Jordan University of Science & Technology
Faculty of Medicine
Department of Neurology

Course Title : Neuroscience
Course code : M 555
Credit Hours : 2.3
Calendar Description : 2 weeks/5th year
Coordinator : Dr. Mohmmad Jamous

I. **Course description:**
**M555 Neuroscience (2.3 Credits hours, 2 weeks)**
This 2 week course is given as part of the clinical rotations for 5th year medical students. It is an integrated neurology/neurosurgery course that covers common neurological and neurosurgical problems. The course also emphasizes fundamentals of the neurological history taking, neurological examination, pathophysiology and management of common neurological and neurosurgical diseases. Care in areas of head and spine injuries, congenital anomalies, brain tumors, spinal diseases, stroke, demyelinating diseases, and neuromuscular diseases are also covered.

II. **Objectives:**
- To give the student a firm background in the fundamentals of the neurological history and examination.
- To give the student the fundamentals of the diagnostic work-up of the neurological and neurosurgical patient.
- To give the student a solid foundation in the pathophysiology and therapeutic options of common neurological and neurosurgical diseases.
- Expose the student to neurological & neurosurgical care in areas of head and spine injuries, congenital anomalies, brain tumors, spinal diseases, stroke, demyelinating diseases, and neuromuscular diseases.

III. **Format**
1. S/he shall participate in all daily rounds and teaching sessions with the teaching staff.
2. The student shall join a daily morning report that discusses the emergency admissions with 6th-year medical students and neurosurgical residents.
3. The students will have a weekly lecture that covers specific N.S topics.
4. The student shall participate in twelve seminars that covers common N & N.S problems

IV. **Evaluation and distribution of mark.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>20%</td>
</tr>
<tr>
<td>Attendance</td>
<td>10%</td>
</tr>
<tr>
<td>First exam</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>40%</td>
</tr>
</tbody>
</table>
IV: **Recommended Text Books**

Principles of Neurosurgery  
Setti S. Rengachary & Robert H. Wilkins  
Handbook of Neurosurgery  
Mark S. Greenberg  

V. **List of seminars and Objectives**

<table>
<thead>
<tr>
<th>Title of Seminar</th>
<th>Objectives of seminar</th>
</tr>
</thead>
</table>
| 1. **Diagnosis and management of Head Trauma** | 1. Understand and assign the Glasgow Coma Score.  
2. Recognize the presentation of brain herniation syndromes in the setting of trauma.  
3. Initiate management of elevated intracranial pressure in head trauma.  
4. Recognize and initiate management of concussion, brain contusion and diffuse axonal injury.  
5. Recognize and initiate management of acute subdural and epidural hematoma, including surgical indications.  
6. Recognize and initiate management of penetrating trauma including gunshot wounds.  
7. Recognize and understand the principles of management of open, closed and basal skull fractures, including cerebrospinal fluid leak, and chronic subdural hematoma (in children and adults). |
| 2. **Diagnosis and Management of Brain Tumor and abscess** | 1. Know the relative incidence and location of the major types of primary and secondary brain tumors.  
2. Understand the general clinical manifestations (focal deficit and irritations, mass effect; supratentorial vs. infratentorial) of brain tumors.  
4. Review the diagnostic tools that are currently used for evaluation (laboratory tests, radiology, biopsy).  
5. Understand broad treatment strategies (surgery, radiosurgery, radiation, and chemotherapy) in the treatment of tumors.  
6. Recognize the clinical manifestations of abscess and focal infections due to local spread, hematogenous disease associated with immune deficiency, and how they differ from the mimic tumors. Understand the general principles in the treatment of abscess and focal intracranial infections. |
| 7. **Diagnosis and Management of Spinal Cord injury** | 1. The emergency room diagnosis and interpretation of radiologic studies in spinal trauma.  
2. Initiate acute management of spinal cord injury including immobilization, steroids and systemic measures.  
3. Understand the definition and subsequent management principles of the unstable spine.  
4. Understand management principles in spinal cord injury including indications for decompressive surgery and treatment of the medical complications associated with cord injury (skin, bladder, bowel movement, respiratory). |
| 5. **Diagnosis and Management of Nontraumatic Neck and Back Problems** | 1. Diagnose and understand the natural history and management principles of whiplash and soft tissue injury.  
2. Recognize the broad categories of spinal pain and radiculopathy:  
3. The signs and symptoms (including cauda equina syndrome).  
4. Their common causes, their diagnosis and their management (cervical and lumbar disc herniation, osteoarthritic disease, spondylolisthesis).  
5. Their differential diagnosis and management (including metastatic disease and primary spinal tumors).  
6. Recognize the broad categories of myelopathy:  
7. The signs and symptoms (including comparison of acute and chronic spinal cord injury). |
### 6. Diagnosis and Management of Hydrocephalus and Spinal Dysraphism

1. Recognize the symptoms and signs of hydrocephalus in children.
2. Recognize the symptoms and signs of hydrocephalus in adults.
3. Understand common etiologies of hydrocephalus in children and adults, and differentiate between communicating and obstructive hydrocephalus.
4. Understand treatment strategies for hydrocephalus.
5. Recognize common syndromes of spinal dysraphism, their neurologic manifestations and broad principles of management.
6. Understand the physiology of cerebrospinal fluid, production, circulation, and absorption.
7. Know the normal biochemical constituents of the CSF and interpret the pathological changes.

### 8. Congenital CNS malformation

1. To know the most common congenital malformation of the CNS, like: Arachnoid cyst, Chiari malformation.
2. Understand the presentation of different congenital malformation and their management.

### 9. Stroke

1. Be able to define stroke and its subtypes
2. Be able to identify risk factors for stroke
3. Identify the major blood vessels in the anterior and posterior circulation and the territories they supply
4. Be able to mention some of the etiologies for ischemic and hemorrhagic strokes
5. Realize the clinical features of stroke in different vascular territories
6. Realize the important role of tissue plasminogen activator (t-PA) in the management of acute stroke and the requirements for its use
7. Realize the major venues of secondary prevention of stroke
8. Realize and be able to prevent the common complications associated with stroke

### 8. Coma

1. Define concepts of: Coma, lethargy, stupor, alertness.
2. Be familiar with the components of Glescow coma scale.
3. Be familiar with the possible etiologies of coma: supratentorial structural lesions, infratentorial structural lesions, primary neurological diseases that are non-focal, and systemic etiologies of coma.
4. Be able to list the most common causes of coma world wide and in our community.
5. Be able to give a comprehensive differential diagnosis for coma.
6. Be able to point out important aspects of neurological history specific for a comatose patient.
7. Be able to point out important aspects of neurological examination specific for a comatose patient.
8. Be able to stabilize and manage a comatose patient

### 9. Epilepsy

1. Be able to define the concept of epilepsy and differentiate it from seizures.
2. Recognize the possible etiologies of seizure disorders.
3. Be familiar with the international classification of epilepsies and seizure disorders.
4. Be able to differentiate a simple from a complex seizure.
5. Be able to give a clinical description of the most common types of seizures: Generalized tonic clonic convulsions, absence seizures, and complex partial seizures.
6. Be able to point out important aspects of history and physical examination related to seizure disorders.
7. Be familiar with the important investigation tools for a seizure patient, especially brain MRI and electroencephalography.
8. Be able to give a general outline for managing an epilepsy patient.
9. Be familiar with the major categories of anti-epileptic medications, their indications, and the major side effect of each. This includes: Phenytion, carbamazepine, valproic acid, topiramate, lamotrigine, and levetiracetam.
10. **Muscle and neuromuscular diseases**

1. Be familiar with the general anatomy and physiology of the neuromuscular junction.
2. Be able to give the general symptoms common to most muscle diseases.
3. Be familiar with the major categories of muscle disease: Congenital and acquired.
4. Of the congenital muscle disease, be familiar with: Duchenne muscular dystrophy, Myotonic dystrophy and Emory Dreifuss muscular dystrophy.
5. Of the acquired myopathies, be familiar with: polymyositis, dermatomyositis, inclusion body myositis, thyroid myopathy, and medication induced myopathies.
6. Be able to outline the major specific investigations and management for a muscle disease patient.
7. Be familiar with myasthenia gravis as the most important disease of the neuromuscular junction.
8. Be able to give the clinical features of myasthenia gravis.
9. Be familiar with specific investigations for a myasthenic patient.
10. Be able to give a major outline for managing myasthenia gravis.

11. **Multiple Sclerosis**

1. Be familiar with the basic histology of a nerve cell and axon, including the process of myelination.
2. Be familiar with multiple sclerosis as the major CNS disease characterized by nerve cell demyelination.
3. Be able to give the major clinical features of multiple sclerosis.
4. Be familiar with the diagnostic tools and criteria for multiple sclerosis.
5. Be able to give the major findings on MRI and lumbar puncture in MS patients.
7. Be familiar with the disease modifying agents in multiple sclerosis: Interferon Beta 1a and Interferon beta 1b, as well as copaxone.
8. Be familiar with the symptomatic treatment of MS.

12. **Motor Neuron Disease**

1. Understand the difference between upper and lower motor neuron disease (MND)
2. Be able to classify MNDS
3. Describe the clinical features seen in ALS
4. Be able to describe the major investigations done in the work up of ALS patients
5. Be able to diagnose ALS using a constellation of clinical and laboratory tools
6. Be able to differentiate ALS from other mimicking illnesses

13. **Neuropathies**

1. Understand the different terms used in the description of nerve diseases
2. Be able to classify neuropathies into different categories
3. Understand the signs and symptoms seen in neuropathy patients
4. Be able to give examples on different etiologies for neuropathy
5. Realize the differences in presentation between hereditary and acquired neuropathies
6. Realize the clinical features of the major acquired and hereditary neuropathies

14. **Movement disorders**

1. To define symptoms of movement disorders
2. To know classification schemes of movement disorders
3. To discuss genetics of movement disorders
4. To know treatment principles of certain diseases e.g. Parkinson’s disease, Wilson’s disease, Primary dystonia, Tourette’s syndrome)

15. **CNS emergencies**

1. To list pathogens causing acute & subacute meningitis & brain abscess
2. To discuss pathogenesis & pathology of meningitis
3. To understand clinical presentation & laboratory evaluation of meningitis
4. To know treatment principles of meningitis & brain abscess
5. To discuss treatment principles of status epilepticus
6. To discuss clinical presentation of neuromuscular emergencies (GBS, myasthenia crisis)
7. To know treatment principles of neuromuscular emergencies
8. To know clinical presentation & treatment principles of cord compression
<table>
<thead>
<tr>
<th></th>
<th><strong>Localization in neurology</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To review anatomy of major tracts (e.g. pyramidal tract, spinothalamic tract)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>To review blood supply of brain</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>To discuss signs &amp; symptoms of upper &amp; lower motor neuron lesions</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>To discuss localization principles of upper motor neuron disorders (e.g. spinal cerebral hemisphere, brainstem)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>To discuss localization principles of lower motor neuron disorders (e.g. nerve plexus)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>Headache</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To understand classification scheme of headache</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>To discuss the clinical presentation, pathophysiology, and diagnostic tests of different primary headache disorders (e.g. migraine, cluster &amp; tension headache)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>To recognize ominous causes of headache.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>To review treatment principles of headache</td>
<td></td>
</tr>
</tbody>
</table>
Fifth Year Medical Students Bi-Weekly Schedule (2009-2010)

<table>
<thead>
<tr>
<th>Day</th>
<th>Didactics/Activity 8:00-8:45</th>
<th>Morning Teaching 9:30-12:30</th>
<th>Didactics/Activity 2:00-4:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun</td>
<td>Neuro Exam Dr. Bataih (NP)</td>
<td>A- Dr. Bataih (NP)</td>
<td>Dr. qayli (5C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B- Dr. qayli (5C)</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>Peripheral Neuropathy (NP)</td>
<td>A-Dr. Jamous (5C)</td>
<td>Movement disorders</td>
</tr>
<tr>
<td></td>
<td>Dr. Khalid El-Salem</td>
<td>B1-Dr. Refai (Clinic)</td>
<td>Dr. Refai(NP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2- Dr. El-Salem (NP)</td>
<td></td>
</tr>
<tr>
<td>Tue</td>
<td>History and clinical exam</td>
<td>A- Dr. Hussam (5C)</td>
<td>Head injury, Spine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B- Dr. Refai (10A)</td>
<td>injury Dr. Jamous</td>
</tr>
<tr>
<td>Wed</td>
<td>History and clinical exam</td>
<td>A- Dr. Refai (10A)</td>
<td>Disc Disease Dr Hussam</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B- Dr. Jamous (5C)</td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td>Multiple Sclerosis Dr. Darweesh (NP)</td>
<td>A- Dr. Darweesh (10A)</td>
<td>S.A.H (Dr,Barbarawi)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B- Dr. Barbarawi (5C)</td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>Epilepsy (NP) Dr. Bataih</td>
<td>A-Dr. qayli (5C)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B-Dr. Bataih (10A)</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>A1- Dr. Refai (Clinic)</td>
<td></td>
<td>Dementia (NP)</td>
</tr>
<tr>
<td></td>
<td>A2- Dr. El-Salem (NP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B- Dr Jamous (5C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tue</td>
<td>A-Dr. Refai(10A)</td>
<td></td>
<td>CNS Tumors Dr. Oqayli</td>
</tr>
<tr>
<td></td>
<td>B-Dr Hussam (5C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>History and clinical exam</td>
<td>A-Dr.Jamous(5C)</td>
<td>Congenital anomalies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B-- Dr. Refai (10A)</td>
<td>(Dr.Jamous )</td>
</tr>
<tr>
<td>Thu</td>
<td>Headache Dr. Darweesh (NP)</td>
<td>A. Dr. Darweesh (5C)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Dr. Barbarawi (10A)</td>
<td></td>
</tr>
</tbody>
</table>

- Groups are divided into A and B groups.
- Whenever groups are not assigned, all students are expected to show up.
- Students are expected to be in the hospital from 8 am to 4 pm.
- Failure to attend any of the teaching rounds or clinics will be counted as one-day abstinence.
- Failure to attend any of the other activities will be counted as one-day abstinence for every two of them.
- Showing up late for more than 5 minutes for any activity will be considered no show, and for less than 5 minutes should be justified, admission to the activity will be up to the teaching staff.
- NP indicates clinical teaching starts in the neurophysiology lab conference room.
- Study subjects include, but are not limited to, topics covered in Didactics.
- In case one or more teaching staff is on vacation, or during major holidays, this schedule will be modified, in which case the substitute schedule will have specific dates on the top. Otherwise, this schedule above is applicable.