



**JOHANNESBURG**  
**ACADEMIC OFFICE**

# CMSA

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**November 2017**

**THE COLLEGE OF SURGEONS OF SOUTH AFRICA**  
**R E G U L A T I O N S**  
**FOR ADMISSION TO THE EXAMINATION FOR**  
**THE POST-SPECIALISATION**  
**SUB-SPECIALTY CERTIFICATE**  
**IN**  
**GASTROENTEROLOGY**  
**Cert Gastroenterology(SA)**

- 1.0 ELIGIBILITY** to undergo training in surgical gastroenterology  
In order to be eligible to enter training, the candidate:
- 1.1 must comply with the requirements for registration as a medical practitioner, as prescribed by the Medical, Dental and Supplementary Health Services Act.
  - 1.2 must be a Specialist General Surgeon
- 2.0 TRAINING UNIT:**
- 2.1 HPCSA approved university surgical gastroenterology subspecialty unit. The Head of the training unit is responsible for co-ordinating the training programme.
  - 2.2 The unit should have an adequate surgical case load of predominantly gastrointestinal related diseases.
  - 2.3 A structured academic programme, including multidisciplinary meetings with medical gastroenterologists, pathologists, oncologists and radiologists is mandatory.
  - 2.4 The surgical gastroenterology unit should have a gastrointestinal outpatient service adequately staffed and equipped to manage the spectrum of gastrointestinal conditions required to fulfil the requirements of the syllabus.
- 3.0 ADMISSION TO THE EXAMINATION**
- 3.1 To be read in conjunction with the instructions in the general college examinations documents.
  - 3.2 The following are the requirements for admission to the examination:
    - 3.2.1 Certification by the Head of the Training Unit that the candidate has completed at least eighteen months as a subspecialty trainee in an accredited specialist department(s) / division(s) / unit(s) of gastroenterology, registered and approved by the Health Professions Council of South Africa.
    - 3.2.2 Submission of the prescribed portfolio filled in up to date, and certified by the head(s) of the department(s)/division(s)/unit(s) in which the candidate trained.
    - 3.2.3 Recognition of training received at overseas institutions is permissible provided that;
      - 3.2.3.1 The Units comply with the regulations in this document.
      - 3.2.3.2 The candidate has completed at least one (1) year of training in a local accredited unit

3.2.4 Training is valid for a period of three years from the date of completion in a numbered subspecialty training post. Candidates who do not successfully complete the subspecialty examination within the period must motivate with support from their HOD to the College of Surgeons for a once off extension.

**4.0 TRAINING**

See Appendix A

**5.0 CURRICULUM**

See Appendix B

**6.0 PORTFOLIO and FORMAT AND CONDUCT OF THE EXAMINATION**

See Appendix C

**APPENDIX A****1.0 TRAINING****1.1 Training period:**

The training should be for a minimum of 2 years after qualification as a general surgeon. The candidate should spend time in an accredited Surgical Gastrointestinal Unit, which provides the candidate exposure to the range of GI surgical procedures as outlined in Appendix B. Institutions are free to structure their training period according to available facilities.

**1.1.1 Training Tracks:**

Candidates may select one of three tracks:

- Hepatopancreaticobiliary
- Colorectal
- General surgical gastroenterology and upper gastroenterology

**1.2 Curriculum:**

The syllabus for the Surgical Certificate Gastroenterology(SA) is outlined Appendix B. Common to all tracks is a core syllabus which covers the theory and practice of gastroenterology. In addition, there are advanced syllabae for each of the three tracks which comprise the theory and acquisition of endoscopic and surgical skills and their application in the clinical setting.

**1.3 Carry over of written examination**

A candidate who has been invited to the clinical examination and fails the oral aspect of the examination, shall be allowed to re-do **ONLY THE ORAL ASPECT AT THE NEXT EXAMINATION** (without re-writing the written aspect of the examination)

The carry-over of the written examination is allowed only once ie for the next examination only. Should the candidate fail the oral examination again, then the candidate must re-write the full examination at their next attempt.

Written examination carry-over applies with immediate effect according to the Colleges of Medicine of South Africa Senate meeting held on the 26 October 2017.

## APPENDIX B

### 1.0 Hepatobiliary and pancreatic surgery

This Curriculum consists of seven major Modules, some with submodules:

#### 1.1 Module 1 – The Liver

- 1.1.1 Anatomy, Embryology, Physiology, Testing
- 1.1.2 Congenital and Acquired Non-neoplastic Liver Disease
- 1.1.3 Neoplastic Liver Disease
- 1.1.4 Liver Surgery

#### 1.2 Module 2 – The Biliary Tract including Gallbladder

- 1.2.1 Anatomy, Embryology, Physiology, Testing
- 1.2.2 Congenital and Acquired Non-neoplastic Biliary Disease
- 1.2.3 Neoplastic Biliary Disease

#### 1.3 Module 3 – The Pancreas and Duodenum

- 1.3.1 Anatomy, Embryology, Physiology, Testing
- 1.3.2 Congenital and Acquired Non-neoplastic Pancreatic Disease
- 1.3.3 Neoplastic Pancreatic Disease
- 1.3.4 Diseases of the Duodenum

#### 1.4 Module 4 – Imaging

#### 1.5 Module 5 – Oncology

#### 1.6 Module 6 – Trauma

#### 1.7 Module 7 – Transplantation

**Each Module or SubModule is organized into 3 Sections:**

- Objectives: description of the topics the Fellow must understand and the specific knowledge to be acquired
- Content: description of the specific areas of study necessary to achieve the Module objectives
- Clinical Skills: description of the clinical activities and technical skills that are to be mastered

#### 1.1 Module 1 – The Liver

##### 1.1.1 Anatomy, Embryology, Physiology, Testing

###### 1.1.1.1 Objectives: Upon completion of this Module the fellow will understand:

- Intrahepatic and extrahepatic anatomy of the liver and the relationship with the adjacent and surrounding structures
- The embryology of the liver and biliary tract and the potential anomalies
- The physiology of the liver
- Clinical hematologic and biochemical tests relevant to the liver and their indications and interpretation:
  - Tests of hepatocellular injury
  - Tests of liver function
- Hepatic imaging techniques and their indications and interpretation
- Implications of investigations and surgical procedures on the liver

###### 1.1.1.2 Content:

- 1.1.1.2.1 Embryology of the liver
  - Relationship to other foregut structures
- 1.1.1.2.2 Extrahepatic anatomy of the liver
  - Lobes, sectors, segments
  - Nomenclature systems
  - Ligaments, fissions and incisures
  - Anomalies

- 1.1.1.2.3 Anatomy of the porta
  - Portal vein, hepatic artery
  - Bile duct, gall bladder
  - Variants of normal and anomalies
  - Lymphatic drainage and nodal anatomy
  - Nerves
- 1.1.1.2.4 Anatomy of the retrohepatic space
  - IVC and its branches
  - Adrenal, kidney, diaphragm
- 1.1.1.2.5 Intrahepatic anatomy:
  - Hepatic veins and variants of normal
  - Portal triad structures and segmental anatomy
  - Histology of the normal liver
- 1.1.1.2.6 Physiology of the liver
  - Bilirubin metabolism
  - Coagulation
  - Other clinically relevant metabolic pathways
- 1.1.1.2.7 Hematologic, biochemical, and histologic testing (assessment) of the liver
  - Transaminases and markers of cholestasis
  - Measures of liver function
    - Static – including INR (PT), Factors V and VII, bilirubin, albumin
    - Dynamic – including clearance tests, eg ICG, galactose, aminopyrine, lidocaine (MEGX)
  - Indicators of portal hypertension
  - Indications for liver biopsy
- 1.1.1.2.8 Imaging of the liver
  - Ultrasound (U/S) and Doppler, Computerized Tomography (CT)
  - Scans, Magnetic Resonance Imaging (MRI) Scans
  - Nuclear tests: Proton Emission Tomographic (PET) Scans, Liver/Spleen scans, Biliary excretion (e.g. HIDA) Scans, RBC Scans
    - Application of investigations to hepatic surgery
- 1.1.13 **Clinical Skills:**
  - Identify, recognize, and describe anatomic structures in and around the liver
  - By reading and interpreting images of the liver
  - Intraoperatively
  - Perform and interpret intraoperative U/S of the liver and porta
  - Perform liver biopsy – percutaneously, laparoscopic or open
  - Identify anatomic anomalies and explain their embryologic origin
  - Understand the indications for and be able to interpret the hematologic and biochemical tests and explain the underlying physiology
  - Interpret the dynamic tests of liver function
  - Apply the relative advantages and disadvantages to the application of the different modalities of hepatic imaging
  - Determine the appropriate abdominal wall incisions for open procedures on the liver
  - Determine the appropriate port site placements and patient positions for laparoscopic procedures on the liver, and the relative indications for each and the need for a hand-port
  - Evaluate liver function and portal hypertension (including Child’s score and its variations)
  - Assess the overall risk and the hepatic risk of surgery by recognizing the implications of abnormalities of liver hematologic and biochemical testing on both hepatic and non-hepatic procedures.
  - Develop a detailed operative strategy for liver resections based on preoperative assessment and imaging

**1.1.2 Congenital and Acquired Non-neoplastic Liver Disease**

**1.1.2.1 Objectives: Upon completion of this Module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the liver.
- The investigative procedures available to efficiently diagnose the disease/ disorder.
- The treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures.
- The pre, intra- and postoperative management, including the management of complications of therapy.

**1.1.2.2 Content:**

1.1.2.2.1 Paediatric liver diseases

- Biliary atresia and Alagille’s syndrome
  - Presentation, evaluation and natural history
  - Treatment options and indications for intervention

1.1.2.2.2 Liver cysts and abscesses

- Solitary liver cysts
  - Presentation, evaluation and natural history
  - Distinguish from cystic neoplasm
  - Treatment options and indications for intervention
- Polycystic liver disease
  - Associated abnormalities
  - Presentation, evaluation and natural history
  - Treatment options and indications for intervention
- Pyogenic and fungal liver abscess
  - Potential bacterial and fungal pathogens and sources
  - Presentation, evaluation
  - Treatment and indications for surgical drainage
- Other liver abscess including amoebic abscess, TB
  - Presentation, evaluation and natural history
  - Treatment options and indications for intervention
- Echinococcal liver cyst
  - Life cycle, epidemiology, target organs
  - Presentation, evaluation and natural history
  - Treatment options and indications for intervention

1.1.2.2.3 Liver failure

- Hepatitis and acute liver failure
  - Causes of acute liver failure
  - Investigation and prognosis
    - Classification systems including King’s College criteria
  - Treatment strategies
    - Role of liver support systems
    - Role of liver transplantation
- Cirrhosis and portal hypertension
  - Causes of cirrhosis, diagnosis and natural history, staging and treatment options (including indications for liver transplantation) for each
    - Viral hepatitis B, C, D
    - Alcoholic liver disease
    - Non-alcoholic fatty liver disease and steatohepatitis
    - Autoimmune liver disease
      - ❖ Autoimmune chronic active hepatitis
      - ❖ Primary biliary cirrhosis
      - ❖ Primary sclerosing cholangitis
        - Hemochromatosis, Wilson’s disease, alpha-1 antitrypsin deficiency
        - Budd Chiari syndrome
        - Portal Hypertension.../

- Portal hypertension
  - Pathophysiology
  - Interpretation of hematologic and biochemical tests and imaging
  - Non-operative treatment options and strategies
  - Portosystemic decompression
    - ❖ Indications and sequelae
    - ❖ Risks and benefits of TIPS and surgical shunts
    - ❖ Types of surgical shunts
      - Relative indications
    - ❖ Sugiura procedure
      - Indications for liver transplantation

1.1.2.2.4 Clinical Skills:

- Diagnose and treat patients with cystic diseases of the liver
- Diagnose and manage patients with liver abscess(es)
- Perform laparoscopic and open drainage of liver cyst or abscess (unroofing, resection)
- Diagnose and classify acute and chronic liver failure.
- Diagnose, investigate and manage patient with portal hypertension
  - Perform portosystemic shunt – portocaval, mesocaval, splenorenal and their variants.
  - Perform the Sugiura procedure

1.1.3 Neoplastic Liver Disease

1.1.3.1 Objectives: Upon completion of this Module the fellow will understand:

- The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the liver.
- The investigative procedures available to efficiently diagnose the disease/disorder.
- The staging of malignancies of the liver including histologic assessment
- The treatment options available for the neoplasm, and the results, including the risks and benefits of the operative and non-operative procedures.
- The pre, intra- and postoperative management, including the management of complications of therapy.
- The role of neoadjuvant and adjuvant therapy of malignant liver neoplasms.

1.1.3.2 Content:

- Benign neoplasms of the liver
  - Presentation, investigation, diagnosis, and natural history of hemangioma, hamartoma, adenoma, focal nodular hyperplasia
  - Histology and indications for biopsy
  - Treatment options and indication for ablation or resection
- Primary malignancies of the liver
  - Hepatocellular carcinoma (HCC)
    - Etiology, presentation, investigation, diagnosis, and natural history of HCC
    - Role of screening and staging systems for HCC
    - Treatment options and the risk: benefit ratio for each: resection, transplantation, ablation, chemotherapy +/- embolization, radiation
  - Cholangiocarcinoma (intrahepatic or peripheral)
    - Diagnosis, investigation and staging
    - Treatment options including palliative procedures

- Epithelioid hemangioendothelioma, lymphoma, sarcoma and other neoplasms
  - Diagnosis, investigation and staging
  - Treatment options
  - Secondary malignancies of the liver
    - ❖ Colorectal primary
      - Pathogenesis, staging of colorectal cancer
      - Investigation and staging
      - Treatment options
        - \* Indications, and risk: benefit ratio of ablation/resection
        - \* Neo-adjuvant, downstaging, and adjuvant chemotherapy
    - ❖ Neuroendocrine and other primary
      - Investigation and staging
      - Treatment options
        - \* Indications, and risk: benefit ratio ablation / resection
      - Neoadjuvant and adjuvant therapy

1.1.3.3 **Clinical Skills:**

- Evaluate patients with benign neoplasms of the liver, including interpretation of imaging and indications for biopsy
- Manage patients with benign hepatic neoplasms
- Evaluate patients with HCC, including screening for potential HCC and staging
- Evaluate patients with primary and secondary adenocarcinoma and other metastatic lesions of the liver including staging
- Manage patients with primary and secondary hepatic malignancies
- Participate in multidisciplinary tumor review conferences
- Perform liver resections
- Provide pre- and postoperative therapy following liver resection including the diagnosis and management of complications
- Recommend appropriate therapy for unresectable hepatic malignancies
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection for hepatic malignancies
- Interact with Medical and Radiation Oncologists

1.1.4 **Liver Surgery**

1.1.4.1 **Objectives: Upon completion of this Module the fellow will understand:**

- The types of and techniques for liver resections
- Preoperative patient assessment and the cumulative risks of the proposed procedure
- Preoperative management
- Intraoperative management during a liver resection
- Postoperative management including complications.

1.1.4.2 **Content:**

- Types of liver resection
  - Nomenclature of liver resections (Brisbane system)
  - Laparoscopic, laparoscopic-assisted, open laparotomy
  - Nonanatomic, segmental, lobectomy, extended lobectomy
  - Vascular control: none, Pringle maneuver, total vascular isolation
  - Vascular resection and reconstruction
  - Staged resections
  - Combination with ablation
- Preoperative assessment and the cumulative risks to the proposed procedure
  - Patient comorbidities (cardiopulmonary and other)
  - Hepatic risk
    - Assessment of liver function, portal hypertension
    - Volumetric assessment of liver remnant
    - Portal vein embolization

- Preoperative management.../



- Preoperative management
  - Prophylaxis against common complications
    - DVT, infection
  - Neuroendocrine hormonal blockade
  - Detailed operative plan based on preoperative imaging
- Liver resection
  - Anesthetic considerations
    - Agents, coagulation, CVP
  - Blood loss conservation including cell saver and blood product administration
  - Laparoscopic techniques
    - Patient and port placement
    - Hand port
  - Parenchymal transection techniques
    - Relative advantages and disadvantages
    - Normal, fatty, fibrotic and cirrhotic parenchyma
    - Laparoscopic or open use
  - Concomitant resection and reconstruction of the
    - Diaphragm
    - IVC
    - Portal vein
    - Bile duct
- Postoperative management
  - Complications and management, including liver failure

**1.1.4.3 Clinical Skills:**

- Evaluate patients for liver surgery including the comorbidities and any underlying liver disease to determine risk
- Determine the need for portal vein embolization, staged resection or concomitant ablation
- Perform intraoperative staging of tumors including intraoperative U/S
- Perform liver resections using a variety of approaches and transection techniques
- Perform complex liver resections including bile duct, portal vein, IVC, diaphragm
- Manage the liver resection patient during the immediate, early and late postoperative periods and diagnose and treat complications of the resection

**1.2 Module 2 – The Biliary Tract including Gallbladder**

**1.2.1 Anatomy, Embryology, Physiology, Testing**

**1.2.1.1 Objectives: Upon completion of this Module the fellow will understand:**

- The anatomy of the biliary tract including the intra- and extrahepatic, hepatic duct, the gallbladder and cystic duct, the common bile duct, the ampulla of Vater, and their relationships with the adjacent and surrounding structures
- The embryology of the liver and biliary tract and the potential anomalies
- The physiology of bile metabolism and biliary tract epithelium
- Clinical biochemical tests relevant to the biliary tract and their interpretation
- Biliary imaging techniques and their indications and interpretation
- Implications of investigations on surgical procedures on the bile duct

**1.2.1.2 Content:**

- Embryology of the biliary tract
  - Relationship to liver, pancreas and other portal and foregut structures
- Anatomy of the hepatic duct and biliary plate
  - Segmental anatomy and variants of normal
  - Blood supply and lymphatic drainage
  - Relationship with other portal structures
- Anatomy of the gallbladder and cystic duct
  - Blood supply and lymphatic drainage
  - Variants of normal and anomalies

- Anatomy of the bile duct.../

- Anatomy of the bile duct
  - Blood supply, lymphatic drainage and regional lymph nodes
  - Variants of normal and anomalies
  - Relationship with other portal structures and the pancreatic duct
  - Sphincter of Oddi and ampulla of Vater
- Bile metabolism and biliary physiology
  - Bile-salt dependent and independent bile production
  - Hormonal influences
  - Biliary epithelium and gallbladder function
  - Sphincter of Oddi motility
- Biochemical investigation
  - interpretation
- Imaging
  - Axial and body imaging techniques:
    - U/S, CT scan and MRI scan, including MRCP
  - Endoscopic U/S
  - Direct contrast imaging
    - Percutaneous transhepatic cholangiogram (PTC) and cholecystography and endoscopic retrograde cholangiopancreatography (ERCP)
  - Endoscopic assessment of Ampulla of Vater
  - Nuclear biliary excretion imaging (HIDA scan) – qualitative and quantitative (HIDA scan)

**1.2.1.3 Clinical Skills:**

- Identify and describe biliary tract structures (normal and abnormal)
  - By reading and interpreting images of the biliary tract
  - Intraoperatively
- Perform and interpret intraoperative U/S of the liver and biliary tract
- Identify anatomic anomalies and explain their embryologic origin
- Understand the indications for and be able to interpret the biochemical tests and explain the underlying physiology
- Apply understanding of the relative advantages and disadvantages of the different modalities of biliary tract imaging to determine optimal investigation
- Determine the abdominal wall incisions that are appropriate for open procedures on the biliary tract and the relative indications for each
- Determine the appropriate port site placements and patient positions that are useful for laparoscopic procedures on the biliary tract and the relative indications for each
- Develop a detailed operative strategy for biliary surgery based on preoperative assessment and imaging

**1.2.2 Congenital and Non-neoplastic Biliary Disease**

**1.2.2.1 Objectives: Upon completion of this Module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the biliary tract including the gallbladder
- The investigative procedures available to efficiently diagnose of the disease/disorder
- The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of therapy

**1.2.2.2 Content:**

- Congenital and pediatric
  - Choledochal cyst, Caroli’s disease, congenital hepatic fibrosis, biliary atresia and Alagille’s syndrome
    - Presentation, classification, evaluation and natural history
    - Treatment options and indications for intervention

- Gallstones
  - Pathogenesis
  - Presentation and investigation of
    - Biliary colic, cholecystitis, cholangitis, Mirrizzi's syndrome, gallstone ileus
  - Treatment: Percutaneous, laparoscopic and open
  - Cholecystectomy-related biliary injuries
    - Mechanism of injury & classification
    - Associated injuries
    - Management
- Benign strictures
  - Primary sclerosing cholangitis (PSC)
    - Etiology, pathophysiology, natural history and non-operative management
    - Complications and management
      - ❖ Screening for cholangiocarcinoma
      - ❖ PTC with biliary drainage (PTBD), ERCP with endobiliary stent
      - ❖ Resection
      - ❖ Transplantation
  - Posttraumatic and idiopathic
    - Mechanism of injury and classification
    - Management options
    - Intrahepatic stones
      - ❖ Pathophysiology, presentation and investigation
      - ❖ Common infectious bacteria
      - ❖ Surgical options including liver resection and biliary access (Hutson) choledochojejunostomy, hepaticojejunostomy with transhepatic stents

#### 1.2.2.3 Clinical Skills:

- Investigate the jaundiced patient by determining the most efficient modalities, and interpret the results of biochemical testing and imaging
- Apply understanding of the relative merits and disadvantages of nonoperative biliary manipulation (PTBD and endoscopic stenting) to treat biliary tract obstruction.
- Manage the patient with complex gallstone disease
- Manage biliary injuries resulting from cholecystectomy and other trauma
- Perform resection and reconstruction for choledochal cysts, intrahepatic stones, and benign strictures
- Evaluate and manage the patient with the complications of PSC

#### 1.2.3 Neoplastic Biliary Disease

##### 1.2.3.1 Objectives: Upon completion of this Module the fellow will understand:

- The presentation and natural history of benign and malignant neoplasms of the bile duct and gallbladder
- The investigative procedures available to efficiently diagnosis the neoplasm.
- The staging of adenocarcinoma of the bile duct and gallbladder including histologic assessment
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of surgery.
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of malignant biliary neoplasms

1.2.3.2 **Content:**

- Gallbladder
  - Polyps
    - Presentation, natural history
    - Indications for resection
    - Principles of resection
  - Adenocarcinoma
    - Presentation, staging (including histology) and natural history
    - Investigation
    - Surgical options
      - ❖ Extent and timing of resection
    - Chemo and radiotherapy
      - ❖ Neo- and/or adjuvant therapy
      - ❖ Definitive management
    - Palliative care options
- Bile duct
  - Adenoma of Ampulla of Vater
    - Presentation, natural history, investigation
    - Resection options
      - ❖ Endoscopic, transduodenal resection and reconstruction
  - Adenocarcinoma
    - Location: Hilar (Klatskin), intrapancreatic, ampulla
    - Type – papillary, sclerosing
    - Presentation, investigation and staging, including laparoscopic staging
    - Resection and reconstruction – indications and contraindication
    - Palliative options
      - ❖ PTBD or endoscopic stent
      - ❖ Surgical bypass

1.2.3.3 **Clinical Skills:**

- Investigate and manage patients with gallbladder polyps and benign neoplasms of the ampulla of Vater
  - Perform extended cholecystectomy for potential oncologic indication
  - Perform transduodenal resection of the Ampulla of Vater with reconstruction of the bile and pancreatic ducts
- Investigate and manage patients with hilar cholangiocarcinoma
  - Perform extended resection of the biliary bifurcation with the caudate and ipsilateral lobes of the liver, portal lymphadenectomy, and biliary reconstruction
- Investigate and manage patients with distal bile duct tumors
  - Perform pancreatoduodenectomy
- Participate in multidisciplinary tumor review conferences
- Provide postoperative management including the diagnosis and treatment of complications of biliary resection and/or bypass
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the gallbladder or bile duct

**1.3 Module 3 – The Pancreas & Duodenum**

**1.3.1 Anatomy, Embryology, Physiology, Testing**

**1.3.1.1 Objectives: Upon completion of this Module the fellow will understand:**

- Anatomy of pancreas and its relationship with portal structures, retroperitoneal structures and the adjacent organs
- Anatomy of the pancreatic duct and its relationship with the bile duct, sphincter of Oddi and the ampulla of Vater
- Anatomy of duodenum and its relationship with portal structures, retroperitoneal structures and the adjacent organs
- The embryology of the pancreas, pancreatic duct and duodenum and potential anomalies
- The physiology of pancreatic exocrine and exocrine functions and duodenal physiology
- Clinical biochemical tests of pancreatic function and injury and their interpretation
- Pancreatic and duodenal imaging techniques and their indications and interpretation
- Implications of investigations on surgical procedures on the pancreas and duodenum

**1.3.1.2 Content:**

- Embryology of the pancreas and duodenum
  - Relationship to liver, bile duct and other foregut structures
  - Etiology of anomalies including pancreas divisum and annular pancreas
- Anatomy of the pancreas
  - Spectrum of normal anatomy and variants
  - Arterial supply and venous drainage
  - Lymphatic drainage and regional lymph nodes.
  - Relationship with:
    - Portal structures: duodenum, bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
    - Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
    - Adjacent organs: stomach, spleen, colon, small intestine
- Anatomy of the pancreatic duct
  - Variants of normal and anomalies
- Anatomy of the duodenum
  - Spectrum of normal anatomy and variants
  - Arterial supply and venous drainage
  - Lymphatic drainage and regional lymph nodes.
  - Relationship with:
    - Portal structures: bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
    - Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
    - Adjacent organs: pancreas, stomach, spleen, colon, small intestine
- Pancreatic metabolism and physiology
  - Exocrine enzyme physiology
    - Synthesis, excretion and activation
    - Neural and hormonal influences
  - Endocrine metabolism
    - Islet cell function, neuroendocrine hormones
- Duodenal physiology
  - Motility
  - Neuroendocrine (“gut”) hormone physiology
  - Biochemical investigation and interpretation
- Biochemical Testing
  - Markers of pancreatic injury
  - Measures of pancreatic exocrine function
  - Urinary and serum neuroendocrine hormones
  -

- Imaging.../

- Imaging
    - Axial and body imaging techniques:
      - U/S, CT scan and MRI scan, including MRCP
    - Endoscopy and endoscopic U/S
    - Direct contrast imaging
      - Endoscopic retrograde cholangio-pancraetography (ERCP)
    - Nuclear studies:
      - PET scan
      - Neuroendocrine imaging (Octreotide scan)
  - Application of testing and imaging to pancreatic and duodenal surgery
- 13.1.3 **Clinical Skills:**
- Identify, recognize, and describe anatomic structures in and around the pancreas & duodenum
    - By reading and interpreting images of the duodenum, pancreas and its duct
    - Intraoperatively
  - Perform and interpret intraoperative U/S of the pancreas and surrounding structures
  - Identify anatomic anomalies and explains their embryologic origin
  - Understand the indications for and interpret the biochemical tests and explain the underlying physiology including the tests of pancreatic function
  - Apply the relative advantages and disadvantages of the different modalities of pancreatic imaging to efficiently investigate diseases and disorders of the pancreas and duodenum
  - Determine the appropriate abdominal wall incision for open procedures on the pancreas and/or duodenum
  - Determine the appropriate port site placements and patient positions for laparoscopic procedures on the pancreas and/or duodenum and the relative indications for each and the need for a hand-port
  - Develop a detailed operative strategy for pancreatic and duodenal surgery based on preoperative assessment and imaging

1.3.2 **Congenital and Acquired Non-neoplastic Pancreatic Disease**

1.3.2.1 **Objectives: Upon completion of this Module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the pancreas
- The investigative procedures available to efficiently diagnose the disease/disorder
- The treatment options available for the condition, and results, including the risks and benefits of the operative and nonoperative procedures
- The pre-, intra- and postoperative management, including the management of complications of therapy

1.3.2.2 **Content:**

- Pancreatitis
  - Acute
    - Pathogenesis, staging and prognosis
    - Management, including surgical options and complications
    - Indications for surgical intervention
  - Chronic
    - Pathogenesis, complications and nonoperative management
    - Pancreatic stents and endoscopic/percutaneous drainage procedures
    - Surgical options and indications
    - Pain control
- Pancreas Divisum
  - Pathogenesis, staging and prognosis
  - Management, including surgical options and complications
  - Indications for surgical intervention

- Annular pancreas
  - Pathogenesis, staging and prognosis
  - Management, including surgical options and complications
  - Indications for surgical intervention

**1.3.2.3 Clinical Skills:**

- Manage patients with acute pancreatitis, including complications
  - Determine the need for surgical intervention
  - Perform open and/or laparoscopic procedures for acute pancreatitis
- Investigate and manage the patient with chronic pancreatitis
  - Determine the need for operative intervention
  - Perform: pseudocyst-enterostomy, lateral pancreaticojejunostomy with/without limited resection of the head of the pancreas (Frey procedure), pancreatic resection

**1.3.3 Neoplastic Diseases of the Pancreas**

**1.3.3.1 Objectives: Upon completion of this Module the fellow will understand:**

- The Pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the pancreas
- The investigative procedures available to efficiently diagnose the disease/disorder
- The staging of malignancies of the pancreas including histologic assessment
- The treatment options available for the neoplasm, and the outcomes, including the risks and benefits of the operative and nonoperative procedures
- The pre-, intra- and postoperative management, including the management of complications of therapy
- The role of neoadjuvant and adjuvant therapy of malignant pancreatic lesions

**1.3.3.2 Content:**

- Benign cysts and neoplasms of the pancreas
  - Microcystic serous cystadenoma
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for biopsy
    - Treatment options and indication for resection
  - Mucinous cystic neoplasm
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for aspiration/biopsy
    - Treatment options and indication for resection
  - Intraductal papillary mucinous neoplasm (IPMN)
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for aspiration / biopsy
    - Treatment options and indication for resection
  - Solid Pseudopapillary Neoplasms
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for aspiration / biopsy
    - Treatment options and indication for resection
    - Cystic Neuroendocrine Tumors
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for aspiration / biopsy
    - Treatment options and indication for resection
  - Von Hippel Lindau syndrome
    - Pathology, associated lesions, investigation
    - Management
- Malignancies of the pancreas
  - Primary
    - Adenocarcinoma
      - ❖ Presentation, investigation and staging
      - ❖ Assessment of resectability
      - ❖ Pre-, peri- and postoperative management
      - ❖ Palliative procedures

- Neuroendocrine tumors
  - ❖ Presentation, investigation and staging
  - ❖ Assessment of resectability
  - ❖ Pre-, peri- and postoperative management
- Lymphoma
  - ❖ Presentation, staging
  - ❖ Role of surgery
- Secondary
  - Renal cell carcinoma
    - ❖ Presentation and management
  - Melanoma
    - ❖ Presentation and management

1.3.3.3 **Clinical Skills:**

- Investigate and manage patients with benign cysts and neoplasms of the pancreas
  - Determine need for biopsy/aspiration and resection
  - Perform resections including enucleation of NE tumors and spleen preserving distal pancreatectomy
- Investigate and manage patients with adenocarcinoma of the pancreas
  - Stage the tumor pre- and intraoperatively and determine resectability
  - Perform pancreatoduodenectomy +/- portal vein resection and reconstruction
  - Perform distal pancreatectomy and regional lymphadenectomy
  - Perform palliative procedures for unresectable tumors
- Participate in multidisciplinary tumor review conferences
- Provide postoperative management including the diagnosis and treatment of complications of pancreatic resection and/or bypass
- Recommend appropriate therapy for unresectable pancreatic carcinoma
- Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with Medical and Radiation Oncologists

1.3.4 **Diseases of the Duodenum**

1.3.4.1 **Objectives: Upon completion of this Module the fellow will understand:**

- The pathophysiology, presentation and natural history of the diseases of the pancreas
- The investigative procedures available to efficiently diagnose the disease/disorder
- The treatment options available for the condition, and the results, including the risks and benefits of the operative and non-operative procedures
- The pre-, intra- and postoperative management, including the management of complications of therapy

1.3.4.2 **Content:**

- Congenital disorders of the duodenum
  - Duodenal atresia and duplication
  - Duodenal diverticulae
- Duodenal ulcer disease
  - Pathogenesis, investigation and diagnosis
  - Nonoperative treatment
  - Operative management
- Crohn's disease
  - Presentation, investigation, diagnosis
  - Management
- Benign neoplasms
  - Adenoma
  - Hereditary Familial Polyposis
    - Genetics, presentation, investigation
    - Management

- Malignant neoplasms of the duodenum.../



- Malignant neoplasms of the duodenum
  - Adenocarcinoma
    - Presentation, investigation, staging
    - Management
  - Gastrointestinal stromal tumor (GIST) and sarcomas
    - Presentation, investigation, staging
    - Management options
      - ❖ Chemotherapy
      - ❖ Resection
- 1.3.4.3 **Neuroendocrine tumor**
  - Presentation (syndromes) investigation, staging
  - Management
- 1.3.4.4 **Secondary” to direct invasion of adjacent malignancy**
  - Carcinoma of the stomach or colon
  - Renal cell carcinoma
  - Investigation, staging
  - Operative management
- 1.3.4.5 **Clinical Skills:**
  - Investigate and manage patients with benign lesions of the of the duodenum
    - Determine need for operative intervention
    - Perform acid-reduction procedures, limited resection and duodenal bypass procedures
  - Investigate and manage patients with malignant neoplasms of the duodenum
    - Stage the tumor pre- and intraoperatively and determine resectability
    - Perform appropriate resection (including pancreatoduodenectomy +/- portal vein resection and reconstruction when necessary) with regional lymphadenectomy
    - Perform palliative procedures for unresectable tumors
    - Participate in multidisciplinary tumor review conferences
    - Recommend appropriate therapy for unresectable duodenal malignancies
    - Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with Medical and Radiation Oncologists
  - Provide postoperative management including the diagnosis and treatment of complications of duodenal resection and/or bypass

#### 1.4 Module 4 – Imaging

##### 1.4.1 Objectives: Upon completion of this Module the fellow will:

- Understand the physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures including biliary excretion scan (HIDA), RBC scan, Octreotide scan, and L/S scan
- Understand the relative advantages, disadvantages and indications of each
- Read and interpret the detailed information provided by the imaging of the liver biliary tract, pancreas and duodenum
- Perform and interpret intraoperative ultrasound

##### 1.4.2 Content:

- The applied physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures
- The clinical protocols available for each technology
  - The information provided by each protocol
  - The interpretation of images
  - The application to clinical investigation
- Imaging algorithm for the investigation of hepatobiliary and pancreatic lesions including
  - Liver cyst or tumor
  - Jaundice
  - Periapillary tumor
  - Cyst or mass in the pancreas

**1.4.3 Clinical Skills:**

- Apply understanding of the relative merits of each imaging modality to efficiently investigate (including staging of) lesions of the liver, biliary tract, and pancreas
- Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
- Correlate and integrate the findings of the various imaging studies during the investigation of a patient
- Perform and interpret intraoperative ultrasound
- Interact with Diagnostic Radiologists with expertise in HPB diseases and body imaging

**1.5 Module 5 – Oncology**

**1.5.1 Objectives: Upon completion of this Module the fellow will:**

- Understand the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
- Understand the mechanisms of action of the classes of chemotherapeutic agents currently available for HBP malignancies
- Understand the physics, mechanism of action and technology of radiation therapy
- Apply this understanding to the multidisciplinary management of HBP malignancies

**1.5.2 Content:**

- Basic pathophysiology of neoplasia
  - Mechanisms of carcinogenesis
  - Genetic alterations
  - Viral carcinogenesis
  - Chronic inflammation
  - Tumor biology including the potential for metastases
- Chemotherapy
  - Classes of drugs
  - Mechanisms of action
  - Toxicities
  - Combination therapy and available protocols
- Radiation therapy
  - Applied physics and technology
  - Mechanism of action
  - Toxicity
  - Combination protocols with chemotherapy
- Multidisciplinary management
  - Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
    - ❖ Definitive management
    - ❖ Neo- and adjuvant therapy
    - ❖ Therapy for recurrent disease
    - ❖ Palliative therapy

**1.5.3 Clinical Skills**

- Apply knowledge of tumor biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual HBP malignancies
- Participate regularly in multidisciplinary tumor review conferences
- Interact with Interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses

**1.6 Module 6 – Trauma**

**1.6.1 Objectives: Upon completion of this Module the fellow will understand:**

- The pathophysiology of blunt and penetrating trauma to the liver, biliary tract and portal structures, pancreas, duodenum and adjacent structures
- The methods of assessment and diagnosis
- The principles and techniques available to manage traumatic injuries
- The management of complications of trauma to the liver, biliary tract, pancreas and duodenum

## 1.6.2 Content:

- Liver trauma
  - Mechanisms of injury and presentation
  - Diagnosis and classification of liver lacerations
  - Management
    - ❖ Angiography and embolization
    - ❖ Liver parenchyma hemostasis techniques
    - ❖ Total vascular exclusion +/- IVC shunt or veno-venous bypass for retrohepatic IVC and/or hepatic vein injuries
    - ❖ Resection
  - Complications: diagnosis and management
- Biliary tract and portal structures
  - Mechanisms of injury and presentation
    - ❖ “External” trauma
    - ❖ Operative injury during cholecystectomy
  - Investigation, diagnosis and classification of bile duct injuries
    - ❖ Identification of associated injuries
  - Management
    - ❖ Timing and role of ERCP + stent and PTBD
    - ❖ Principles and techniques of biliary reconstruction
  - Complications: diagnosis and management
- Pancreatic and duodenal trauma
  - Mechanisms of injury and presentation
  - Investigation, diagnosis
    - ❖ Identification of pancreatic duct disruption
    - ❖ Identification of duodenal injury
  - Management
    - ❖ Indications for pancreatic resection
    - ❖ Techniques for repair of duodenal injuries
  - Complications: diagnosis and management

## 1.6.3 Clinical Skills

- Consult and manage patients with blunt and penetrating trauma to the upper abdomen
- Evaluate injuries to the liver, biliary tract, porta, pancreas and duodenum
- Evaluate post-cholecystectomy injuries to the bile duct and determine a management strategy
- Perform emergency and elective operative procedures to resole and/or repair injuries to the liver, bile duct, portal structures, pancreas, and duodenum
- Manage complications of operative intervention

## 1.7 Module 7 – Transplantation

## 1.7.1 Objectives: Upon completion of this Module the fellow will have a working knowledge of:

- Organ procurement and preservation
- Indications for liver transplantation
- Outcomes including complications of transplantation
- Immunosuppression and its toxicities

## 1.7.2 Content:

- Organ procurement
  - Brain death and donor management
    - (a) Deceased donor hepatectomy and pancreatectomy
  - Living donor assessment
    - (a) Living donor left or right hepatectomy
- Organ preservation
  - Principles and application
- Transplantation
  - Indications for liver transplantation
    - ❖ Acute and chronic liver failure
    - ❖ Hepatocellular carcinoma and other liver tumors
    - ❖ Childs’ and MELD scores and organ allocation

- Liver
  - ❖ Transplant hepatectomy
  - ❖ Liver transplant techniques
- Pancreas
  - ❖ Back bench reconstruction
  - ❖ Pancreas transplant
- Immunosuppression
  - ❖ Drugs, mechanisms of action, toxicities and combination therapy
- Complications of transplantation
  - ❖ Surgical
  - ❖ Infectious
  - ❖ Immunologic

### 1.7.3 Clinical Skills:

- Apply understanding of liver transplantation to recommend a liver transplant to the appropriate patient at the appropriate time
- Recognize the oncologic impact of immunosuppression on recurrence of hepatocellular carcinoma following liver transplantation and the increased risk of de-novo malignancies

## 2.0 CORE COMPETENCIES

### 2.1 Patient Care

- Fellows will be expected to perform pre-operative assessment of patients, demonstrate an understanding of the management options, indications and contraindications and complications associated with recommended procedures.
- An understanding of and ability to order, integrate and interpret per-operative testing and evaluation related to gastrointestinal surgery.
- Demonstrate a core level of medical knowledge related to the conditions of gastrointestinal disorders.
- Demonstrate clinical, intra operative and peri-operative decision making that is based upon sound medical knowledge that minimises complications and demonstrates an awareness of the limitations of clinical experience and technical skills.
- Develop fundamental competency in the performance of open, laparoscopic and endoscopic interventions related to the practice of gastrointestinal surgery.

### 2.2 Interpersonal and Communication Skills

- The Fellow is able to provide concise and accurate communication of clinical information, with colleagues and other health related personnel.
- Provide effective communication with patients and family members that creates and sustains a professional relationship.
- Demonstrate caring attitudes towards patients and families.
- Maintain comprehensive and clear medical records.
- Act as an educator of patients, especially in cases of chronic disease

### 2.3 Scholar and Teacher

- The Fellow should be diligent in updating knowledge and skill bases by constantly viewing the medical literature and attending professional meetings and interaction with colleagues.
- Critically evaluate medical information and apply appropriately to clinical decisions.
- Facilitate the learning of undergraduates, surgical trainees, health professionals and the community.
- Contribute to the dissemination of and application of gastrointestinal knowledge through research, teaching and communication in general.

### 2.4 Professionalism

- Demonstrate a commitment to the patients, profession and community through ethical practice.
- Display honesty and admission of limitations to provide patients with optimal care.
- Display compassion and respect for all patients and be the advocate for patients' needs.
- Have a commitment to teamwork, inter professional collaboration and offer assistance to colleagues in need.
- Recognise medico legal issues, respect patient confidentiality and apply appropriate government regulations to medical practice.

## 2.5 Leadership

- Manage and lead clinical teams in an efficient and harmonious manner to optimise patient management.
- Serve in administration and leadership roles as appropriate.

## 2.6 Core Syllabus

The core syllabus is common to all streams in surgical gastroenterology.. This knowledge will be examined at the same level for all streams. Core knowledge objectives are detailed below.

- Understand the anatomy, histology, molecular biology, embryology, and development of the gastrointestinal system.
- Be familiar with the physiology and pathophysiology of the gastrointestinal system digestion, absorption, secretion, motility, metabolism and immunology.
- Be able to diagnose and evaluate patients with digestive diseases, taking into consideration all biological and psychosocial aspects.
- Understand the pharmacology, adverse reactions, efficacy, and appropriate use of common drugs used in the practice of surgical gastroenterology and which may impact on management decisions.
- Be able to decide on timely surgery or other therapeutic options.
- Knowledge of the principles and current guidelines relevant to the practice of gastroenterology including but limited to:
  - Anticoagulation
  - Conscious sedation
  - Endoscopy reprocessing
- Be aware of cost-effective management and treatment for patients suffering from digestive diseases.
- Know the incidence and prevalence of common digestive disorders on the basis of locally available data.
- Be able to recommend appropriate measures for the prevention of common digestive diseases.
- Know the indications contraindications and complications of endoscopic procedures.
- Be able to assess nutritional status, including specific nutrient deficiencies, protein-energy malnutrition, maldigestion, vitamin and mineral deficiency and obesity and know the indications for nutritional support and basic management of modified diets, enteral tube feeding, and parenteral nutrition.
- Understand the needs of patients with terminal illness and the needs of their families.
- Know basic bioethics in the management of patients and human research.
- Understand how to apply research methodology in gastroenterology.
- Understand the principles of investigation and management of symptoms or conditions which affect the entire gastrointestinal tract including:
  - Anemia
  - Chronic diarrhea
  - Abdominal pain
  - Weight loss
  - Stenting
  - Micorbiome
  - Lymphoma
  - HIV
  - TB
  - Neuroendocrine tumours
  - Gastrointestinal stromal tumours
  - Malabsorption

### 3.0 UPPER GASTROINTESTINAL SURGERY

#### 3.1 Module 1 – The Oesophagus

Anatomy, Embryology, Physiology, Work-up, Congenital and Acquired Non-neoplastic esophageal Disease, Neoplastic Esophageal Disease, Esophageal operations and procedures

#### 3.2 Module 2 – The Stomach

Anatomy, Embryology, Physiology, Work-up, Congenital and Acquired Non-neoplastic Gastric Disease, Neoplastic Gastric Disease, Gastric operations and procedures

#### 3.3 Module 3 – Duodenum

Anatomy, Embryology, Physiology, Work-up, Congenital and Acquired Non-neoplastic Duodenal Disease, Neoplastic Duodenal Disease, Duodenal operations and procedures

#### 3.4 Module 4 – Imaging

#### 3.5 Module 5 – Oncology

#### 3.6 Module 6 – Trauma

#### Each Module or Submodule is organized into 3 or 4 Sections:

- Objectives: description of the topics the Fellow must understand and the specific knowledge to be acquired
- Content: description of the specific areas of study necessary to achieve the module objectives
- Clinical Skills: description of the clinical activities and technical skills that are to be mastered

#### 3.1 Module 1 – The Oesophagus

##### 3.1.1 Embryology, Anatomy, Physiology, Work-up

- **Objectives: Upon completion of this module the fellow will have sufficient knowledge to discuss**
  - The embryology of the Oesophagus and the potential anomalies
  - Anatomy and histology of the Oesophagus, including the relationship with the adjacent and surrounding structures
  - The physiology of the Oesophagus
  - Clinical evaluation and work-up with physiological tests relevant to the Oesophagus, their indications and interpretation

##### 3.1.1 Content:

###### 3.1.1.1 Embryology of the Oesophagus

###### 3.1.1.2 Anatomy of the Oesophagus

- Relationship to other pharyngeal, foregut and thoracic structures
- Anomalies
- Histology of the Oesophagus

###### 3.1.1.3 Physiology of the Oesophagus

- Motility
- Mechanism of swallowing
- Gastroesophageal junction functionality

###### 3.1.1.4 Clinical evaluation and work-up

- Clinical assessment
- General and nutritional assessment
- Physiological tests
  - Diagnosis of GORD (pH-metry + impedance studies)
  - Diagnosis of motility disorders (High Resolution (HR) Manometry)

**3.1.2 Congenital and Acquired Non-neoplastic Oesophageal Disease**

- Schatzki’s ring, oesophageal webs
- Hiatus hernia; diaphragmatic hernias
- Achalasia and other oesophageal motility disorders
- Oesophageal diverticuli
- GORD and Barrett’s
- Infective/Inflammatory conditions of the Oesophagus
- Causes of oesophageal UGIB’s
- Acute and chronic management of caustic ingestion
- Acute/Iatrogenic oesophageal perforations
- Causes of dysphagia
- Bezoars and foreign bodies

**3.1.3 Neoplastic Esophageal Disease**

- Benign neoplasms
- Adenocarcinoma
- Squamous carcinoma
- Miscellaneous
- Terminal/Palliative care UGI malignancies including pain management

**3.1.4 Oesophageal operations and procedures**

**3.1.4.1 Endoscopic procedures**

- Dilatation and stentplacement
- POEM
- EMR/ESD
- Ablative techniques (MWA)
- Endoscopic reflux procedures
- Endoscopic management of variceal, Mallory-Weiss or other bleeds

**3.1.4.2 Operations**

- Open and laparoscopic antireflux procedures
- Revision antireflux procedures
- Open and laparoscopic paraoesophageal hernia repairs
- Oesophagectomy and reconstructive procedures
- Open and laparoscopic achalasia operations

**3.2 Module 2 – The Stomach**

**3.2.1 Embryology, Anatomy, Physiology, Work-up**

**3.2.1.1 Objectives: Upon completion of this module the fellow will have sufficient knowledge to discuss:**

- The embryology of the stomach and the potential anomalies
- Anatomy and histology of the stomach, including the relationship with the adjacent and surrounding structures
- The physiology of the stomach
- Clinical evaluation and work-up with physiological tests relevant to the stomach, their indications and interpretation

**3.2.1.2 Content:**

- Embryology of the stomach
- Anatomy of the stomach
  - Relationship to other abdominal organs
  - Anomalies
  - Histology of the stomach
- Physiology of the stomach
  - Acid secretion
  - Motility (gastric emptying)
- Clinical evaluation and work-up
  - Clinical assessment
  - General and nutritional assessment
- Physiological tests
  - Acid secretion test

**3.2.2 Congenital and Acquired Non-neoplastic Gastric Disease**

- Malrotation
- Causes of gastric UGIB's
- Peptic ulcer disease
- Post-gastrectomy syndromes
- Zollinger-Ellison
- Gastric volvulus
- Gastric Outlet Obstruction (GOO)
- Gastroparesis
- Refeeding syndrome
- Bezoars and foreign bodies
- Management UGI fistulae
- Acute gastric perforations
- Metabolic surgery (bariatric)

**3.2.3 Neoplastic Gastric Disease**

- Gastric polyps
- Gastric carcinoids
- Gastric cancer
- Gastric lymphoma, GIST etc.
- Gastric manifestations of FAP, Peutz-Jeghers, IBD, etc.
- Terminal/Palliative care gastric malignancies including pain management

**3.2.4 Gastric operations and procedures**

- Endoscopic procedures
  - Dilatation and stent placement
  - Endoscopic options for nutritional support (PEG, nasojejunal tube placement etc.)
  - EMR/ESD
  - Endoscopic management of gastric bleeds
  - Detortion of volvulus
- Operations
  - Laparoscopic and open gastrectomy
  - Open and Laparoscopic management options GOO
  - Revision procedures for postgastrectomy syndromes
  - Surgical management of gastric bleeds
  - Surgical techniques in bariatric surgery
  - Management of bariatric surgery complications

**3.3 Module 3 – The Duodenum**

**3.3.1 Embryology, Anatomy, Physiology, Work-up**

**3.3.1.1 Objectives: Upon completion of this module the fellow will have sufficient knowledge to discuss:**

- The embryology of the duodenum and the potential anomalies
- Anatomy and histology of the duodenum, including the relationship with the adjacent and surrounding structures
- The physiology of the duodenum
- Clinical evaluation and work-up with physiological tests relevant to the duodenum, their indications and interpretation

**3.3.1.2 Content:**

- Embryology of the duodenum
- Anatomy of the duodenum
  - Relationship to other abdominal organs
  - Anomalies
  - Histology of the duodenum
- Physiology of the duodenum
- Clinical evaluation and work-up
  - Clinical assessment
    - ❖ General and nutritional assessment



**3.3.2 Congenital and Acquired Non-neoplastic Duodenal Disease**

- Malrotation
- Causes duodenal UGIB's
- Peptic ulcer disease
  - Management duodenal fistulae
  - Acute duodenal perforations
  - SMA (Wilkie) syndrome

**3.3.3 Neoplastic Gastric Disease**

- Duodenal polyps
- Duodenal carcinoids
- Duodenal cancer
- Duodenal lymphoma, GIST etc.
- Duodenal manifestations of FAP, Peutz-Jeghers, IBD, etc.
- Terminal/Palliative care gastric malignancies including pain management

**3.3.4 Duodenal operations and procedures**

- Endoscopic procedures
  - Dilatation and stent placement
  - EMR/ESD
  - Endoscopic management of duodenal bleeds
- Operations
  - Surgical management of duodenal bleeds
  - Duodenal bypass surgery, including metabolic (bariatric) surgery

**3.4 Module 4 – Imaging**

**3.4.1 Objectives**

- Upon completion of this unit the fellow will:
  - Understand planar contrast imaging, Ultrasound, CT, MRI , PET, RBC scan, Octreotide scan
  - Understand the relative advantages, disadvantages and indications of each
  - Read and interpret the detailed information provided by the imaging of the Oesophagus, stomach and duodenum

**3.4.2 Content:**

- The applied physics and technology of Ultrasound, CT, MRI , PET, RBC scan, Octreotide scan
- The imaging protocols available for each technology
  - The information provided by each protocol
  - The interpretation of images
  - The application to clinical investigation
- Imaging algorithm for the investigation of Oesophagus, stomach and duodenal pathology including
  - Dysphagia
  - Benign and malignant oesophageal tumours
  - Achalasia and other oesophageal motility disorders
  - Zollinger-Ellison
  - Benign and malignant gastric tumours
  - Complications of metabolic surgery (bariatric)
  - Benign and malignant duodenal tumours

**3.4.3 Clinical Skills**

- Apply understanding of the relative merits of each imaging modality to efficiently investigate (including staging of) lesions of the oOesophagus, stomach and duodenum
- Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
- Correlate and integrate the findings of the various imaging studies during the investigation of a patient

**3.5 Module 5 – Oncology**

**3.5.1 Objectives**

Upon completion of this unit the fellow will:

- Understand the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
- Understand the mechanisms of action of the classes of chemotherapeutic agents currently available for oesophageal, gastric and duodenal malignancies
- Understand the physics, mechanism of action and technology of radiation therapy
- Apply this understanding to the multidisciplinary management of oesophageal, gastric and duodenal malignancies

**3.5.2 Content**

- Basic pathophysiology of neoplasia
  - Mechanisms of carcinogenesis
  - Genetic alterations
  - Viral carcinogenesis
  - Chronic inflammation
  - Tumor biology including the potential for metastases
- Chemotherapy
  - Classes of drugs
  - Mechanisms of action
  - Toxicities
  - Combination therapy and available protocols
- Radiation therapy
  - Applied physics and technology
  - Mechanism of action
  - Toxicity
  - Combination protocols with chemotherapy
- Multidisciplinary management
  - Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
    - ❖ Definitive management
    - ❖ Neo- and adjuvant therapy
    - ❖ Therapy for recurrent disease
    - ❖ Palliative therapy

**3.5.3 Clinical Skills**

- Apply knowledge of tumor biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual oesophageal, gastric and duodenal malignancies
- Participate regularly in multidisciplinary tumor review conferences
- Interact with Interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses

**3.6 Module 6 – Trauma**

**3.6.1 Objectives**

Upon completion of this unit the fellow will understand:

- The pathophysiology of blunt and penetrating trauma to the Oesophagus, stomach and duodenum
- The methods of assessment and diagnosis
- The principles and techniques available to manage traumatic injuries
- The management of complications of trauma to the Oesophagus, stomach and duodenum

**3.6.2 Content**

- Mechanisms of injury and presentation
- Diagnosis and work-up
- Management - interventional and operative
- Complications: diagnosis and management

**3.6.3 Clinical Skills**

- Consult and manage patients with blunt and penetrating trauma to the upper abdomen
- Management of complications of endoscopy and endoscopic intervention
- Evaluate injuries to the Oesophagus, stomach and duodenum
- Perform emergency and elective operative procedures to resole and/or repair injuries to the Oesophagus, stomach and duodenum
- Manage complications of operative intervention

**4.0 COLORECTAL**

This Curriculum consists of 11 major modules, some with submodules:

**4.1 Module 1 – Small intestine**

- 4.1.1 Anatomy, Embryology, Physiology, Testing
- 4.1.2 Congenital and Acquired Non-neoplastic small bowel disease
- 4.1.3 Neoplastic small intestine disease
- 4.1.4 Small intestine surgery

**4.2 Module 2 – Appendix**

- 4.2.1 Anatomy, Embryology, Physiology, Testing
- 4.2.2 Congenital and Acquired Non-neoplastic appendiceal disease
- 4.2.3 Neoplastic appendiceal disease

**4.3 Module 3 – Colon**

- 4.3.1 Anatomy, Embryology, Physiology, Testing
- 4.3.2 Congenital and Acquired Non-neoplastic colonic disease
- 4.3.3 Neoplastic colonic Disease

**4.4 Module 4 – The Rectum**

- 4.4.1 Anatomy, Embryology, Physiology, Testing
- 4.4.2 Congenital and Acquired Non-neoplastic rectal disease
- 4.4.3 Neoplastic rectal Disease

**4.5 Module 5 – Anus**

- 4.5.1 Anatomy, Embryology, Physiology, Testing
- 4.5.2 Congenital and Acquired Non-neoplastic anal disease
- 4.5.3 Neoplastic anal disease

**4.6 Module 6 – Peritoneal disease**

- 4.6.1 Anatomy, Embryology, Physiology
- 4.6.2 Congenital and Acquired Non-neoplastic peritoneal disease
- 4.6.3 Neoplastic peritoneal disease

**4.7 Module 7 - Abdominal wall**

- 4.7.1 Anatomy, Embryology, Physiology
- 4.7.2 Congenital and Non-neoplastic abdominal wall disease
- 4.7.3 Neoplastic abdominal wall Disease

**4.8 Module 8 – Imaging****4.9 Module 9 – Oncology****4.10 Module 10 – Trauma**

Each module or submodule is organized into 3 Sections:

- Objectives: description of the topics the Fellow must understand and the specific knowledge to be acquired
- Content: description of the specific areas of study necessary to achieve the Module objectives
- Clinical Skills: description of the clinical activities and technical skills that are to be mastered

4.1 **Module 1 – Small intestine**4.1.1 **Anatomy Physiology, Testing**4.1.1.1 **Objectives: Upon completion of this module the fellow will understand:**

- Anatomy of the small intestines and the relationship with the adjacent and surrounding structures
- The physiology of the small intestine
- Clinical haematologic and biochemical tests relevant to the small intestine their indications and interpretation:
- Small intestine imaging techniques and their indications and interpretation
- Implications of investigations and surgical procedures on the small intestine

4.1.1.2 **Content:**

- **Anatomy of the small intestine**
  - Arterial, venous and lymphatics
  - Variants of normal and anomalies
  - Lymphatic drainage and nodal anatomy
  - Nerves
- **Anatomy of the retroperitoneum**
  - IVC and its branches
  - Aorta and its branches
  - Adrenal, kidney
- **Physiology of the small intestine**
- **Imaging of the small intestine**
  - Ultrasound (U/S) and Doppler, Computerized Tomography (CT)
  - Scans, Magnetic Resonance Imaging (MRI) Scans
  - Nuclear tests: Proton Emission Tomographic (PET) Scans,
- **Application of investigations to small intestinal surgery**

4.1.1.3 **Clinical Skills:**

- **Identify, recognize, and describe anatomic structures in and around the small intestine**
  - By reading and interpreting images of the small intestine
- **Identify anatomic anomalies**
- **Apply the relative advantages and disadvantages to the application of the different modalities of small intestinal imaging**
- **Determine the appropriate abdominal wall incisions for open procedures on the small intestine**
- **Determine the appropriate port site placements and patient positions for laparoscopic procedures on the small intestine, the relative indications for each and the need for a hand-port**
- **Develop a detailed operative strategy for small intestinal resections based on preoperative assessment and imaging**

4.12 **Congenital and Acquired Non-neoplastic small intestinal disease**4.1.2.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the small intestines.
- The investigative procedures available to efficiently diagnose the disease/ disorder.
- The treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures.
- The pre, intra- and postoperative management, including the management of complications of therapy.

4.1.2.2 **Content:**

- **Paediatric small intestinal diseases**
  - Atresia, volvulus and malrotation
    - Presentation, evaluation and natural history
- **Treatment options and indications for intervention**
  - Short bowel syndrome
    - Causes of short bowel syndrome
  - Investigation and prognosis
    - Classification systems
  - Treatment strategies
    - Role of small bowel support methods
    - Role of transplantation
- **Duplication cysts**
- **Inflammatory bowel disease**
  - Presentation, evaluation and natural history
  - Treatment options and indications for intervention
- **Small bowel obstruction**
  - Aetiology
  - Classification
  - Presentation, evaluation and natural history
  - (b) Treatment options and indications for intervention

4.1.2.3 **Clinical Skills:**

- Diagnose and treat patients with small intestinal diseases
- Interact with medical gastroenterologists

4.1.3 **Neoplastic small intestinal disease**4.1.3.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the small intestine
- The investigative procedures available to efficiently diagnose the disease/disorder.
- The staging of malignancies of the small intestine including histologic assessment
- The treatment options available for the neoplasm, and the results, including the risks and benefits of the operative and non-operative procedures.
- The pre, intra- and postoperative management, including the management of complications of therapy.
- The role of neoadjuvant and adjuvant therapy of malignant small intestinal neoplasms.

4.1.3.2 **Content:**

- Benign neoplasms of the small intestine
  - Presentation, investigation, diagnosis, and natural history of hamartoma, adenoma, haemangioma
  - Histology and indications for biopsy
  - Treatment options and indication for resection
- Primary malignancies of the small intestine
  - Adenocarcinoma
    - Aetiology, presentation, investigation, diagnosis, and natural history
    - Treatment options including resection and chemotherapy
  - Lymphoma
    - Diagnosis, investigation and staging
    - Treatment options including palliative procedures
  - Gastrointestinal stromal tumours
    - Diagnosis, investigation and staging
    - Treatment options
  - Neuro-endocrine tumour and other primary tumours
    - Diagnosis, investigation and staging
    - Treatment options

**4.1.3.3 Clinical Skills:**

- Evaluate patients with benign neoplasms of the small intestine, including interpretation of imaging and indications for biopsy
- Manage patients with benign small intestinal neoplasms
- Evaluate patients with primary and secondary adenocarcinoma and other metastatic lesions of the small intestine including staging
- Participate in multidisciplinary tumour review conferences
- Perform small bowel resections
- Provide pre- and postoperative therapy following small intestine resection including the diagnosis and management of complications
- Recommend appropriate therapy for unresectable small intestinal malignancies
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection for small intestinal malignancies
- Interact with Medical and Radiation Oncologists

**4.1.4 Small intestine Surgery****4.1.4.1 Objectives: Upon completion of this module the fellow will understand:**

- The types of and techniques for small intestine resections and anastomoses
- Preoperative patient assessment and the cumulative risks of the proposed procedure
- Preoperative management
- Intraoperative management during a small intestine resection
- Postoperative management including complications.

**4.1.4.2 Content:**

- Types of small intestine resection
  - Laparoscopic, laparoscopic-assisted, open laparotomy
    - Preoperative assessment and the cumulative risks to the proposed procedure
  - Patient comorbidities (cardiopulmonary and other)
- Preoperative management
  - Prophylaxis against common complications
    - DVT, infection
  - Neuroendocrine hormonal blockade
  - Detailed operative plan based on preoperative imaging
    - Anaesthetic considerations
      - ❖ Agents, coagulation, CVP
      - ❖ Blood loss conservation including cell saver and blood product administration
      - ❖ Laparoscopic techniques
  - Patient and port placement
  - Hand port

**4.1.4.3 Clinical Skills:**

- Evaluate patients for small intestine surgery including the comorbidities and any underlying small intestine disease to determine risk
- Perform intraoperative staging of tumours including indications for intraoperative U/S
- Perform small intestine resections using a variety of approaches and transection techniques
- Perform complex small intestine anastomoses
- Manage the small intestine resection patient during the immediate, early and late postoperative periods and diagnose and treat complications of the resection

## 4.2 Module 2 – Appendix

## 4.2.1 Anatomy, Physiology, Testing

## 4.2.1.1 Objectives: Upon completion of this module the fellow will understand:

- The anatomy of the appendix including its various positions
- Appendiceal imaging techniques and their indications and interpretation

## 4.2.1.2 Content:

- Anatomy of the appendix
  - Blood supply and lymphatic drainage
  - Relationship with other structures
- Imaging
  - Axial and body imaging techniques:
    - U/S, CT scan

## 4.2.1.3 Clinical Skills:

- Identify and describe appendix (normal and abnormal)
  - By reading and interpreting images
  - Intraoperatively
- Apply understanding of the relative advantages and disadvantages of the different modalities of imaging to determine optimal investigation
- Determine the abdominal wall incisions that are appropriate for open procedures and the relative indications for each
- Determine the appropriate port site placements and patient positions that are useful for laparoscopic procedures on and the relative indications for each

## 4.2.2 Congenital and Non-neoplastic appendiceal disease

## 4.2.2.1 Objectives: Upon completion of this module the fellow will understand:

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the appendix
- The investigative procedures available to efficiently diagnose of the disease/disorder
- The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of therapy

## 4.2.2.2 Content:

- Congenital and paediatric
  - Treatment options and indications for intervention
- Appendicitis
  - Pathogenesis
  - Presentation and investigation
  - Treatment: Percutaneous, laparoscopic and open
- Mucocoele
  - Pathogenesis
  - Presentation and investigation
  - Treatment: Percutaneous, laparoscopic and open

## 4.2.2.3 Clinical Skills:

- Investigate
- Manage the patient with appendiceal disease

## 4.2.3 Neoplastic appendiceal Disease

## 4.2.3.1 Objectives: Upon completion of this module the fellow will understand:

- The presentation and natural history of benign and malignant neoplasms of the appendix
- The investigative procedures available to efficiently diagnosis the neoplasm
- The staging of adenocarcinoma of the appendix including histologic assessment
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments

- The pre-, intra.../

- The pre-, intra- and postoperative management, including the management of complications of surgery
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of appendiceal neoplasms

**4.2.3.2 Content:**

- Appendix
  - neuroendocrine tumours
    - Presentation, natural history
    - Indications for resection
    - Principles of resection
  - Adenocarcinoma
    - Presentation, staging (including histology) and natural history
    - Investigation
    - Surgical options
      - ❖ Extent and timing of resection
    - Chemo and radiotherapy
      - ❖ Neo- and/or adjuvant therapy
      - ❖ Definitive management
    - Palliative care options

**4.2.3.4 Clinical Skills:**

- Investigate and manage patients with appendiceal benign neoplasms
  - Perform right hemicolectomy for potential oncologic indication
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of surgery
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the appendix

**4.3 Module 3 – Colon**

**4.3.1 Anatomy, Physiology, Testing**

**4.3.1.1 Objectives: Upon completion of this module the fellow will understand:**

- Anatomy of colon and its relationship with retroperitoneal structures and the adjacent organs
- The physiology of colonic function
- Clinical tests of colonic function and their interpretation
- Colonic imaging techniques and their indications and interpretation
- Implications of investigations on surgical procedures on the colon

**4.3.1.2 Content:**

- Anatomy of the colon
  - Spectrum of normal anatomy and variants
  - Arterial supply and venous drainage
  - Lymphatic drainage and regional lymph nodes.
  - Relationship with:
    - Duodenum, splenic, superior and inferior mesenteric arteries, veins and their branches
    - Retroperitoneum: IVC and its branches, aorta and their branches, adrenal gland, kidneys and ureters
    - Adjacent organs: stomach, spleen, colon, small intestine
- Colonic physiology
  - Motility



- Imaging
    - Axial and body imaging techniques:
      - U/S, CT scan and MRI scan
    - Endoscopy
    - Direct contrast imaging
      - barium and water soluble enema
    - Nuclear studies:
      - PET scan
  - Application of testing and imaging to colonic surgery
- 4.3.1.3 **Clinical Skills:**
- Identify, recognize, and describe anatomic structures in and around the colon
    - By reading and interpreting images of the colon
    - Intraoperatively
  - Identify anatomic anomalies
  - Apply the relative advantages and disadvantages of the different modalities of imaging to efficiently investigate diseases and disorders of the colon
  - Determine the appropriate abdominal wall incision for open procedures on the colon
  - Determine the appropriate port site placements and patient positions for laparoscopic procedures on the colon and the relative indications for each and the need for a hand-port
  - Develop a detailed operative strategy for colonic surgery based on preoperative assessment and imaging
- 4.3.2 **Congenital and Acquired Non-neoplastic colonic Disease**
- 4.3.2.1 **Objectives: Upon completion of this module the fellow will understand:**
- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the colon
  - The investigative procedures available to efficiently diagnose the disease/disorder
  - The treatment options available for the condition, and results, including the risks and benefits of the operative and non-operative procedures
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- 4.3.2.2 **Content:**
- Diverticulitis
    - Acute
      - Pathogenesis, staging and prognosis
      - Management, including surgical options and complications
      - Indications for surgical intervention
    - Complicated
      - Pathogenesis, complications and non-operative management
      - Colonic stents and percutaneous drainage procedures
      - Surgical options and indications
      - Pain control
  - Colitis: Inflammatory and infective
    - Pathogenesis, staging and prognosis
    - Management, including surgical options and complications
    - Indications for surgical intervention
  - Colonic motility disorders
    - Pathogenesis and prognosis
    - Management, including surgical options and complications
    - Indications for surgical intervention

4.3.2.3 **Clinical Skills:**

- Manage patients with acute diverticulitis, including complications
  - Determine the need for surgical intervention
  - Perform open and/or laparoscopic procedures for acute diverticulitis
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- Investigate and manage the patient with complicated diverticular disease
  - Determine the need for intervention
  - Perform operative procedures
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- Manage patients with ulcerative colitis and Crohn's disease
  - Determine the need for intervention
  - Perform endoscopic intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- Investigate and manage the patient with motility disorders including irritable bowel syndrome
  - Determine the need for intervention
  - Perform endoscopic intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- Investigate and manage the patient with colonic obstruction
  - Determine the need for intervention
  - Perform endoscopic intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- Bowel preparation
  - Determine the indications
  - Understand the methods
  - Choose appropriate methods
  - Management complications of therapy
- Investigate and manage the patient with colonic volvulus
  - Determine the need for intervention
  - Perform endoscopic intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy

4.3.3 **Neoplastic Diseases of the colon**4.3.3.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the colon
- The investigative procedures available to efficiently diagnose the disease/disorder
- The staging of malignancies of the colon including histologic assessment
- The treatment options available for the neoplasm, and the outcomes, including the risks and benefits of the operative and non-operative procedures
- The pre-, intra- and postoperative management, including the management of complications of therapy
- The role of neoadjuvant and adjuvant therapy of malignant colonic lesions

4.3.3.2 **Content:**

- Benign neoplasms of the colon
  - Colonic polyps
    - Presentation, investigation, diagnosis, and natural history
    - Histology and indications for biopsy
    - Treatment options and indication for resection
    - Familial adenomatous Polyposis
      - ❖ Presentation, investigation
      - ❖ Management of patient and family
- Malignancies of the colon
  - Primary
    - Adenocarcinoma
      - ❖ Aetiology including genetics
      - ❖ Presentation, investigation and staging
      - ❖ Assessment of resectability
      - ❖ Pre-, peri- and postoperative management
      - ❖ Palliative procedures
  - Neuroendocrine tumours
    - Presentation, investigation and staging
    - Assessment of resectability
    - Pre-, peri- and postoperative management
  - Lymphoma
    - Presentation, staging
    - Role of surgery

4.3.3.3 **Clinical Skills:**

- Investigate and manage patients with benign neoplasms of the colon
  - Determine need for biopsy and resection
  - Perform resections including endoscopic and transabdominal
- Investigate and manage patients with adenocarcinoma of the colon
  - Stage the tumour pre- and intraoperatively and determine resectability
  - Perform colectomy and regional lymphadenectomy
  - Perform palliative procedures for unresectable tumours
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of resection and/or bypass
- Recommend appropriate therapy for unresectable colonic carcinoma
- Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with Medical and Radiation Oncologists

4.4 **Module 4 - Rectum**

4.4.1 **Anatomy, Physiology, Testing**

4.4.1.1 **Objectives: Upon completion of this module the fellow will understand:**

- The anatomy of the rectum
- Rectal imaging techniques and their indications and interpretation

4.4.1.2 **Content:**

- Embryology of the rectum
- Anatomy of the rectum and pelvic floor
  - Blood supply and lymphatic drainage
  - Relationship to surrounding structures
    - Nerves
    - Ureters, bladder, seminal vesicles, prostate
    - Uterus, ovaries and vagina
    - Fascial plains
    - Pelvic anatomy

- Imaging
    - Axial and body imaging techniques:
      - U/S, CT scan, MRI
- 4.4.1.3 **Clinical Skills:**
- Identify and describe rectum (normal and abnormal)
    - By reading and interpreting images
    - Intraoperatively
  - Apply understanding of the relative advantages and disadvantages of the different modalities of imaging to determine optimal investigation
  - Determine the abdominal wall incisions that are appropriate for open procedures and the relative indications for each
  - Determine the appropriate port site placements and patient positions that are useful for laparoscopic procedures on and the relative indications for each
- 4.4.2 **Congenital and Non-neoplastic rectal disease**
- 4.4.2.1 **Objectives: Upon completion of this module the fellow will understand:**
- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the rectal
  - The investigative procedures available to efficiently diagnose of the disease/disorder
  - The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
  - The pre-, intra- and postoperative management, including the management of complications of therapy
- 4.4.2.2 **Content:**
- Congenital abnormalities and paediatric
    - Treatment options and indications for intervention
  - Prolapse
    - Pathogenesis
    - Presentation and investigation
    - Treatment: Laparoscopic and open and perineal
  - Rectocele
    - Pathogenesis
    - Presentation and investigation
    - Treatment: Laparoscopic and open and perineal
  - Ulcerative colitis and Crohn's disease
    - Pathogenesis
    - Presentation and investigation of
    - Treatment: Laparoscopic and open
    - Interact with Medical Gastroenterology
  - Proctitis
    - Pathogenesis
    - Presentation and investigation
    - Treatment:
  - Solitary rectal ulcer disease
    - Pathogenesis, investigation and diagnosis
    - Nonoperative treatment
    - Operative management
- 4.4.2.3 **Clinical Skills:**
- Investigate
  - Manage the patient with non-neoplastic rectal disease
  - Understand paediatric rectal surgery and manage the complications thereof in adults

- Manage patients with ulcerative colitis and Crohn's disease
  - Determine the need for intervention
  - Perform endoscopic intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy

#### 4.4.3 Neoplastic rectal Disease

##### 4.4.3.1 Objectives: Upon completion of this module the fellow will understand:

- The presentation and natural history of benign and malignant neoplasms of the rectum
- The investigative procedures available to efficiently diagnosis the neoplasm.
- The staging of adenocarcinoma of the rectum including histologic assessment
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of surgery.
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of rectal neoplasms

##### 4.4.3.2 Content:

- Adenomas
  - Presentation, staging (including histology) and natural history
  - Investigation
  - Surgical options
    - Extent and timing of resection
      - Adenocarcinoma
  - Presentation, staging (including histology) and natural history
  - Investigation
  - Surgical options
    - Extent and timing of resection
  - Chemo and radiotherapy
    - Neo- and/or adjuvant therapy
    - Definitive management
  - Palliative care options
- Lymphoma
  - Presentation, natural history
  - Indications for resection
  - Principles of resection
- Neuro-endocrine tumours
  - Presentation, natural history
  - Indications for resection
  - Principles of resection
- Gastrointestinal Stromal tumours
  - Presentation, natural history
  - Indications for resection
  - Principles of resection
- Extrarectal pelvic tumours
  - Presentation, natural history
  - Indications for resection
  - Principles of resection

4.4.3.3 **Clinical Skills:**

- Investigate and manage patients with rectal benign neoplasms
  - Perform rectal resection for potential oncologic indications
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of surgery
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the rectum

4.5 **Module 5 – Anus**4.5.1 **Anatomy, Embryology, Physiology, Testing**4.5.1.1 **Objectives: Upon completion of this module the fellow will understand:**

- The anatomy of the anus
- Anal imaging techniques and their indications and interpretation

4.5.1.2 **Content:**

- Embryology of the anus
- Anatomy of the anus
  - Blood supply and lymphatic drainage
  - Relationship with other structures
- Imaging
  - Axial and body imaging techniques:
    - U/S, CT and MRI scan

4.5.1.3 **Clinical Skills:**

- Identify and describe anus (normal and abnormal)
  - By clinical examination
  - reading and interpreting images
  - Intraoperatively
- Apply understanding of the relative advantages and disadvantages of the different modalities of imaging to determine optimal investigation
- Determine the incisions that are appropriate for procedures and the relative indications for each

4.5.2 **Congenital and Non-neoplastic anal disease**4.5.2.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the anus
- The investigative procedures available to efficiently diagnose of the disease/disorder
- The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of therapy

4.5.2.2 **Content:**

- Congenital and paediatric
  - Treatment options and indications for intervention
- Anal fistula disease
  - Pathogenesis
  - Presentation and investigation
  - Treatment
- Haemorrhoids
  - Pathogenesis
  - Presentation and investigation
  - Treatment options

- Anal fissures.../

- Anal fissures
  - Pathogenesis
  - Presentation and investigation
  - Treatment
- Thrombosed perianal haematoma
  - Pathogenesis
  - Presentation and investigation
  - Treatment
- Pruritis ani
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Mucosal prolapse
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Ano rectal infections (including sexually transmitted diseases)
  - Pathogenesis (viral and bacterial)
  - Presentation and investigation of
  - Treatment
- Pilonidal sinus
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Hidradenitis suprativa
  - Pathogenesis
  - Presentation and investigation of
  - Treatment

4.5.2.3 **Clinical Skills:**

- Investigate
- Manage the patient with benign anal disease

4.5.3 **Neoplastic anal Disease**

4.5.3.1 **Objectives: Upon completion of this module the fellow will understand:**

- The presentation and natural history of benign and malignant neoplasms of the anus
- The investigative procedures available to efficiently diagnosis the neoplasm.
- The types and staging of carcinoma of the anus and perianal area
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of surgery.
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of anal neoplasms

4.5.3.2 **Content:**

- Anal intraepithelial neoplasia
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Bowen's disease
  - Pathogenesis
  - Presentation and investigation of
  - Treatment

- Paget's disease
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Squamous carcinoma
  - Presentation, staging (including histology) and natural history
  - Investigation
  - Surgical options
    - Extent and timing of resection
  - Chemo and radiotherapy
    - Neo- and/or adjuvant therapy
    - Definitive management
  - Palliative care options
- Adenocarcinoma
  - Presentation, staging (including histology) and natural history
  - Investigation
  - Surgical options
    - Extent and timing of resection
  - Chemo and radiotherapy
    - Neo- and/or adjuvant therapy
    - Definitive management
    - Palliative care options

4.5.3.3 **Clinical Skills:**

- Investigate and manage patients with anal benign and malignant neoplasms
- Perform appropriate operative interventions
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of surgery
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the anus

4.6 **Module 6 – Peritoneal disease**

4.6.1 **Anatomy, Physiology, Testing**

4.6.1.1 **Objectives: Upon completion of this module the fellow will understand:**

- The anatomy of the peritoneum
- Peritoneal imaging techniques and their indications and interpretation

4.6.1.2 **Content:**

- Anatomy of the peritoneum
  - Blood supply and lymphatic drainage
  - Relationship to surrounding structures
    - Nerves
    - Ureters, bladder, seminal vesicles, prostate
    - Uterus, ovaries and vagina
    - Fascial plains
    - Pelvic anatomy
- Imaging
  - Axial and body imaging techniques:
    - U/S, CT scan, MRI



4.6.1.3 **Clinical Skills:**

- Identify and describe peritoneal cavity (normal and abnormal)
  - By reading and interpreting images
  - Intraoperatively
- Apply understanding of the relative advantages and disadvantages of the different modalities of imaging to determine optimal investigation

4.6.2 **Congenital and Non-neoplastic peritoneal disease**4.6.2.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the peritoneum
- The investigative procedures available to efficiently diagnose of the disease/disorder
- The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of therapy

4.6.2.2 **Content:**

- Congenital abnormalities and paediatric
  - Treatment options and indications for intervention
- Infections
  - Pathogenesis
  - Presentation and investigation
  - Treatment:
- Mesenteric cysts
  - Pathogenesis
  - Presentation and investigation
  - Treatment: Laparoscopic and open and perineal
- Mesenteric panniculitis
  - Pathogenesis
  - Presentation and investigation
  - Treatment

4.6.2.3 **Clinical Skills:**

- Investigate
- Manage the patient with non-neoplastic peritoneal disease
- Manage patients with mesenteric cysts
  - Determine the need for intervention
  - Perform appropriate surgical intervention
  - The pre-, intra- and postoperative management, including the management of complications of therapy

4.6.3 **Neoplastic peritoneal Disease**4.6.3.1 **Objectives: Upon completion of this module the fellow will understand:**

- The presentation and natural history of benign and malignant neoplasms of the peritoneum
- The investigative procedures available to efficiently diagnosis the neoplasm
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of surgery
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of rectal neoplasms

4.6.3.2 **Content:**

- Pseudomyxoma
  - Pathogenesis
  - Presentation and investigation of
  - Treatment
- Metastatic peritoneal disease

4.6.3.3 **Clinical Skills:**

- Investigate and manage patients with benign neoplasms
- Perform resection for potential oncologic indications
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of surgery
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the peritoneum

4.7 **Module 7- Abdominal wall**4.7.1 **Anatomy, Physiology, Testing**4.7.1.1 **Objectives: Upon completion of this module the fellow will understand:**

- The anatomy of the abdominal wall
- Abdominal wall imaging techniques and their indications and interpretation

4.7.1.2 **Content:**

- Anatomy of the abdominal
  - Blood supply and lymphatic drainage
  - Nerve supply
- Imaging
  - Axial and body imaging techniques:
    - U/S, CT scan, MRI

4.7.1.3 **Clinical Skills:**

- Identify and describe the abdominal wall
  - By reading and interpreting images
  - Intraoperatively
- Apply understanding of the relative advantages and disadvantages of the different modalities of imaging to determine optimal investigation

4.7.2 **Congenital and Non-neoplastic abdominal wall disease**4.7.2.1 **Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the abdominal wall
- The investigative procedures available to efficiently diagnose of the disease/disorder
- The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of therapy

4.7.2.2 **Content:**

- Congenital abnormalities and paediatric
  - Treatment options and indications for intervention
- Hernias
  - Pathogenesis
  - Presentation and investigation of
  - Treatment:
- Large Abdominal wall defects
  - Pathogenesis
  - Presentation and investigation of
  - Treatment

4.7.2.3 **Clinical Skills:**

- Investigate
- Manage the patient with non-neoplastic abdominal wall disease

4.7.3 **Neoplastic abdominal wall Disease**4.7.3.1 **Objectives: Upon completion of this module the fellow will understand:**

- The presentation and natural history of benign and malignant neoplasms of the abdominal wall
- The investigative procedures available to efficiently diagnosis the neoplasm
- The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
- The pre-, intra- and postoperative management, including the management of complications of surgery
- The role of neoadjuvant and adjuvant chemo- and radiation therapy of rectal neoplasms

4.7.3.2 **Content:**

- Desmoid disease
  - Pathogenesis
  - Presentation and investigation of
  - Treatment

4.7.3.3 **Clinical Skills:**

- Investigate and manage patients with benign neoplasms
- Perform resection for potential oncologic indications
- Participate in multidisciplinary tumour review conferences
- Provide postoperative management including the diagnosis and treatment of complications of surgery
- Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
- Recommend appropriate therapy for unresectable carcinoma of the abdominal wall

4.8 **Module 8 – Imaging**4.8.1 **Objectives: Upon completion of this module the fellow will:**

- Understand the physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures RBC scan, Octreotide scan
- Understand the relative advantages, disadvantages and indications of each
- Read and interpret the detailed information provided by the imaging of the small intestine, colon and rectum

4.8.2 **Content:**

- The applied physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures
- The clinical protocols available for each technology
  - The information provided by each protocol
  - The interpretation of images
  - The application to clinical investigation

4.8.3 **Clinical Skills:**

- Apply understanding of the relative merits of each imaging modality to efficiently investigate (including staging of) lesions of the small intestine, colon and rectum
- Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
- Correlate and integrate the findings of the various imaging studies during the investigation of a patient
- Perform and interpret intraoperative ultrasound
- Interact with Diagnostic Radiologists with expertise in colorectal diseases and body imaging

**4.9 Module 9 – Oncology****4.9.1 Objectives: Upon completion of this module the fellow will:**

- Understand the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
- Understand the mechanisms of action of the classes of chemotherapeutic agents currently available for colorectal malignancies
- Understand the physics, mechanism of action and technology of radiation therapy
- Apply this understanding to the multidisciplinary management of colorectal malignancies

**4.9.2 Content:**

- Basic pathophysiology of neoplasia
  - Mechanisms of carcinogenesis
  - Genetic alterations
  - Viral carcinogenesis
  - Chronic inflammation
  - Tumour biology including the potential for metastases
- Chemotherapy
  - Classes of drugs
  - Mechanisms of action
  - Toxicities
  - Combination therapy and available protocols
- Radiation therapy
  - Applied physics and technology
  - Mechanism of action
  - Toxicity
  - Combination protocols with chemotherapy
- Multidisciplinary management
  - Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
    - Definitive management
    - Neo- and adjuvant therapy
    - Therapy for recurrent disease
    - Palliative therapy

**4.9.3 Clinical Skills**

- Apply knowledge of tumour biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual colorectal malignancies
- Participate regularly in multidisciplinary tumour review conferences
- Interact with Interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses

**4.10 Module 10 – Trauma****4.10.1 Objectives: Upon completion of this module the fellow will understand:**

- The pathophysiology of blunt and penetrating trauma to the small bowel, colon and rectum and adjacent structures
- The methods of assessment and diagnosis
- The principles and techniques available to manage traumatic injuries
- The management of complications of trauma to the small bowel, colon and rectum

**4.10.2 Content:**

- Mechanisms of injury and presentation
- Diagnosis
- Management
- Complications: diagnosis and management

## APPENDIX C

### 1.0 PORTFOLIO AND FORMAT AND CONDUCT OF THE EXAMINATION

The College of Surgeons is constantly reviewing assessment methods to ensure the validity and reliability for their examinations.<sup>1</sup>

#### 1.1 The candidate should declare an area of clinical focus within the subspecialty at the time of application

- 1.1.1 Hepatopancreaticobiliary or
- 1.1.2 Colorectal or
- 1.1.3 Foregut and General Gastroenterology Surgery

#### 1.2 Portfolio

A personal portfolio which details the individuals training and formative assessments in Gastroenterology training, gained while the candidate was in a training post approved and registered by the Medical and Dental Board of the Health Professions Council of South Africa, or in a comparable postgraduate training post in any other country.

The portfolio must at least record:

- 1.2.1 Full details about the training institution(s) or hospital(s), sub- specialist supervision names, qualifications and addresses of consultants, and the candidates training post registered number and dates of employment in the post must be provided
- 1.2.2 All events in the candidate's subspecialist training, with particular reference to formative assessments, operative experience, and academic performance.
- 1.2.3 Candidates are required to detail their training exposure in chronological order and list courses attended, with supporting documentation.
- 1.2.4 *Academic activities:* A record of all academic activities in which the candidate has been involved including publications and contributions to clinical and scientific meetings, courses and involvement in research projects.
- 1.2.5 *Surgical operations:* A record of all surgical operations in which the candidate has been personally involved. The operation records should include all relevant information ie the date of the operation, the patients hospital number and age, the nature of the procedure and an indication of whether it was performed without supervision [NS] or under supervision by a qualified surgical gastroenterologist [S] or if the candidate acted as first assistant to a qualified surgical gastroenterologist [A]. Significant post-operative complications are to be recorded.
- 1.2.6 *Endoscopies:* All endoscopic procedures observed or performed by the candidate, either supervised or unsupervised, are to be recorded separately.
- 1.2.7 *Formative reports:* The candidate's formative report every 6 months should be included in the portfolio. It must contain details of their endoscopic and operative experience and the current consolidated exposure. It should be signed by the supervising surgical gastroenterologist
- 1.2.8 *Overall Consolidated Experience:* At the time of submission for the Certificate Gastroenterology examination an overall consolidation sheet reflecting the candidate's total experience to date must be compiled. It should be signed by the Head of the training programme..
- 1.2.9 *Overall formative report:* The candidate's overall formative report should be included in the portfolio. It should be signed by the Academic Head of the training programme and be based on the candidate's overall performance during training.
- 1.2.10 *Research:* The portfolio must contain details of research activities.
- 1.2.11 *Format:* The portfolio is available in word format and as an excel spread sheet. The Candidate may record and submit the details only in typed form or as a computer database file, provided it includes the required information in the format required and verification of authenticity (portfolios are obtainable on the CMSA website)

1.2.12.../

<sup>1</sup> Statement of assessment systems used.

- 1.2.12 *Submission procedure:* The portfolio must be submitted three months prior to the written examination in order to reach the College of Surgeons timeously. The CMSA will inform candidates whose portfolios do not meet the above minimum requirements. These candidates may, at the discretion of the College of Surgeons be given the opportunity re-submit their portfolios after having addressed the deficiencies identified by the College of Surgeons at least 4 weeks before the clinical part of the examination. Failure to re-submit an acceptable portfolio before this date will result in the candidate not being invited for the clinical part of the examination, regardless of the marks obtained in the written examination. No credit will be given for the marks obtained in the written examinations if the corrected portfolio is not received in time.

## 2.0 EXAMINATION:

**Venue:** The examination board will determine the venue and the date for the clinical and oral component of the examination.

The examination will consist of

- 2.1 One 3 hour written examination comprising 4 equally weighted questions (with at least 3 sub sections per question) that incorporating both clinical and basic science elements. There will be separate paper for each of the 3 tracks. There will be a single common question in all papers based on the core curriculum.
- 2.2 An average mark of 50% for the 4 written questions must be achieved for the candidate to be invited to the oral examinations.
- 2.3 The oral examination will consist of a clinical and a viva.
- 2.4 The clinical component will have least 3 clinical paper cases. **The cases chosen will reflect the subspeciality declared area of clinical focus stated by the candidate and reflected in the portfolio.**
- 2.5 The clinical component of the examination will be of 60 minutes.
- 2.6 A 40 minute oral examination which will include applied anatomy, physiology, pathology, operative technique, oncology and radiology relevant to **the declared area of clinical focus stated by the candidate and reflected in the portfolio.**
- 2.7 The 3 components of the examination, written paper, clinical and oral will be equally weighted. The clinical and oral components will be marked as percentages using quintile increments.
- 2.8 The candidate must achieve a mark of 50% for each component. An overall average mark of 50% must be achieved to pass the examination.
- 2.9 **Examiners:**  
The candidate should be examined by at least 3 registered surgical gastroenterologists. The appointment of examiners will be made by the CMSA. All 3 examiners must not be from the same institution.