Course Specifications

General Information

Course name	Neurosurgery
Course number	MDCN5224
Faculty	
Department	
Course type	Major Needs
Course level	5
Credit hours (theoretical)	2
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Understand the anatomy and physiology of the central nervous system: The course should provide a comprehensive understanding of the structure and function of the brain, spinal cord, and peripheral nerves

2 - Develop proficiency in neurosurgical techniques: Students should learn and master various neurosurgical techniques, including diagnostic procedures, surgical interventions, and postoperative management

3 - Acquire knowledge of neurosurgical diseases and conditions: The course should cover a wide range of neurosurgical diseases and conditions, including brain tumors, vascular disorders, traumatic brain and spinal cord injuries, neurodegenerative diseases, and congenital anomalies

4 - Learn to diagnose and evaluate patients with neurological disorders: Students should be able to perform a thorough neurological examination, interpret diagnostic tests such as MRI and CT scans, and make accurate diagnoses based on clinical findings and imaging studies

5 - Develop effective communication and teamwork skills: Neurosurgery often requires a multidisciplinary approach, involving collaboration with other healthcare professionals. Students should learn effective communication skills to interact with patients, families, colleagues, and other members of the healthcare team

6 - Understand ethical and legal considerations in neurosurgery: The course should address ethical issues related to neurosurgical practice, including patient autonomy, informed consent, end-of-life decisions, and confidentiality. Students should also be familiar with legal and regulatory aspects of neurosurgery

7 - Gain proficiency in neurosurgical procedures through practical training: The course should provide hands-on experience through practical training, such as surgical simulations, cadaveric dissections, and supervised surgical rotations in the operating room

8 - Understand the principles of neurosurgical research and evidence-based practice: Students should be familiar with research methodologies, study designs, and statistical analysis relevant to neurosurgery. They should also understand the importance of evidence-based practice in guiding clinical decisions

9 - Develop decision-making skills in neurosurgical management: The course should emphasize the development of critical thinking and decision-making skills in the management of neurosurgical patients, including determining the appropriate surgical approach, selecting the most suitable treatment options, and managing complications

Intended Learning Outcomes

Knowledge and Understanding	* Students should demonstrate a comprehensive understanding of the anatomy of the central nervous system, including the brain, spinal cord, and peripheral nerves, including their structures, functions, and interconnections * Students should possess knowledge of the fundamental principles of neurophysiology, including the electrical properties of neurons, synaptic transmission, neural signaling, and the organization of neural circuits * Students should be able to identify, classify, and describe the etiology, pathophysiology, clinical presentation, and natural history of various neurosurgical diseases and conditions, such as brain tumors, cerebrovascular diseases, epilepsy, neurodegenerative disorders, and traumatic brain and spinal cord injuries * Students should have an understanding of the pharmacological agents commonly used in neurosurgery, including anesthetics, analgesics, neuromuscular blocking agents, antiepileptic drugs, and neuroprotective medications, including their mechanisms of action, dosages, and potential adverse effects * Students should understand the basic principles of research methodology, study design, and statistical analysis in neurosurgery. They should be able to critically appraise scientific literature, apply evidence-based practice in clinical decision-making, and interpret and communicate research findings
Intellectual Skills	* Students should be able to critically analyze complex neurosurgical cases, evaluate diagnostic findings, and formulate evidence-based treatment plans, considering the available scientific literature, patient-specific factors, and potential risks and benefits * Students should develop effective problem-solving skills in the context of neurosurgical practice, including the ability to identify and address clinical challenges, anticipate and manage potential complications, and make informed decisions in dynamic and time-sensitive situations * Students should demonstrate the ability to integrate clinical information, including history, physical examination findings, imaging results, and laboratory data, to arrive at accurate diagnoses, formulate differential diagnoses, and develop appropriate management plans for patients with neurosurgical conditions * Students should possess strong analytical skills, enabling them to critically evaluate research studies, interpret complex neuroimaging findings, and analyze surgical outcomes data to inform clinical practice and advance the field of neurosurgery * Students should demonstrate proficiency in technical skills related to neurosurgical procedures, including surgical techniques, instrument handling, and precision in executing surgical maneuvers
Professional Skills	* Students should develop and demonstrate the technical skills necessary to perform neurosurgical procedures safely and effectively, including surgical techniques, instrument handling, suturing, and hemostasis * Students should possess the skills to conduct thorough neurological examinations, including obtaining a detailed medical history, performing neurological tests, interpreting imaging studies, and formulating accurate diagnoses * Students should learn how to effectively communicate with patients and their families, explaining diagnoses, treatment options, potential outcomes, and risks involved, and obtaining informed consent for surgical interventions * Students should develop the ability to work collaboratively with other healthcare professionals, such as neurologists, radiologists, anesthesiologists, and physical therapists, to provide comprehensive care and ensure optimal patient outcomes

Professional Skills	* Students should demonstrate a commitment to providing patient-centered care, respecting patients autonomy, cultural and socioeconomic backgrounds, and preferences, and involving them in shared decision-making processes * Students should develop leadership skills, including the ability to effectively lead a surgical team, delegate tasks, manage resources, and make informed decisions in complex and dynamic clinical situations * Students should cultivate a commitment to lifelong learning, engaging in continuous professional development activities, attending conferences, participating in research, and staying up-to-date with advancements in neurosurgery to provide the best possible care to patients
General Skill	* Students should be able to identify and address clinical challenges, develop innovative solutions, and adapt to unexpected situations during neurosurgical practice * Students should acquire effective communication skills, including listening, speaking, and writing, to effectively communicate with patients, families, colleagues, and other healthcare professionals * Students should develop strong interpersonal skills, including empathy, compassion, cultural sensitivity, and the ability to establish rapport and build trust with patients and their families * Students should demonstrate the ability to work effectively as part of a multidisciplinary team, collaborating with other healthcare professionals to provide comprehensive and coordinated care to neurosurgical patients * Students should recognize the importance of lifelong learning and engage in continuous professional development, staying updated with the latest advancements, research, and best practices in neurosurgery * Students should develop the ability to adapt to changing circumstances, handle stress, and maintain resilience in challenging situations inherent to neurosurgical practice

Course Contents

1 - Introduction to Neurosurgery
2 - Neuroanatomy
3 - Neurophysiology and Neuropathology
4 - Neuroimaging
5 - Neurosurgical Techniques and Procedures
6 - Neurosurgical Diseases and Conditions
7 - Neurocritical Care
8 - Pediatric Neurosurgery
9 - Neurosurgical Research and Innovation
10 - Professional and Communication Skills

Teaching and Learning Methods

1 - Lectures
2 - Case-Based Learning
3 - Surgical Simulations
4 - Clinical Rotations
5 - Small-Group Discussions
6 - Surgical Observations
7 - Team-Based Learning
8 - Online Resources and e-Learning
9 - Research Projects
10 - Presentations and Grand Rounds

Students Assessment

Assessment Method	TIME	MARKS
First exam	6th week	20
attendance	At the end of the course	10
Research	8th week	20
Final exam	At the end of the course	50

Books and References

Essential books	Greenbergs Textbook of Neurosurgery by Mark S. Greenberg
Recommended books	Principles and Practice of Neurosurgery by Setti Rengachary and Richard G. Ellenbogen
	Handbook of Neurosurgery by Mark S. Greenberg
Other References (Periodical, web sites, ... etc.)	(https://www.aans.org/) American Association of Neurological Surgeons (AANS)
	Neurosurgical Atlas https://www.neurosurgicalatlas.com