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**CURRICULUM/STATUTES & REGULATIONS  
FOR  
4 YEARS DEGREE PROGRAMME  
IN  
GENERAL SURGERY  
(MS GENERAL SURGERY)**

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**UNIVERSITY OF HEALTH SCIENCES,  
LAHORE**

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## STATUTES

### **1. Nomenclature of the Proposed Course**

The name of degree programme shall be MS General Surgery. This name is well recognized and established for the last many decades worldwide.

### **2. Course Title:**

MS General Surgery

### **3. Training Centers**

Departments of General Surgery (accredited by UHS) in affiliated institutes of University of Health Sciences Lahore.

### **4. Duration of Course**

The duration of MS General Surgery course shall be four (4) years (first year in Part I and next three years in Part II) with structured training in a recognized department under the guidance of an approved supervisor.

The course is structured in two parts:

**Part I** is structured for the 1<sup>st</sup> calendar year. The candidate shall undertake didactic training in Basic Medical Sciences, Behavioural Sciences and Biostatistics & Research Methodology. At the end of first year the examination shall be held in Basic Medical Sciences. The clinical training in fundamental concepts of General Surgery shall start from the 1<sup>st</sup> day of enrollment.

**Part II** is structured for the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> calendar years although the clinical training shall be started from 1<sup>st</sup> year. It has two components:

1. Clinical training in General Surgery
2. Research and thesis writing

The candidate shall undergo clinical training to achieve educational objectives of MS General Surgery (knowledge & skills) along with rotation in relevant fields. Research component and thesis writing shall be completed over the four years duration of the course. Candidate will spend total time equivalent to one

calendar year for research during the training. Research can be done as one block in 4<sup>th</sup> year of training or it can be done in the form of regular periodic rotations over four years as long as total research time is equivalent to one calendar year.

### **5. Admission Criteria**

For admission in MS General Surgery course, the candidate shall be required to have:

- MBBS degree
- Completed one year House Job
- One year experience in General Surgery/Allied Surgical discipline in the given order of preference
- Registration with PMDC
- Passed Entry Test conducted by the University & aptitude interview by the Institute concerned
- Having up to the mark credentials as per UHS rules (no. of attempts in each professional, any gold medals or distinctions, relevant work experience, Rural/ Army services, research experience in a recognized institution, any research article published in a National or International Journal) may also be considered on case to case basis.

### **6. Registration and Enrollment**

- Total number of students enrolled for the course must not exceed 2 per supervisor/year.
- The maximum number of trainees that can be attached with a supervisor at a given point of time (inclusive of trainees in all years/phases of MS training), must not exceed 6.
- Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
- The University will approve supervisors for MS courses.
- Candidates selected for the courses after their enrollment at the relevant institutions shall be registered with UHS as per prescribed Registration Regulation.

## **7. Accreditation Related Issues of the Institution**

### **A). Faculty**

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC)

### **B). Adequate Space**

Including class-rooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab etc.

### **C). Library**

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

- Accreditation of General Surgery training program can be suspended on temporary or permanent basis by the University, if the program does not comply with requirements for residents training as laid out in this curriculum.
- Program should be presented to the University along with a plan for implementation of curriculum for training of residents.
- Programs should have documentation of residents training activities and evaluation on monthly basis.
- To ensure a uniform and standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary.

## **AIMS AND OBJECTIVES OF THE COURSE**

### **AIM**

The aim of four years MS programme in General Surgery is to train residents to acquire the competency of a specialist in the field so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

### **GENERAL OBJECTIVES**

MS General Surgery training should enable a student to:

- Access and apply relevant knowledge to clinical practice:
  - Maintain currency of knowledge
  - Apply scientific knowledge in practice
  - Appropriate to patient need and context
  - Critically evaluate new technology
- Safely and effectively performs appropriate surgical procedures:
  - Consistently demonstrate sound surgical skills
  - Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
  - Demonstrate manual dexterity required to carry out procedures
  - Adapt their skills in the context of each patient and procedure
  - Maintain and acquire new skills
  - Approach and carry out procedures with due attention to safety of patient, self and others
  - Critically analyze their own clinical performance for continuous improvement
- Design and implement effective management plans:
  - Recognize the clinical features, accurately diagnose and manage surgical problems
  - Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
  - Formulate a differential diagnosis based on investigative findings

- Manage patients in ways that demonstrate sensitivity to their physical, social, cultural and psychological needs
- Recognize disorders of the organ systems and differentiate those amenable to surgical treatment
- Effectively manage the care of patients with trauma including multiple system trauma
- Effectively recognize and manage complications
- Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities
- Indicate alternatives in the process of interpreting investigations and in decision-making
- Manage complexity and uncertainty
- Consider all issues relevant to the patient
- Identify risk
- Assess and implement a risk management plan
- Critically evaluate and integrate new technologies and techniques.
- Organize diagnostic testing, imaging and consultation as needed:
  - Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner
  - Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs
  - Critically evaluates the advantages and disadvantages of different investigative modalities
- Communicate effectively:
  - Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated with surgery in ways that encourage their participation in informed decision making
  - Communicate with the patient (and their family) the treatment options including benefits and risks of each
  - Communicate with and co-ordinate health management teams to achieve an optimal surgical environment
  - Initiate the resolution of misunderstandings or disputes

- Modify communication to accommodate cultural and linguistic sensitivities of the patient
- Recognize the value of knowledge and research and its application to clinical practice:
  - Assume responsibility for self-directed learning
  - Critically appraise new trends in General Surgery
  - Facilitate the learning of others.
- Appreciate ethical issues associated with General Surgery:
  - Consistently apply ethical principles
  - Identify ethical expectations that impact on medico-legal issues
  - Recognize the current legal aspects of informed consent and confidentiality
  - Be accountable for the management of their patients.
- Professionalism by:
  - Employing a critically reflective approach to General Surgery
  - Adhering with current regulations concerning workplace harassment
  - Regularly carrying out self and peer reviewed audit
  - Acknowledging and have insight into their own limitations
  - Acknowledging and learning from mistakes
- Work in collaboration with members of an interdisciplinary team where appropriate:
  - Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type
  - Develop a care plan for a patient in collaboration with members of an interdisciplinary team
  - Employ a consultative approach with colleagues and other professionals
  - Recognize the need to refer patients to other professionals.
- Management and Leadership
  - Effective use of resources to balance patient care and system resources
  - Identify and differentiate between system resources and patient needs
  - Prioritize needs and demands dealing with limited system resources.

- Manage and lead clinical teams
- Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team.
- Maintain clinically relevant and accurate contemporaneous records
- Health advocacy:
  - Promote health maintenance of patients
  - Advocate for appropriate health resource allocation
  - Promote health maintenance of colleagues and teacher

## **SPECIFIC LEARNING OUTCOMES**

On completion of the training programme, General Surgical Trainees pursuing an academic pathway will be expected to have demonstrated competence in all aspects of the published syllabus. The specific training component would include the following areas:

1. Establishing clearly defined standards of knowledge and skills required to practice General Surgery at secondary and tertiary care levels
2. Understand Basic Sciences relevant to the surgical diseases and their management
3. **General Surgery specialization areas:**
  - Principles of Wound Healing – knowledge of collagen synthesis-stimulating and inhibitory factors primary and secondary intention prevention and treatment of dehiscence management of chronic wounds
  - Suturing techniques
  - Fluid/Electrolyte and Acid/Base Physiology with understanding of the normal physiology of body water and minerals, common derangements and principles of treatment
  - Critical Care: know the basic principles of hemodynamic monitoring, acid/base physiology, oxygen consumption, oxygen delivery, respiratory failure, ventilation support and nutrition
  - Trauma: know the systematic approach to managing multiply injured patients, indications for operative and non-operative management and the pathophysiology of injury
  - Surgical Oncology: understand the basic principles of solid tumor management, the role of surgery in the multidisciplinary approach to diagnosis and treatment and the natural history of the most common malignancies (breast cancer, colon and other GI cancers, melanoma)
  - Emergent Non-traumatic Surgical Problems: know the approach to evaluation of acute abdominal pain, indications for emergent surgical intervention and the diagnosis, natural history and treatment of the most common conditions that present as surgical emergencies

- Surgical Infections: understand the microbiology, predisposing factors, and treatment of nosocomial infection, post-operative wound infection and intra-abdominal abscess
- Surgical Diseases: be familiar with the natural history, diagnosis, pre-operative work-up, intra-operative approaches, post-operative management, and the recognition and treatment of post-operative complications of those diseases most commonly encountered by General Surgeons. These include:
  - Patients presenting with an acute abdomen
  - Assessment of the acute abdomen;
    - Peritonitis;
    - Acute appendicitis;
    - Acute presentation of gynaecological disease;
    - Acute intestinal obstruction
  - Manage infections of the skin and superficial tissues:
    - Superficial sepsis, including necrotizing infections
  - Manage primary and recurrent hernia of the abdominal wall in the acute or elective situation:
    - Obstructed hernia
    - Strangulated hernia
  - Manage the patient with multiple injuries: the assessment of the multiply injured patient, including children
  - Blunt and penetrating injuries
  - Abdominal injuries especially splenic, hepatic and pancreatic injuries;
  - Injuries of the urinary tract;
  - Vascular injury
  - Provide specialist surgical support in the management of conditions affecting the reticulo-endothelial and haemopoetic systems:
    - Manage benign and malignant lesions of the skin and subcutaneous tissue
    - Manage perforated peptic ulcer
    - Manage acute GI haemorrhage
  - Gastroscopy; Endoscopy for lower GI problems

- Manage the patient presenting with upper gastrointestinal symptoms, including dysphagia and dyspepsia:
- Elective oesophagogastric disorders
- Manage the patient presenting with symptoms referable to the biliary tract, including jaundice:
  - Acute gallstone disease;
  - Acute pancreatitis;
  - Elective HPB disorders
- Manage patients with symptoms of lower gastrointestinal disease such as change in bowel habit:
  - Benign colon conditions
  - Colorectal neoplasia
  - Inflammatory bowel disease
- Manage acute breast infection and recognize common breast conditions:
- Manage varicose veins
- Recognize the acutely ischaemic limb

**4. Surgical Subspecialties:** be familiar with the management of the most common symptom patterns, differential diagnosis, investigation and management of surgical conditions related to the following subspecialties;

- Emergency Surgery
- Central and peripheral nervous systems
- Head and neck surgery
- Thoracic surgery
- Gastrointestinal surgery
- Genitourinary surgery
- Laproscopic Surgery
- Traumatology
- Organ transplantation
- Surgical oncology etc.

**i.) Trauma/Emergency Surgery Service**

- Explain the importance of mechanism of injury in the evaluation of the acutely injured patient.
- Describe the pathophysiology of acutely injured patients, including

- Hemorrhagic shock
- Neurogenic shock
- Obstructive shock
- Traumatic brain injury
- Understand the role of imaging in the care of acutely injured patients.
- Describe the evaluation of the abdomen in the trauma patient.
- Delineate the steps in evaluation and management of long-bone and pelvic musculoskeletal injuries.
- Discuss perioperative fluid and electrolyte management.
- Articulate the evaluation and management of patients with post-operative fever.
- Explain the importance of injury prevention efforts.
- Understand the role of nutrition, physical therapy, rehabilitation, and family/social services in patient management.
- Take a history and perform physical examination to evaluate a patient with acute abdominal pain.
- The initial assessment and management of a patient in respiratory and/or cardiovascular arrest.
- Fluid management in resuscitation.
- Cardiovascular physiology and the basics of invasive monitoring techniques.
- Place bladder and gastric catheters.
- Basic principles of mechanical ventilation and troubleshooting common problems on mechanical ventilation
- Chest radiograph interpretation
- ABG interpretation
- ECG interpretation
- Basic principles of hemodynamic monitoring and introduction to the Pulmonary artery catheter
- Diagnosis and treatment of shock
- Management of various atrial and ventricular dysrhythmias
- Diagnosis and management of congestive heart failure
- Diagnosis and management of acute coronary syndromes
- The use of sedatives, analgesics, and neuromuscular blockade in the ICU

- The evaluation and initial management of oliguria and acute renal failure
- Basic principles of acid-base physiology
- Diagnosis and management of electrolyte disorders
- Nutritional assessment of the critically ill patient
- Administration of enteral and parenteral nutrition
- Evaluation and management of the anemic/thrombocytopenic patient
- Use of antithrombotic agents and blood products
- Central venous catheterization using ultrasound guidance
- Placement of chest tubes and arterial lines
- Introduction to bronchoscopy
- To appreciate the critical decision-making involved in the management of patients with vascular disease.
- The ability to construct a differential diagnosis, interpret investigations and construct a management plan for common conditions
- Undergoing exposure and training in a range of common surgical procedures
- Developing a number of generic and advanced operative skills specific to General Surgery
- Proficiency in handling critical and intensive care surgical illness
- Understand the indications, actions and monitoring of drugs used in the surgical diseases

## **ii.) Anesthesiology / Perioperative Care**

- To introduce concepts of perioperative medicine including preoperative evaluation and intra- and post-operative management of the surgical patient
- To gain experience in the management of critical incidents, such as airway and vascular access.
- How to perform a preoperative evaluation of a patient including medical condition, physical status, airway examination, appropriate preoperative testing and the impact of anesthesia and surgery on their condition.
- General tenets of intraoperative medicine including monitoring (selection, steps in placement and basic interpretation of invasive monitors) and anesthetic options.

- How to recognize and manage common post-operative complications including pain, hypotension, respiratory depression, and myocardial ischemia.
- The pharmacology of anesthetic, sedative, narcotic and vasoactive medications.

**iii.) Burn Service**

- Understand early emergency care of burn patients including assessment of:
  - Airway, breathing, circulation
  - Extent and depth of burn
- Need for burn center referral
- Comprehend fluid resuscitation in burn patients with respect to:
  - Fluid composition
  - Calculating fluid requirements
  - Monitoring adequacy of resuscitation
- Understand the pathophysiology, diagnosis and treatment of inhalation injury.
- Understand general principles of wound management including:
  - Topical antimicrobials
  - Skin grafting techniques
  - Use of skin substitutes and biologic dressings.
- Develop a basic knowledge of the rehabilitation needs of burn patients.

**iv.) Orthopaedic Surgery**

- Demonstrate ability to take a history and perform the appropriate physical examination for a patient with a musculo-skeletal problem.
- Demonstrate the ability to organize the information obtained from a history and physical examination, formulate a differential diagnosis, and recommend options for treatment
- Understand what types of diagnostic imaging studies are useful in the evaluation of musculoskeletal problems. Understand how to interpret basic findings on plain radiographs, such as normal anatomy, common types of fractures, arthritis.

- Participate in the preoperative evaluation, surgical procedure, and postoperative care of patients undergoing surgical treatment of musculoskeletal problems.
- Understand the clinical and radiographic findings & the treatment options and objectives of common musculoskeletal problems including:
  - Bone and joint injury
  - Fractures & dislocations
  - Acute soft tissue injury
  - Ligament, tendon, nerve injuries
  - Chronic soft tissue problems
  - Tendonitis/bursitis
  - Nerve compression/entrapment
  - Joint instability
  - Arthritis-degenerative and inflammatory
  - Metabolic bone disease-osteoporosis
  - Infection-bone (osteomyelitis) and joints (septic arthritis)
  - Neoplastic bone disease

**v.) Thoracic and Cardiovascular Surgery**

- Learn the natural history and pathophysiology of cardiothoracic surgical diseases
- Be able to apply knowledge of cardiothoracic surgical diseases to the preoperative evaluation and postoperative care of a patient undergoing cardiothoracic surgery
- Develop a general understanding of surgical techniques and equipment specific to the specialty including the use of the cardiopulmonary bypass pump, hypothermia and tissue protection methods
- Learn about counseling activities to promote health
- The students should develop an appreciation of the procedures involved in the care of TCV patients, such as chest tubes, lines, monitoring, wound management, intubation, tracheostomies, gastrostomies, and VAC sponge treatment of wounds.

**vi.) Transplant Surgery**

- Establish a working understanding of the human immune system and ways to manipulate it as it applies to:

- Basic science of immunology
- Transplant recipients undergoing transplantation and the agents used
- Complications of immunosuppression likely to be encountered

**vii.) Hepatobiliary Surgery**

- Comprehend surgery of the liver and biliary tract as it relates to:
  - Surgical anatomy of the liver and biliary tract
  - Hepatic resections for benign and malignant liver lesions
  - Bile duct reconstruction or bypass for benign and malignant strictures.
  - Whole organ, split liver, and live donor liver transplants
  - Pancreas transplantation for type I DM
- Understand portal hypertension in terms of:
  - Anatomy and pathophysiology of the portal venous system
  - Evaluation, treatment, and resuscitation of hemodynamically significant upper gastrointestinal bleed
  - Medical and non-shunt surgical therapy
  - Non-selective, selective and TIPSS shunt therapy
- Principles of management of complex, post-operative patients recovering from major hepatobiliary surgery
- Evaluation of hepatic masses/ Liver imaging

**viii.) Urology**

- The students should learn the pathophysiological basis of all urological diseases that they encounter in the hospital.
- General surgical problems arising in the renal failure patients
- Participation in the care of all urological inpatients.
- Insertion of a Foley's catheter in a male and female patient.
- The evaluation, work-up and management of patients with urolithiasis, prostate cancer, bladder cancer, renal carcinoma, carcinoma of the testes and scrotal masses, female urology– including incontinence and prolapse and the management of bladder outlet obstruction
- Additionally, students should understand how to read imaging as it pertains to Urology including CT scan of the abdomen and pelvis – with specific reference to the retroperitoneum, kidneys, ureters, bladder, retroperitoneal lymph nodes, prostate, and have a basic understanding of renal ultrasound and MRI.

- Understand fundamentals of renal transplantation
- Indications for dialysis and transplantation

**ix.) Vascular Surgery**

- To become proficient in the initial evaluation of patients with cerebrovascular, arterial occlusive, aneurysmal and venous disease.
- To understand the basic pathophysiology and treatment options for patients with cerebro-vascular, arterial occlusive, aneurysmal and venous disease.
- To become familiar with non-invasive testing for vascular disease.

**x.) Gastrointestinal Surgery**

- Demonstrate proficiency in the assessment and management of:
  - The acute abdomen
  - Gastro-oesophageal reflux and its complications
  - Hiatus hernia
  - Peptic ulceration and its complications
  - Radiation enteritis
  - Infantile pyloric stenosis
  - Diagnostic upper GI endoscopy
  - Swallowed foreign bodies
  - Gastrointestinal bleeding
  - Appendicitis and right iliac fossa pain
  - Abdominal pain in children
  - Peritonitis
  - Acute intestinal obstruction
  - Intestinal pseudo-obstruction
  - Strangulated hernia
  - Intestinal ischaemia
  - Toxic megacolon
  - Superficial sepsis and abscesses
  - Acute ano-rectal sepsis
  - Ruptured aortic aneurysm
  - Neoplasms of the GI tract

**xi.) Plastic Surgery**

- Student should be able to conduct a basic physical exam and recognize important physical signs.
- Students should be competent in closure of cutaneous wounds.
- Specific items of knowledge that should be acquired during this rotation:
  - Diagnosis of congenital anomalies of the head and neck including clefting and craniofacial anomalies.
  - Physical diagnosis of hand injuries and disease.
  - Diagnosis and treatment of skin cancers.
  - Physiology of flaps and grafts.
  - Breast cancer treatment including reconstructive options.

**xii.) Head & Neck surgery**

- Maintenance of airway, Tracheostomy.
- Salivary gland disease.
- Lymph nodes
- Swellings of the neck
- Swellings of scalp and face
- Surgical flaps
- Oral malignancies

**xiii.) Neurosurgery**

- The student will acquire a fundamental knowledge including basic principles of Neurosurgery, along with recognition and surgical treatment of diseases of the central and peripheral nervous system.

**xiv.) Ophthalmologic Surgery**

- Students should be able to generally describe the basic organization/structures of the eye and the various ophthalmic subspecialties.

**xv.) Otolaryngology**

- Improve understanding of otolaryngologic pathology and normal variants.
- Improve diagnostic skills for otolaryngologic pathology.
- Be able to perform a general head and neck exam.
- Establish evaluation and treatment for otolaryngologic pathology, including need for surgical options.

**xvi.) Surgical diseases of Reproductive System and Breast**

- Surgical diseases of Prostate gland
- Pain and swelling in the scrotum
- Testicular diseases
- Principles of Endo Urology
- Gynaecological Surgery related to General Surgery, Pelvic inflammatory diseases, ectopic Pregnancy, ovarian cyst.
- Benign breast diseases
- Carcinoma breast
- Gynaecomastia
- Breast reconstruction
- Newer investigations in Pathology & Radiology

**xvii.) Surgical Oncology**

- Epidemiology of cancer and tumor registries.
- Principles of cancer treatment by surgery, radiotherapy, chemotherapy,
- Immunotherapy and Hormone therapy.
- Principles of molecular biology of cancer, carcinogenesis; genetic factors;
- Mechanisms of metastasis.
- Cancer screening
- TNM staging principles
- Terminal care of cancer patients; pain relief

## REGULATIONS

### 1. Scheme of the Course

A summary of four years course in MS General Surgery is presented as under:

Course Structure	Components	Examination
<b>Part I</b>	<ul style="list-style-type: none"> <li>• <b>Basic Medical Sciences</b></li> </ul> Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Behavioural Sciences and Biostatistics & Research Methodology.	Part-I examination at the end of 1 <sup>st</sup> year of MS General Surgery programme. <ul style="list-style-type: none"> <li>• <b>Written:</b></li> </ul> Paper I: MCQs Paper II: SEQs
<b>Part-II</b>	<p style="text-align: center;"><u><b>Clinical component of Part II</b></u></p> <ul style="list-style-type: none"> <li>• <b>Professional Education in General Surgery :</b></li> </ul> Training in General Surgery with compulsory rotations in Allied Surgical Disciplines, starting from the first day of enrollment <p style="text-align: center;"><u><b>Research component of Part II</b></u></p> <ul style="list-style-type: none"> <li>• <b>Research and Thesis Writing:</b></li> </ul> Research work/Thesis writing project must be completed and thesis be submitted before the end of training.	Part-II examination at the end of 4 <sup>th</sup> year of MS General Surgery programme. <ul style="list-style-type: none"> <li>• <b>Written:</b></li> </ul> Papers 1 & 2: Problem-based questions in the subject <ul style="list-style-type: none"> <li>• <b>Oral &amp; Practical / Clinical Examination</b></li> </ul> <ul style="list-style-type: none"> <li>• OSCE</li> <li>• Clinical Examination (Long case / short cases)</li> </ul> <ul style="list-style-type: none"> <li>• <b>Log Book</b></li> </ul> Part-II thesis examination with defense at the end of fourth (4th) year of MS General Surgery programme.

## **2. Examinations**

### **Part-I Examination**

- 1).All candidates admitted in MS General Surgery course shall appear in Part-I examination at the end of first calendar year.
- 2).The examination shall be held on biannual basis.
- 3).The candidate who fails to pass the examination in 3 consecutive attempts availed or un-availed, shall be dropped from the course.
- 4)The examination shall have two components:

▪ Paper-I MCQs (single best)	100 Marks
▪ Paper-II SEQs	100 Marks
- 5).Subjects to be examined shall be Basic Sciences (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology), Behavioural Sciences and Biostatistics & Research Methodology.
- 6).To be eligible to appear in Part-I examination the candidate must submit;
  - i. duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;
  - ii. a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
  - iii. Examination fee as prescribed by the University
- 7).To be declared successful in Part-I examination the candidate must secure 60% marks in each paper.

### Part-II Examination

1. All candidates admitted in MS General Surgery course shall appear in Part-II (clinical) examination at the end of structured training programme (at the end of fourth year), and having passed the part I examination.
2. The examination shall be held on biannual basis.
3. The candidate who fails to pass the examination within 7 years of enrollment shall be dropped from the course.
4. To be eligible to appear in Part-II examination the candidate must submit;
  - i. duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;
  - ii. a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
  - iii. Original Log Book complete in all respect and duly signed by the Supervisor (for Oral & practical/clinical Examination);
  - iv. certificates of having passed the Part-I examination;
  - v. Examination fee as prescribed by the University.
5. The examination shall have the following components:

• Written	300 marks
• Oral & practical/clinical examination	300 marks
• Log Book Evaluation	200 marks (50 marks per year)
6. There shall be two written papers of 150 marks each.
7. Both papers shall have problem-based short/modified essay questions and MCQs.
8. Oral & practical/clinical examination shall have 300 marks for:

i. 1 Long Case	100
ii. 4 Short Cases	100 (25 marks each)
iii. OSCE	100
9. To be declared successful in Part-II examination the candidate must secure 60% marks in each component and 50% in each sub-component.
10. Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.

11. The candidates, who have passed written examination but failed in Oral & Practical/ Clinical Examination, will re-appear only in Oral & Practical / Clinical examination.
12. The maximum number of attempts to re-appear in oral & practical /clinical Examination alone shall be three, after which the candidate shall have to appear in both written and oral & practical/clinical examinations as a whole.
13. The candidate with 80% or above marks shall be deemed to have passed with distinction.
14. *Log Book/Assignments:* Through out the length of the course, the performance of the candidate shall be recorded on the Log Book.
15. The Supervisor shall certify every year that the Log Book is being maintained and signed regularly.
16. The Log Book will be developed & approved by the Advanced Studies & Research Board.
17. The evaluation will be maintained by the Supervisor (in consultation with the Co- Supervisor, if appointed).
18. The performance of the candidate shall be evaluated on annual basis, e.g., 50 marks for each year in four years MS General Surgery course. The total marks for Log Book shall be 200. The log book shall reflect the performance of the candidate on following parameters:
  - Year wise record of the competence of skills.
  - Year wise record of the assignments.
  - Year wise record of the evaluation regarding attitude & behaviour
  - Year wise record of journal club / lectures / presentations / clinico-pathologic conferences attended & / or made by the candidate.

### ***3. Submission / Evaluation of Synopsis***

- a) The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on UHS website.
- b) The research topic in clinical subject should have 30% component related to basic sciences and 70% component related to applied

clinical sciences. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data.

- c) Synopsis of research project shall be submitted by the end of the 2<sup>nd</sup> year of MS program. The synopsis after review by an Institutional Review Committee, shall be submitted to the University for consideration by the Advanced Studies & Research Board, through the Principal / Dean /Head of the institution.

#### **4. Submission of Thesis**

- a) Thesis shall be submitted by the candidate duly recommended by the Supervisor.
- b) The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis can not be submitted later than 7 years of enrolment.
- c) The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.
- d) The research thesis will be submitted along with the fee prescribed by the University.

#### **5. Thesis Examination**

1. All candidates admitted in MS course shall appear in Part-II thesis examination at the end of 4<sup>th</sup> year of their training course.
2. Only those candidates shall be eligible for thesis evaluation who have passed Part I and Part-II (clinical) Examinations.
3. The examination shall include thesis evaluation with defense.
4. The Vice Chancellor shall appoint three external examiners for thesis evaluation, preferably from other universities and from abroad, out of the panel of examiners approved by the Advanced Studies & Research Board. The examiners shall be appointed from respective specialty. Specialists from allied surgical disciplines may also be appointed/co-opted, where deemed necessary.

5. The thesis shall be sent to the external examiners for evaluation, well in time before the date of defense examination and should be approved by all the examiners.
6. After the approval of thesis by the evaluators, the thesis defense examination shall be held within the University on such date as may be notified by the Controller of Examinations. The Controller of Examinations shall make appropriate arrangements for the conduct of thesis defense examination in consultation with the supervisor, who will co-ordinate the defense examination.
7. The thesis defense examination shall be conducted by two External Examiners who shall submit a report on the suitability of the candidate for the award of degree. The supervisor shall act as coordinator.

#### **6. Award of MS General Surgery Degree**

After successful completion of the structured course of MS General Surgery and qualifying Part-I and Part-II examinations in totality, the degree with title MS General Surgery shall be awarded.

## **CONTENT OUTLINE**

### **Part I MS General Surgery**

Basic sciences:

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology, Biochemistry and Pharmacology relevant to surgical practice

#### **1. Anatomy**

- Detailed Anatomy of the organ systems of body, their blood supply, nerve supply, lymphatic drainage and important gross relations to other organs as appropriate for surgical operations
- Developmental Anatomy and associated common congenital abnormalities
- Features of Surface, Imaging and Applied Anatomy within each organ system
- Relate knowledge to assessment of clinical situation or progress of disease condition

**CARDIOVASCULAR:**

- Embryogenesis of heart and major vessels, and formation of the lymphatic system
- Common anatomical variations of heart chambers, valves and major vessels
- Surgical anatomy of heart and major arteries + veins in thorax, neck, abdomen and groins

**RESPIRATORY:**

- Embryogenesis of trachea and bronchial tree
- Lung development
- Development and defects of diaphragm
- Common anatomical variations of respiratory tree and lungs to include vascular anomalies
- Surgical anatomy of pleura, lung and trachea and bronchial tree

**GASTROINTESTINAL TRACT AND ABDOMINAL WALL:**

- Embryogenesis of the GIT to include formation of the solid organs, anorectum, and abdominal wall
- Common anatomical variations in the formation of the GIT and abdominal wall
- Surgical anatomy of the GIT and its relations to other systems

**RENAL:**

- Embryogenesis of the upper and lower renal tract to include male and female genital development
- Common anatomical variations of the renal tract and genitalia
- Surgical anatomy of the renal tract, and associated genital structures to include relationships to other systems

**NEUROLOGICAL:**

- Embryogenesis of the brain and spinal cord, and of the supporting structures (skull, vertebral column)
- Common anatomical variations of the brain and spinal cord
- Surgical anatomy of the brain, spinal cord and major somatic nerves (to include relationships to other systems)

**MUSCULO SKELETAL:**

- Embryogenesis of the skeleton and muscle development
- Common anatomical variations of skeleton
- Surgical anatomy of skeleton where relevant to other systems

**ENDOCRINE:**

Development, defects and surgical anatomy of endocrine organs

## **2. Physiology**

- Cellular organization, structure function correlations and physiological alterations in the organ systems of body
- Relate knowledge to assessment of clinical situation or progress of disease condition

**FLUID BALANCE:**

- Basic requirements of fluid and electrolytes at different ages
- Mechanisms of homeostasis
- Influence of disease states
  - renal
  - cardiac
  - gastrointestinal
  - trauma
- Mechanisms of homeostasis
- Abnormalities encountered in disease

**ACID-BASE BALANCE:**

- Basic requirements of fluid and electrolytes at different ages
- Mechanisms of homeostasis
- Influence of disease states

**OXYGEN TRANSPORT:**

- Airway function in health and disease
- Alveolar function and gas exchange
- Effect of disease
  - R.D.S.
  - Infection
  - Barotrauma
  - Prematurity
- Effect of foetal circulation

**GASTROINTESTINAL TRACT:**

- Motility of different regions of gut
- Secretion and absorption
- Function of sphincter regions

- Gastroesophageal junction
- Pylorus
- Ileocaecal region
- Anorectum
- Defaecation and continence

#### HEPATOBIILIARY FUNCTION AND PANCREATIC FUNCTION:

- Metabolic and synthetic hepatic function
- Bile production and transport
- Exocrine pancreatic function
- Effect of disease on normal function

#### RENAL TRACT:

- Renal mechanisms for maintenance of homeostasis
- Effect of disease
- Bladder function and continence
- Transitional renal physiology in neonate and young child

#### GROWTH AND METABOLISM:

- Nutritional requirements at different ages
- Endocrine factors influencing growth
  - thyroid
  - pituitary
  - pancreatic
  - adrenal
  - gonadal
- Effect of disease states including
  - chronic disease
  - trauma
  - response to operation
- Influence and use of parenteral and enteral feeding

#### AUTONOMIC NERVOUS SYSTEM:

- Differing effects of sympathetic and parasympathetic innervation
- Effects on differing physiological processes

### 3. Biochemistry

- Membrane biochemistry and signal transduction
- Gene expression and the synthesis of proteins
- Bioenergetics; fuel oxidation and the generation of ATP
- Carbohydrate metabolism
- Lipid metabolism
- Nitrogen metabolism
- Enzymes and biologic catalysis
  
- Tissue metabolism

- Biotechnology and concepts of molecular biology with special emphasis on use of recombinant DNA techniques in medicine and the molecular biology of cancer

#### 4. Pharmacology

- The Evolution of Medical Drugs
- British Pharmacopia
- Introduction to Pharmacology
- Receptors
- Mechanisms of Drug Action
- Pharmacokinetics
- Pharmacokinetic Process
  - Absorption
  - Distribution
  - Metabolism
  - Desired Plasma Concentration
  - Volume of Distribution
  - Elimination
  - Elimination rate constant and half life
  - Creatinine Clearance
- Drug Effect
  - Beneficial Responses
  - Harmful Responses
  - Allergic Responses
- Drug Dependence, Addiction, Abuse and Tolerance
- Drug Interactions
- Dialysis
- Drug use in pregnancy and in children

#### 5. Pathology

Pathological alterations at cellular and structural level

- Inflammation
- Wound healing
- Cellular injury
- Vascular disorders
- Disorders of growth, differentiation and morphogenesis
- Tumours
- Surgical immunology
- Surgical haematology

Microbiology:

- Surgically important microorganisms
- Sources of infection
- Asepsis and antisepsis
- Sterilization
- Antibiotics
- High risk patient management

## 6. Biostatistics & Research Methodology

1. Introduction to Bio-Statistics
2. Introduction to Bio- Medical Research
3. Why research is important?
4. What research to do?
  - Selecting a Field for Research
  - Drivers for Health Research
  - Participation in National and International Research
  - Participation in Pharmaceutical Company Research
  - Where do research ideas come from
  - Criteria for a good research topic
5. Ethics in Health Research
6. Writing a Scientific Paper
7. Making a Scientific Presentation
8. Searching the Literature

## 7. Behavioural Sciences

- Bio-psycho-social (BPS) model of health care
- Use of non-medicinal interventions in clinical practice
  - Communication skills
  - Counseling
  - Informational skills
- Crisis intervention/disaster management
- Conflict resolution
- Breaking bad news
- Medical ethics, professionalism and doctor-patient relationship
  - Hippocratic oath
  - Four pillars of medical ethics (autonomy, beneficence, non-maleficence and justice)
  - Informed consent and confidentiality
  - Ethical dilemmas in a doctor's life
- Delivery of culturally relevant care and cultural sensitivity
- Psychological aspects of health and disease
  - Psychological aspect of health
  - Psychological aspect of disease
  - Stress and its management
  - Psychological aspect of pain
  - Psychological aspect of aging

## **Part II**

### **MS General Surgery**

Part II shall comprise three components:

1. Clinical (both didactic & practical skills and procedures)
2. Research and Thesis writing
3. Log book

#### **1. Clinical Component**

### **Fundamental & Advanced Professional Education in General Surgery**

#### **Fundamental Concepts in General Surgery:**

- History of surgery
- Preparing a patient for surgery
- Principles of operative surgery: asepsis, sterilization and antiseptics
- Surgical infections and antibiotics
- Basic principles of anaesthesia and pain management
- Acute life support and critical care:
  - Pathophysiology and management of shock
  - Fluids and electrolyte balance/ acid base metabolism
  - Haemostasis, blood transfusion
- Trauma: assessment of polytrauma, triage, basic and advanced trauma
- Accident and emergency surgery
- Wound healing and wound management
- Nutrition and metabolism
- Principles of burn management
- Principles of surgical oncology
- Principles of laparoscopy and endoscopy
- Organ transplantation
- Informed consent and medico-legal issues
- Molecular biology and genetics
- Operative procedures for common surgical manifestations e.g. cysts, sinuses, fistula, abscess, nodules, basic plastic and reconstructive surgery
- Principles of basic diagnostic and interventional radiography
- Principles and interpretation of conventional and advanced radiographic procedures

#### **Common Surgical Skills**

##### **Incision of skin and subcutaneous tissue:**

- Langer's lines
- Healing mechanism
- Choice of instrument
- Safe practice

**Closure of skin and subcutaneous tissue:**

- Options for closure
- Suture and needle choice
- Safe practice

**Knot tying:**

- Choice of material
- Single handed
- Double handed
- Superficial
- Deep

**Tissue retraction:**

- Choice of instruments
- Placement of wound retractors
- Tissue forceps

**Use of drains:**

- Indications
- Types
- Insertion
- Fixation
- Management/removal

**Incision of skin and subcutaneous tissue:**

- Ability to use scalpel, diathermy and scissors

**Closure of skin and subcutaneous tissue:**

- Accurate and tension free apposition of wound edges

**Haemostasis:**

- Control of bleeding vessel (superficial)
- Diathermy
- Suture ligation
- Tie ligation
- Clip application
- Plan investigations
- Clinical decision making
- Case work up and evaluation; risk management

**Pre-operative assessment and management:**

- Cardiorespiratory physiology
- Diabetes mellitus
- Renal failure
- Pathophysiology of blood loss
- Pathophysiology of sepsis
- Risk factors for surgery
- Principles of day surgery
- Management of comorbidity

**Intraoperative care:**

- Safety in theatre
- Sharps safety
- Diathermy, laser use
- Infection risks
- Radiation use and risks
- Tourniquets

- Principles of local, regional and general anaesthesia

**Post-operative care:**

- Monitoring of postoperative patient
- Postoperative analgesia
- Fluid and electrolyte management
- Detection of impending organ failure
- Initial management of organ failure
- Complications specific to particular operation
- Critical care

**Blood products:**

- Components of blood
- Alternatives to use of blood products
- Management of the complications of blood product transfusion including children

**Antibiotics:**

- Common pathogens in surgical patients
- Antibiotic sensitivities
- Antibiotic side-effects
- Principles of prophylaxis and treatment

**Safely assess the multiply injured patient:**

- History and examination
- Investigation
- Resuscitation and early management
- Referral to appropriate surgical subspecialties

**Technical Skills**

- Central venous line insertion
- Chest drain insertion
- Diagnostic peritoneal lavage
- Bleeding diathesis & corrective measures, e.g. warming, packing
- Clotting mechanism; Effect of surgery and trauma on coagulation
- Tests for thrombophilia and other disorders of coagulation
- Methods of investigation for suspected thromboembolic disease
- Anticoagulation, heparin and warfarin
- Role of V/Q scanning, CT angiography and thrombolysis
- Place of pulmonary embolectomy
- Awareness of symptoms and signs associated with pulmonary embolism and DVT
- Role of duplex scanning, venography and d-dimer measurement
- Initiate and monitor treatment

**Diagnosis and Management of Common Surgical Conditions:**

- Child with abdominal pain
- Vomiting child
- Trauma
- Groin conditions
  - Hernia
  - Hydrocoele
  - Penile inflammatory conditions
  - Undescended testis
  - Acute scrotum

- Abdominal wall pathologies
- Urological conditions
- Constipation
- Head / neck swellings
- Intussusception
- Abscess
- In growing toenail

In terms of general experience it is expected that trainees would have gained exposure to the following procedures and to be able to perform them.

- Elective Procedures
  - Inguinal hernia
- (not neo-natal)
  - Orchidopexy
  - Circumcision
  - Lymph node biopsy
  - Abdominal wall herniae
  - Insertion of CV lines
  - Management of in growing toenails
  - EUA rectum
  - Manual evacuation
  - Open rectal biopsy
  - Excision of skin lesions
- Emergency Procedures
  - Appendicectomy
  - Incision and drainage of abscess
  - Pyloromyotomy
  - Operation for testicular torsion
  - Insertion of pleural drain
  - Insertion of suprapubic catheter
  - Reduction of intussusception

## Advanced Professional Education in General Surgery

TOPICS	PRACTICAL PROCEDURES
<b>1.Non Trauma Emergency Surgery</b>	
Assessment of the acute abdomen	<i>Diagnostic laparoscopy</i>
Biliary tract emergencies	Closure of perforated peptic ulcer, open and laparoscopic
Acute pancreatitis	Endoscopy for upper GI bleeding
Swallowed foreign bodies	Operations for GI bleeding including partial gastrectomy
Gastrointestinal bleeding	Emergency cholecystectomy
Appendicitis and right iliac fossa pain	Emergency hernia repair
Abdominal pain in children	Laparotomy for small bowel obstruction
Peritonitis	Small bowel resection
Acute intestinal obstruction	Ileostomy
Intestinal pseudo-obstruction	Laparotomy for large bowel obstruction
Strangulated hernia	Laparotomy for perforated colon
Intestinal ischaemia	Hartmann's operation
Toxic megacolon	Colostomy
	Appendicectomy
Acute ano-rectal sepsis	Drainage of ano-rectal sepsis
Ruptured aortic aneurysm	Laparotomy for post operative complications
Acutely ischaemic limb	Urethral catheterization
Acute presentations of urological disease	Suprapubic cystostomy
	Exploration of scrotum
Acute presentations of gynaecological disease	Reduction of paraphimosis
Scrotal emergencies in all age groups	Embolectomy
	Fasciotomy
	<i>Organ retrieval for transplantation</i>

<b>2. Trauma Surgery</b>	
<p>Assessment of the multiple injured patient including children</p> <p>Closed abdominal injuries, especially splenic, hepatic and pancreatic injuries</p> <p>Closed chest injuries</p> <p>Stab and gunshot wounds</p> <p>Arterial injuries</p> <p>Injuries of the urinary tract</p> <p>Initial management of head injuries and interpretation of CT scans</p> <p>Initial management of severe burns</p>	<p>Tracheostomy</p> <p>Emergency thoracotomy</p> <p>Splenectomy for trauma</p> <p>Laparotomy for abdominal injury</p>
<b>3. Surgical sepsis</b>	
<p>Superficial sepsis and abscesses</p> <p>Pyomyositis</p> <p>Abdominal sepsis</p> <p>Empyema and thoracic sepsis</p> <p>Intracranial sepsis</p> <p>Tuberculous disease of the chest and abdomen</p>	<p>Drainage of superficial abscesses</p> <p>Laparotomy for sepsis</p> <p>Chest drainage for sepsis</p> <p>Thoracotomy for sepsis</p> <p>Burr holes and craniotomy for intracranial abscess</p>
<b>4. Critical care</b>	
<p>Hypotension</p> <p>Haemorrhage</p> <p>Haemorrhagic and thrombotic disorders</p> <p>Blood transfusion and blood component therapy</p> <p>Septicaemia and the sepsis syndrome</p> <p>Antibiotic therapy and the management of opportunist infection</p> <p>Gastro-intestinal fluid losses and</p>	<p>Tracheal Intubation</p> <p>Tracheostomy</p> <p>Surgical airway</p> <p>Cardio-pulmonary resuscitation</p> <p>Chest drain insertion</p> <p>Central venous line insertion</p> <p>Insertion of peritoneal dialysis catheter</p> <p>Primary vascular access for haemodialysis</p> <p>A detailed knowledge of the methods and</p>

<p>fluid balance, including in children</p> <p>Nutritional failure and nutritional support</p> <p>Respiratory failure</p> <p>Renal failure and principles of dialysis</p> <p>Fluid overload and cardiac failure</p> <p>Myocardial ischaemia</p> <p>Cardiac arrhythmias</p> <p>Multiple organ failure</p> <p>Pain control</p> <p>Cardiac arrest, respiratory arrest and brain death</p> <p><i>Organ donation</i></p> <p>Hypo and hyperthermia</p> <p>Diagnosis of brain death</p> <p><i>Legal &amp; ethical aspect of transplantation</i></p>	<p>results of invasive monitoring will <i>not</i> be required</p>
<b>5. Gastrointestinal surgery</b>	
<p><b>Neoplasms of the upper GI tract</b></p> <p>Gastro-oesophageal reflux and its complications</p> <p>Hiatus hernia</p> <p>Peptic ulceration and its complications</p>	<p>Diagnostic upper GI endoscopy</p> <p>Oesophageal dilatation</p> <p>Oesophageal stenting</p> <p>Laser recanalisation</p> <p>Mucosal resection</p> <p>Staging laparoscopy &amp; laparoscopic ultrasound scanning</p> <p>Oesophagectomy</p> <p>Total and subtotal gastrectomy</p> <p>Extended lymphadenectomy for gastric cancer</p> <p>Laparoscopic anti-reflux surgery</p> <p>Open anti-reflux surgery</p> <p>Repair of para-oesophageal hiatus hernia</p>



Complex liver injuries Hydatid disease Management of primary & secondary hepatic and choledochal neoplasms Other conditions of the liver and biliary tract Pancreatic neoplasms Chronic liver disease Liver failure Pancreatic insufficiency Imaging & endoluminal ultrasound Hepatitis	Biliary stenting Pancreatic stenting Biliary reconstruction Pancreatectomy all types Treatment of pancreatic necrosis Drainage of pancreatic pseudo-cyst Porto-systemic shunt Liver resection Laparoscopic exploration of bile duct Staging laparoscopy & laparoscopic ultrasound scanning
<b>7. Surgery of the skin &amp; integument</b>	
Pathology, diagnosis and management of skin lesions, benign and malignant Basal and squamous cell carcinoma Malignant melanoma Other skin cancers	Excision of skin lesions Excision of skin tumours Split and full thickness skin grafting Node biopsy Block dissection of axilla and groin Surgery for soft tissue tumours including sarcomas
<b>8. Endocrine surgery / neck surgery</b>	
Diagnosis & management of neck lumps <b>Physiology &amp; pathology of Thyroid</b> Parathyroid Adrenal cortex Adrenal medulla Management of :- Thyrotoxicosis Adrenal insufficiency Hyper and hypo thyroidism Carcinoid syndrome	Thyroid lobectomy Retrosternal goitre Thyroglossal cystectomy Submandibular salivary gland excision Parotidectomy Approach and exploration of adrenal glands

Anaesthetic and pharmacological problems Imaging techniques for endocrine organs	
<b>9. Breast surgery</b>	
Carcinoma of the breast Benign breast disease Hormone therapy for benign and malignant breast disease Histo-/cytopathology Mammography Ultrasound Adjuvant chemotherapy Chemotherapy for advanced disease Radiotherapy Counselling Hospice care	Treatment of breast abscess Fine needle aspiration cytology Needle localisation biopsy Trucut biopsy Mammary duct fistula Excision of breast lump Mastectomy Wide excision of breast tumours Axillary dissection with other breast operations Breast duct excision Microdochectomy Reconstruction Myocutaneous flaps Tissue expanders Complications and re-operation Breast reduction
<b>10. Hernias</b>	
External and internal abdominal herniae. Anatomy, presentation, complications Hernia in childhood	Surgery for all abdominal herniae, using open <i>and laparoscopic</i> techniques Repair of childrens' herniae
<b>11. Genitourinary Surgery</b>	
Principles of the surgical treatment of Kidney. Investigations in Urology Urinary tract infections	Dialysis and renal transplant Suprapubic catheter insertion Urethral catheterization Suprapubic cystostomy

Urinary calculi. Transplantation	Pyeloplasty Partial Nephrectomy Management of renal calculi Operative destruction of valves Complex hypospadias repair Nephrectomy Reimplantation of ureters Operative management of impalpable testis Operative relief of urinary obstruction (e.g. stent insertion)
Surgical diseases of Prostate gland Pain and swelling in the scrotum Testicular diseases Male sterilization, including counseling and informed consent Principles of Endo Urology Gynaecological Surgery related to General Surgery, Pelvic inflammatory diseases, ectopic, ovarian cyst.	Operations for hydrocoele, epididymal cyst and varicocele  Adult circumcision Vasectomy
<b>12. Paediatric surgery</b>	
Infantile pyloric stenosis Childrens tumours e.g. Wilms Congenital abnormalities of bladder and abdominal wall Anorectal anomalies Tracheoesophageal abnormalities	Ramstedt's procedure Orchidopexy Circumcision in children
<b>13. Vascular surgery</b>	
Atherosclerosis Ischaemic limb Aneurysmal disease Venous thrombosis & embolism	Vascular suture/anastomosis Approach to/control of infra-renal aortic, iliac and femoral arteries Control of venous bleeding

Hyper-hypo coagulable state	<i>Balloon thrombo-embolectomy</i>
Chronic venous insufficiency	Amputations of the lower limb
Arteriography	Fasciotomy
Vascular CT scanning	Primary operation for varicose veins
<i>Magnetic Resonance Angiography</i>	<i>Abdominal aortic aneurysm repair, elective and ruptured</i>
<i>Vascular ultrasound</i>	<i>Femoro-popliteal bypass</i>
Varicose veins	<i>Femoro-femoral bypass</i>
Mesenteric ischaemia	

#### 14. Transplant Surgery

Pathology of renal and hepatic disease	Donor nephrectomy
Patho-physiology of renal and hepatic failure	Donor hepatectomy
Peritoneal and haemo-dialysis	Renal transplantation
Selection of patients for transplantation	Uretero-neocystostomy
Post-operative management	Uretero-ureterostomy
Immuno-pathology of rejection	Renal biopsy
Management of rejection	Transplant nephrectomy
Immunosuppression	Vascular access
Opportunist infections	Peritoneal access
Immunosuppression and cancer	Drainage of intra-and extra-peritoneal collections
Transmission of viral and fungal diseases	Live donor transplantation
Tissue typing	Renal procedures: -
The HLA system	Work bench preparation of the kidney
Bladder dysfunction	Ileal and colonic conduits
Preservation of organs	Uretero-pyelostomy
Legal & ethical aspects of transplantation	Bladder (psoas) hitch
	Boari flap
	Partial nephrectomy
	Bilateral nephrectomy
	Secondary vascular access
	Renal artery reconstruction
	Renal vein reconstruction

	Parathyroidectomy Pancreatic procedures: - Donor pancreatectomy Pancreatic transplantation Hepatic procedures: - Liver transplantation
<b>15. Endoscopic Surgery</b>	
Theory and practice of choledochoscopy Theory of different forms of diathermy Laparoscopic ultrasound Advanced instrumentation and equipment Endoscopic suturing devices Theory, uses and dangers of lasers and other energy sources e.g. harmonic scalpel Creation and maintenance of new endoscopic spaces Use of assistance robots and robotic instruments Minilaparoscopy Ultrasound interpretation, internal and external techniques	Laparoscopic repair of all types of hernia Laparoscopic anti-reflux procedures Laparoscopic splenectomy Laparoscopic large bowel resection Laparoscopic rectopexy Laparoscopic exploration of CBD Laparoscopic closure of perforated duodenal ulcer Laparoscopic adrenalectomy Laparoscopic operations for morbid obesity Laparoscopic abdominal lymphadenectomy Other major laparoscopic and laparoscopically assisted procedures
<b>16. Cardiac and Thoracic Surgery</b>	
Myocardial revascularisation Valvular Disorders Peripheral vascular disease Renovascular disease Secondary Hypertension	Cardiopulmonary Bypass, Myocardial Protection and Circulatory Support Mitral valve repair and secondary procedures to be developed in the post CCT period. Cardiothoracic Trauma

Inflammatory Lung Disease Chest Wall lesions Thoracic Neoplastic Disease Chest Trauma Pleural Diseases	Repair pectus excavatum Thoracotomy Foreign body retrieval Competence in performing appropriate Mediastinal exploration Thoracic incisions Open biopsy of lung Pulmonary lobectomy
<b>17. Other surgical specialties</b>	
Limb trauma Open and closed Fractures Dislocation of joints Nerve injuries Flexor and extensor tendon repairs Acute septic arthritis  Spinal injury  Head injury  Open and closed Chest injuries  Obstetric and gynaecological emergencies	Open and closed reduction of dislocations Manipulation and POP splintage of fractures Skin and skeletal traction Open fracture debridement External fixation and Nerve repair Flexor and extensor tendon repair Surgical approaches to the joints and arthrotomy  Emergency management of spinal injury  Emergency management of closed and open head injury Burr holes and craniotomy Insertion and management of chest drains Thoracotomy and post operative management  Approaches to the female pelvis Episiotomy Caesarian section Surgery for ruptured ectopic pregnancy

Anaesthesia	Use of local anaesthesia Digital block Axillary block Spinal anaesthesia Use of ketamine Simple general anaesthesia
Research and ethics	
Critical appraisal of the surgical literature	
Scientific method & statistics as applied to surgery	
Informed consent	
Ethical aspects of surgical practice	
Genetic aspects of surgical disease	

## **ROTATIONS:**

### **1<sup>st</sup> Year**

- Basic Surgical Skills (Inpatient, Outpatient and Minor OT) (6 months)
- Acute/ Critical Care Surgery (6 months)

### **2<sup>nd</sup> Year**

- General Surgical Skills (Inpatient, Outpatient and OT) (3 months)
- Acute/ Critical Care Surgery (2 months)
- Vascular Surgery (1 month)
- Radiology (1 month)
- Burn Service (2 months)
- Pediatric Surgery (2 months)
- Endoscopic Surgery (1 month)

### **3<sup>rd</sup> Year**

- General Surgical Skills (Inpatient, Outpatient and OT) (3 months)
- Acute/ Critical Care Surgery (1 months)
- Gastrointestinal Surgery (3 months)

- Orthopaedic Surgery (1 month)
- Plastic Surgery and Breast Surgery (2 month)
- Endoscopic Surgery (1 month)
- Urology (1 month)

#### **4<sup>th</sup> Year**

- General Surgical Skills (Inpatient, Outpatient and OT) (3 months)
- Acute/ Critical Care Surgery (1 months)
- Hepatopancreaticobiliary Surgery (3 month)
- Surgical Oncology (1 month)
- Cardiothoracic Surgery (1 month)
- Head and Neck Surgery (1 month)
- Transplant Surgery (1month)
- Neurosurgery (1 month)

## **Part-II** **Thesis Component**

### **RESEARCH/ THESIS WRITING**

Total of one year will be allocated for work on a research project with thesis writing. Project must be completed and thesis be submitted before the end of training. Research can be done as one block in 4<sup>th</sup> year of training or it can be stretched over four years of training in the form of regular periodic rotations during the course as long as total research time is equivalent to one calendar year.

### **Research Experience**

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical experience. Recent productivity by the program faculty and by the residents will be required, including publications in peer-reviewed journals. Residents must learn the design and interpretation of research studies, responsible use of informed consent, and research methodology and interpretation of data. The program must provide instruction in the critical assessment of new therapies and of the surgical literature. Residents should be advised and supervised by qualified staff members in the conduct of research.

### **Clinical Research**

Each resident will participate in at least one clinical research study to become familiar with:

1. Research design
2. Research involving human subjects including informed consent and operations of the Institutional Review Board and ethics of human experimentation

3. Data collection and data analysis
4. Research ethics and honesty
5. Peer review process

This usually is done during the consultation and outpatient clinic rotations.

### **Case Studies or Literature Reviews**

Each resident will write, and submit for publication in a peer-reviewed journal, a case study or literature review on a topic of his/her choice.

### **Laboratory Research**

#### *Bench Research*

Participation in laboratory research is at the option of the resident and may be arranged through any faculty member of the Division. When appropriate, the research may be done at other institutions.

#### ***Research involving animals***

Each resident participating in research involving animals is required to:

1. Become familiar with the pertinent Rules and Regulations of the University of Health Sciences Lahore i.e. those relating to "Health and Medical Surveillance Program for Laboratory Animal Care Personnel" and "Care and Use of Vertebrate Animals as Subjects in Research and Teaching"
2. Read the "Guide for the Care and Use of Laboratory Animals"
3. View the videotape of the symposium on Humane Animal Care

#### ***Research involving Radioactivity***

Each resident participating in research involving radioactive materials is required to

1. Attend a Radiation Review session
2. Work with an Authorized User and receive appropriate instruction from him/her.

## **METHODS OF INSTRUCTION/COURSE CONDUCTION**

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

1. Lectures
2. Seminar Presentation and Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Clinico-pathological Conferences
6. SEQ as assignments on the content areas
7. Skill teaching in ICU, Operation Theatres, emergency and ward settings
8. Attend genetic clinics and rounds for at least one month.
9. Attend sessions of genetic counseling
10. Self study, assignments and use of internet
11. Bedside teaching rounds in ward
12. OPD & Follow up clinics
13. Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

### **1. Clinical Case Conference**

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Surgeon on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

### **2. Monthly Student Meetings**

Each affiliated medical college approved to conduct training for MS General Surgery will provide a room for student meetings/discussions such as:

- a. Journal Club Meeting
- b. Core Curriculum Meetings
- c. Skill Development

**a. Journal Club Meeting**

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

**b. Core Curriculum Meetings**

All the core topics of General Surgery should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

**c. Skill Development**

Two hours twice a month should be assigned for learning and practicing clinical skills.

List of skills to be learnt during these sessions is as follows:

1. Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline (pg.34-43) (mentioned in the Log Book).
2. Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.
3. Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making.
4. Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
5. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming

familiar with Project Professionalism Manual Residents should have instruction and experience with patient counseling skills and community education.

6. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
7. Residents should have experience in the performance of General Surgery related clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards
8. Each resident will manage at least the following essential surgical cases and observe and participate in each of the procedures, preferably done on patients under supervision initially and then independently (pg.34-43)

### 3. Annual Grand Meeting

Once a year all residents enrolled for MS General Surgery should be invited to the annual meeting at UHS Lahore.

One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making.

The research work done by residents and their literary work may be displayed.

In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

## LOG BOOK

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MS examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed the indications for the procedure, any complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Candidate's Name: \_\_\_\_\_

Roll No. \_\_\_\_\_

The above mentioned procedures shall be entered in the log book as per format (pg.34-45):

### **Procedures Performed**

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Performed	Supervisor's Signature
1					
2					
3					
4					

### **Emergencies Handled**

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure /Management	Supervisor's Signature
1					
2					
3					
4					

**Case Presented**

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Case Presented	Supervisor's Signature
1				
2				
3				
4				

**Seminar/Journal Club Presentation**

Sr.#	Date	Topic	Supervisor's signature
1			
2			
3			
4			

**Evaluation Record**

(Excellent, Good, Adequate, Inadequate, Poor)

At the end of the rotation, each faculty member will provide an evaluation of the clinical performance of the fellow.

Sr.#	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1				
2				
3				
4				

## **EVALUATION & ASSESSMENT STRATEGIES**

### **Assessment**

It will consist of action and professional growth oriented *student-centered integrated assessment* with an additional component of *informal internal assessment, formative assessment* and measurement-based *summative assessment*.

### **Student-Centered Integrated Assessment**

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate it, encourages students to 'own' the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

### ***Self Assessment by the Student***

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

### ***Peer Assessment***

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in future.

### ***Informal Internal Assessment by the Faculty***

There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

- a. Punctuality
- b. Ward work
- c. Monthly assessment (written tests to indicate particular areas of weaknesses)
- d. Participation in interactive sessions

### **Formative Assessment**

Will help to improve the existing instructional methods and the curriculum in use

#### ***Feedback to the faculty by the students:***

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

### **Summative Assessment**

It will be carried out at the end of the programme to empirically evaluate cognitive, psychomotor and affective domains in order to award diplomas for successful completion of courses.

## **MS General Surgery Examinations**

### **Part I MS General Surgery**

**Total Marks: 200**

All candidates admitted in MS General Surgery course shall appear in Part I examination at the end of first calendar year.

#### **Components of Part-I Examination:**

Paper-I, 100 MCQs (single best, having one mark each)	100 Marks
Paper-II, 10 SEQs (having 10 marks each)	100 Marks

#### **Topics included in papers:**

	<b>Paper-I</b>	<b>Paper-II</b>
1. Anatomy	(20 MCQs)	(2 SEQs)
2. Physiology	(20 MCQs)	(2 SEQs)
3. Pathology	(20 MCQs)	(2 SEQs)
4. Biochemistry	(15 MCQs)	(1 SEQs)
5. Pharmacology	(15 MCQs)	(1 SEQ)
6. Behavioural Sciences	(05 MCQs)	(1 SEQ)
7. Biostatistics & Research Methodology	(05 MCQs)	(1 SEQ)

### **Part II MS General Surgery**

**Total Marks: 1000**

All candidates admitted in MS General Surgery course shall appear in Part-II examination at the end of structured training programme (end of 4th calendar year and after clearing Part I examination).

There shall be two written papers of 150 marks each, Oral & Practical/ Clinical examination of 300 marks, log book assessment of 200 marks and thesis examination of 200 marks.

**Part II MS General Surgery**  
**Clinical Examination**  
**Total Marks: 800**

**Topics included in paper 1**

- |                                       |           |
|---------------------------------------|-----------|
| 1. Fundamental Concepts in Surgery    | (20 MCQS) |
| 2. Hernias & Gastrointestinal Surgery | (15 MCQS) |
| 3. Hepatopancreaticobiliary Surgery   | (10 MCQS) |
| 4. Non Trauma Emergency Surgery       | (10 MCQS) |
| 5. Trauma / Critical Care Surgery     | (10 MCQS) |
| 6. Genitourinary Surgery              | (05 MCQS) |
| 7. Breast Surgery                     | (05 MCQS) |

**Topics Included In Paper 2**

- |  |           |
|--|-----------|
| 1. Paediatric Surgery  | (10 MCQS) |
| 2. Cardiothoracic Surgery  | (10 MCQS) |
| 3. Vascular & Transplant Surgery   | (05 MCQS) |
| 4. Endoscopic Surgery  | (05 MCQS) |
| 5. Head & Neck / Neurosurgery  | (05 MCQS) |
| 6. Plastic Surgery   | (05 MCQS) |
| 7. Endocrine Surgery   | (05 MCQS) |
| 8. Orthopaedic   | (10 MCQS) |
| 9. Anaesthesia   | (10 MCQS) |
| 10. Other Surgical Specialties (Surgery related to<br>Skin, Otolaryngology, Ophthalmology, etc.) | (10 MCQs) |

**Components of Part II Examination****Theory****Paper I**

- 15 SEQs (No Choice)  
75 MCQs

**150 Marks**

- 75 Marks  
75 Marks

**3 Hours****Paper II**

- 15 SEQs (No Choice)  
75 MCQs

**150 Marks**

- 75 Marks  
75 Marks

**3 Hours**

Only those candidates who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.

**OSCE****100 Marks**

10 stations each carrying 10 marks of 10 minutes duration; each evaluating performance based assessment with five of them interactive.

**Clinical****200 Marks**

Four short cases (each 25 marks)

100 Marks

One long case:

100 Marks

**Log Book**

**200 Marks**

**Part II MS General Surgery**

**Thesis Examination**

**Total Marks: 200**

All candidates admitted in MS General Surgery courses shall appear in Part-II (thesis examination) at the end of 4<sup>th</sup> year of the MS programme and not later than 7th calendar year of enrolment. The examination shall include thesis evaluation with defense.

## RECOMMENDED BOOKS

### **BASIC SCIENCES PART-I EXAMINATIONS**

#### **Anatomy**

- General Anatomy By: Professor Tassaduq Hussain
- Embryology: Langman's Embryology
- Gross Anatomy: Clinical Anatomy By: Shell
- Basic Histology By: Jenquiera
- Neuroanatomy By: Snell

#### **Behavioral Sciences**

- Rana M.H., Ali S. Mustafa M.A. Handbook of Behavioral Sciences for Medical and Dental students. Lahore: university of Health Sciences.

#### **Physiology**

- Human Physiology By: Guyton

#### **Research Methodology**

- The Medical Research Handbook, planning a research project. Amar-Singh HSS, Azman Abu Bakar and Sondi Sararaks. © 2008, Kuala Lumpur. Online available at URL, <http://www.crc.gov.my/wp-content/uploads/documents/researchHandBook.pdf>

#### **Pathology**

- Microbiology By: Jawetz
- Haematology By: Hoffbrand Postgraduate Hematology
- Histopathology By: Robin's Pathology Basic Disease
- Chemical Pathology By: Bishop's

#### **Pharmacology**

- Review of Pharmacology By: Lippincott's Illustrated

### **SURGERY:**

#### **Clinical:**

1. An introduction to the symptoms and signs of surgical disease by Norman Browse
2. Churchill, pocketbook of differential diagnosis By: A. Raftery E. Lim, Edition 2001

**Theory:**

3. Essential of General Surgery, latest edition by Peter Lawrence
4. Essential of Surgical Specialties, latest edition by Peter Lawrence  
Operative Surgery
5. General Surgery. Rob & Smith
6. General Surgery 2nd Ed. Burge DM

**OTHER REFERENCES FOR EXTRA READING:**

7. Bailey & Love's Short Practice of Surgery by: H. Bailey & R.J. McNeil
8. Scott: An Aid to Clinical Surgery by: HAF Dudley and BP Waxman
9. Principles of Surgery, 7th Edition by Seymour I. Schwartz, 1999.
10. Essential Surgery 1990 by: H. George Burkit and B. O'Donnel
11. Principle and Practice Surgert by Forrest, Carter, Macleod
12. Clunie GJA, Tjandra JJ, Thomas R.S.J. Textbook of Surgery, 2nd edn Blackwell Science Asia, Melbourne, 2001. ISBN 0867930233.
13. Clunie GJA, Tjandra JJ, Ross H. MCQ's and Short Answer Questions for Surgery. Blackwell Science Asia, Melbourne, 1999. Paperback. ISBN 0867930101. [www.blacksci.co.uk/australi/books.htm](http://www.blacksci.co.uk/australi/books.htm)
14. Forrest AP, Carter DC, MacLeod IB. Principles and Practice of Surgery - A Surgical Supplement to Davidson's Principles and Practice of Medicine, 3rd edn. Churchill Livingstone, Edinburgh, 1995. ISBN 0443048606 [www.us.elsevierhealth.com](http://www.us.elsevierhealth.com)
15. Hunt PS, Marshall VC. Clinical Problems in General Surgery. Butterworths, Sydney, 1991. ISBN 0409492132. This publication is out of print and only available second hand.
16. Morris PJ, Malt RA. Oxford Textbook of Surgery, 2nd edn. Oxford University Press, New York, 2001. ISBN 0192628844 (three volume set). [mnemosyne.oup-usa.org/medical](http://mnemosyne.oup-usa.org/medical)

17. Williamson R. An Aid to Clinical Surgery, 6th edn. Churchill

Livingstone, Edinburgh, 1998. ISBN 044305603X.

[www.us.elsevierhealth.com](http://www.us.elsevierhealth.com)

18. Surgery: Pretest Self-Assessment and Review. ISBN: 0071359540.

Publisher: McGraw-Hill, 2000, 9th Edition

**SURGICAL ATLASES:**

1. Operative Surgery, Principles and Techniques by Paul Nora.
2. Atlas of General Surgery, 3rd Edition by Carter.
3. Mastery of Surgery by Nyhus and Baker.
4. An Atlas of Surgical Operations by Zollinger and Zollinger.
5. Operative Orthopedics, 7th Edition by Campbell.
6. Vascular Surgery, 4th Edition by Robert Rutherford (2 volumes)
7. Johnson's Surgery of the Chest by Waldhausen and Pierce.