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SYLLABUS

CYTOLOGY

MEDICAL TECHNICIAN

**PBMT Approved July 2022 for training implementation in 2023
for students writing exams from August 2024**

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1. INTRODUCTION

Cytopathology is a component of pathology that studies and diagnoses diseases on a cellular level. Cytology is usually used to aid in the diagnosis of cancer, but also helps in the diagnosis of certain infectious diseases and inflammatory conditions. Cytology Medical Technicians must have understanding and knowledge of the anatomy and physiology of the body sites included in the syllabus. Cytopathologic techniques are used in the examination of virtually all body organs and cavities. Cytology Medical Technicians must understand the principles and guidelines for the use of ancillary tests in confirming a diagnosis (as documented in the syllabus).

The objective of this syllabus is to provide the student technicians with a guideline on the essential aspects that must be covered in order to adequately prepare themselves for the HPCSA's Professional Board of Medical Technology examination.

The examination is based on the contents of this syllabus and related theoretical and practical knowledge gained during studentship at the training laboratory. A pass mark of 50% must be achieved by the candidate in the theory examination before admittance to the practical examination. A minimum of 60% must be obtained in the Cytology practical paper. Failure in any part of the examination will require the candidate to repeat the entire examination.

THEORY PAPER

The theory paper will consist of questions totalling up to a maximum of 120 marks (2 hour paper). Candidates should expect a mixture of short questions, comparisons, drawings etc. based on cytomorphology and other theoretical aspects of up to 80 marks (2/3 of the paper). Candidates should also expect to be tested on any general (e.g. lab organization, safety, etc.) or practical aspect of the syllabus (e.g. preparatory techniques, fixation, staining, etc.) which can account for up to 40 marks (1/3 of the paper). Multiple-choice questions will no longer be included in the examination.

PRACTICAL SLIDE SCREENING

Twenty (20) unmarked smears with appropriate clinical histories will be provided. About twelve gynaecologic and eight non-gynaecologic cases can be expected. Candidates must screen and report on each slide in nine minutes. Specific information on the degree and type of abnormalities will be expected. The latest Bethesda system of reporting must be used for the gynaecologic slides, so a statement of adequacy, where appropriate, will also be expected on these slides.

When examining these cellular samples, technician candidates are mainly tested on their detection/ recognition skills, rather than diagnostic/ interpretation skills. More marks are thus awarded for the adequate description of cellular changes/ microorganisms (7 marks out of 10), than the category and final diagnosis (which counts 3 marks out of 10).

Recommended format for the examination of slides: Please note that this format should be strictly adhered to:

Statement of adequacy:	Preservation/ Staining/ Cellularity/ Visibility of squamous component; Presence of adequate endocervical component
Background:	Inflammatory exudate; Blood; Tumour diathesis
Micro-organisms:	Candida/ Trichomonas/ Schistosoma sp, etc. with short description
Other findings:	Artefacts, psammomma bodies, asbestos bodies etc.
Cells:	Number: Occasional, numerous, etc.
Arrangement:	Single, sheets, syncytia, etc.
Nuclear/cytoplasmic ratio:	Normal/ increased
Nuclei:	Position: Central/ eccentric
	Size: Small/ enlarged
	Membrane: Irregular/ interrupted/ wrinkled/ well-demarcated
	Chromatin: Normal; hypo-/hyperchromatic; finely/ coarsely granular
	Other: Multinucleation, karyorrhexis, etc.
Nucleoli:	Inconspicuous/ present: number, size, shape
Cytoplasm:	Amount: Scanty/ abundant
	Staining: Eosinophilic/ basophilic/ keratinised
	Membrane: Distinct/ indistinct
	Consistency: Dense/ vacuolated
	Other: Inclusions
Categorisation:	NILM/ Benign/ Atypical/ Malignant/Classification System Category
Specific Final diagnosis:	No malignant cells/LSIL/Malignant cells present, Adenocarcinoma

The breakdown of the marking for the practical exam is as follows:

Three (3) marks are allocated for the specific FINAL DIAGNOSIS and CATEGORY and seven (7) marks are allocated for the most specific criteria for each diagnosis. Each case will have a total of ten (10) marks allocation.

Notice for Training Supervisors and Intern/Students

Evidence of "Evaluation" criteria as detailed within this syllabus (write ups and slides, etc.) must be available prior to the Board Examination and be available for five (5) years after the candidate has passed the Board Examination for inspection / audit by the HPCSA. (These records/material cannot be held at the SMLTSA office, but must be retained by the candidate in the laboratory in which they are working in the event of an audit). HPCSA regulations require that accredited training laboratories perform a minimum of 80% of the tests identified / listed in this syllabus. Laboratories are required to ensure that intern/students receive appropriate training in the tests contained within the syllabus but which are not routinely performed on

site. Plagiarism, of any sort, is unacceptable.

In addition, it is expected that the intern/student will have, where applicable, knowledge and understanding of the following:

2. STATUTORY REGULATIONS AND ETHICS

Objective

Provide the Intern/ student with information on the regulations and ethical principles which underpin the practice of Medical Laboratory Technology.

Specified outcomes

On completion of this section the student should be able to:

- Demonstrate knowledge of the structure and function of the Health Professions Council of South Africa (HPCSA).
- Demonstrate knowledge of the structure and function of the Professional Board for Medical Technology (PBMT).
- Discuss the regulations relating to the scope of practice for Medical Technicians.
- Describe the legal and ethical standards related to the professional practice of Medical Technology.
- Demonstrate knowledge of the requirements for the acquisition of continual education units (CEUs).
- Demonstrate knowledge on the practice/ ethos of how confidentiality in the workplace is achieved and maintained.
- Demonstrate knowledge of No. 61 of 2003: National Health Act, 2004.
- Discuss the application of legal and ethical guidelines with regards to the communication and distribution of patient results via electronic platforms.
- Discuss possible ethical problems that could play a role in Cytology.
- Other Acts the intern/student must be familiar with:
 - Human Tissue Act (65, 1983)
 - Human Tissue Amendment Act (51, 1989)
 - Patient Rights Charter (108, 1996); and all subsequent updates
 - POPI Act (4, 2013)

3. TOTAL QUALITY MANAGEMENT SYSTEM

3.1 LABORATORY SAFETY

Objective

Provide knowledge of all safety procedures that must be applied in the workplace and an understanding of the relevant legislation relating to laboratory safety procedures.

Specified outcomes

On completion of this section the student should be able to:

- Explain and apply the fundamental concepts of the relevant legislation pertaining to laboratory safety.
 - Range - *Occupational Health and Safety Act; Hazardous Substances Act; Compensation for Occupational Injuries and Diseases Act*
- Demonstrate knowledge of the procedures to follow in the event of laboratory accident or emergency.
 - Range - *Chemical or bio-hazardous spill; Fire; Flood; Bomb threat*
- Describe the correct procedures for the storage, handling and disposal of laboratory waste.
- Describe the application of laboratory safety procedures to the collection, transport, storage and analysis of biological specimens including the International Air Transport Association (IATA) regulations.
 - Range - *Biological specimens; Human tissue; Solid and liquid bio-hazardous waste; Radioactive waste; Sharps*
- Describe the basic principles for the storage, handling and disposal of chemicals; poisons; flammable substances; gases and infectious material.
- Describe procedures to follow for the prevention, control and management of laboratory acquired infections including general housekeeping and decontamination of equipment.
- Describe the purpose and basic content of the material safety data sheets (MSDS).
- Demonstrate knowledge of the protocols to follow in the event of injuries on duty including needle-stick injury.
- Define the role of the designated safety personnel.
 - Range - *Fire marshal; Safety representative; First aid officer*
- Recognise the international safety symbols used in the laboratory environment.
- Demonstrate knowledge of all safety and emergency equipment.

On completion of this module the intern/student must be:

- Able to recognize the health hazards involved in handling fresh and unfixed specimens.
- The Intern/student must adhere to the following safety precautions in a Cytology laboratory and understands the implications thereof:
- Intern/Students are only permitted to prepare Cytology slides (including staining) under the guidance of the instructor/supervisor
- Interns/Students must wear Personal Protective Equipment (PPE)
- All chemical solutions should be collected in labelled waste containers, only water can (considered not to pose a significant risk of infection) be poured down the sink.
- Xylene must always be used under the hood.
- All sharp instruments must be handled with extreme care and disposed of in a designated sharps container.
- Light microscopes must be covered when not in use.
- Biological specimens; human, solid and liquid bio-hazardous waste, needles, syringes and sharps
- Have a clear understanding of the evacuation procedures pertaining to the laboratory

3.2 SPECIMENS/PRE-ANALYTICAL REQUIREMENTS

Objective

Provide an understanding of the optimal specimen requirements for the maintenance of the integrity and suitability for all types of laboratory analysis with particular reference to the tests specified throughout this syllabus.

Specified outcomes

On completion of this section the student should be able to:

- Describe the optimal specimen requirements for the individual tests.
- Describe the conditions under which the specimens must be transported to the laboratory.
- Display knowledge of the optimal storage conditions should testing be delayed and the stability of the specimen for the individual testing process.
- Where applicable, capture the data and patient demographics that are required for the registration of the specimens at the laboratory accurately.
- Explain the principle of continuous identification and tracking of the specimen, aliquots and documentation.
- Identify criteria for the rejection of unsuitable specimens.
- Conduct the pre-analytical preparation required for specimen type and test requested.
- Preparation of cell samples from the female genital tract (conventional and LBC samples), sputum, bronchial washings, bronchial/ gastric/ oesophageal brushings, urine, CSF, body cavity fluids, nipple secretion, fine needle aspiration, and miscellaneous

aspirated material. Treatment of heavily bloodstained material. Wet preparations.

- Fixation: theory and practice. Use and preparation of commonly used fixatives. Different methods of fixation.
- Concentration techniques, centrifugation, LBC techniques, cell blocks, wet preparations, and imprints.
- Cleaning of glassware and maintenance of laboratory equipment.
- Use of mountants – e.g. DPX, Entellan

Students should know the principle, method and troubleshooting of:

- Staining by means of Papanicolaou and Romanowsky methods (such as MGG/DiffQuick/RapiDiff) – both manual and autostainer.
- Clearing
- Coverslipping / Mounting
- De-staining

The intern/student must have knowledge of all preparatory and ancillary processes associated with a Cytology service including:

- Cell block preparation
- Special stain investigations eg. ZN, techniques to demonstrate simple lipids; mucopolysaccharides; glycogen. Outline techniques (principle and results) to demonstrate pigments and microorganisms (incl. Gram, PAS, Perl's, ZN, Methenamine silver, Masson Fontana)

Thorough knowledge of:

- Avoiding cross contamination
- Receiving of work, matching of specimens, data and slide retention and retrieval.
- Describe the optimal specimen requirements and or fixative / transport medium for the individual tests required such as Gynaecological, Non-Gynaecological, Fine-needle Aspirations (FNAs), Cell Blocks, Immunocytochemistry specimen collection.

3.3 LABORATORY EQUIPMENT

Objective

Explain the correct use, principle of operation, maintenance of laboratory equipment and the appropriate troubleshooting procedures to apply where and when indicated.

Specified outcomes– applicable to all equipment/instruments and analysers

On completion of this section the student should be able to:

- Operate all equipment optimally in accordance with the manufacturers recommended operating procedures.
- Apply the correct safety precautions during the operation and maintenance of equipment.
- Demonstrate full knowledge of, and apply, the correct maintenance, service and calibration requirements within scope, of / for the specific instrumentation.
- Conduct applicable decontamination procedures.
- Apply the appropriate functional checks to ensure optimal operation
- Describe and implement troubleshooting procedures when optimal operation is not demonstrated by the instrument on-board functional checks.
- Demonstrate full knowledge of the maintenance procedures, all equipment records and documentation required for good laboratory practice.
 - Range - All glassware – volumetric and graduated; Pipettes – glass, automated, air displacement and disposable; Fridges; Freezers; Stopwatches/timers; Thermometers – min/max, electronic and mercury; Bio-hazardous safety cabinets – Class I and II; Fume cupboards; Pipette aids - rubber teats, pro-pipettes and dispensers; Centrifuges, safety centrifuges. Laboratory instrumentation and automated analysers are included in this range.
- Microscopy: Use, care and maintenance of the light microscope. Köhler illumination and a brief introduction to the principles and use of fluorescent and phase microscopy.
- Students should know the principle and be able to use the following equipment when preparing specimens:
 - Range - Centrifuge; Cytospin; Fume cabinet; Biosafety cabinet and how to perform the decontamination procedures; Autostainer; Coverslipping instruments; Blenders; thermometers; fridges; light microscope; LBC instruments; automatic reviewers; timers and hotplates.

3.4 LABORATORY REAGENTS

Objective

Provide details of the correct preparation, storage and disposal of laboratory reagents.

Specified outcomes

On completion of this section the student should be able to:

- Demonstrate knowledge of the objective, use and retention of package inserts/ instructions for use (IFU's).
- Prepare, store, and safely dispose of laboratory reagents including working reagents
- Define terms and solutions used in the laboratory:
 - Range - Physiologically normal saline; Buffer

- Staining:
 - Theory and practice of staining by Papanicolaou technique, Haematoxylin and Eosin, May-Grünwald-Giemsa, Periodic acid Schiff, Oil Red O, Mucicarmine, Methenamine silver (Grocott's technique), and Perls Prussian Blue
 - Factors affecting staining.
 - Preparation of commonly used stains and reagents (Haematoxylin, EA, OG, Scott's, phosphate buffers, acid alcohol).
 - Use of pH meter, measuring cylinders and pipettes.
 - Preparation of dilutions and solutions.

Prepare the following reagents:

- Ethanol dilutions (95%, 80%, 70% and 50%)
 - Methanol dilutions (95%)
 - Lithium Carbonate (1%)
 - Hydrochloric Acid (0.5%)
 - Acid Alcohol (0.5%)
 - Carbowax (2%)
 - May-Grunwald and Giemsa if concentrated
 - Scott's tap water
- Know how to record the preparation (date prepared, date opened and by whom)
- Have knowledge of other ready-made solutions:
 - Haematoxylin, including all kinds of haematoxylin e.g. Harris, Mayer's and Gill's.
 - Orange - G eg. OG6
 - Eosin Azure eg EA50
 - Methylene Blue
 - Eosin
 - LBC staining components
 - Xylene
 - Acetone

3.5 STOCK CONTROL

Objective

Outline the processes involved in good materials stock management

Specified outcomes

On completion of this section the student should be able to:

- Demonstrate knowledge of the basic principles to apply when managing merchandise stock.
- Demonstrate an understanding of the receipt of stock including the required records regarding condition of goods, expiry dates and lot numbers.
- Demonstrate an understanding of stock rotation with particular reference to expiry dates.
- Describe the correct storage conditions for all stock.
- Differentiate between open vial stability and expiry date
- Demonstrate knowledge of workplace policy with regard to the use of expired reagents, controls

3.6 QUALITY ASSURANCE / ACCREDITATION

Objective

Expose the student to all aspects of quality control.

Specified outcomes

On completion of this section the student should be able to:

- Discuss quality assurance and quality control in the correct context.
- Define and apply the appropriate processes of quality assurance in the pre-analytical, analytical and post analytical areas of specimen handling.
- Demonstrate general knowledge on the terms accreditation, International Organisation for Standardisation (ISO).
- Demonstrate general knowledge on the use, performance and evaluation of RISK assessments.
- Define and explain all quality assurance terminology.
 - *Range - Non-conformance; Corrective action; Preventive action; Root cause analysis; Continual improvement of quality assurance and quality control processes; Audits – Internal & External*
- Identify the need for releasing, communicating and reporting urgent laboratory results, following prescribed protocols - especially when no senior technologist is available.
Ethics surrounding the above statement

- Discuss the correct protocol to be followed when erroneous laboratory reports are released and amended reports are issued. (including responsibilities assigned to specific individuals)

3.7 QUALITY CONTROL

Objective

Expose the student to all aspects of quality control.

Specified outcomes

On completion of this section the student should be able to:

- Describe and apply the appropriate quality control processes which must be performed and applied to all the analyses as well as equipment and reagents in this syllabus.
- Explain the principles of internal and external quality control procedures in the context of the tests performed.
- Apply a sound knowledge of all the principles, procedures and interpretation of all related internal and external, quantitative quality control data.
- Apply a sound knowledge of all the principles, procedures and interpretation of all related internal and external, qualitative quality control data.
- Describe the potential causes and apply appropriate troubleshooting procedures in the event of failed Internal and external, quantitative and qualitative quality control.
- Apply the appropriate quality control processes which must be performed in the analysis of all Cytological specimens, equipment operation, reagents and stains preparation and ancillary testing as contained in this syllabus
- Have an in-depth understanding of the internal quality control measures with regards to individual screening quality within a Cytology laboratory including individual screening IQC and ASCUS-LSIL ratio.
- Understand of the responsibilities of each person in the IQC triage of specimens (e.g. primary screening, rapid review, 10% checking, re-screening, checking)

3.8 METHOD VALIDATION

Objective

Expose the student to basic aspects of method validation.

Specified outcomes

On completion of this section the intern/student should be able to:

- Differentiate between validation and verifications in terms of relevant ISO standards.
- Demonstrate an understanding of the approach to the validation and/or verification of new equipment, reagents and testing kits (Qualitative and Quantitative).

- Display, discuss and demonstrate an understanding of Method Validation and the importance of this process in the laboratory environment.
- Demonstrate knowledge of the International Organization for Standardization (ISO) 15189.
- Display knowledge of Diagnostic validation as a formal requirement of accreditation standards to validate tests/methods and instruments before diagnostic use to ensure reliable results for patients.

3.9 PERSONNEL

Objective

Provide knowledge of basic requirements for personnel in terms of relevant ISO standards.

Specified outcomes

On completion of this section the student should be able to:

- Describe the personal documents and records which are required for all laboratory personnel which falls within the scope of practice of Medical Technicians.
- Demonstrate an understanding of the terms ‘competency’ and ‘ongoing competency’ in terms of the training of all laboratory personnel which falls within the scope of practice of Medical Technicians.
- Understand the personnel guidelines, including ethical guidelines, according to the HPCSA.

3.10 DOCUMENTATION

Objective

Provide knowledge of basic requirements of documentation in terms of relevant ISO standards.

Specified outcomes

On completion of this section the student should be able to:

- Demonstrate knowledge of document control requirements in terms of relevant ISO standards.
- Demonstrate knowledge of the required content of SOP’s including the minimum content of the cover page.
- Know the process on how to render documents obsolete.
- Demonstrate knowledge on the retention and disposal of this documentation.
- Demonstrate knowledge on document control and regular review of prescribed documentation.
- Differentiate between a record and document.
 - Range - Policies; Procedures(SOPs); Working instructions; Raw data; Equipment

records; Quality control records; Personnel records; Package inserts/ IFU's; Manufacturers operating manuals and operating procedures; Laboratory worksheets and Maintenance records.

4. LABORATORY RELATED MATHEMATICS

Objective

Provide the student with instruction on the application of the correct mathematical formulae to relevant calculations.

Specified outcomes

On completion of this section the student should be able to:

- Demonstrate proficiency in the calculations required for the preparation of solutions.
 - Range - *Physiological saline; Percentage solutions*

5. LABORATORY ADMINISTRATION

Objective

Provide knowledge of basic laboratory administration and various acts that govern our profession.

Specified outcomes

On completion of this module the intern/student must have:

- A thorough knowledge of the administrative structure of the laboratory that he / she is working in.
- A sound knowledge of the collection and handling, allocation, data recording, reporting, retention and retrieval of data, specimens/cases received in the laboratory.

The intern/student must have a sound knowledge of:

- Historical review and introduction to Cytology.
- General terminology – clinical terms, request form, reporting.
- The hierarchical structure of a Cytology laboratory (organogram).
- Route of specimen through the lab, including: reception, data capturing, preparation, staining, screening, reporting of results, storage and archiving of results into the central computerized program, disposal.
- Retrieval of previous electronic pathology diagnoses on patients with repeat specimens.
- The retention of glass slides and diagnostic data.
- Retrieval of diagnostic data for retrospective research and writing of articles for presentations and publication.

6. CYTOLOGY SPECIFIC MODULES: DIAGNOSTIC CRITERIA AND PATHOPHYSIOLOGY OF BODY SITES

6.1. GYNAECOLOGIC CYTOLOGY

- The cell – general features and mitosis.
 - Cytomorphology of normal blood cells and histiocytes and basic features of the immune response
 - Anatomy, physiology, Histology and Cytology of the normal female genital tract.
 - Have a clear knowledge and understanding of the Bethesda System for Reporting Cervical Cytology
 - Different specimen collection techniques and its implications (incl. brush and liquid-based)
 - Formation of the transformation zone.
 - Hormonal Cytology
 - Normal and abnormal cell patterns
 - Pregnancy, post-partum, termination of pregnancy; Atrophy
 - Reporting of endometrial cells in the various age groups
 - Effects of contraceptives and therapeutic agents
 - Reactive changes
 - Squamous metaplasia
 - Lymphocytic cervicitis
 - Hyperkeratosis and parakeratosis
 - Degenerative changes
 - Inflammation (including typical repair)
 - Atrophy with inflammation (“atrophic vaginitis”)
 - Iatrogenic changes, including IUCD and irradiation changes
 - All agents of infection
 - Tubal metaplasia
 - Neoplasia: General criteria
 - The pathogenesis, molecular and genotyping of HPV
 - Atypia and pre-malignant lesions:
 - ASC-US; ASC-H; AGC
 - LSIL, HSIL
 - Adenocarcinoma-in-situ (AIS)
 - Malignancies:
 - Squamous cell carcinoma, Adenocarcinoma: Endocervical and Endometrial carcinoma
 - Theoretical overview of rare lesions of FGT (extra-uterine malignancies of ovary)
-

and vulva, sarcoma, lymphoma, melanoma, metastatic lesions)

- Differential diagnostic problems
- Vaginal disease – overview
- The interaction of HIV and carcinogenesis

At the end of this section, the intern/student will be able to screen provided gynaecological cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.2 RESPIRATORY TRACT (EXFOLIATIVE ONLY)

- Anatomy of normal respiratory tract
- Cytomorphology of normal respiratory epithelia
- Different preparatory methods and techniques used in respiratory specimen preparation
- Application and FNA techniques
- Cytomorphology of inflammation, degeneration, metaplasia and hyperplastic change
- Recognition of pigments and ferruginous bodies
- All agents of infection
- Iatrogenic changes
- Atypia and its causes
- Malignancies:
 - Squamous carcinoma, Adenocarcinoma, Large cell undifferentiated; Small cell carcinoma, Adenosquamous carcinoma; Carcinoids
 - Outline other primary tumours; Metastatic tumours
- Basic understanding of the use of ancillary testing, immunocytochemistry and special stains to differentiate between tumours.
- Have a clear knowledge and understanding of the latest Reporting System (if available)

At the end of this section, the intern/student will be able to screen provided respiratory cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.3 URINARY TRACT

- Anatomy of the urinary tract
- Cytomorphology of normal cells, inflammation and degeneration
- Recognition of casts and clinically important crystals
- All agents of infection
- Atypia and its causes, including lithiasis and malakoplakia
- Iatrogenic changes, including ileal conduits
- Transplant rejection changes
- Cytomorphology of carcinoma of the urinary bladder; ureters and renal pelvis; and adjoining organs (e.g. cervix).

- Malignancies:
 - Low-grade Urothelial Neoplasm; High-grade Urothelial carcinoma; metastatic tumours
- Basic understanding of the use of ancillary testing, immunocytochemistry and special stains to differentiate between tumours.
- Have knowledge and understanding of the Paris reporting system

At the end of this section, the intern/student will be able to screen provided urinary tract cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.4 SEROUS EFFUSIONS

- Origin of body cavity fluids
- Cytomorphology of benign cells in body cavities, inflammation, degeneration, hyperplasia
- Conditions and infections reflected in effusions
- The effect of chemotherapeutic agent.
- Primary and most common metastatic tumours
- Basic understanding of the use of ancillary testing, immunocytochemistry and special stains to differentiate between tumours.
- Have a clear knowledge and understanding of the International System for Serous Fluid Cytopathology

At the end of this section, the intern/student will be able to screen provided body cavity effusion cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.5 CENTRAL NERVOUS SYSTEM

- Anatomy of brain and spinal cord
- Origin and normal cell content in cerebrospinal fluids (shunt picture)
- Macroscopic presentation and significance, fixation, preparatory techniques
- Different sample types, including CSF, brain aspirates and tumour imprints
- Meningitis
- All agents of infection
- Basic morphology of malignant tumours
- Have a clear knowledge and understanding of the latest Reporting System (if available)

At the end of this section, the intern/student will be able to screen provided central nervous system cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.6 GASTROINTESTINAL TRACT (EXFOLIATIVE)

- Anatomy, Histology and physiology
- Specimen types, collection methods
- Cytopreparatory techniques
- Normal cells
- All agents of infection; including opportunistic infections
- Benign proliferative disorders; Barrett's oesophagus.
- Malignant tumours: Oral cavity, Oesophagus, Stomach, Colon and rectal cancers.
- Anal Cytology
- Have a clear knowledge and understanding of the latest Reporting System (if available)

At the end of this section, the intern/student will be able to screen provided GIT cases and generate an initial diagnosis using their theoretical and practical knowledge.

6.7 FINE NEEDLE ASPIRATION

- Application, use and preparation method.
- *Screening of FNA material not part of scope of practise.*

7. RECOMMENDED REFERENCE BOOKS: USE LATEST (REVISED) EDITIONS

- Various organ specific updated Reporting Systems such as Bethesda (Gynae and Thyroid), Yokohama, Paris, Milan, Sydney, IAC Effusion System etc.
- The Art & Science of Cytopathology Vol1&2. De May RM . ASCP Press
- Koss' Diagnostic Cytology And Its Histopathologic Base. Koss, L. Lippincott Williams & Wilkins, 2006
- A Manual of Cytotechnology. Reagan J, Keebler. ASCP Press
- Comprehensive Cytopathology. Bibbo M. WB Saunders Co
- Clinical Cytotechnology. Coleman DV, Chapman PA Butterworths
- Atlas and Text of Aspiration Biopsy Cytology. Suen KC Williams & Wilkins
- Diagnostic Cytopathology A Text and Colour Atlas. Grubb C Churchill Livingstone
- Diagnostic Pathology and its Histologic Bases Vol1&2. Koss LG. JB Lippincott Co
- Cytology: Diagnostic Principles and Clinical Correlates. Cibas and Ducatman. Elsevier Saunders
- Diagnostic Cytopathology. Gray and Kocjan. Chruchill Livingstone Elsevier.
- Cytopreparation: Principles and practice. Gill. Springer

In addition most updated versions of the reading list above may be accessed via Google Books use the following address: <https://books.google.co.za/> Published journal articles can also be accessed via the following search engines: Google Scholar <http://scholar.google.co.za/> or via PubMed: <http://www.ncbi.nlm.nih.gov/pubmed>. A comprehensive Cytology learning site can be accessed at www.cytologystuff.com.

- QUALITY CONTROL AND ACCREDITATION REFERENCE SITES:
www.iso.org
www.clsi.org
www.sanas.co.za.
- HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA (HPCSA):
www.hpcsa.co.za

8. NOMENCLATURE / ACRONYMS

FNA: Fine-needle aspiration

IATA: International Air transport Association

GLP: Good Laboratory Practice

IQC: Internal Quality Control

EQA: External Quality Control

HPCSA.: Health Professions Council of South Africa

SMLTSA: Society of Medical Laboratory Technologists of South Africa

ASC-US: Atypical squamous cells of undetermined significance

ASC-H: Atypical squamous cells cannot exclude a high-grade lesion

AGC: Atypical glandular cells of undetermined significance

LSIL: Low-grade squamous intraepithelial lesion

HSIL: High-grade squamous intraepithelial lesion

AIS: Adenocarcinoma-in-situ

LBC: Liquid-based Cytology