



Anatomy Course Specifications of the Master Degree in Neurosurgery

Program on which the course is given: Master Degree in Neurosurgery

Department offering the program: Department of Neurosurgery

Course code: NEUS801

Major and/or minor element of program: Basic course.

Department offering the course: Department of Anatomy

Academic year: 2015–2016

Date of approval: July 2015

Credit points: 4.5 points

Course duration: 10 weeks

Teaching hours: theoretical 70% and practical 30%

Course coordinators:

- **Professor Dr. Ahmed Salaheldin Hassan (Department of Neurosurgery)**
- **Professor Dr. Safwat Wadei (Department of Anatomy)**

I. Aim of the course:

The aim of the course is to refresh the anatomical knowledge acquired during undergraduate courses with special emphasis on Neuroanatomy and anatomy of vertebral column and relevant parts of the musculo-skeletal system that are necessary for the understanding and best practicing of the art of Neurosurgery.

II. Intended learning outcomes (ILOs):

A. Knowledge and understanding: By the end of the course the candidate should be able to:

1. Describe the basic embryological development of the central nervous system, skull and vertebrae.
2. Define the anatomy of the skull vault and base, cranio-cervical junction, and vertebral column.
3. Relate the gross anatomy of the brain and spinal cord.
4. Identify the anatomy of the cerebral ventricles and basal ganglia.

5. Describe the anatomy of the meninges, dural folds and arachnoid cisterns.
6. Describe the anatomy of the arterial supply and the venous drainage of the brain and spinal cord and the dural venous sinuses.
7. Identify the anatomy of the facial muscles, para-spinal muscles and the sternomastoid muscle.
8. Recall the anatomy of cranial nerves.
9. Describe the anatomy of the spinal nerves and their plexuses.
10. Recognize the internal structure and neuroanatomy of the cerebrum, brainstem and cerebellum.
11. Recall the anatomy of the tracts and gray matter of the spinal cord.
12. Describe the embryology and development of the central nervous system and the vertebral column and the skull.
13. Review the anatomy of the peripheral nerves and muscle compartments of the peripheral limbs.
14. recognize the anatomy of the sympathetic chain.
15. Describe the anatomy of the fascial layers and triangles of the neck.
16. Recall the neuroanatomy of the special senses.

B. Intellectual skills: By the end of the course the candidate should be able to:

1. Identify the different surfaces of the skull and the features of the cervical, thoracic, lumbar vertebrae and the sacrum.
2. Interpret detailed neuroanatomy of association, and projection tracts of the brain and spinal cord.
3. Diagram the gross anatomy of the skull base, orbit, nasal air sinuses and cranio-cervical junction.
4. Differentiate between the vascular supply of the central nervous system.
5. Illustrate the detailed tractology of the special senses.
6. Illustrate the microanatomy of the basal cisterns of the brain.
7. Examine the histological structure of the brainstem, spinal cord and sympathetic chain.

C. Professional and practical skills: By the end of the course the candidates should be able to:

1. Discuss the clinical presentation in anatomical terms of syndromes of the brain and its coverings.
2. Review the expected effects of a mass lesion at different locations within the cerebrum, brain stem, cerebellum, and the spinal cord.
3. Identify the different internal structures in cadavers and preserved specimens.
4. Correlate the anatomical facts to clinical problems.

D. General Transferable skills: By the end of the course the candidates should be able to:

1. Affirm the values of the ethics and respect to all individuals inside and outside the department.
2. Master computer skills required to present data bases as well as use the internet for learning communication and updating the latest knowledge.
3. Write perfect scientific articles according to the basis of scientific research.
4. Acquire abilities to organize and control the juniors and subordinate paramedical staff.

5. Demonstrate perfect administrative skills to be enabled to fulfill the needed paper work.

III. Course contents:

Lectures:

1. Review the embryological development of the brain, cerebellum, brain stem, spinal cord, conus medullaris, cauda equina, sympathetic and parasympathetic systems and the peripheral nervous system.
2. Review in detail the carotid and vertebral arteries and their branches which provide blood supply to the face, scalp, skull, meninges, brain, brain stem, cerebellum, and rostral spinal cord.
3. Review in detail the arterial blood supply to the spinal cord and the concept of watershed zone ischemia.
4. Review the venous drainage of the central nervous system.
5. Review the bones of the skull .
6. Review the sutures of the skull and named foramen of the skull and list its contents.
7. Review of the anatomy of the meninges including the dura mater, arachnoid mater, pia mater
8. Review the anatomy of the dura including the falx cerebri and tentorium.
9. Review the layers of the scalp and discuss its innervation. Review and diagram the cerebral ventricles.
10. Review the major arachnoid cisterns.
11. Review and describe the gross anatomy of the spinal vertebral segments including: the Atlas, the Axis, subaxial cervical vertebrae, thoracic vertebrae, lumbar vertebrae, sacrum, coccyx, intervertebral disc complex, and the supporting ligaments of the spine.
12. Review the gross anatomy of the brain, brain stem, cerebellum, cranial nerves, and spinal cord.
13. Review the anatomy of the hypothalamus and pituitary gland.
13. Review the anatomy of the cerebellum.
14. Describe the anatomy of the brainstem.
15. Review the course of each cranial nerve from nucleus to end organ.
19. Review the anatomy of the spinal cord.
20. Review the sympathetic and parasympathetic nervous system.
21. Review the anatomy of the spinal nerve roots.
22. Review the cervical, brachial, and lumbosacral plexuses.
23. Review the anatomy of the major peripheral nerves of the upper and lower extremity.

Dissecting room:

1. Cadaveric dissection of the skull base and meninges.
2. Cadaveric identification of the cranio-cervical junction.
3. Cadaveric identification of the peripheral nerves, plexuses, and sympathetic chain.
4. Cadaveric identification of the circle of Willis and the cranial nerves and the exiting foramina.
5. Cadaveric dissection of the neck fascial layers and triangles.

Anatomy	Lectures (hrs)	Tutorial / Small group discussion (hrs)	Practical (hrs)	Total (hrs)	% of Total
1- Upper Limb	19	Not Availble	8	27	20%
2- Lower Limb	19	Not Availble	8	27	20%

3- Thorax & Abdonem & Pelvis	19	Not Availble	8	27	20%
4- Spine	19	Not Availble	8	27	20%
5- Neuroanat omy	19	Not Availble	8	27	20%
Total	95		40	135	100

IV. Teaching methods:

Methods:

- Lectures will cover the required topics.
- Spoting of anatomical structures in the dissecting room.

Facilities required for teaching and learning:

- Blackboard and Data show.
- Dissecting table, instruments, microscope, and cadavers.

List of references

- Course notes
- Essential books (text books): Kasr Al-Ainy staff members text book for postgraduate

V. Teaching and learning facilities:

- Lecture halls.
- Dissecting room.
- Audio-visual aids (data-show, slide projection).

VI. Assessment:

Attendance criteria:

The prerequisite for legibility for the final examination is 75% attendance of the lectures.



Course Specifications of the Master Degree in Neurosurgery

Medical Physiology

Program on which the course is given: Master Degree in Neurosurgery

Department offering the program: Department of Neurosurgery, Cairo University

Course code: **NEUS 804**

Major or minor element of program: **Basic course.**

Department offering the course: **Neurosurgery and Medical Physiology Departments**

Academic year: **2015–2016**

Date of approval: July 2015

Course duration: **5 weeks**

Teaching hours: **Theoretical (100%)**

Credit points: **2 points**

Course coordinators:

- **Professor Dr. Ahmed Amr Taher (Department of Neurosurgery)**
- **Professor Dr. Akef Khewailed (Department of Medical Physiology).**

I. Aim of the course:

The aim of the course is to update the knowledge in the field of basic Medical Physiology with special emphasis on the topic of Neurophysiology for proper understanding of the malfunctions of the nervous system, and their reflections in the clinical dimensions

II. Intended learning outcomes (ILOs):

A. Knowledge and understanding: By the end of the course the candidate should be able to:

1. Define the major subdivisions, mapping, and functions of cerebral cortical areas (motor, sensory, language, cognition, emotion, memory).
2. Demonstrate the basic nerve cell membrane physiology including ion channels, receptors, second messenger, neurotransmitter and neuromodulators.

3. Describe and explain the function of major neurotransmitters and their receptors.
4. Relate important pathways of clinical significance of the neural functions.
5. Determine the cerebral blood flow and cerebral perfusion pressure.
6. Describe metabolic pathways that affect neural functions.
7. Identify the advanced physiological mechanisms of the motor and sensory system.
8. Illustrate the basis of all the physiological and diagnostic procedures regarding the vestibular, auditory and visual functions.
9. Demonstrate the major functions and connections of brain nuclei and tracts.
10. Describe the principles of the blood brain barrier, cerebral perfusion and nervous system hemostasis and cerebrospinal fluid circulation.
11. Recall the different hormones of endocrine glands and their systemic and local functions.
12. Name the autonomic supply of the internal organs and the skin.

B. Intellectual skills: By the end of the course the candidate should be able to:

1. Explain the basic aspects of the neuroscience including neurophysiology, neurochemistry, neuroanatomy, and neuropharmacology.
2. Identify, describe, draw and label the major structures and explain the functions of the human nervous system and cerebrospinal fluid circulation.
3. Identify, draw and label the major central visual pathways
4. Draw and label the major central auditory and vestibular pathways.
5. Label major brainstem nuclei and tracts from origin to termination.
6. Localize, identify, draw and label major somatosensory systems and pathways from origin to termination
7. Explain, draw and label the major neuroanatomical features and functions of the frontal cortex, hippocampus, limbic system, and ventricular system.
8. Localize, identify, draw and label the Pyramidal and Extrapyramidal afferent and efferent pathways.
9. Identify, draw and label different areas of the cerebellum and their connections with the motor system.
10. Explain the basic components of the autonomic nervous system and their role in homeostatic mechanisms and the cerebral blood flow.
11. Explain the homeostatic functions of the endocrine hormones.

C. Professional and practical skills: By the end of the course the candidates should be able to:

1. Understand the detailed structure and function of cerebral cortical system.
2. Describe the major functions and interrelationships of the somatosensory systems
3. Gain insight into some degenerative and metabolic diseases of the central nervous system.
4. Understand how synaptic transmission is modulated during diseases.
5. Explain the fundamentals of the localization and diagnosis of neurological lesions.
6. Explain vestibulocochlear functions and their related clinical implications.

D. General and transferable skills: By the end of the course the candidates should be able to:

1. Affirm the values of the ethics and respect to all individuals inside and outside the department.
2. Master computer skills required to present data bases as well as use the internet for learning communication and updating the latest knowledge.
3. Write perfect scientific articles according to the basis of scientific research.
4. Acquire abilities to organize and control the juniors and subordinate paramedical staff.
5. Demonstrate perfect administrative skills to be enabled to fulfill the needed paper work.

III. Course contents:

Medical Physiology	Lectures (hrs)	Tutorial / Small group discussion (hrs)	Practical (hrs)	Total (hrs)	% of Total
1- Nerve & Muscle	6	Not Available	Not Available	6	20%
2- Endocrine	6	Not Available	Not Available	6	20%
3- Cranial Nerves	6	Not Available	Not Available	6	20%
4- Cortical Functions	6	Not Available	Not Available	6	20%
5- Cerebrospinal fluid	6	Not Available	Not Available	6	20%
Total	30			30	100%

Lectures:

1. Basic biology of the nerves
 - a. membrane potential and membrane properties.
 - b. generation and conduction of an action potential.
2. The synaptic transmission
 - a. types of synaptic transmission
 - b. transmitter release
 - c. nerve-muscle transmission.
3. The physiology of the sensory systems
 - a. pain and analgesia
 - b. cortical integration of sensory perception

- c. **visual system**
 - I. processing of information in the retina
 - II. Processing of vision in the central visual pathways.
 - d. **Vestibular & auditory system:** vestibule-cochlear functions and central pathways.
 - e. **olfaction and taste**
- 4. The physiology of the motor system
 - a. **mechanisms of muscle contraction**
 - b. **muscle receptors, spinal reflexes**
 - c. **spinal reflexes concerned with position**
 - d. **brain stem reflexes controlling motion**
 - e. **vestibular nuclei control of movement and posture**
 - f. **red nucleus control of movement**
 - g. **cortical control of movement**
 - h. **cerebellar control of movement**
 - 1) regional and cellular organization of the cerebellum
 - 2) functional divisions and connections of the cerebellum
 - i. **Basal ganglia:** neural transmitters in the circuits within the basal ganglia
- 5. The autonomic nervous system
- 6. The physiological basis of arousal and emotion
 - a. **noradrenergic systems**
 - b. **limbic system. Include within this review the physiologic basis for emotion and memory**
 - c. **reticular activating system**
- 7. The higher cortical and cognitive functions
 - anatomy of language & function of association cortex**
- 8. Cerebrospinal fluid circulation.
- 9. Review the physiological control of the cerebral vasculature.
- 10. The endocrinological functions of the hypothalamus and pituitary gland.
- 11. The general visceral neural control especially the urinary bladder.

IV. Teaching methods:

Methods:

Lectures will cover the required topics.

Facilities required for teaching and learning:

- Blackboard and Data show.

List of references

- Course notes
- Essential books (text books): Kasr Al-Ainy staff members text book for postgraduate

V. Teaching and learning facilities:

- Lecture halls.
- Rooms for small groups
- Audio-visual aids (data-show, slide projection).

VI. Assessment:

Attendance criteria:

The prerequisite for entry the final examination is 75% attendance of the lectures.

Assessment tools:

Assessment will be by written and oral exams.

Assessment schedule: Written and oral exams will be held twice yearly, in April and October.

Examination description:

1. Written 3 hours examination that includes MCQ and short questions.
2. Oral examination of general discussions.

Weighing of assessment (total marks: 100)

Name of the course/ code	Written exam and MCQ (3 hours)	Oral exam	Total marks
Medical Physiology/ 801	50 marks written 75 marks MCQ	100	225

Date of specification / revision: June 2015

Date of approval by departments: August 2015

Course coordinators:

Neurosurgery Department

Prof. Dr. Ahmed Amr Taher

Physiology Department

Prof. Dr. Akef Khewailed

Head of the Neurosurgery Department

Prof. Dr. Amr Safwat

Head of the Physiology Department



Course Specifications of the Master Degree in Neurosurgery

General Surgery

Program on which the course is given: Master Degree in Neurosurgery

Department offering the program: Department of Neurosurgery

Course code: NEUS 812

Major or minor element of program: Basic course.

Department offering the course: Department of General Surgery

Academic year: 2015–2016

Date of approval: July 2015

Credit points: 3

Course duration: 16 weeks

Teaching hours: Theoretical (30%) and Practical (70%)

Course coordinators:

- Professor Dr. Helmy Abdelhaleem Eldesouky (Department of Neurosurgery)
- Professor Dr. Maamoun Ismail (Department of General surgery)

I. Aim of the course:

The aim of the course is to refresh, upgrade, and deepen the general surgical knowledge of the candidate with special emphasis on the topics necessary for the practicing neurosurgery.

II. Intended learning outcomes (ILOs):

A. Knowledge and understanding: By the end of the course the candidate should be able to:

1. Describe the general clinical manifestations of shock, haemostasis and massive haemorrhage. Enumerate the principles of blood transfusion and administration of

blood products, alternatives of blood products & patient safety with respect to blood products.

2. Discuss the principles of skin ulcers, wound healing, management of skin loss including use of skin grafts and skin flaps.
3. Define acute infections, septicemia and disseminated intravascular coagulopathy.
4. Review the clinical management of fluid and electrolyte imbalance, nutritional management (Methods of enteral and parenteral nutrition).
5. Describe the general picture and management of multiple trauma patient: Assessments of head and facial trauma, spinal cord injury, chest trauma, abdominal and urogenital trauma, and vascular and tendon injuries.
6. Describe the general clinical manifestations of peripheral venous occlusion.
7. Identify the general clinical manifestations of acute and chronic peripheral ischemia.
8. Discuss the Clinical picture and management principles of long bone fractures.
9. Demonstrate the clinical aspects of renal impairments and multi-organ failure.
10. Describe the differential diagnosis of neck masses.
11. Show mid-face (facio-maxillary) and lower face (mandibular) fractures.
12. List the differential diagnosis of tumors in the posterior abdominal wall and pelvis.
13. Report the characteristics of the surgical patient.

B. Intellectual skills: By the end of the course the candidate should be able to:

1. Discuss the general clinical manifestations of shock, haemostasis and massive hemorrhage.
2. Explain the principles of blood transfusion and administration of blood products.
3. Demonstrate the principles of wound healing, management of skin loss and skin flaps.
4. Describe the clinical management of fluid and electrolyte imbalance and nutrition.
5. Illustrate acute infections, septicemia and disseminated intravascular coagulopathy.
6. Distinguish the general picture and management of multiple trauma patient.
7. Assess the general clinical manifestations of peripheral venous occlusion.
8. Discuss the clinical aspects of renal impairments and multi-organ failure.
9. Explain the manifestations of respiratory failure and indications of assisted ventilation.
10. Discuss the clinical evaluation and management of patient with neck mass(s).
11. Explain the clinical manifestations of poly trauma patients.
12. Discuss the communication with the surgical patient.

C. Professional and practical skills: By the end of the course the candidates should be able to:

1. Demonstrate the procedure of closure of fascial layers and skin.
2. Demonstrate the preliminary positioning, shaving, disinfecting and drapping the surgical site.
3. Discover the psycho-social factors affecting the surgical patient and his/her relatives.
4. Demonstrate the procedure of haemostasis of tissue plains.

5. Assess the procedures of venous cut-down, central venous canulation and tracheostomy.
6. Show the use of wound drains.
7. Demonstrate cardiopulmonary resuscitation and circulatory support of the severely ill patient.

III. Course contents:

General Surgery	Lectures (hrs)	Tutorial / Small group discussion (hrs)	Practical (hrs)	Total (hrs)	% of Total
1- Fluid & Electrolyte Balance & Nutrition	2.25	Not Available	6.3	8.55	11%
2- Polytrauma	2.25	Not Available	6.3	8.55	11%
3- Principles of Plastic Surgery	2.25	Not Available	6.3	8.55	11%
4- Principles of Vascular Surgery	2.25	Not Available	6.3	8.55	11%
5- Genitourinary surgical disorders	2.25	Not Available	6.3	8.55	11%
6- Orthopedics.	2.25	Not Available	6.3	8.55	11%
7- Head trauma	-	Not Available	6.3	6.3	8.2%
8- Spinal Trauma	-	Not Available	6.3	6.3	8.2%
9- Burns	-	Not Available	6.3	6.3	8.2%
10- Surgical Abdomen	-	Not Available	6.3	6.3	8.2%
Total	13.5	Not Available	63	76.5	100%

Lectures:

1. Vascular: Intermittent claudication, Acute ischemia (embolism & thrombosis).
2. Shock & Multi-organ system failure.
3. Nutritional management: Perioperative nutrition, Methods of enteral and parenteral nutrition
4. Haemostasis and blood products: Mechanisms of haemostasis including the clotting cascade, impaired haemostasis and DIC, and principles of administration of blood products.
5. Trauma: Assessment of patients with head and facial trauma, spinal cord injury, chest trauma, abdominal and urogenital trauma, vascular trauma, fractures &/or dislocations
6. Organ-specific trauma: Pneumothorax, hemothorax, spinal cord injury, blunt and penetrating abdominal trauma, Hepatic and splenic trauma & vascular injury including iatrogenic injuries.
7. Principles of management of skin loss and bed sores including use of skin grafts and skin flaps.
8. Principles of mechanical ventilation.
9. Deep vein thrombosis.
10. Systemic malignancies.
11. Evaluation and management of acutely ill patients.

Clinical residency and operative training:

1. Acutely injured patient with polytrauma.
2. Patients with systemic malignancies.
3. Patients with postoperative anoxic and neural complications.
4. Surgical patients with general problems hypertension, ischemic heart diseases, diabetes mellitus, hepato-renal dysfunctions and extremes of ages.
5. Preparation of the patient in the operative theatre.
6. Communication with the surgical patient and his relatives.
7. General plastic surgical procedures.

IV. Teaching methods:**Methods:**

1. Lectures.
2. Six months clinical internship in the general surgical and casualty departments.

Facilities required for teaching and learning:

Blackboard and Data show

List of references

- Course notes
- Essential books (text books): Kasr Al-Ainy staff members text book for postgraduate

V. Assessment:

Attendance criteria:

The prerequisite for eligibility for the final examination is 75% attendance of the lectures, and 80% of the clinical internship.

Assessment tools:

Assessment will be by written, oral and clinical (OSCE) exams.

Assessment schedule:

Written and oral exams will be held twice yearly, in April and October.

Examination description:

The examination includes a 3 hours written exam that is formed of short essay questions, in addition to the Oral & Clinical exams.

Weighing of assessment (total marks 150)

Name of the course/ code	Written exam and MCQ (3 hours)	Oral exam	Clinical exam (OSCE)	Total marks
General surgery NEU 812	- 20 marks (Short essay) - 25 marks MCQ	30 marks	75 marks	150 marks

Date of specification / revision: June 2015

Date of approval by departments: July 2015

Course coordinators:

Neurosurgery Department

Prof. Dr. Helmy Abdelhaleem Eldesouky

General Surgery Department

Prof. Dr. Hisham Abou Eisha

Head of the Neurosurgery Department

Prof. Dr. Amr Safwat

**Head of the General surgery
Department**

Prof. Dr. Maamoun Ismail

Assessment tools:

Assessment will be by written and oral exams.

Assessment schedule:

Written and oral exams will be held twice yearly, in April and October.

Examination description:

The examination includes a written exam of 3 hour duration and includes MCQ and essay questions, in addition to an oral exam .

Weighing of assessment (total marks: 100)

Name of the course/ code	Written exam and MCQ (3 hours)	Oral exam	Total marks
Anatomy / NEU 801	<ul style="list-style-type: none">•45 marks short essay questions.•25 marks MCQ	30	100

Date of specification / revision: June 2016

Date of approval by departments: July 2016

Course coordinators:**Neurosurgery Department**

Prof. Dr. Ahmed Salaheldin Hassan

Anatomy Department

Prof. Dr. Safwat Wadei

Head of the Neurosurgery Department

Prof. Dr. Amr Safwat

Head of the Anatomy Department

Prof. Dr. Maha Ashmawy