Universidad de Navarra

Clinical cases in Neuroradiology

Guía docente 2025-26

Introduction to Neuroradiology with Interactive Participation

Of the Clinical Sciences in general, perhaps the one that has had the most profound impact in the last generation is Diagnostic Radiology, with Neuroradiology being at the forefront of medical imaging, and among those in the forefront of image intervention. In Neuroradiology it is especially evident that the concept developed at the late Armed Forces Institute of Pathology, Washington, D.C., that "the Radiologist is a Gross Pathologist", is especially true. This rapidly evolving subspecialty has become of paramount importance, due to the required interaction from those not only in the field of advanced Clinical and Research Neurosciences, but also those in other clinical professions like Medical and Radiation Oncology, General Internal Medicine, Pediatrics, Emergency Medicine, and Family Practice. It is the general objective that with this short course the participant will develop an understanding of how to properly order neuroradiology examinations, how to identify basic patterns of neurologic disease by a rudimentary evaluation of images, and to develop a basic understanding of selected but varied topics in the field of Neuroradiology. Interactive participation by the students is an important aspect of this course. Prerequisite knowledge of Gross Neuroanatomy is a must. Gross neuroanatomy of the brain and basic functions should be REVIEWED BEFORE starting the course.

- *Degree:* Medicine
- *Years and semesters:* 5th and 6th year. Second semester.
- *Department:* International Program, School of Medicine.
- *Module in the Degree Program:* Module VI. Electives.
- *Lecture schedule:* From January 12th to 23rd inclusive, Monday to Friday from 7 to 9 pm.
- *Lecture Room:* 4A02
- *Exam: to be announced*
- *Venue:* School of Medicine
- *Number of credits: 3* ECTS
- *Type of course: Elective*
- *Language:* English
- *Course Instructor*
- Héctor A. Robles y González, MD, MPH, FACR (Click for CV)
  - Neuroradiologist , Mayo Clinic, Jacksonville, Florida, US
  - Visiting Professor, Universidad de Navarra
  - Professor of Radiology, Voluntary Faculty, Miller School of Medicine, University of Miami , Miami, Florida, US
  - Assistant Professor, Part Time , The Johns Hopkins University School of Medicine, Baltimore, Maryland

LEARNING OUTCOMES (Competencies)

BASIC COMPETENCIES

CB1 – That students have shown themselves to possess and understand knowledge in an area of study that develops from general secondary education, and is usually at a level that, although requiring advanced textbooks, also includes some aspects that imply knowledge from the forefront of their field of study.

CB2 – That students know how to apply their knowledge, in a professional manner, to their work or vocation, and that they possess the abilities that are usually demonstrated through the preparation and justification of arguments and the resolution of problems in their field of study.

CB3 – That students have the capacity to collate and interpret relevant data (normally within their area of study) in order to express opinions that include reflection on relevant subjects of social, scientific or ethical nature.

CB5 – That students have developed the learning skills necessary to carry out further study with a high level of autonomy.

GENERAL COMPETENCIES

CG7 – To understand and recognize the structure and normal function of the human body at the levels of the molecule, cell, tissue, organ and system over the different stages of life and in both sexes.

CG9 – To understand and recognize the effects, mechanisms and manifestations of disease on the structure and function of the human body.

CG15 – To have the capacity to prepare an initial diagnostic evaluation and to establish a reasoned diagnostic strategy.

CG17 – To establish diagnosis, prognosis and treatment, by application of principles based on the best information possible and on conditions of clinical safety.

SPECIFIC COMPETENICIES

CE19 – To recognize the morphology and structure of tissues, organs and systems with macroscopic and microscopic methods and with imaging techniques.

CE109 – To evaluate the risk/ benefit relationship of diagnostic and therapeutic procedures.

CE110 – To know the indications for biochemical, hematological, immunological, microbiological, anatomical- pathological tests and imaging.

CE111 – To know the characteristics of tissues in different states of injury, adaptation and cellular death.

CE113 – Alterations in cell growth.

CE118 – To know the bases of the interaction of radiation with the human organism.

CE119 – Radiological imaging.

CE120 – Basic radiological semiology for the various apparatuses and systems.

CE121 – To know other techniques to obtain diagnostic images.

CE122 – To evaluate indications and contra-indications of radiological studies.

CE123 – To have the ability to apply the criteria of radiological protection during diagnostic and therapeutic procedures with ionizing radiation.

CE142 – To know how to interpret a radiological image by means of a systematic approach.

LEARNING OBJECTIVES

Knowledge and abilities the student must acquire:

At the end of the fifteen -hour course, the participant should be able to:

1. Develop a basic approach to image interpretation: Develop the rudiments of an organized approach for image evaluation through interactive case participation in the brain and spine. The course is not designed for credentialing or certifying the student in image interpretation, but rather familiarization.

2. Brain Tumors: Develop a basic approach for identification of brain neoplasms according to intra axial and extra axial location, pattern of enhancement, calcification, demographics, and other imaging characteristics.

3. Cerebrovascular Disease/ Neuroradiology of Stroke: Understand the Neuroradiologic study utilization in the diagnosis and treatment of Acute Infarction, Intracranial Hemorrhage, and Dural Venous Sinus Thrombosis.

4. Congenital Malformations of the Brain: Recognize the most common posterior fossa congenital malformations. Understand the spectrum of Holoprosencephaly. Recognize patterns of Neuronal migration anomalies. Recognize and identify Supratentorial midline anomalies.

5. Selective cases and topics: Through interactive participation, being able to develop a rudimentary approach of analysis of the case, discussion, and a basic differential diagnosis.

PROGRAM

TOPICS LIST:

The Course will consist of a core of didactic lectures covering the following topics:

1.The Neuroradiologist's Armamentarium and Basic Approach to Image Interpretation of CT, MRI, and Myelography

- Neuroradiologic Anatomy (This course expects pre-requisite knowledge of Neuroanatomy)

2. Neuroradiology of Stroke/Cerebrovascular Disease

3. Brain Tumors

4. Congenital Brain Malformations

These topics will be supplemented by Conferences of Unknown Cases with interactive participation.

TOPICS NOT COVERED IN THIS COURSE

Topics not covered in this course: Among others, these topics are beyond the scope of this introductory Neuroradiology course and will not be discussed:

1. Functional MRI, Spectroscopy, and advanced MR techniques.

2. Interventional Neuroradiology.

3. In-depth discussion of Neuroanatomy

4. Clinical Syndromes.

EDUCATIONAL ACTIVITIES

The student will acquire the knowledge and abilities through:

- Attendance at lectures: MANDATORY
- Personal study of the lectures content and the study materials provided by the professor

Time distribution:

- Attendance at lectures: 20 hours
- Academic advising /Meet with the professor (optional): 1 hour
- Evaluation: 3 hours
- Time devoted to personal study: 34 hours

Total: 58 hours (3 ECTS)

Activities requiring attendance

- Class-room/attendance at lectures: **20 hours**
- Academic advising /Meet with the professor (optional): **1 hour**
- Evaluation: **3 hours**

Activities not requiring attendance

- Time devoted to personal study: **34 hours**

Total: 58 hours (3 ECTS)

The student will acquire the knowledge and abilities through:

- Attendance at the class-room lectures
- Personal study of the lectures content and the study materials provided by the professor

ASSESSMENT

ORDINARY EXAM

Final evaluation:

Percentage of final score:

- 100% Final online exam

Final exam

- Date, hour: 18 june, 16 to 18 hours
- Exam type: Tests multiple choice questions exam.

EXTRAORDINARY EXAM

Percentage of final score:

- 100%

Final Extraordinary exam To be confirmed.

Special students: Those students proceeding coming from other universities, within Erasmus program or other programs will be evaluated individually.

OFFICE HOURS

The student may schedule an appointment with the professor, directly during the classes or by e-mail:

Contact information:

hectorrobles87@gmail.com

Universidad de Navarra

BIBLIOGRAPHY AND RESOURCES

1. Neuroradiology: The Requisites, by Rohini Nadgir and David M. Yousem and David Grossman, Mosby. Find it in the Library
2. https://www.imaios.com/en/e-Anatomy
3. The whole Brain Atlas

The Whole Brain Atlas