HISTOLOGY COURSE SPECIFICATIONS
FIRST YEAR

Cairo University
Faculty of Medicine
Department of Histology

Course Specifications

Course title: Histology for first year students
(Code HIS-102)

A) BASIC INFORMATION:

- Department offering the course Histology Department
- First academic year of M.B. & B.Ch. program
- Date of specification approval 2016

B) PROFESSIONAL INFORMATION:

1- Overall Aim of the Course:

- To inform students about the different histological tools & techniques.
- To teach the students the basic histological structures of different cells and tissues of human body, preparing them for studying organs and systems in the second term & second year
- To make correlation between function and structure of various tissues and their clinical significance

2- Intended Learning Outcomes (ILOs):

A: Knowledge and understanding:
By the end of the course, students should be able to:

1. Describe and recognize commonly used microscopes, histological techniques and stains (a.1, 2 and 3)
2. Define and describe the histological characteristics of normal cells (a.1, 2 and 3)
3. Differentiate between normal and abnormal karyotyping (a.1, 2, 3 and 9)
4. Define and describe cell cycle phases, differentiate between types of cell division and compare between necrosis and apoptosis (a.1, 2, 3 and 9)
5. Describe and compare between different blood elements and recognize some related clinical applications (a.1, 2, 3 and 9)
6. Define and discuss the basic histological tissues of the body (General histology) and some systems in the second term (Vascular & Lymphatic) (a.1, 2 and 3)
7. Recognize some clinical applications in relation to histological structure (a.1, 2, 3 and e.1)
8. Recognize basics of ethics (a.14)

B: Practical skills:

By the end of the course, students should be able to:

9. Identify various types of stains & microtechniques (b.1)
10. Identify different cell organelles in projector slides (b.1)
11. Identify different blood elements (RBCs, WBCs and platelets) in blood films seen in projector slides (b.1)
12. Identify different types of epithelium, connective tissue cells, connective tissue proper, cartilage, bone & bone cells (b.1)
13. Differentiate between tissues (epithelium, connective tissue, muscle and nervous) and organs in histological slide seen under the microscope (b.1)

C. Professional attitude and behavioral skills:

14. Respect and follow the institutional code of conduct (c.6)
15. Maintain professional image in manner, dress, speech and interpersonal relationships that is consistent with the medical profession's accepted contemporary standards in the community (c.6 and d.5)

D. Communication skills:

16. Communicate effectively with individuals regardless of their social, cultural, ethnic backgrounds, or their disabilities (d.2)
17. Express themselves freely and adequately by improving their descriptive capabilities and enhancing their communication skills.(d2)

18. Honor and respect, superiors, colleagues and any other member of the health profession.(d.5)

**E. Intellectual skills:**

*By the end of the course, students should be able to:*

19. Correlate between histological structure & function of any cell or tissue (e.1)

20. Diagnose slides different from those seen during his course but of the same organs or tissues previously studied (a.1,2,3 and b1)

21. Distinguish between normal and abnormal karyotyping (a.9)

22. Interpret a complete blood picture report.(e1)

**E. General and transferable skills:**

23. Use the sources of biomedical information to remain current with advances in knowledge and practice.(f.2)

24. Present information clearly in written, electronic and verbal forms. (f.3 and f.8)

25. Frame a question, search and literature, collect, analyze, critically appraise and utilize the obtained information to solve a particular clinical problem according to the principles of evidenced based medicine.(a.8 and f.5)

26. Appreciate the importance of life long learning and show a strong commitment to it. (f.2)

**3- COURSE CONTENTS:**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lectures (hrs)</th>
<th>Tutorial &amp;Practical (hrs)</th>
<th>Total (hrs)</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction, Microtechniques.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.15%</td>
</tr>
<tr>
<td>2. Cytology</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td>14.11%</td>
</tr>
<tr>
<td>3. Cytogenetics</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>6.64%</td>
</tr>
<tr>
<td>4. Epithelium</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>9.13%</td>
</tr>
<tr>
<td>5. Connective Tissue</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>9.13%</td>
</tr>
<tr>
<td>6. Cartilage</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.15%</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Bone</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>8.3%</td>
</tr>
<tr>
<td>8. Blood</td>
<td>9</td>
<td>6</td>
<td>15</td>
<td>12.45%</td>
</tr>
<tr>
<td>9. Muscle</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>5.81%</td>
</tr>
<tr>
<td>10. Nervous tissue</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>9.96%</td>
</tr>
<tr>
<td>11. Vascular</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>4.98%</td>
</tr>
<tr>
<td>12. Lymphatic System</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>9.96%</td>
</tr>
<tr>
<td>13. Reticuloendothelial system</td>
<td>1</td>
<td>1</td>
<td>0.83%</td>
<td></td>
</tr>
<tr>
<td><strong>Total (120 hours)</strong></td>
<td>60</td>
<td>60</td>
<td>120</td>
<td>100%</td>
</tr>
</tbody>
</table>

### III-A) TOPICS:

1-Introduction, microtechnique & cytology

- Histology is the science dealing with the study of the normal microscopical structure of tissues. It helps the student to correlate between the structure & function of tissues and organs. It also, prepares the student to study histopathology.

2-cytology

- General structure of the cell
- Cytoplasmic contents (organelles & inclusion)
- Classification of organelles into membranous & non- membranous organelles
- LM, EM , molecular biology & functions of cell membrane Cell coat & its functions
- Mitochondria
- Golgi complex
- Endoplasmic reticulum
- Lysosomes
- Peroxisomes
- All of the above membranous organelles are described as regarding their EM&LM pictures, molecular biology and function
- Non - membranous organelles:
- Ribosomes, Centrioles, Cilia, Flagella, Microtubules & microfilaments.Regarding their LM, EM, molecular biology & function
- Cell inclusions
• Structure of the nucleus (LM & EM) & its functions

3- Cytogenetics
• Cell division (mitosis & meiosis)
• Cell cycle & interphase
• Chromosomal number & sex chromosomes
• Karyotyping & classification of chromosomes
• Structure of chromosomes
• Sex chromatin
• Abnormalities of cell division
• Causes of chromosomal aberrations
• Aberrations in chromosomal number, e.g. Mongolism
• Aberrations in chromosomal structure
• Aberrations of sex chromosomes e.g. Turner & Kleinfelter syndromes

4- Epithelium
• General characteristics of epithelium & its types
• Types of simple epithelium (structure & sites)
• Transitional epithelium
• Structure & sites of stratified squamous & stratified columnar epithelium
• Glandular epithelium with reference to sites
• Neuro- and myo-epithelium with reference to sites
• General functions of epithelium
• Modifications of epithelial cells surfaces: Apical basal & lateral modifications

5- Connective tissue (C.T.)
• General characteristics & Types of C.T.Cells of C.T. proper (LM, EM & function)
• Fibers of C.T.
• Ground substance
• Types of C.T. proper with reference to sites
• General functions of C.T. proper

6- Cartilage
• Types of cartilage
• Histology of each type
• Sites of each type
7- Bone
- Types of bone with reference to sites
- Methods of preparation of bone sections
- Histology of compact bone
- Bone cells & their functions
- Histology of spongy bone
- Differences between cartilage & bone
- Ossification (intramembranous & intracartilagenous)

8- Blood
- What are the blood elements?
- Normal structure, size & number of erythrocytes
- Abnormalities in structure, size & number of RBCs
- Polycythaemia & anemia & their causes
- How the RBCs are adapted to perform their function
- Differences between RBCs & WBCs
- Types of WBCs & normal % of each
- Total leucocytic count & its clinical importance
- Differential leucocytic count & its importance
- Detailed structure & function of neutrophils
- Detailed structure & function of eosinophils
- Detailed structure & function of basophils
- Structure & function of lymphocytes
- Structure & function of monocytes
- Structure & function of platelets
- Types & structure of bone marrow
- Erythropoiesis
- Granulopoiesis
- Development of lymphocytes
- Development of monocytes
- Development of platelets

9- Muscular tissue
- General histological structure of muscle cells (fibers)
• Types & action of muscles
• Skeletal muscle
• Skeletal muscle fibers (LM & EM)
• Types of skeletal muscle fibers
• EM picture of myofibrils
• Smooth muscle fibers (LM & EM)
• Cardiac muscle fibers (LM & EM)
• Conducting system of heart
• Purkinje muscle fibers

10- Nervous tissue
• Neuron structure, classification & examples
• Dendrites & axons
• Types of nerve fibers with examples
• Histology of peripheral nerve fibers
• Structure of nerve trunk
• Spinal & autonomic ganglia
• Synapse
• Degeneration and regeneration
• Stains used for detection of degeneration
• Neuroglia types, sites, structure and functions
• Nerve endings (in epithelium, connective tissue and muscle)

11- Blood vascular system
• General structure of blood vessels & its significance
• Large, medium sized & small arteries
• Small, medium sized & large veins
• Structure of special blood vessels e.g. basilar, coronary, umbilical & penile arteries
• Types, sites & structure of capillaries
• AV shunt

12- Lymphatic system
• Lymph vessels & distribution of Lymphoid tissue
• Lymph node & its immunological function
• Spleen & its function
- Differences between lymph node & spleen
- Blood supply of spleen & theories of circulation
- Tonsils
- Structure & functions of thymus
- Thymic barrier

**13- Immune system & RES**
- Cells involved in the immune system & their functions
- Antigen presenting cells
- Cells of RES & method of their demonstration

**III-B) Tutorial / Small Group Discussions**
1. Introduction and microtechniques
2. Cytology
3. Cytogenetics.
4. Epithelial tissue
5. Connective Tissue
6. Cartilage
7. Bone
8. Blood
9. Muscular Tissue
10. Blood vessels
11. Lymphatic system
12. Nervous tissue
13. Receptors

**III-C) PRACTICAL CLASSES:**

<table>
<thead>
<tr>
<th>I-List of projector slides</th>
<th>II-List of glass slides</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EM picture of cell membrane.</td>
<td>1. Umbilical cord</td>
</tr>
<tr>
<td>2. EM picture of mitochondria</td>
<td>2. Hyaline cartilage</td>
</tr>
<tr>
<td>3. EM picture of Golgi apparatus</td>
<td>3. Elastic cartilage</td>
</tr>
<tr>
<td>4. EM picture of rough endoplasmic reticulum</td>
<td>4. Ground compact bone</td>
</tr>
<tr>
<td>5. EM picture of smooth endoplasmic reticulum</td>
<td>5. Decalcified compact bone</td>
</tr>
<tr>
<td>6. EM picture of lysosomes</td>
<td>6. Spongy bone</td>
</tr>
<tr>
<td>7. EM picture of centrioles</td>
<td>7. Intercartilagenous ossification</td>
</tr>
<tr>
<td>8. EM picture of cilia</td>
<td>8. Skeletal muscle longitudinal section</td>
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<td>---</td>
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</tr>
<tr>
<td>9.</td>
<td>EM picture of microvilli</td>
</tr>
<tr>
<td>10.</td>
<td>Blood film showing neutrophils</td>
</tr>
<tr>
<td>15.</td>
<td>Blood film showing platelets</td>
</tr>
<tr>
<td>16.</td>
<td>Bone marrow smear showing megakaryocyte</td>
</tr>
<tr>
<td>17.</td>
<td>Simple squamous epithelium</td>
</tr>
<tr>
<td>18.</td>
<td>Simple cubical epithelium</td>
</tr>
<tr>
<td>20.</td>
<td>Pseudostratified columnar ciliated with goblet cells</td>
</tr>
<tr>
<td>22.</td>
<td>Stratified squamous non keratinized epithelium</td>
</tr>
<tr>
<td>23.</td>
<td>Transitional epithelium</td>
</tr>
<tr>
<td>24.</td>
<td>Loose areolar connective tissue</td>
</tr>
<tr>
<td>25.</td>
<td>Adipose connective tissue sudan III</td>
</tr>
<tr>
<td>26.</td>
<td>Regular white collagenous connective tissue</td>
</tr>
<tr>
<td>27.</td>
<td>Irregular white collagenous connective tissue</td>
</tr>
<tr>
<td>28.</td>
<td>Yellow elastic connective tissue</td>
</tr>
<tr>
<td>29.</td>
<td>Reticular connective tissue</td>
</tr>
<tr>
<td>30.</td>
<td>Fibroblasts</td>
</tr>
<tr>
<td>31.</td>
<td>Plasma cells</td>
</tr>
<tr>
<td>32.</td>
<td>Pigment cell</td>
</tr>
</tbody>
</table>
III- Data show photos of sections previously studied in slides but from different sources

4- TEACHING AND LEARNING METHODS:

METHODS USED:
1. Lectures
2. Tutorials
3. Practical classes

TEACHING PLAN:

Lectures: Division of students into 2 groups twice /week
Tutorials & Practical classes:
Division of students into 5 groups once /week

The practical training in the labs is every week. The students will be organized by dividing them into 5 big groups, one group each day, and then each group is divided into 4 smaller sub- groups in 4 labs simultaneously. These Subgroups of students allow interaction, presentations and feedback. The plan for practical training is attached in instructional units section. Each lab includes presentation of the scheduled topic by one of the staff, and explanation of the slides. Then the students examine the slides themselves helped by joiner staff aided with microscopes, projector slides, data show photos. The tutorial data show photos of sections of tissues and organs similar to those studied in practical lab but of different and variable sources for training and Quizzes. This is carried by senior staff members.

Time plan:

<table>
<thead>
<tr>
<th>Item</th>
<th>Time schedule</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>twice / week</td>
<td>60 hours</td>
</tr>
<tr>
<td>Tutorial &amp; Practical</td>
<td>once / week</td>
<td>60 hours</td>
</tr>
<tr>
<td>Revision</td>
<td>two weeks/semester</td>
<td></td>
</tr>
<tr>
<td>Mid-year exam</td>
<td>two weeks</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30 weeks</td>
<td>120</td>
</tr>
</tbody>
</table>

5- STUDENTS ASSESSMENT METHODS:

5-A) ATTENDANCE CRITERIA: Faculty bylaws

The minimum acceptable attendance is 75%, Students who fail to meet their attendance requirements are deprived of their final practical exams.

5-B) Assessment TOOLS:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Purpose (ILOs)</th>
</tr>
</thead>
</table>
### Written examination
Midyear exam: MCQ & matching
End of year: short & long questions, problem solving, MCQ and matching

To assess knowledge and understanding and skills

<table>
<thead>
<tr>
<th>OSPE (Practical and Oral examination) second midterm and end of year</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess knowledge &amp; understanding, general and transferable skills (communication), professional attitudes/skills &amp; intellectual skills</td>
</tr>
<tr>
<td>To assess descriptive &amp; diagnostic abilities (intellectual skills) and practical skills</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practical book</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess practical skills and monitor attendance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess the communication skills</td>
</tr>
<tr>
<td>To assess the ability to use computer to reach biomedical information.</td>
</tr>
</tbody>
</table>

### 5-C) TIME SCHEDULE: Faculty bylaws

<table>
<thead>
<tr>
<th>Exam</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- First half of the academic year</td>
<td>November fourth week</td>
</tr>
<tr>
<td>2- Mid-year exam</td>
<td>January second week</td>
</tr>
<tr>
<td>3- Second half of the academic year</td>
<td>March fourth week</td>
</tr>
<tr>
<td>4- Practical exam</td>
<td>May first week</td>
</tr>
<tr>
<td>5- Final exam</td>
<td>June fourth week</td>
</tr>
</tbody>
</table>

### 5-D) GRADING SYSTEM:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Marks allocated</th>
<th>% of Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- First mid term</td>
<td>5</td>
<td>3.3%</td>
</tr>
<tr>
<td>2- Mid-year</td>
<td>20</td>
<td>13.3%</td>
</tr>
<tr>
<td>3- Second mid term</td>
<td>5</td>
<td>3.3%</td>
</tr>
<tr>
<td>4- Final exam:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Written</td>
<td>75</td>
<td>50%</td>
</tr>
<tr>
<td>b. OSPE (Practical &amp; Oral)</td>
<td>40</td>
<td>26.7%</td>
</tr>
<tr>
<td>5- Assignments &amp; other activities</td>
<td>5</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

| Total | 150 | 100% |

- The minimum passing & Passing grades (Faculty bylaws).
- The minimum passing score is 60% provided at least 40% are obtained in the final written exam. Passing grades:
  - Excellent ≥ 85%
Very good $\geq 75\%$

Good $\geq 65 \%$

Fair 60–65

FORMATIVE ASSESSMENT:
Student knows his marks after the Formative exams.

5-E) Examinations description:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- First midterm</td>
<td>MCQ</td>
</tr>
<tr>
<td>2- Mid-year</td>
<td>Matching, MCQ, case studies and problem solving</td>
</tr>
<tr>
<td>3- Second midterm</td>
<td>OSPE identification of tissues and organs in data show photos</td>
</tr>
<tr>
<td>4- Final exam:</td>
<td></td>
</tr>
<tr>
<td>a- Written</td>
<td>Long question, short questions, matching, MCQ, case studies and problem solving</td>
</tr>
<tr>
<td>5- Assignments &amp; other activities</td>
<td>Assignments and practical book</td>
</tr>
</tbody>
</table>

6- LIST OF REFERENCES:

6.1- Basic materials:
- Department book: constructed by staff members.
- Department’s colored atlas book.
- Department’s practical book

6.2- Essential books (text books):
- Basic histology text and atlas

6.3- Recommended books:
- Wheater’s functional histology

7- FACILITIES REQUIRED FOR TEACHING AND LEARNING:
Facilities used for teaching this course include:
- Lecture halls: five grand lectures halls allocated daily for teaching central lecture halls).
- Small 4 well equipped labs available within the department.
- Two small lecture rooms available within the department.
- Six data show equipments and computers for slide and photo presentation.
- Microscopes.
- Writing boards are available in all rooms; overhead aids and slide projectors.
- Microscopic slides.

Course coordinator:

Head of Department:

Date: /   /