ANNEX A

TRAINING PROGRAMME FOR
ADVANCED SPECIALIST TRAINING
IN
GENERAL SURGERY
1. **SYLLABUS**

In the first two years, the advanced trainee is expected to consolidate his clinical skills in general surgical patient management and achieve a higher level of competence in clinical and operative surgery. He should be fully competent to operate independently all common elective and emergency operations and be able to perform with guidance more major operations. The subspecialties of General Surgery are:

- Upper Gastrointestinal
- Colorectal Surgery
- Hepato-Pancreato-Biliary Surgery
- Breast
- Endocrine Surgery
- Head & Neck
- Vascular Surgery
- Transplantation
- Trauma
- Laparoscopic, Endoscopic Surgery
- Research

2. **CORE KNOWLEDGE**

AST trainees are expected to have an in-depth knowledge of the following important common surgical conditions and topics:

**Surgery in General**

a) Nutrition Support (parenteral and enteral) in surgical conditions
b) Considerations in preparation for surgery
c) Hernia including groin (inguinal & femoral), incisional, umbilical, paraumbilical, recurrent
d) Principles of skin and wound closure
e) Sepsis and antisepsis in surgery
f) Antibiotic therapy and prophylaxis in surgery
g) Electrocautery and other coagulation devices including lasers in Surgery

**Upper GI**

a) Upper GI Bleed - endoscopic control, and operations for GI Bleed
b) Malignancies of the upper GI including oesophagus and stomach
c) The current role of vagotomy and gastrectomy for benign diseases
d) Reflux and surgical options (laparoscopic and open anti-reflux procedures)
e) Oesophageal and Gastric Stenting

**Colorectal/Lower GI**

a) Neoplasms of the large bowel
b) Inflammatory bowel disease (incl. medical management)
c) Diverticular disease
d) Irritable bowel syndrome
e) Haemorrhoids
f) Anal Fissure
g) Rectal Prolapse
h) Acute appendicitis/ RIF pain
i) Intestinal obstruction
j) Intestinal Pseudo-obstruction
k) Intestinal ischaemia
l) Peritonitis
m) Large bowel injuries

Hepatopancreaticobiliary

Liver
a) Anatomy of the liver with emphasis on segmental anatomy of the liver
b) Assessment of liver function including prognostic scores and their clinical utility
c) Imaging Investigations
   - Appreciation of the various imaging modalities to specifically evaluate hepatocellular carcinomas, intrahepatic cholangiocarcinomas, liver metastases, as well as various benign liver lesions. Includes ultrasound, CT scan, angiography and MRI.
d) Care of the critically ill HPB Patient
   - Peri-operative care of the patient undergoing liver resections
   - Care of the patient with liver decompensation
e) Cirrhosis and Portal Hypertension
   - Understanding the pathophysiology of cirrhosis and its complications
   - Understanding the problems related to surgery in the cirrhotic patient
   - Resuscitative management of a patient presenting with portal hypertensive/variceal bleeding including medical therapy, endoscopic haemostasis & temporising measures like the Sengstaken Blakemore Tube
   - Understanding the management of other complications of portal hypertension, including ascites.
f) Liver Infections - management of pyogenic & non-pyogenic liver abscesses including amoebic & hydatid disease.
g) Benign Liver Lesions - pathology of benign, non-infective liver lesions.
h) Primary Liver Malignancies - management principles for patients with hepatocellular carcinoma and cholangiocarcinoma.
i) Metastatic Liver Disease
   - Evaluation of a patient with liver metastases
   - Specific management principles of patients with colorectal liver metastases
   - Awareness of management principles for non-colorectal liver metastases
j) Liver Trauma
   - Priorities for management in the context of multi-organ trauma
   - Resuscitative manoeuvres for temporary vascular control (e.g. packing) including inflow control (Pringle's manoeuvre)
   - Understanding the role of conservative management in liver trauma
   - Awareness of the different options available in the operative management of liver trauma eg. packing, resectional debridement and formal anatomic resections.

Pancreas
a) Acute Pancreatitis: etiology, presentation, imaging, acute management, surgery
b) Chronic Pancreatitis: management, indications for Surgery
c) Pancreatic Trauma:
   Recognise the subtle presentation & signs of pancreatic trauma and recognise the potential complications of pancreatic trauma
d) Pancreatic Adenocarcinoma: etiology, diagnosis, principles of surgical management
e) Imagings:
   - EUS-indications, limitations
- CT Scan: indications, limitations, interpretation of scans
- MRCP/ERCP: indications, limitations, interpretation of scans

**Biliary Tract**

a) Biliary Tract Anatomy:
   - in relation to the liver segmental anatomy
   - variations in anatomy with respect to cholecystectomy, (emphasis on wide variation)

b) Imaging Investigations:
   - Understand the role and application of various imaging modalities including US scans, CT scan, ERCP, PTC, MRI/MRCP & EUS
   - Able to interpret simple cholangiogram especially IOC for cholecystectomy

c) Bile Duct Stone Disease:
   - surgical approach: open vs laparoscopic
   - Endoscopic approach
   - Management of retained stones
   - Interventional radiology in the management of bile duct stones
   - recurrent pyogenic cholangitis
   - intrahepatic stone disease

d) Cholangitis

e) Dealing with Bile Duct Injury:
   - Able to appreciate the wide variation of biliary anatomy, the importance of prevention and role of IOC in early recognition of BDI during cholecystectomy
   - operative approaches to bile duct injuries

f) Biliary Tumors:
   - including benign, malignant and pseudotumors
   - Have a general understanding of the management strategy of these tumors, including the role of surgical resection or palliative procedures, the role of endoscopic or other non surgical procedures.

**Breast**

a) Carcinoma of the breast
b) Benign breast diseases
c) Hormone therapy for benign and malignant breast disease

**Endocrine**

Patho-physiology, diagnosis and surgical management of the diseases of the following endocrine organs, and relevant basic science:

a) Thyroid including thyrotoxicosis, hyper- or hypothyroidism, thyroid gland nodularities, malignancies and dysfunctions

b) Parathyroid hyperfunction and malignancies

c) Pituitary

d) Adrenal Cortex & Medulla including Adrenal Insufficiency
e) Gut as endocrine organ
f) Endocrine Pancreas
g) Carcinoid Syndrome

**Vascular**

a) Ischaemic limb
b) Arterial trauma
c) Venous thromboembolism
d) Hyper/hypo coagulable states
e) Chronic venous insufficiency
f) Imaging modalities including arteriography, continuous wave Doppler, and Duplex ultrasound
Transplantation
a) Pathology for renal & hepatic disease
b) Patho-physiology of renal & hepatic failure
c) Peritoneal-and haemo-dialysis
d) Management of fluid & electrolyte disorders

Endoscopic Surgery
a) Laparoscopic anatomy of the abdomen
b) Pneumoperitoneum – Physiology, derangements and dangers
c) Informed Consent for Laparoscopic Procedures
d) Pre & Post Operative Management of Laparoscopic cases
e) Port Complications
f) Technology of Video Imaging, Cameras, Insufflator, etc..
g) Methods of Manipulation of Images
h) Laparoscopic Instruments, clips, staplers, port types
i) Management of Equipment Failure
j) Ultrasound Interpretation, Internal & External Techniques
k) Recognition & Management of Laparoscopic Complications
l) Anaesthetic Problems in Laparoscopic Surgery
m) Medico-legal Implications of Video-endoscopic Surgery

Trauma
Must have completed and be current in the ATLS
a) Assessment of the multiply injured patient
b) Diagnosis modalities: including diagnostic peritoneal lavage (DPL), FAST, CT Scan and angiography
c) Management approach to patients with blunt and penetrating abdominal injuries including anterior and flank injuries.
d) Management approach to patients with blunt & penetrating chest injuries
   - Management of Tracheo-pulmonary injuries
   - Management of Cardiac injuries
   - Management of Oesophageal injuries
e) Management approach to blunt and penetrating neck injuries
f) Management of Pelvic fractures
g) Management of Urological injuries
h) Management of wounds
i) Initial management of Head injuries
j) Initial management of severe burns
k) Management of specific abdominal organ injuries: Liver, Spleen, Duodenum, Pancreas, Urogenital, Mesenteric, Colo-rectal (see specific sections)
l) Damage Control: Principles and Techniques

Head & Neck
a) -Malignancies of the Upper Aerodigestive Mucosa, including Carcinoma of the Oral Cavity, Tongue, Maxilla, Pharynx and Larynx.
b) -Nasopharyngeal Carcinoma.
c) --Salivary Gland Masses
3. **ADJUNCT TOPICS**

AST trainees should also have an understanding of the following topics:

**Upper GI**
- a) Redo gastric surgery
- b) Heller Cardiomyotomy
- c) Morbid Obesity – management and surgical options

**Colorectal/Lower GI**
- a) Anal tumours
- b) Pelvic autonomic nerves
- c) Screening for colorectal cancer
- d) Genetics of colorectal cancer
- e) Place of radiotherapy & chemotherapy in treatment
- f) Anorectal physiology
- g) Anorectal ultrasound
- h) Faecal incontinence
- i) Chronic constipation
- j) Intestinal fistulae
- k) Colonic bleeding
- l) Radiation enterocolitis
- m) Other small bowel conditions
- n) Anorectal Trauma
- o) Rectovaginal Fistula
- p) Anal sphincter reconstruction

**Hepatopancreaticobiliary**

**Pancreas**
- a) Cystic Tumors: recognition of entity and the role of surgical resection
- b) Neuroendocrine Tumors: recognition of entity and the role of surgical management
- c) Pancreatic Stones: recognition of the problem and the role of surgical management

**Breast**
- a) Epidemiology of breast cancer
- b) Screening Programme
- c) Histo/Cytopathology
- d) Imaging including mammography, Ultrasound, Stereotaxis
- e) Adjuvant Chemotherapy, Chemotherapy for Advanced Disease
- f) Radiotherapy
- g) Counselling
- h) Hospice Care
- i) Appropriate referral to oncologists, radiotherapists, or orthopaedic surgery
- j) Genetics related to surgery
- k) Immunocytochemistry
- l) Clinical trials
- m) Neo-adjuvant therapy and related surgery

**Endocrine**
- a) Counselling & screening in familial endocrine disease
- b) Anaesthetic and pharmacological problems
- c) Radio-immune assays
- d) Imaging techniques
e) Histo/cytopathology

Vascular
a) Atherosclerosis
b) Angioplasty/stenting
c) Thrombolysis
d) Reno-vascular disease
e) Raynaud’s/vasospastic disorders
f) Vasculitis
g) Mesenteric Ischaemia
h) Graft prosthetics
i) Graft surveillance
j) Autonomic dysfunction
k) Reperfusion injury
l) Sclerosant therapy

Transplantation
a) Selection of patients for transplantation
   - Tissue typing
   - The HLA system
b) Post operative management
c) Rejection
   - Immuno-pathology of rejection
   - Management of rejection
d) Immunosuppression
   - Opportunist infections
   - Immunosurpression & cancer
   - Transmission of viral & fungal diseases
e) Bladder dysfunction
f) In vitro preservation of organs

Endoscopic Surgery
a) Laparoscopic Ultrasound
b) Advanced Instrumentation & Equipment
c) Endoscopic Suturing Devices
d) Creation & maintenance of new Endoscopic spaces
e) Use of assistance robots & robot instruments
f) Minilaparoscopy

Head & Neck
a) Understanding multimodality treatment of Head and Neck Cancers
b) Knowledge of basic medical oncology and radiation oncology
c) Cytopathology
d) New imaging modalities, Magnetic Resonance Imaging (MRI), Position Emission Tomography (PET)
e) Planning and executing clinical trials relating to Head & Neck Malignancies
f) -Understanding the role of patient education
4. **CORE SURGICAL PROCEDURES**

The AST trainee should be competent in the following surgical procedures at the end of training.

**General**

a) Hernia repairs including inguinal herniorrhaphy, femoral herniorrhaphy, repair of recurrent groin hernia, umbilical and para-stomal hernia repair, incisional hernia repair
b) Common genital system procedures like adult circumcision, hydrocoele surgery, epididymal cyst excision
c) Use of staplers
d) Intestinal resection & anastomosis
e) Laparotomy for acute abdomen
f) Splenectomy
g) Closure and flaps
h) Conversant with diathermy, lasers, harmonic scalpel
i) Incisions and approaches

**Upper GI**

a) Endoscopic control of Upper GI Bleed
b) PDU repair
c) open gastrostomy
d) Percutaneous Endoscopic Gastrostomy
e) Gastro-jejunostomy
f) Gastrectomy (including D2) for Gastric Cancer

**Colorectal/Lower GI**

a) Proctoscopy
b) rigid & flexible simoidoscopy
c) outpatient haemorrhoid treatment
d) haemorrhoidectomy
e) fissure-in-ano
f) acute anorectal sepsis treatment
g) colonic resections - right hemicolecotomy, left hemicolecotomy, sub-total colectomy
h) surgical options for colonic obstruction
i) surgical options for colonic perforation
j) Hartmann’s procedure
k) Colostomy
l) Ileostomy
m) appendicectomy

**Hepatobiliary**

**Liver**

a) Mobilisation of the liver
b) Securing a Pringle's manoeuvre
c) Drainage of liver abscess
d) Suturing of liver for control of haemostasis
e) Marsupialisation of liver cyst

**Biliary Tree**

a) Cholecystectomy – open and laparoscopic
b) Intra-operative cholangiography – cystic duct, needle cholangiography, T-tube cholangiography, laparoscopic cholangiography
c) Choledochoscopy – rigid/flexible
d) Exploration of common bile duct
e) Cholecystoenteric bypass
f) Choledocho/Hepatico-enteric bypass

**Breast**
a) Treatment of breast abscess
b) -FNA
c) -Trucut biopsy
d) -Excision of breast lump
e) -Mastectomy

**Endocrine**
a) Thyroid surgery – Lobectomy, total thyoidectomy, thyroidectomy for toxic goitre
b) Surgery for Retrosternal goitre
c) Thyroglossal cystectomy
d) Re-operative thyroid surgery including nodal dissection
e) Parathyroidectomy - reoperative parathyroidectomy
f) Adrenalectomy (inc. laparoscopic).

**Vascular**
a) Vascular suture/ anastomosis
b) Approach to/control of infra-renal aortic, iliac and femoral arteries
c) Control of venous bleeding
d) Balloon thrombo-emolectomy
e) Amputations - Above knee amputation, below knee amputation
f) Fasciotomy
g) Varices - Long saphenous varices, short saphenous varices, recurrent varicose veins
h) Abdominal aortic aneurysm repair: elective, emergency
i) Arterial bypasses - ilio-femoral bypass, femoro-popliteal above knee bypass, femoro-popliteal below knee bypass, infra popliteal bypass, axillo-femoral bypass, femoro-femoral bypass
j) Carotid endarterectomy
k) thrombo-emolectomy
l) redo surgery
m) infected femoro-popliteal grafts
n) per operative: thrombolysis angiography
o) arterial injuries

**Transplantation**
a) Arterial & venous anastomosis
b) Harvesting saphenous vein

**Endoscopic Surgery**
a) Diagnostic Laparoscopy:
b) Closed & open port insertion techniques, including Veress needle
c) Induction of pneumo-peritoneum
d) Laparoscopic biopsy

In addition, the following courses should be attended by trainees:
a) Basic Laparoscopy/Cholecystectomy
b) Cholecystectomy & Appendicectomy Techniques
c) Other courses in the relevant advanced endoscopic techniques

Trauma
a) Vascular Access
b) Diagnostic Peritoneal Lavage
c) Chest Tube Insertion
d) Surgical Airway Techniques
e) Diagnostic Laparoscopy for Trauma
f) Exploratory Laparotomy
g) Splenectomy
h) Repair and Resection of Bowel injuries
i) Stoma Creation
j) FAST
k) Liver Packing and Liver Repair
l) Splenorrhaphy
m) Control of major Abdominal Vascular Injuries
n) Presacral Drainage for Rectal Injuries
o) Pelvic Packing
p) Closure Techniques for the difficult Abdomen
q) Emergency Thoracotomy
r) Pericardiectomy
s) Sub-xiphoid Pericardial Window
t) Median Sternotomy
u) Cardiorrhaphy
v) Neck Exploration

Head & Neck
a) Cervical Lymph Node Biopsy
b) Submandibular Gland Excision
c) Hemiglossectomy, per-oral
d) Total Parotidectomy
5. **ADJUNCT PROCEDURES**

AST trainees should also have assisted or be familiar with the following procedures:

**Upper GI**
- a) Laparoscopic and Open Anti-reflux Surgery
- b) Oesophagectomy for benign and malignant diseases

**Colorectal/Lower GI**
1. Diagnostic & therapeutic colonoscopy
2. Fistula-in-ano surgery
3. Anterior Resection of Rectum
4. AP resection of rectum
5. Illeorectal anastomosis
6. Panproctocolectomy
7. Closure of Hartmann’s procedure.
9. Incontinence Surgery
10. Sphincter Repair
11. Rectovaginal Fistula
12. Ileo-anal & Colonic Pouch
13. Colo-anal Anastomosis
14. Re-operation for Pelvic Malignancy
15. Re-operation for Inflammatory Bowel disease
16. Operation for Intestinal Fistula
17. Complex Fistula-in-ano
18. Posterior approach to rectum
19. Transanal Microsurgery
20. Posterior Pelvic Clearance
21. Block dissection of groin
22. Rectal injuries

**Hepatobiliary & Pancreatic**

**Liver**
- a) Intra-operative ultrasound
- b) Hemihepatectomy – including right, left, and extended resections
- c) Segmental resections – including caudate lobe resection
- d) Metastasectomy
- e) Transection techniques – finger-fracture, artery fracture, CUSA, harmonic scalpel
- f) Re-resections for recurrent tumours

**Pancreas**
- a) Transduodenal biopsy of pancreas
- b) Whipple’s procedure
- c) Distal pancreatectomy
- d) Total pancreatectomy
- e) Surgery for acute pancreatitis including necrosectomy and cyst-enterostomy for pseudocyst
- f) Surgery for chronic pancreatitis
- g) Surgery for ERCP perforation/pancreatic trauma
- h) Surgery for pancreatic duct stones
Biliary tree
a) Resections for Klatskin tumors
b) Resections for choledochal cysts
c) Bile duct reconstruction after injury
d) Revision surgery for stricture
e) High biliary bypasses
f) Intrahepatic biliary bypasses
g) Surgery for recurrent pyogenic cholangitis

Breast
a) Wide excision of breast tumors - needle localisation, mammary duct fistula
b) Breast duct excision
c) Microdochectomy-axillary dissection
d) Reconstruction Module: Myocutaneous flaps, Tissue expanders, Complications & re-operation, Breast reduction

Endocrine
a) Block dissection of neck
b) Pituitary Surgery

Vascular
a) - supra renal aortic aneurysm
b) - aortic dissection
c) - renal/visceral artery reconstruction
d) - per-operative angioplasty
e) - carotid body tumour
f) - thoracic outlet syndrome
g) - Sympathectomy - thoracoscopic sympathectomy, lumbar sympathectomy
h) - arterio venous malformations
i) - upper limb arterial reconstruction
j) - venous reconstruction
k) - through knee amputation
l) - vascular access for dialysis
m) - vena caval filter placement
n) - infected aortic graft
o) - Fem-pop bypass
p) - Fem-fem X over graft

Transplantation
a) Donor Nephrectomy
b) - donor hepatectomy
c) Renal Transplantation
d) Uretero-Neocystostomy
e) Uretero-Ureterostomy
f) Renal Biopsy
g) Transplant Nephrectomy
h) Vascular Access
i) Peritoneal Access
j) Drainage of intra & extra Peritoneal Collections
k) - liver donor transplantation
l) - arterial thrombectomy

Renal Procedures:-
a) - Work bench preparation of the Kidney
b) - Ileal & Colonic Conduits
c) -Urtero-pyelostomy

d) -Bladder (psoas) hitch

e) -Boari flap

f) -Partial nephrectomy

g) -Bilateral nephrectomy

h) -Secondary vascular access

i) -Renal artery reconstruction

j) -Renal vein reconstruction

Pancreatic module:

a) -Donor pancreatectomy

b) -Pancreatic transplantation

Hepatic module:

a) -Liver transplantation

b) -Recipient hepatectomy

c) -Roux loop construction

Endoscopic Surgery

a) laparoscopic appendicectomy

b) Laparoscopic Hernia Repair

c) laparoscopic adhesiolysis

d) thoracoscopy

e) laparoscopy in acute emergencies

f) other advanced laparoscopic procedures as appropriate

g) laparoscopic suturing and knotting

h) control of laparoscopic bleeding

i) use of retrieval bags

j) stone retrieval

There are also several advanced endoscopic procedures which are still experimental and others are developing, but an advanced trainee should be aware of them and have assessed their potential. For example:

a) Laparoscopic Anti-reflux Procedures:-

b) -laparoscopic splenectomy

c) -laparoscopic large bowel resection

d) -laparoscopic rectopexy

e) -laparoscopic exploration of CBD

f) -laparoscopic closure of perforated duodenal ulcer

Head & Neck

a) Radical Neck Dissection and its modifications

b) Commando Operations

c) Basic Pedicled Flaps
6. **RESEARCH**

All AST trainees in General Surgery must learn Research Methods and must be involved in at least one major research project. This may be clinical or research based, on surgical-related topic/field..