials.
- C4. Solve variable dosimetric parameters.
- C5. Perform assessment calculations of Radiolabeled compounds' Preparation.
- D1. Communicate Effectively Using Scientific Language and Reasoning.
- D2. Enhance students' written and oral skills.
- D3. Use information technology in handling data, information retrieval, document preparation, presentation and communication.
- D4. Develop an independent approach to learning as a preparation for continuous professional development
- D5. Share in determination of standards for evaluating others (e.g. subordinates, trainees).
- D6. Master access to web sites to perform a research or solve problems.
- D7. Establish working relationship with colleagues, work effectively as a part of a team and develop a culture of disseminating and sharing information with peers.
- D8. Work as team leader in situations comparable to his work level
- D9. Develop an independent approach to learning as a preparation for continuous professional development

Ph.D. Degree in Radiobiology

- A1- Review the molecular basis of radiation biology of normal and neoplastic tissue systems.
- A2- Recognize the chemical basis of nuclear reactions.
- A3- Identify the impact of radioactivity on the environment including; sources of radioactivity, routes of radiation exposure and biological radiotoxicity.
- A4- Review modern clinical nuclear medicine applications including imaging, scanning and therapeutic techniques.
- A5- Review recent scientific research in the field of radiobiology.
- A6- Identify legal and ethical considerations in radiobiology practice and research according to national and international guidelines.
- A7- Recognize quality standards in handling radioactive materials and production of radiolabelled compounds.
- B1- Understand the link between radiation exposure and cancer

- B2- Examine descriptive models that explain risk of radiation.
- B3- Interpret data from monitoring devices in order to assess radiation protection programs in facilities.
- B4- Examine Individual monitoring for external and internal exposures in sight of biological dosimetry of exposure and dose recordings.
- B5- Analyze parameters affecting treatment and treatment planning with photon beam
- B6- Design, conduct and publish scientific research that adds to the existing knowledge in radiobiology.
- B7- Publish scientific articles/papers
- B8- Plan for periodic self-enhancement of his/her skills.
- B9- Take decisions in various emergency situations including radiation contamination and nuclear crises.
- B10- Add to the specialty field through creativity & innovation
- B11- Manage discussions on basis of evidence and proofs
- C1- completely perform radioanalytical procedures taking into consideration radiation lab safety measures.
- C2- independently perform radiation surveying for labs and personnel, interpret the obtained readings and construct a plan suitable for any deviation from normal values.
- C3- Evaluate the available tools for radiation detection and plan to improve methods for detection.
- C4- Use technology to enforce his knowledge in the field of radiation, analyze data and improve his practice
- C5- Plan for enhancing professional practice and improving performance of other radiobiologists
- D1- Communicate effectively using different methods.
- D2- Use information technology to obtain data and improve his/her professional practice.
- D3- Perform self and peer appraisal.
- D4- To be motivated and able to seek continuous learning and help in teaching others.
- D5- Use different sources of information to obtain data
- D6- Work in a team and understands the responsibilities of a team leader
- D7- Manage scientific meetings and appropriately utilize time

12- Medical Biophysics

Master Degree in Medical Biophysics

- a1- Recognize the principals of bioelectricity, biotransport and biomechanics
- a2- Discuss advanced topics about different medical imaging modalities
- a3- Recognize the role of biomedical engineering in advancing all of biomedical sciences
- a4- Discuss advanced topics on radiation biophysics and dosimetry
- a5- Recognize the different research methodologies, statistical analyses and ethical considerations
- b1-Construct mathematical methods to represent biomedical systems
- b2- Judge the applicability of different image modalities in diseases and organ dysfunction diagnosis
- b3-Evaluate many biophysical parameters used in radiodiagnosis and radiotherapy
- b4-Analyze chemical signaling in cellular communications, adhesion and migration.
- c1-Practice versatile procedures to prepare tissue samples to be studied under the electron microscope.
- c2- Use Ultrasound and laser devices in lab to study the mechanisms of interaction between ultrasound waves and laser photons with the biological tissues
- c3- Use computer software to test mathematical models represent some biomedical systems.
- c4- Demonstrate the design and working of some high technology medical therapeutic devices
- c5- construct simulation models and prototypes to serve the recent challenges of medical technology
- d1-Develop skills in reading.
- d2- Develop team work and communication skills
- d3- Use information technology.
- d4- Increase written and oral skills.

PhD Degree in Medical Biophysics

- a1- Recognize the principals of theoretical and experimental biophysical methods used in study macromolecules
- a2- Discuss advanced topics on tissue engineering
- a3- Recognize the fundamentals of neuroscience
- a4- Discuss the mechanics of soft , hard tissues and human movement
- a5- Recognize the different research methodologies, statistical analyses and ethical considerations
- b.1-Construct mathematical methods to represent some physiological systems
- b2- Judge the biocompatibility of biomaterials, micro and nanomaterials
- b3-Evaluate many biophysical parameters used in nuclear medicine and radiotherapy
- b4-Assess the efficiency of medical instruments involved in monitoring, diagnosis and therapy.
- c1-Practice different spectroscopic and microscopic techniques used to study the biological systems characteristics.
- c2- Use computer software to handle proteome informatics database and process images and signals harvested by different medical instrumentations
- c3- Use computer software to test mathematical models represent some physiological systems.
- c4- Prepare and characterize different types of nanomaterials
- d1-Develop skills in reading.
- d2- Develop team,communication skills and disussion groups
- d3- Use information technology.
- d4- Increase written and oral skills.
- d5- Develop team work skills and ability to communicate with others in scientific meetings and group
Manage scientific meetings and appropriately utilize time through seminars

13 Human Genetics

Master Degree in Human Genetics

- a1- Recognize the role of genetics in medicine, recall the structure and function of genes and chromosomes.
 - a2- Discuss genetic counseling and the various methods used for prenatal diagnosis and for treatment of genetic disorders.
 - a3- Recognize the molecular basis of inherited disease and the role of proteomics in genetic disorders.
 - a4- Recall the metabolic pathways in the inborn errors of metabolism.
 - a5- Review genetic diversity in human populations and principles of genetic epidemiology.
 - a6- Recognize the role of cytogenetics in medicine, recall the various chromosome abnormalities and the different methods used in cytogenetics and discuss anomalies of autosomes and sex chromosomes, and recognize the role of genetics in cancer.
 - a7- Describe patterns of human malformations, review genetic aspects of development, and evaluate cases with craniofacial disorders, deafness. short stature, limb defects, overgrowth, neural tube defects, fragile X syndrome, muscular dystrophy and congenital myopathies.
 - a8- Recognize the fundamentals of ethical and legal practice in Medical Genetics.
- Thesis
- b1- Interpret, analyze and evaluate basic genetic information to solve problems
 - b2- Relate the structure and function of genes and chromosomes.
 - b3- Demonstrate the value of prenatal diagnosis and the various methods used for treatment of genetic disorders.
 - b4- Review molecular basis of genetic diseases and proteomics in relation to genetic diseases

- b5- Relate the precise biochemical abnormalities and the disease phenotype and demonstrate the application of pharmacogenetics
- b6- Explain the genetic diversity in human populations, demonstrate the factors that disturb Hardy-Weinberg equilibrium and evaluate cases with complex inheritance and differentiate between disorders with complex inheritance and other modes of inheritance.
- b7- Differentiate between the various methods used in cytogenetics, demonstrate the syndromes with autosomal anomalies, and evaluate cases with sex chromosome anomalies, review role of genetics in cancer.
- b8- Evaluate cases with craniofacial disorders, deafness, neural tube defects, fragile X syndrome, overgrowth syndromes, and reproductive disorders, differentiate cases with proportionate and disproportionate short stature and cases with muscle dystrophy, congenital myopathies or spinal muscle atrophy. Discuss clinical aspects of human teratology and evaluate cases exposed to different teratogens.
- d6-Develop skills to work safely in a laboratory environment

Student questionnaire

- b1- Interpret, analyze and evaluate basic genetic information to solve problems
- b2- Relate the structure and function of genes and chromosomes.
- b4- Review molecular basis of genetic diseases and proteomics in relation to genetic diseases
- b5- Relate the precise biochemical abnormalities and the disease phenotype and demonstrate the application of pharmacogenetics.
- b6- Explain the genetic diversity in human populations, demonstrate the factors that disturb Hardy-Weinberg equilibrium and evaluate cases with complex inheritance and differentiate between disorders with complex inheritance and other modes of inheritance.
- b7- Differentiate between the various methods used in cytogenetics, demonstrate the syndromes with autosomal anomalies, and evaluate cases with sex chromosome anomalies, review role of genetics in cancer.
- b8- Evaluate cases with craniofacial disorders, deafness, neural tube defects, fragile X syndrome, overgrowth syndromes, and reproductive disorders, differentiate cases with proportionate and disproportionate short stature and cases with muscle dystrophy, congenital myopathies or spinal muscle atrophy. Discuss clinical aspects of human teratology and evaluate cases exposed to different teratogens.
- c1- Differentiate between the tools used in molecular genetics
- c2- Diagnose inborn errors of metabolism.
- c3- Construct and examine a karyotype.
- c4- Construct and examine a pedigree and gain skills in clinical genetic examination and evaluation
- d1- Communicate through group discussion
- d2- Work as a part of team
- d3- Develop skills in information technology
- d4- Develop skills for oral presentation.
- d5- Develop skills in reading and research

PhD Degree in Human Genetics

- A1- Recall facts of the genome structure and gene expression, role of mutations in human disease, Mendelian inheritance patterns the principles of population genetics, segregation and genetic linkage analyses
- A2- Discuss the genetic basis of human female & male infertility, a clinical approach to the dysmorphic child, clinical teratology, human malformations, abnormal mental development and abnormal body size and proportions.

- A3- Recall metabolic disorders, hematological and immunological disorders, with special emphasis in the hemoglobinopathies and thalassemias, hemophiliac, leukemias and lymphomas, immunodeficiency disorders and autoimmune diseases.
- A4- Identify human craniofacial, skeletal and connective tissue disorders, human hereditary hearing impairment, congenital blindness and other ophthalmologic disorders and genetic disorders of the skin, fundamental genetic basis of the cardiovascular, respiratory, renal, gastrointestinal and endocrinological disorders, genetic basis of the human mental, behavioral, neurologic and neuromuscular disorders.
- A5- Review human syndromes caused by chromosomal abnormalities and the clinical genetics of common autosomal trisomies, sex chromosomes abnormalities, deletions and other structural abnormalities of the autosomes.
- A6- Describe mitochondrial inheritance, multifactorial inheritance, complex disease, and pathogenetics of diseases.
- A7- Recognize the fundamental concepts and methods in genetic epidemiology, the molecular basis of cancer, the biological basis of aging, pharmacogenetics and pharmacogenomics.
- A8- Explain the process of genetic counseling, carrier and prenatal screening, cytogenetic and molecular diagnostic techniques, strategies for treatment of genetic disorders, bioinformatics, and the ethical, social and legal issues in genetic medicine.
- A9- Identify future considerations in medical genetics and quality standards of the practice
- A10- Know details of ethical and legal considerations in medical genetics .
- B1- Differentiate between disease-causing DNA mutations and polymorphisms, the different modes of inheritance and chromosomal disorders
- B2- Apply basic genetic knowledge to clinical problem solving , calculate simple statistics in epidemiological researches on genetic disorders
- B3- Illustrate the different genetic errors responsible for human cancers and the basic principles of pharmacogenetics.
- B4- Integrate all phases of the genetic counseling process, the various genetic testing methods, the different genetic tests used in carrier and prenatal screening with clinical genetic applications.
- B5- Apply basic principles of clinical genetics to the dysmorphic cases, human infertility, abnormal growth and different types of malformations.
- B6- Evaluate the different genetic syndromes caused by chromosomal abnormalities, sex chromosomes abnormalities and the genetics of deletion syndromes.
- B7- Illustrate current genetic pathophysiological mechanisms of cardiovascular diseases, respiratory diseases and renal disorders.
- B8- Illustrate the molecular basis of hematological, endocrinological and immunological disorders
- B9- Illustrate the genetic causes and inheritance patterns of inborn errors of metabolism, clinical presentations of various metabolic disorder and how to appropriately work up a patient suspected of having a metabolic disorder.
- B10- Use critical judgment to assess different craniofacial syndromes, skeletal dysplasias, connective tissue disorders and patterns of human malformations.
- B11- Argue future considerations in medical genetics.
- B12- Evaluate the genetic basis of genetic ophthalmologic disorders, deafness and dermatologic disorders
- B13- Assess the genetic basis of mental and behavioral and neuromuscular disorders
- C1- Develop the skills to apply the molecular knowledge in clinical practice
- C2- Perform a blood culture for chromosome analysis and examine a karyotype and to differentiate between different types of chromosomal abnormalities .
- C3- Develop counseling skills and recognize the ethical dilemmas in genetic disorders
- C4- Interpret pedigree data and calculate risk

- C5- Develop a working knowledge of the various genetic testing methods
- C6- Examine and diagnose patients with various genetic disorders and to accurately record the findings and write the reports .
- D1- Communicate through group discussion
- D2- Develop skills in information technology
- D3- Develop skills for oral presentation, teach and evaluate others
- D4- Develop skills in reading, critical and self appraisal
- D5- Develop skills in reading and research
- D6- Work as a part of team
- D7- Manage scientific meetings and appropriately utilize time through monthly scientific meeting in the department

14-experimental and clinical surgery

MASTER Degree in Experimental surgery

- A1 Recognize the basic aspects of experimental surgery, and become familiar with common and important surgical conditions.
- A2 Identify the legal and ethical aspects of surgical practice.
- A3 Describe the etiology, pathogenesis, clinical features, complications, and management of common and important surgical conditions. The students have many opportunities for discussing important and common surgical problems with the teaching staff.
- A4 Explain the operative details of surgical operations, different laparoscopic techniques and experimental surgical methods.
- A5 Clarify the methods of cancer screening, early cancer detection and recognize risk groups.
- B1 Interpret patients' symptoms and physical signs in terms of their anatomic, pathologic and functional diagnostic significance.
- B3 Select the appropriate investigations needed for diagnosis and management of surgical patient.
- B4 Analyze the results of clinical and investigatory findings to formulate an appropriate diagnosis.
- B5 Plan management strategies for surgical diseases and to monitor the effectiveness of therapy and re-evaluate management plan accordingly
- B6 Developing experience in managing different surgical complications and follow up of these patients to evaluate the success of management.
- B7 Identify different cancer screening programs and the implication of early cancer detection in reducing cancer mortality and life style modification.
- C1 Improve the clinical skills and decision making which influence the management of patients.
- C2 Identify basic and advanced different operative techniques to improve surgical training skills.
- C3 Develop skills in interpreting radiological findings of various surgical diseases.
- C4 Gain advanced practical skills through experimental surgical researches
- D1 Establish professional relation with patients, their families, and the community.
- D2 Conduct reliable and responsible behaviors.
- D4 Communicate effectively with other health care providers and work co-operatively in a team.
- D5 Discuss professional errors in an honest way.
- D6 Assess the relevance and importance of the ideas of others.

Medical Doctorate in Experimental Surgery

- A1- Describe laboratory animal as a model of human disease, the main types of pancreatic and liver transplant, small intestinal transplantation in animal models, different types of hernias and herniotomy, herniorrhaphy and hernioplasty.
- A-2 Have fluent deep knowledge and understanding of benign breast diseases and nipple disorders, principles of evidence based medicine and laparoscopic surgery.
- A3 Discuss GORD, diagnosis and management of upper GIT bleeding, colorectal disorders and colorectal neoplasia, jaundice, Cystic disease of biliary tract, portal hypertension and management of acute and chronic limb ischemi
- A-4 Describe endoscopic equipments, fundamentals of ERCP and motility disorders of oesophagus
- A-5 Recognize ethical and legal aspects of medical practice, review the principles of evidence based surgery.
- A-6 Define how to write a protocol of a thesis.
- A-7 Discuss the impact of surgical care practitioners on surgical training.
- B-1 Predict diseases outcome in laboratory animal used as model for human diseases, review problems of pancreatic and liver transplantation and importance of experimental small intestinal transplantation in animal models and evaluate techniques of hernia repair
- B2 Analyze the importance of medical ethics, and laparoscopic surgery
- B-3 Categorize the different causes of intestinal obstruction, interpret the role of new diagnostic tools in the management of bile duct strictures and suspect complications of lower limb ischemia.
- B-4 Plan for prevention and management of upper and lower gastrointestinal bleeding, explain the role of ERCP (diagnostic & therapeutic) in pancreatobiliary malignancies and Analyze combined impedance manometry for esophageal motility testing.
- B-5 Appraise evidence based Surgery, surgical practitioners, ethical and legal aspects of medical practice, and practice writing of thesis protocol.
- C-1 Tailoring the new surgical techniques to be tried on animal labs, apply main strategies to prolong experimental xenograft survival and experimental graft survival and gain experience in the management of breast cancer patients
- C-2 Practice Evidence Based Surgery and laparoscopic surgery.
- C-3 Apply surgical management for variable colorectal disorders, apply main strategies of management
- C-4 Monitor the effectiveness of GORD therapy, gain skills in practicing gastrointestinal endoscopy, oesophageal manometry, impedance manometry, Sphincter of Oddi manometry & anorectal manometry, optimizing the use of ERCP. of cholangitis, lower limb ischemia, and diabetic foot disease.
- C-5 Gain skills for anesthesia and anatomy, apply techniques to get sample or specimen, and gain skills to use appropriate laboratory animals.
- D-1 Communicate effectively using scientific language and reasoning.
- D-2- Work as a part of team
- D-3 Maintain an open and questioning mind toward ideas and alternative points of view.
- D-4 Develop skills for oral presentation
- D-5 Evaluate their learning and personal planning processes and be resourceful.

15-Clinical and Experimental Internal Medicine
DIPLOMA DEGREE IN PREVENTIVE CARDIOLOGY

- Recognize the cardiovascular risk factors as well as methods of screening of asymptomatic individuals at risk of cardiovascular events and recall the international guidelines in cardiovascular prevention and barriers for their implementation.

- Recall the pathogenesis and diagnostic criteria of cardiovascular diseases in different metabolic diseases and their management.
 - Discuss the different etiologies of heart failure the diagnostic tests , the pathogenesis and lines of treatment.
 - List cardio-protective drugs.
 - List different infectious etiologies and the different types of cardiac trauma.
 - Recall the anatomy and physiology of the coronary arteries as well as pathophysiology of atherosclerosis , recognize the coronary artery disease risk factors and the lines of treatment of coronary artery disease.
 - Discuss different hypertension and arterial disease risk factors
 - Discuss genetically determined cardiovascular diseases.
 - List the principles underlying the methods of cardiac rehabilitation
 - Recognize the fundamentals of ethics and legal practice and quality standards of the practice
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- Illustrate the methods used for screening high risk patients and the barriers against implementation of the international guidelines in prevention of cardiovascular diseases.
 - Analyze the effects of metabolic diseases on the heart.
 - Illustrate the effects of heart failure on various body systems
 - Analyze the effects of different drugs
 - Analyze the effect of infection to the heart
 - Relate atherosclerosis and endothelial pathology to coronary artery disease.
 - Analyze the effects of hypertension and arterial diseases.
 - Analyze the effects of hereditary and genetic factors on the cardiovascular system and estimate the genetic risk
 - Analyze the effects of cardiac disease on performance and evaluate the methods used in cardiac rehabilitation.
 - Develop skills to Screen for risk factors, perform exercise testing and calculate different incidence and risk rates and ratios.
 - Gain experience in identification of metabolic risk factors for CVD, perform obesity indices and interpretation of lab investigations and management to metabolic diseases
 - Diagnose, manage and interpret ECG, CXR abnormalities associated with heart failure
 - Perform dobutamine stress echo.
 - Gain skills to diagnose clinically infectious diseases of the heart including rheumatic fever, infective endocarditis and interpret lab and imaging tests
 - Examine cases with coronary artery disease.
 - Gain skills in identification of risk factors of hypertension, diagnose, manage cases with hypertension, identify complications and signs of hypertension on ECG and echo.
 - Gain skills to identify individuals at risk for genetic CVD and perform appropriate counseling
 - Gain skills in measuring and improving quality of cardiovascular care
 - Communicate through group discussion
 - Work as a part of team
 - Develop skills in information technology
 - Develop skills for oral presentation
 - Develop skills in reading and research
 - Develop skills to work safely in a laboratory environment

16-Anesthesia and pain management

Diploma Degree in Pain medicine

- A1. Describe the three layers of spinal meninges, boundaries of the spinal cord and identify spinal nerves, basic anatomical landmarks of the back and segmental cutaneous innervation (dermatomes)..
- A2. Identify different types of pain and how to evaluate a pain patient , assess and measure pain using different pain score.
- A3. Define acute pain service and identify the role of the staff and different protocols used.
- A4. Identify chronic pain types and outline their management.
- A5. Identify the basic pharmacological principles of the different analgesics and coanalgesics and the possible interaction between them.
- A6. Identify basics of pain physiology.
- A7- Define sterilization and disinfection and familiarize the students with different antiseptics ,disinfectants and personal protective barriers used in hospitals
- A8. Describe the importance of radiodiagnosis concerning pain medicine.
- A9. Discuss the effect of pain on different body systems.
- A10- Recognize the fundamentals of ethical & legal practice and know the quality standards of the practice
- b1- -Categorize the components of the central nervous system (CNS) and peripheral nervous system (PNS); explain the structural and functional divisions of each.
- b2 Appraise pain management protocol in postoperative units, medical emergencies and trauma in both pediatrics and adults
- b3 Appraise the importance of technology and the updates in analgesic drugs and techniques
- b4- Appraise the strategy to use opioid in non cancer pain
- b5- categorize tolerance and addiction in patients receiving opioids for chronic pain and able to dealing with and manage those patients with addiction.
- B6- Analyze the Types Of Pain And Identify the concepts of Molecular Pathophysiology Of Pain Development, Peripheral And Central Sensitization And Pain Processing
- B7- Analyze problems related to inadequate infection control including surgical site infection , catheter related infection and ventilator associated pneumonia.
- B8- Analyze the hazards of exposure to ionizing radiation.
- B9. Analyze problems related to inadequate infection control including surgical site infection , catheter
- C1. Illustrate the lines of the thoracic wall and the major thoracic surface landmarks and anatomical landmarks integral to the interventional pain practice
- C2. Use different pain scales for assessing pain and monitoring treatment.
- C3. Use management of acute pain and complications of medications and blocks
- C4. Use nerve stimulator and ultrasound in conduction of peripheral nerve blocks.
- C5. Use neuroaxial blocks on simulators and perform supervised trial on patients.
- C6. Interpret the technique of fluoroscopy guided interventions in pain management.
- C7. Demonstrate lesions in X ray films.
- C8. Interpret radiological anatomy.
- C9. Practice correct and full medical , neurological and psychological examination.
- d1- Make scientific presentation
- d2-- Develop team work skills ,work as team leader as well as a member in larger teams.

d3- Use information technology to improve professional practice and use different sources of information to obtain data.

d4- Develop skills in communication using all methods. Manage time effectively.

Master Degree in Pain medicine

a1- List the steps of performing a neuroaxial analgesia and precautions of anticoagulants use with anticoagulants .

a2- Describe the different approaches of peripheral blocks including the upper and lower limb blocks ,paravertebral , ileoinguinal , ileohypogastric ,TAP and rectus sheath blocks and reported complications.

A3-Describe the drugs, novel techniques and devices including PCA,continuous catheter techniques both stimulating and non stimulation catheters .

A4- Describe and measure acute and chronic pain using different scales.

A5- Describe acute neuropathic pain, opioid tolerant and more complex pain presentations

A6- Identify major landmarks of the central nervous system and correlate them with a known function.

A7-Outline the course of the peripheral nerves with emphasis on the nerves of the head and neck, trunk, upper and lower limbs.

A8- Identify cognitive and behavior aspect of pain

A9- Describe opioid induced psychological changes and dealing with them

A10- Recognize the fundamentals of ethical & legal practice and know the quality standards of the practice

B1-Appraise signal pain perception , transmission , transduction modulation and sensitization

B2-Solve the complications of the nerve blocks in view of the relations to the adjacent structure

B3-Distinguish problems related to inadequate pain management

B4- Propose the appropriate investigations required and lines of treatment to acute medical conditions.

B5-Assess anomalies in different imaging studies.

B6-Appraise the standard and advanced responsibility for prevention of infection

B7- Appraise the normal functions of different components of the central nervous system and the effect of their lesions .

B8-Analyze stress, depression, anxiety, addiction , suicidal attempts and pain

B9. Appraise the bundles of infection control including Ventilator associated pneumonia bundle

C1.Illustrate the lines of the thoracic wall and the major thoracic surface landmarks and anatomical landmarks integral to the interventional pain practice

C2.Practice history taking ,examining pain patients using different pain scales for assessing pain and monitoring treatment.

C3.Apply management of acute pain and complications of medications and blocks

C4.Use nerve stimulator and ultrasound in conduction of peripheral nerve blocks.

C5.Practice neuroaxial blocks on simulators and perform supervised trial on patients.

d1- Develop skills in self appraisal, learning and seek continuous learning

d2-- Develop team work skills ,work as team leader as well as a member in larger teams.

d3- Use information technology to improve professional practice and use different sources of information to obtain data.

d4- Develop skills in communication using all methods. Manage time effectively

Doctor Degree in Pain medicine

a1- Identify the mechanism of developing, transmission ,modulation and perception of pain.

- a2- Identify the effect of the opioid, non-opioid analgesics, the role sodium and calcium channel antagonists and local anesthetic drugs in prevention of pain
- a3- Outline service provided by acute pain team., different type of pain and Multimodal approach for its management
- a4- Identify different pathophysiology for musculoskeletal, low back pain neuropathic pain, headache and cancer pain for better management
- a5- Outline pain management in end of life terminal patients and interventional techniques for intractable pain
- a6- Describe neurological principles emotion and behaviour changes to pain
- a7- Describe the health related acquired infection and infection control policy in operative theater., icu and wards
- a8-Describe the advanced radiodiagnostic parameters in pain medicine.
- b1- Categorize the modulation of pain and prevention of developing chronic pain
- b2- Appraise the mechanism of action of analgesics, pharmacological principles and their application
- b3- Appraise the safe and effective plan for the treatment of acute pain using multiple analgesics and coanalgesics
- b4-.Analyze the problems related to cancer pain , neuropathic and musculoskeletal pain
- b5-. Analyze the problems in communications with angry, dying patients and their families.
- b6- Appraise the psychology of addiction
- b7- Appraise hand hygiene and professional responsibility for infection control
- b8- Appraise advanced radiological guidance in pain intervention
- c1- Illustrate different types of pain and their modulation at different levels
- c2 Use the proper multimodal drug therapy in acute pain
- c3- Use the intervention pain techniques for cancer patients and non cancer pain
- c4- Use drugs for palliative pain therapy and understanding their interaction with other medications taken by the patient for other systemic disease, and dealing with the complications
- c5 - Interpret radiodiagnostic images for diagnosis of pain
- d1-Make scientific presentations
- d2 Work in group.
- d3- Use information technology to improve professional practice and use different sources of information to obtain data.
- d4- Develop skills in communication using all multimedia effectively and internet resources.
- d5- Develop team work skills ,work as team leader as well as a member in larger teams.

17- Chemical pathology

MASTER Degree in Chemical pathology

- a1- Define basic principles in chemical pathology as sampling, quality and safety.
- a2- Recognize different techniques & instrument and separation techniques
- a3- Discuss screening, diagnosis and monitoring of disease related to different body organs.
- a4- Explain main body components and body ions.
- a5-Memorize different laboratory markers in diagnosis and management of patients
- b1- Compare sample processing methods and quality control and assurance and implement safety tools. Basics and ethics of scientific research through thesis work
- b2- Distinguish the use of different instruments and separation techniques
- b3- Criticize abnormal lab results concerning different diseases in different organs

- b4-Contrast the use of laboratory test in main body components and body ions
- b5- Appraise different laboratory markers in diagnosing and management of different diseases
- c1-Use different constructed quality control charts ,and perform lab safety measures
- c2-- Use different lab instruments and lab separation techniques
- c3- Illustrate different organ functions by different methods and techniques
- C4-Employ examination main body component and body ions
- C5- Use different laboratory markers specific to diagnose and manage different diseases
- d1- Develop skills in reading and research
- d2- Establish team work skills and use of information technology
- d3- Acquire skills in communication and problem solving
- d4- Establish skills in presentation of case study

MD Degree in Chemical pathology

- a1- Review the impact of quality management in chemical pathology laboratory practice
- a2- Recognize all congenital and acquired diseases affecting body organs
- a3- Identify all possible laboratory methods, techniques and instruments suitable for the assessment of organ dysfunction
- a4- Describe and classify new advances in clinical chemistry
- Recognize ethical and legal considerations in laboratory practice through thesis work
- b1-Compare different statistical tests to analyze quality control results.
- b2- Appraise the use of laboratory tests in diagnosing and monitoring organ dysfunctions and disturbed metabolism.
- b3-Analyze laboratory results and integrate problem solving.

- c1-Apply quality control and diagnostic performance of different lab tests
- c2- Use different laboratory instruments and calibrate required equipments
- c3- Apply laboratory tests in the assessment and monitoring of diseases.
- c4- Practice the use laboratory results of acquired disturbed metabolism
- d1- Develop team work skills and ability to communicate with others in scientific meetings and group discussions.
- d2- Acquire research skills and ability to use information technology

18- Radiodiagnosis

Diploma Degree in breast imaging

- a1-List of the different techniques for Breast imaging
- a2-Recognise the basic knowledge of breast anatomy and normal plain mammographic findings
- a3-Recognise the recent and advanced techniques for MRI breast
- a4-Recall different benign and malignant breast disorders
- a5-Recognise techniques for breast biopsy
- a6-Recognise fundamentals of ethical legal practice
- a7- know the quality standard of the practice
- b1-Investigate cases of bleeding nipple
- b2-Investigate cases of breast lump
- b3-Investigate cases of asymmetric breast density
- b4-Analyze the basic imaging fields in cases of bleeding per nipple, breast lump and asymmetric breast density
- b5-Solve diagnostic problems in case of indeterminate lesion of dense breast

- b6-Evaluate professional risks
- c1-Perform different mammograph, techniques , ultrasound and MRI of the breast
- c3-Perform biopsy
- d1- Develop skills in communication
- d2- Develop skills for oral presentations (to fulfill seminar).
- d3- Work in groups (whenever possible).

20-Biomedical Engineering
Master Degree in Biomedical Image Processing

- A1. Describe the functions of several physiological systems in human body.
- A2. Recognize different biomedical signals induced from human body.
- A3. Translate different signal processing techniques on biosignals for enhancing patient diagnosis.
- A4- Recognize the main advance in the field of biomedical engineering
- A5-Recognize the ethical regulations associated with the use of medical devices.
- A6-Recognize the quality standards of the practice in the field of biomedical engineering.
- A7-Order the research method in details.
- A8-Identify intellectual property rights.
- B1- Analyze biosignals using signal processing techniques.
- B2- Examine dynamic physiological systems using simulation modeling techniques
- B3-Compare different information to solve professional problems through thesis
- B4- Examine scientific papers through thesis
- B5- Examine safety instructions associated with the use of medical devices.
- B6- Analysis of student questionnaire for professional improvement plan
- B7.Comparing different biosensors for capturing bioelectrical signals.
- C1. Practice on different aspects in neurophysiology.
- C2. Design physiological models on MATLAB simulink software.
- C3. Practice on writing a research protocol.
- C5. Sketch various medical devices used in operation room or in hospitals.
- C6. Practice on using different technical computer programs used in hospital information system construction.
- C7. Demonstrate different aspects in bioelectric phenomena.
- D1- Develop skills in communication
- D2- Use information technology to improve professional practice and use different sources of information to obtain data
- D3- Develop skills in self appraisal and seek continuous learning during preparation of thesis
- D4.Develop skills of evaluating different scientific papers based on scientific regulations.
- D5.Use of World Wide Web, digital libraries to obtain required data for research.
- D6. Develop a culture of disseminating and sharing information with peers.
- D7. Develop skill in time Management through giving oral presentation and sending required activities before deadline.
- D8- Election of students for representation in department's council.
- D9- Use of resources (www, research articles,) other than lecture notes to master his research point during preparation of thesis.

Master Degree in Biomedical Devices

- A1. Describe the functions of several physiological systems in human body.
- A2. Recognize different biomedical signals induced from human body.
- A3. Explain the function of the main steps for analyzing digital medical images for enhancing patient diagnosis.
- A4- Recognize the main advances in the field of biomedical image processing
- A5-Recognize the ethical regulations associated with the use of medical devices.
- A6- Recognize the quality standards of the practice in the field of biomedical image processing.
- A7-Order the research method in details.
- A8-Identify intellectual property rights.
- B1- Analyze biosignals using signal processing techniques.
- B2- Examine dynamic physiological systems using simulation modeling techniques.
- B3- Compare different information to solve professional problems through thesis
- B4- Examine scientific papers through thesis
- B5- Examine effect of using non efficient image processing techniques for analyzing medical images on patient diagnosis during preparation of thesis.
- B6- Analyze student questionnaire for professional improvement plan
- B7.Comparing different biosensors for capturing bioelectrical signals.
- C1. Apply different image processing techniques on digital images usingMATLAB.
- C2.Apply physiological models on MATLAB simulink software.
- C3. Practice on writing a research protocol.
- C4- Apply various medium and high levels image processing techniques for extracting object features.
- C5. Sketch various medical devices used in operation room or in hospitals.
- C6.Practice on using different technical computer programs used in hospital information system construction
- C7.Demonstrate different aspects in bioelectric phenomena.
- D1- Develop skills in communication
- D2- Use information technology to improve professional practice and use different sources of information to obtain data
- D3- Develop skills in self appraisal and seek continuous learning during preparation of thesis.
- D4.Develop skills of evaluating different scientific papers based on scientific regulations.
- D5.Use of World Wide Web, digital libraries to obtain required data for research.
- D6. Develop a culture of disseminating and sharing information with peers.
- D7. Develop skill in time Management through giving oral presentation and sending required activities before deadline.
- D8- Election of students for representation in department's council.
- D9- Use of resources (www, research articles,) other than lecture notes to master his research point during preparation of thesis.

21- Biomedical informatics & Medical Statistics

Diploma Degree in Biomedical informatics & Medical Statistics

a- Knowledge and understanding:

1. Recall different statistical tests
2. Explain the background of genetic epidemiology
3. Explain examples of bioinformatics
4. Demonstrate knowledge of basic computer skills
6. Identify Basic facts, theories, of the principles of medical statistics

7. Identify Quality standards in the practice of personal computer & internet.
8. Identify basic principles and ethics of scientific research

b- Professional and practical skills:

1. Interpret data derived from statistical analysis.
2. Apply evidence based guidelines.
3. Assess the scientific data
4. Perform and interpret the statistical results.
5. Evaluate method used in statistical analysis.

c- General and transferable skills:

1. Communicate effectively through written and oral presentation.
2. Present effectively different scientific topic.
3. Use **information technology**
4. Develop an **independent** approach to **learning**
5. Use modern computing resources for data handling, **information** retrieval, document preparation, presentation and communication
6. Develop a culture of Team work
7. Acquire **independent** study skills as preparation for **continuous professional development**
8. Develop skills in **research**.

Master Degree in Biomedical informatics & Medical Statistics

- a1- Identify data types, determine their distribution, summarize them soundly and recognize how to make inference using statistical significance
- a2- Explain different sampling techniques, sample size calculation and different research designs.
- a3- Identify appropriate statistical test based on type of data and dependence of the observation.
- a4- Explain the performance of diagnostic tests.
- a5- Explain regression analysis, its types and assumptions
- a6- Recognize the aim and components of each section of a scientific paper and the principles of publication ethics
- a7- Recognize the commonly used hospital rates and its importance in successful management.
- a8- Define the concept of evidence based medicine (EBM)
- a9- Recognize bi-informatics, population genetics and rules of Mendelian inheritance
- a10- Explain pharmaco-epidemiology and its main objectives
- a11- Define chronic diseases, their determinants, their impact, importance of their reporting and different levels of their prevention
- b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel
- b2- Calculate commonly used statistical tests, e.g., t-test, ANOVA, Mann-Whitney and interpret its results
- b3- Identify which research design is suitable to answer different research questions
- b4- Choose the appropriate regression analysis and interpret its results soundly
- b5- Derive ideas and organize them
- b6- Judge the validity of different epidemiological studies and differentiate between types of plagiarism
- b7- Translate the results of hospital statistics and understand their implication
- b8- Examine the type of clinical questions and evaluate the level of evidence

- b9- Analyze and interpret results of bio-informatics
- b10- Interpret the results of Hardy Weinberg law
- b11- Outline the different methodological issues raised by pharmaco-epidemiological studies
- c1- Use statistical softwares for data entry, manipulation, summarization and presentation and for conducting commonly used statistical tests and evaluate the performance of diagnostic tests.
- c2- Plan and calculate the required sample size for different research designs.
- c3- Use statistical software to conduct appropriate regression analysis, test its assumption and report its results soundly
- c4- Use MS Word, Excel, Access, Powerpoint in different academic needs.
- c5- Employ the principles of effective writing, present tables and graphs and manage references and Conduct scientific research without violating ethical issues
- c6- Calculate different hospital rates and report them soundly.
- c7- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion
- c8- Manage data bases in bioinformatics
- c9- Estimate probabilities of genetic diseases for different individuals
- c10- Design different pharmaco-epidemiological and pharmaco-economics studies.
- c11- Apply appropriate statistical tests for different epidemiological studies.
- c12- Code diseases used ICD-10 and interpret the results provided chronic disease registries

PhD Degree in Biomedical informatics & Medical Statistics

- A1-Recognize basic facts of the Meta analysis& different statistical tests used in Evaluation of diagnostic tests.
- A2-Recognize mutual relation between Regression Bootstrapping and Jack-knifing Cross-validation
- A3-Recognize recent advances in Computational Biology: Genomes, Networks, Evolution Details of ethical & legal practice
- A4-Recognize quality standards of methods of screening of diseases
- A5-Review Design, conduction & publishing of clinical guidelines and its components
- A6-Discuss ethical considerations in identifying the notions of rational behavior and intelligent agents&
- B1-Analyze, deduce, extrapolate & evaluation of diagnostic tests
- B2-Analyze Interpret the results of GIS analysis to solve population health research
- B3-Solve the majority of problems in Sigma tools to improve and control the complex processes of health care delivery)
- B4-Conduct research studies that decide how to Formulate health questions
- B6-Differentiate and implement (or supervise implementation of) different domains of the guideline assessment tool to practice
- B7,8-Review decisions in various results of GIS analysis to solve population health research, Add to the specialty field through creativity & innovation
- B9-Evaluate and manage discussions on basis of evidence and proofs
- C1-Assess all basic and all required advanced professional skills (Do Statistical analysis & interpret the results of ROC curve
- C2-Apply reports and perform critical appraisal of different studies
- C3-Apply and improve different methods of registration
- C4-Assess different technologies to practice and Interpret the results of meta analysis
- C5-Construct professional development courses to improve discovery sources of bias in research

- D1-Communicate effectively using all methods
- D2-Use information technology to improve his/her professional practice(Six Sigma, GIS)
- D3,e1-Evaluate others through critical appraisal
- D3-Perform self appraisal & seek continuous learning
- D4-Work with different sources of information to obtain data for evidence based guidelines
- D5-Work as team leader as well as a member in larger teams
- D6 -Communicate and manage scientific meetings and appropriately utilize time