



## **Program Specification for MD Degree in Neurosurgery**

**Program type: Single.**

**Department offering the program: Department of Neurosurgery.**

**Program Code: NEUS933**

**Total Credit points: 280.**

**Academic year: 2010/2011.**

**Program coordinator: Professor Doctor: Ahmed Amr Taher**

**External Evaluator: Professor Doctor Hossam El-Huseiny,  
Ain Shams University, Cairo, Egypt.**

### **I. Aim of the Program**

The two-year advanced neurosurgical education and training program at the Kasr Al-Ainy School of Medicine, Cairo University is designed to prepare the candidate to function as a consultant in neurosurgery and as a leader in the field of academic neurosurgery. It is the intent of this program to actively participate in the development of those candidates as world class neurosurgeons who will share the regional as well as the international community as neurosurgical science educators, researchers, and health care professional providers. They will learn to work in teams, share in community focused researches and interests, and committed to life-long learning activities. They will also learn to offer health care services to the patients using the evidence-based medical knowledge and high-level professional and ethical standards.

### **II. Intended Learning Outcomes of the Program (ILOs)**

#### **A. Knowledge and Understanding:**

**By the end of the program the candidate should be able to:**

- 1) Describe the principles of general surgery and discuss the anatomy of structures other than the nervous system.**
- 2) Describe the precise anatomy of the central and peripheral nervous systems including the spine and skull as well as their embryology.**
- 3) Describe the different topics of neurology with particular emphasis on those neurological entities that have important differential diagnostic considerations with respect to neurosurgical interests.**

4) Interpret clinical electrophysiology (electroencephalography [EEG], electromyography [EMG], electrocorticography [ECoG], evoked potentials, and neuro-otology), cerebral vascular physiology including cerebral blood flow, and functional cortical localization as derived from neurophysiological and neuropsychological principles.

5) Interpret neuroradiological examinations (plain X-rays, different computed tomographic (CT) modalities, magnetic resonance imaging (MRI) modalities, angiography, ultrasonography and radionuclide imaging.

6) Describe the fundamentals of clinical endocrinology.

7) Interpret the results of neuro-ophthalmology and neuro-otology tools including perimetry, electronystagmography, and audiometry.

8) Recognize the physiology and fundamentals of neuro-anesthesia.

9) Describe the gross and microscopic neuropathology with recognition of morphological features allowing the formulation of a differential diagnosis with respect to the common neurological and neurosurgical disorders.

10) Describe and discuss the following clinical competencies:

10. 1: Clinical features, including the presenting signs and symptoms, natural history, and prognosis for different neurosurgical disorders.

10. 2: The embryological development of the nervous system and how congenital anomalies arise.

10. 3: The anatomical and physiological basis of consciousness, wakefulness and sleep.

10. 4: The anatomical and physiological basis of speech, memory, learning and behavior.

10. 5: The anatomical and physiological basis of the following systems: special senses, sensory, motor, autonomic, limbic, and reticular activating systems.

10. 6: The physiology of the following major subdivisions of the central nervous system: major cortical regions, basal ganglia, thalamus, cerebellar, reticular activating system, respiratory centers and limbic system.

10. 7: The role of medical treatment in the therapy of neurosurgical disorders including mechanism(s) of action, indications, contraindications for its use and their teratogenic effects.

10. 8: The basic principles of clinical genetics.

10. 9: The basic principles of clinical epidemiology.

**10.10: The therapeutic and toxic effects of irradiation on neural tissues, including radiosurgery and its role in the treatment of neurosurgical disorders.**

**10.11: The infectious diseases of the nervous system.**

**10.12: The role of rehabilitative medicine in the management of neurosurgical disorders.**

**B. Technical and Practical Skills:**

By the end of the program the candidate should be able to:

**1) Implement the discipline of obtaining a detailed history and carryout a detailed clinical and neurological examination in order to provide a comprehensive differential diagnosis.**

**2) Order and assess appropriate diagnostic tests relating to the management of neurosurgical patients.**

**3) Arrange ongoing, high quality preoperative and postoperative care, including neuro-intensive care.**

**4) Design and perform different elective and emergent craniotomies (supratentorial and posterior fossa) and the subsequent:**

**4.1: Removal of intracranial hematoma;**

**4.2: Repair of cerebral aneurysms;**

**4.3: Removal of arteriovenous malformation;**

**4.4: Removal of different benign and malignant intracranial tumors.**

**5) Design and perform trans-sphenoidal removal of pituitary tumors.**

**6) Utilize neuronavigation technology.**

**7) Design and perform neck dissection appropriate to:**

**7.1: Exposure of carotid arteries and endarterectomy;**

**7.2: Tracheostomy;**

**7.3: Anterior cervical discectomy, corpectomy and fusion.**

**8) Manage cervical, thoracic and lumbar spondylotic pathologies, including the relevant anterior and posterior approaches.**

**9) Manage spinal injuries and other spinal disorders, including internal and external spinal stabilization.**

- 10) Manage cases of spinal tumors, infections, and vascular lesions.**
- 11) Manage the following cases of cranial and peripheral nerves:**
  - 11.1: Trigeminal neuralgia and other cranial nerve disorders;**
  - 11.2: Different cases of entrapment neuropathies;**
  - 11.3: Repairing and suturing of a lacerated nerve.**
- 12) Manage general pediatric neurosurgical conditions including:**
  - 12.1: Hydrocephalus by different shunts;**
  - 12.2: Craniosynostosis;**
  - 12.3: Different cases of spinal dysraphism.**
- 13) Utilize endoscopy for intracranial interventions: 3<sup>rd</sup> ventriculostomy, tumor biopsy or excision, and endoscopy assisted microneurosurgery.**
- 14) Manage different cases of functional neurosurgery:**
  - 14.1: Variable pain management procedures;**
  - 14.2: Spasticity;**
  - 14.3: Intractable epilepsy;**
  - 14.4: Stereotaxic surgery for movement disorders.**
- 15) Utilize radiosurgery.**

#### **C. Intellectual Skills:**

**By the end of the program the candidate should be able to:**

- 1) Integrate and adopt the discipline of obtaining and completing a detailed history and carrying out a detailed general and neurological examination in order to provide a comprehensive differential diagnosis and anatomical localization of diseases affecting the nervous system.**
- 2) Integrate the skills in ordering and interpreting appropriate general diagnostic tests (laboratory, radiological, electrophysiological, etc) for the ideal management of patients.**
- 3) Design an ongoing, high quality preoperative and postoperative neurological assessment and care.**

- 4) Utilize the information technology to optimize patient care, learning process, and research activities.

#### **D. General Transferable Skills:**

By the end of the training program the candidate should be able to:

- 1) Discuss appropriate information with patient/families and health care team.
- 2) Reflect sensitivity to the needs of patients and their families as they are affected by gender, cultural, educational, and social perspectives.
- 3) Adopt written documentation regarding patient consultations in a timely and accurate fashion.
- 4) Integrate effectively with other interdisciplinary team activities.
- 5) Acquire administrative skills to the medical team.
- 6) Adopt resources utilization effectively to balance patient care and learning needs.
- 7) Adopt and develop a personal continuing education strategy.
- 8) Exemplify highest quality care with integrity, honesty, and compassion.
- 9) Exhibit appropriate personal and interpersonal professional behavior.
- 10) Acquire current techniques to appraise sources of medical information and develop, implement, and monitor an education strategy.
- 11) Acquire a sufficient awareness of the scientific methods needed for critically analyze the literature.
- 12) Demonstrate the ability of teaching students, medical colleagues, both junior and senior, as well as other health care professionals.
- 13) Integrate the contribution to the discovery and development of new knowledge.

### **III. Academic standards**

1. Academic reference standers: The academic standers of anatomy program is adopted and accredited by the departmental council

## 2. External References for Standards

### **V. Program Structure and Contents**

**Program admission requirements:**

According to the bylaws of the Faculty of Medicine, Cairo University, MD applicants should have the MB, BCh or equivalent degree with a minimum “Good” score and a minimum “Very Good” score in general surgery. Also, the applicant must have acquired successfully the Master Degree in Neurosurgery from a recognized institute.

**Program duration: Two years (maximum 6 years).**

**Program structure: Total credit points 280.**

* Master degree in Neurosurgery	160
* General courses	18
* Advanced courses	10
* Clinical training	48
* MD thesis	40
* Scientific activities	4

<b>Courses</b>	<b>Credit Points</b>	<b>ILOs</b>
<b>GENERAL COURSES (18 points)</b>		
Neurosurgery (Advanced)	8	1A, 3A, 5A, 7A, 8A, 10.1A, 10.4A, 10.5A, 10.7A, 10.8A, 10.9A, 1B, 2B, 3B, 12.1B, 15B, 1C, 2C, 3C, 4C, 1-13D.
Surgical Anatomy	4	2A, 5A, 10.2A, 6B, 7.1B, 7.2B.
Clinical Neurophysiology	3	4A, 6A, 7A, 8A, 10.3A, 10.4A, 10.5A, 10.6A.
Surgical Pathology	3	5A, 9A, 10.2A, 10.10A, 10.11A.
<b>ADVANCED COURSES (10 points)</b>		
Neuro-endoscopy	2	3A, 4.1B, 5B, 12.1B, 13B.
Functional Neurosurgery	2	4A, 10.1A, 10.3A, 10.7A, 10.12A, 6B, 11.2B, 11.3B, 14.1B, 14.2B, 14.3B, 14.4B.
Spinal Surgery	2	2A, 5A, 10.1A, 10.12A, 7.3A, 8B, 9B, 10B, 12.3B.

Skull-base Surgery	2	5A, 9A, 10.1A, 10.12A, 4.4B, 5B, 6B, 11.1B.
Vascular Neurosurgery	2	10.1A, 10.7A, 10.12A, 4.1B, 4.2B, 4.3B, 7.1B.
<b>SCIENTIFIC ACTIVITIES (4 points)</b>		
	4	
<b>THESIS (40 points)</b>		
	40	

### **Clinical Training**

**According to the Bylaws, July 2009 for postgraduate programs, all the MD trainees should complete the advanced neurosurgical training program in the neurosurgical department. They should spend 24 months in order to acquire the needed credit points. During this period the trainee will also attend the general and advanced courses and will participate in the scientific activities of the department.**

### **MD Thesis:**

All MD degree students should prepare a thesis in neurosurgery. The research and ethical committee must approve the protocol of the research. The thesis may include a review part and a research part. The thesis is supervised by one or more senior staff members and may include other specialties according to the nature of the research. The thesis should be evaluated and approved by a committee of three professors including one of the supervisors and an external professor.

### **Scientific Activities:**

The candidates should participate in the scientific activities of the neurosurgical department such as:

- Seminars.
- Journal clubs.
- Scientific meetings.
- Workshops.
- Conferences.
- Thesis discussions.

Each activity is monitored and given credit points registered in a special section in the logbook. Candidates should collect the required points before allowed to sit for final exam.

## **VII. Assessment**

### **A: Assessment Tools**

- **Supervision and Monitoring of Training Program**

According the Faculty of Medicine, Cairo University Bylaws for practical Training Programs, professors carry continuous assessment during the program. A practical training program logbook will be kept for each candidate to document all his/her practical activities as well as his/her participation in different scientific activities. The head of the department should allow the candidates to undergo the final examination when they complete their training program and collect the credit points needed.

- **Formal Assessment**

1. Written exam.
2. Clinical exam.
3. Oral exam.

### **B: Assessment Schedule:**

1. Written exam:
  - a) day 1: paper I: Neurosurgery (essay questions).
  - b) day 2: paper II: Neurosurgery (multiple choice questions).
  - c) day 3: paper III: Surgical Anatomy (essay and multiple choice questions).
  - d) day 4: paper IV: Clinical Neurophysiology and Surgical Pathology (essay and multiple choice questions).



- e) day 5: paper V: Case study.
- 2. Clinical exam:
  - a) day 6: Long and short cases.
- 3. Oral exam:
  - a) day 7: Clinical discussions.

**C: Assessment techniques allocated to courses:**

Courses	Assessment technique		
Code & Title	Written	Oral	C/P*
1A: Describe the principles of general surgery and discuss the anatomy of structures other than the nervous system.	*	*	*
2A: Describe the precise anatomy of the central and peripheral nervous systems including the spine and skull as well as their embryology.	*	*	
3A: Describe the different topics of neurology with particular emphasis on those neurological entities that have important differential diagnostic considerations with respect to neurosurgical interests.	*	*	*
4A: Interpret clinical electrophysiology (electroencephalography [EEG], electromyography [EMG], electrocorticography [ECoG], evoked potential and neuro-otology), cerebral vascular physiology including cerebral blood flow, and functional cortical localization as derived from neurophysiological and neuropsychological principles.		*	*
5A: Interpret neuroradiological examinations (plain X-rays, different computed tomographic (CT) modalities, magnetic resonance imaging (MRI) modalities, angiography, ultrasonography and radionuclide imaging.		*	*
6A: Describe the fundamentals of clinical endocrinology.	*		
7A: Interpret the results of neuro-ophthalmology and neuro-otology tools including perimetry, electronystagmography, and audiometry.		*	*
8A: Recognize the physiology and fundamentals of neuro-anesthesia.	*	*	
9A: Describe the gross and microscopic neuropathology with recognition of morphological features allowing the formulation of a differential diagnosis with respect to the common neurological and neurosurgical disorders.		*	*
10. 1A: Describe and discuss the clinical features, including the presenting signs and symptoms, natural history, and prognosis for different neurosurgical disorders.			*
10. 2A: Describe and discuss the embryological development of the nervous system and how congenital anomalies arise.	*	*	
10. 3A: Describe and discuss the anatomical and physiological basis of consciousness, wakefulness and sleep.	*	*	
10. 4A: Describe and discuss the anatomical and physiological basis of speech, memory, learning and behavior.	*	*	

\* C: clinical exam;  
P: practical exam.

Remarks

- It is mandatory to pass all the papers

- of written exams separately.
- The passing mark in any written exam is  $\geq 60\%$ .

## VIII. Evaluation

<b>Evaluator</b>	<b>Tool</b>	<b>Sample</b>
1. Senior Students	Questionnaire at the end of the program	Sample of the postgraduate students
2. External Evaluators	Review the program and courses Attend the final exam.	Annual report

**Date of approval by the department's council: 12.06.2011**

**Program Coordinator**

**Professor Dr. Ahmed Amr Taher**

**Head of the Department**

**Professor Dr. Ahmed Mohamed Issa**