Cairo University
Faculty of Medicine
Department of Medical Physiology

Course Specifications

Course title: Medical Physiology For Second Year
(Code) PHY-203

- Department offering the course: Medical Physiology Department
- Second academic year of M.B. & B.Ch. program
- Academic Year: 2016/2017
- Date of specification approval: 7/9/2016

A) Basic Information:
- Allocated marks: 250 marks
- Course duration: 30 weeks of teaching with a final year examination.
- Teaching hours: Total 210 hrs,
  - Theoretical 150 hrs,
  - Tutorials 30 hrs
  - Practical 30 hrs

B) Professional Information:

1- Overall Aim of the Course:
The aims of the course are to enable student:
- To continue upgrading the physiology basis taken in the first year.
To explore in details the function of the nervous, the endocrinial, the reproductive, renal & the digestive systems as well their integration to achieve homeostasis.

To integrate physiological data & mechanisms with the ongoing basic sciences anatomy, histology & biochemistry and their clinical applications.

To follow the rapidly changing and inflating details about molecular physiology & genetics.

To develop the basic skills and ethical behavior required for scientific research, as well as effective communication and team work attitude.

2- Intended Learning Outcomes (ILOs):

a- Knowledge and understanding:

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

1- Describe the main morphologic features of the nervous system (a1).
2- Review the physiology of sensory receptors, synaptic transmission, different sensory pathways, sensory coding and sensory lesions (a1,a2,a3).
3- Describe the motor functions of spinal cord, brain stem, motor cortex and subcortical centers (a1,a2,a3).
4- Point out the neural basis of sleep, alertness, instinctual behavior, emotions, learning and memory (a1,a2,a3).
5 – Discuss the functional anatomy of the eye, the physiology of the image –forming mechanism, physiology of retina, visual pathway, visual cortex and eye movements (a1,a2,a3).
6- Describe the various parts of ear, and summarize the mechanism of hearing, auditory pathway, and various forms of deafness (a1,a2,a3).
7- Point out the physiology of receptor organs and pathways of smell and taste sensations(a1,a2,a3).
8- Describe the gross and microscopic anatomy of endocrine glands, mechanism of action of hormones, control of hormone secretion (a1,a2,a3).
9- Point out the effects of hormones in health and disease states (a3).
10- Describe the physiology of the male reproductive system and abnormalities of testicular functions (a1,a2,a3).
11- Describe the physiology of female reproductive system as regards ovarian cycle, puberty, pregnancy, parturition, lactation and menopause (a1,a2,a3).
12- Describe the functional anatomy of the digestive system, action
and regulation of the gastrointestinal secretion and motility (a1,a2).
13- Describe the metabolism from the physiologic point of view and identify mechanisms of regulation of metabolic rate, body temperature, food intake and physiology of exercise (a2,a3).
14 - Point out the functional anatomy of the kidney, physiology of glomerular filtration, renal tubular function and micturition (a1,a2).
15 - Discuss regulation of extracellular fluid composition and volume (a1,a2,a3).

b- Professional and practical skills:
By the end of the course, students should be able to:
1- Perform a systematic examination of the nervous system: types of sensation, motor system, tendon jerks and muscle tone.
2- Use the most important visual tests: corneal, light & accommodation reflexes, visual acuity, color vision and visual field defects (b1).
3- Do a preliminary examination and diagnosis of common endocrine conditions: Acromegaly, Dwarfism, Thyroid disease (hypo or hyper), Cushing and Addison’s diseases (b1)
4- Perform the most important renal function tests (b1).
5- Integrate physiological with other basic and clinical sciences (b1).

c- Professional Attitude and Behavioral skills.
1- Respect and follow institutional code of conduct (c5,c6).
d- Communication Skills:
By the end of the course, students should be able to:
1- Work effectively in a group in lab (d1,d2, d6).
2- Respects the role of staff and co-staff members regardless of degree or occupation (d1,d2,d6).
e- Intellectual skills:
1- Distinguish between physiological and pathological performance of different body systems (e1,e3).
2- Suggest the basic physiological measurements used to test different body functions (e1).
3- Comment, on some clinical parameters such as using nerve conduction velocity for calculation of synaptic delay and number of synapses (e3).
4- Integrate physiology with other sciences (e3).

f- General and transferable skills:
By the end of the course, students should be able to:
1- Identify the essential ethical issues involved in scientific research (f1,f2).
2- Work separately or in groups to research and prepare a scientific topic (f1, f2, f3, f4, f5).
3- Use available presentation aids (e.g. overhead projectors or Data show) to present clearly and effectively a scientific topic in a tutorial, a staff meeting or the yearly scientific day(f2,f3,f4).
3- **Course contents:**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lectures (hrs)</th>
<th>Tutorial / Small group discussion (hrs)</th>
<th>Practical (hrs)</th>
<th>Total (hrs)</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- The central nervous system &amp; special senses</td>
<td>68</td>
<td>12</td>
<td>15</td>
<td>95</td>
<td>45.2</td>
</tr>
<tr>
<td>2- Endocrine &amp; Reproductive system</td>
<td>42</td>
<td>9</td>
<td>6</td>
<td>57</td>
<td>27.2</td>
</tr>
<tr>
<td>3- Gastrointestinal system</td>
<td>18</td>
<td>3</td>
<td>3</td>
<td>24</td>
<td>11.4</td>
</tr>
<tr>
<td>4-Renal System &amp; body fluids</td>
<td>16</td>
<td>3</td>
<td>3</td>
<td>22</td>
<td>10.5</td>
</tr>
<tr>
<td>5- Metabolism &amp; Regulation of body temperature</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>5.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td>30</td>
<td>30</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

III-A) **TOPICS:**

1. The central nervous system & special senses:
   - General functional organization.
   - Receptors.
   - Somatic sensations.
   - Synapses of the CNS, & chemical transmitters.
   - Organization of the motor control system: spinal, descending motor system, cortical motor areas.
   - Spinal cord reflexes, stretch reflex, upper and lower motor neuron lesions.
   - Basal ganglia & cerebellum: functions and syndromes.
   - Vestibular apparatus & control of posture.
   - Hypothalamus & limbic system.
- RAS, consciousness and sleep.
- The neurophysiological basis of learning & memory.
- Functional structure of the eye, lacrimal apparatus and protection of the eye.
- Refractive power of the eye, functions of iris, aqueous humour, and retina.
- Visual acuity, color and binocular vision.
- Visual pathways and role of cortical areas in perception of vision.
- Functional structure of the external, middle and internal ears.
- Mechanism of sound transduction, auditory pathway and auditory perception.
- Deafness and testing for deafness.
- Smell & taste, receptors and pathway

2. Endocrine & Reproductive system.
   - Introduction.
   - Pituitary gland: anterior & posterior and their syndromes.
   - Thyroid gland, syndromes and function tests.
   - Parathyroid gland, vitamin D3 and calcitonin.
   - Calcium homeostasis and tetany.
   - Suprarenal cortex: glucocorticoids, mineralocorticoids and adrenal androgens.
   - Supernal medulla.
   - Endocrine pancreas: insulin and glucagon pancreatic polypeptide and somatostatin and diabetes mellitus.
   - Glucose homeostasis.
   - Male reproduction: functional structure, spermatogenesis, blood testis barrier, male sex hormones control & actions.
   - Female reproduction: functional structure, female sex cycles, Ovulation, female sex hormones control & actions
   - Physiology of pregnancy and lactation.
   - Physiology of puberty.

3. Gastrointestinal system.
   - Salivary secretion, mastication and deglutition.
• Gastric secretion, gastric mucosal barrier, motility, gastric evacuation and vomiting
• Hepatic secretion, gall bladder, control of bladder evacuation, jaundice.
• Small & large intestine, digestive and absorptive functions.
• Gastrointestinal motility and GIT hormones.
• Defecation

4. Metabolism & regulation of body temperature.
   ▪ Energy balance and metabolic rate.
   ▪ Control of food intake, obesity estimation of body fat.
   ▪ Body temperature, control of body temperature.
   ▪ Exercise physiology.

5. Renal physiology
   ▪ Functional structure of the kidney.
   ▪ Glomerular filtration, tubular segments function, renal handling of different plasma constituents.
   ▪ Renal function tests plasma clearance concept.
   ▪ Micturition.

III-B) Tutorial / Small Group Discussions
   b1- Preparation of assignments.
   b2- Presentation.
   b3- case scenarios, reports and problem solving.

III-C) PRACTICAL CLASSES:
   c1-Perform a systematic examination of the nervous system: types of sensation, motor system, tendon jerks and muscle tone.
   c2- Use the most important visual tests: corneal, light & accommodation reflexes, visual acuity, color vision and visual field defects.
   c3-Do a preliminary examination and diagnosis of common endocrinial conditions: Acromegaly, Dwarfism, Thyroid disease(hypo or hyper), Cushing and Addison’s diseases
   c4-Perform the most important renal function tests.
   c5- Integrate physiological with other basic and clinical sciences

4- Teaching and learning methods:

A-METHODS USED:
A1-Lectures: the students are divided into groups (according to faculty system).
A2-Tutorials classes: two groups (about 60 students each)
A3-Practical training: small groups training (about 25 students each)
A4-A yearly scientific day for students, in the form of small group presentations. The titles of the subjects are determined during several meetings with staff.

B- Methods for disabled students:

- Supporting Learning Classes can be arranged for disabled students.
- Procedures for availability of faculty member for individual student consultations and academic advice:
  1. Office hours of each staff members.
  2. Availability of email communication.

TEACHING PLAN:

Lectures: One hour lecture daily (for five days /week), Time from September to May; Students will be divided into groups according to faculty system.

Tutorials: In two small lecture halls (60 students each), a 3hr/ 2 weeks (during 3 months each term). The tutorial class is scheduled and previously announced (2 weeks before). The subject, which are conversationally directed are lagging by few weeks to the related branches and systems given at that time in the lectures. Special topics from the curriculum- of special interest – are exclusively discussed in the tutorial classes.

Practical classes: In two big labs a 3hr/ 2 weeks (alternating with the tutorial classes) small groups (25 students) is scheduled & the planned practical tests are announced two weeks before.
Time plan:

<table>
<thead>
<tr>
<th>Item</th>
<th>Time schedule</th>
<th>Teaching hours</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>5 times/week; one hour each between September to May</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>Practical</td>
<td>3 hours / 2 weeks</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Tutorial</td>
<td>3 hours / 2 weeks</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>210</td>
</tr>
</tbody>
</table>

5- Students Assessment methods:

5-A) **ATTENDANCE CRITERIA**: The minimal acceptable attendance in the practical & tutorial is 70%. Students who fail to attend this percentage in each half of the year will not be allowed to take the midyear and end of the year final theoretical exam and the end of the year practical exam.

5-B) **Assessment TOOLS**:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Purpose (ILOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>To assess knowledge, understanding &amp; intellectual skills.</td>
</tr>
<tr>
<td>Oral examination</td>
<td>To assess knowledge &amp; understanding, intellectual and presentation skills.</td>
</tr>
<tr>
<td>Practical examination</td>
<td>To assess some practical and intellectual skills</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- Mid term test1 at First half of the academic year</td>
<td>November</td>
</tr>
<tr>
<td>2- Mid-year exam</td>
<td>January</td>
</tr>
<tr>
<td>3- Mid term test2 at Second half of the academic year</td>
<td>March</td>
</tr>
<tr>
<td>4- Practical exam</td>
<td>April</td>
</tr>
<tr>
<td>5- Final exam</td>
<td>May</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- Formative assessment</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2- Mid-term</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>3- Mid-year</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>4- Second half</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5- Final exam:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a- Written</td>
<td>125</td>
<td>50%</td>
</tr>
<tr>
<td>b- Practical</td>
<td>40</td>
<td>16%</td>
</tr>
<tr>
<td>c- Oral</td>
<td>30</td>
<td>12%</td>
</tr>
<tr>
<td>6- Assignments &amp; other activities</td>
<td>5</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

- The minimum passing score is 150 marks, provided at least 50 marks are obtained in the final written exam.
- Passing grades are: EXCELLENT ≥85%, VERY GOOD 75-<85%, GOOD 65-<75% AND FAIR 60-<65%.

5-E) **Examinassions description:**

<table>
<thead>
<tr>
<th>Examination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Formative Assessment</td>
<td>Usually carried out during the course, to give feedback to students. It is not part of grading process</td>
</tr>
<tr>
<td>2- Mid term test1</td>
<td>Objectively structured questions.</td>
</tr>
<tr>
<td>3- Mid-year</td>
<td>MCQ (single best opinion) + true &amp; false + cases + problem solving + matching items.</td>
</tr>
<tr>
<td>4- Mid term test2</td>
<td>Objectively structured questions.</td>
</tr>
<tr>
<td>5- Final exam:</td>
<td></td>
</tr>
<tr>
<td>a- Written</td>
<td>MCQ (single best opinion) + true &amp; false + cases + problem solving + matching items + short essay Qs. In the lab, at multiple phases through the practical courses.</td>
</tr>
<tr>
<td>b- Practical</td>
<td></td>
</tr>
<tr>
<td>c- Oral</td>
<td>In front of two separate examiners (an internal &amp; external)</td>
</tr>
<tr>
<td>6- Assignments &amp; other activities</td>
<td>Distributed according to the performance of students in practical &amp; tutorial classes between: Attendance, Attitude, Discussion, Assignments &amp; Presentations</td>
</tr>
</tbody>
</table>
6- **List of references:**

6.1- **Basic materials:** Department book : written by staff members ( 5 volumes) is available for purchase by students from bookshops installed in the faculty.

6.2- **Essential books (text books):**

6.3- **Recommended books:**

6.4- **Periodicals, Web sites, ... etc:**

7- **Facilities required for teaching and learning:**
Facilities used for teaching this course include:
- Lecture halls:
- Small group classes
- Laboratory
- Information technology / AV aids
- Models etc

**Course Specification Updating Team:** Curriculum Committee of Medical Physiology Department

**Head of the department:** Prof. Dr. Maha Gamal

**Revised by Prof. Dr ...............**  Quality assurance unit