Course: Neurology
Course Coordinator: Vladimira Vuletić, MD, PhD, Assist. Professor
Department: Department of Neurology
Study program: Integrated Undergraduate and Graduate University Study of Medicine in English
Study year: Fourth
Academic year: 2021/22

SYLLABUS

Course description (a brief description of the course, general instructions, where and in what form the lessons are organized, necessary equipment, instructions for attendance and preparation for classes, student obligations, etc.):

The course "Neurology" is a compulsory course in the 4th year of the Integrated Undergraduate and Graduate Study of Medicine and consists of 20 hours of lectures, 35 hours of seminars and 30 hours of exercises (4.5 ECTS). Most of the course is conducted at the Clinic of Neurology of the Clinical Hospital Center Rijeka, except for lectures that are held in the central lecture room of Rijeka locality of the Clinical Hospital Center Rijeka.

Course objective:
Acquisition of basic knowledge and clinical skills in the field of neurology. The aim is to acquaint students with new knowledge about the functioning of the brain, the current possibilities of the neurological profession and to enable easier understanding and access to neurological patients. Students will be introduced to the specifics of neurological propaedeutics and the basics of clinical neurological examination. The aim of the course is also to acquaint students with neurological diseases, diagnostics, differential diagnosis and treatment. The seminars will cover the anatomical and physiological examination of the relevant neurological area, the functions of the cerebral nerves, sensory, motor, vegetative and higher nervous functions, and topical diagnostics. Students will be introduced to the methods of examination and pathological changes of certain neurological functions and their correct interpretation during practicals.

Course content:
Cerebrovascular diseases; Tumors of the central nervous system; Epilepsy and other paroxysmal conditions; Demyelinating diseases; Extrapyramidal diseases; Dementia; Headaches and other painful conditions; Neuromuscular diseases; Diseases and injuries of the spinal cord and nerve roots; Emergencies in neurology.

Class organization:
The estimated duration of classes is 8 weeks in total. Active participation is expected and monitored during the seminars, along with short (approx. 10 min.) independent Powerpoint presentations on a given topic of the seminar, the teacher will discuss the topic with students and at the end of each seminar students will receive 5 questions from the given topic, either orally or in writing. During practicals, the teacher will demonstrate the neurological exam and evaluate the active participation of students in performing the neurological exam. There will be a mandatory oral colloquium held at the end of Seminars and Practicals. A final exam will be held at the end of the course, in both written and oral form, during which the student will demonstrate practical knowledge of neurological propaedeutics according to the Skills Catalog Booklet. By completing all teaching activities, the student can achieve a maximum of 50 points (up to 50% of the grade) and at the final exam 50 points. The student will gain 4,5 ECTS by fulfilling all the above obligations.

Assigned reading:

1. Roger Simon, David Greenberg, Michael Aminoff et al. Lange Clinical Neurology, McGraw-Hill Education, 10th ed, 2017.
2. William W. Campbell et al. DeJong's The Neurologic Examination. LWW, 8th ed, 2019.

Optional/additional reading:

COURSE TEACHING PLAN:

The list of lectures (with topics and descriptions):

L1, L2 Cerebrovascular diseases

Learning outcomes:

Know the definition of cerebrovascular disease (CVD). Know the division and subtypes of CVD. Familiarize with the etiology of stroke. Understand the pathophysiology of cerebral ischemia and cerebral hemorrhage. Get acquainted with the diagnosis and treatment of acute stroke. Know how to apply primary and secondary stroke prevention measures.

L3, L4 Tumors of the central nervous system

Learning outcomes:

Know the types of brain and spinal cord tumors. Know the pathophysiological mechanisms of CNS tumors. Recognize the clinical status of such patients. Know how to choose diagnostic procedures and get acquainted with treatment methods.

L5, L6 Epilepsy and other paroxysmal disorders

Learning outcomes:

Know how to classify epileptic seizures. Identify certain types of epileptic seizures. Know the etiology of epileptic seizures. Apply specific treatment with antiepileptics.

L7, L8 Demyelinating in inflammatory diseases of the central nervous system

Learning outcomes:

Get acquainted with various demyelinating diseases. Understand the pathogenesis of multiple sclerosis. Interpret the clinical picture and clinical course. Get acquainted with the modalities of diagnosis and treatment of multiple sclerosis.

L9, L10 Extrapyramidal diseases

Learning outcomes:

Understand the pathogenesis and etiology of movement disorders. Be able to recognize the main features of Parkinson's disease. Be able to use diagnostic methods and treatments for Parkinson's disease. Be able to recognize forms of atypical parkinsonism.

L11 Dementia

Learning outcomes:

Know how to distinguish cognitive disorders. Learn the definition and classification of dementias. Know the most common causes of confusion states in patients. Understand the pathogenesis of Alzheimer's disease. Distinguish dementia from pseudodementia.

L12 Vertigo

Learning outcomes:

Define vertigo. Understand the differences between vertigo and imbalance disorders. Know how to distinguish the central cause of vertigo from the peripheral. Explain the most common causes of central vertigo.

L13 Headaches

Learning outcomes:

Define acute and chronic pain. Classify pain. Understand the pathophysiological features of nocicepsia pain. Understand neuropathic pain. Classify headaches. Distinguish individual types of headache. Explain the pathogenesis of migraine. Be able to apply criteria for the purpose of diagnosing migraine. Be able to apply the treatment of acute migraine attack and prophylactic treatment of migraine. Be able to describe other primary headaches.

L14, L15, L16, L17, L18 Neuromuscular diseases

Learning outcomes:
Identify the main groups of neuromuscular diseases according to location of the disease process. Describe the clinical picture of motor neuron disease (upper, lower). Know the diagnostic criteria for amyotrophic lateral sclerosis. Identify peripheral neuropathy and myopathy. Describe the clinical picture of metabolic, hereditary and other forms of neuropathy. Be able to recognize acute inflammatory polyradiculoneuropathy. Explain the function of the neuromuscular junction and the pathogenesis of myasthenia gravis. Know the methods of diagnosis and specific treatment of myasthenia gravis.

L19, L20 Emergencies in neurology
Learning outcomes:
Describe a group of neurological diseases that endanger the life of patients. Be able to recognize life-threatening conditions. Be able to determine the general condition of patients and determine the degree of patient response. Get acquainted with emergency diagnostic and treatment measures.

The list of seminars with descriptions:

S1, S2, S3 Consciousness and disorders of consciousness
Learning outcomes:
Explain the concept of consciousness. Know the causes of wakefulness disorders. Be able to assess the degree of consciousness disorder. Get acquainted with clinical indicators of the depth of consciousness disorders.

S4, S5, S6 Cranial nerves
Learning outcomes:
Know all 12 cerebral nerves and their function. Be able to recognize and explain the clinical characteristics of individual cranial nerve lesions.

S7, S8, S9 Pyramidal system
Learning outcomes:
Explain the corticospinal and corticonuclear pathways. Explain the function of the upper motor neuron. Explain the clinical characteristics of upper motor neuron damage.

S10, S11, S12 Extrapyramidal system
Learning outcomes:
Explain the basic function of the extrapyramidal motor system. Know the main extrapyramidal motor pathways. Know the symptoms of extrapyramidal nervous system damage.

S13, S14, S15 Peripheral nervous system
Learning outcomes:
Know the dissemination of motor information in the peripheral nervous system (spinomuscular level of motor skills). Explain the system of the lower motor neuron. Know the segmental and peripheral innervation of the most important muscles of the arm and leg.

S16, S17, S18 Sensory nervous system
Learning outcomes:
Explain the sensory system in general. Know the types of sensations and their transmission from the periphery to the central nervous system. Explain cortical sensory functions - integrative sensory functions.

S19, S20, S21 Balance and coordination
Learning outcomes:
Explain the anatomical position of the cerebellum, the main motor and sensory connections of the cerebellum. Know the functions of the cerebellum. Identify disorders of body balance - causes and types.

S22, S23, S24 Diagnosis and treatment of demyelinating diseases

Learning outcomes:

Explain the characteristics of demyelinating diseases and the differential diagnosis. Understand diagnostic workup and interpret the finding correctly. Know the paraclinical criteria for the diagnosis of multiple sclerosis. Understand the modalities of multiple sclerosis treatment.

S25, S26, S27 Painful syndromes of upper and lower extremities

Learning outcomes:

Recognize the clinical picture of compressive radiculopathy. Explain the clinical picture of cervical disc prolapse. Recognize symptoms of brachial and lumbal plexopathy, carpal tunnel syndrome, radial nerve palsy as well as ulnar, axillar, sciatic, femoral and peroneal nerve damage

S28, S29, S30 Unconsciousness and dizziness

Learning outcomes:

Be able to distinguish syncope from other paroxysmal disorders of consciousness. Understand the etiology of syncope. Know the types of syncope according to etiology. Explain the definition of vertigo and its causes.

S31, S32, S33 Diagnosis of stroke

Learning outcomes:

Recognize the signs of a stroke. Understand and explain the importance of emergency neurological treatment in acute stroke. Know neuroradiological diagnostic methods and correctly interpret findings. Explain the peculiarities of cerebral circulation and the principles of ultrasound examinations of blood vessels with a brain destination.

S33, S34, S35 Treatment of stroke

Learning outcomes:

Know the causes of stroke. Understand and explain pharmacological and non-pharmacological methods of treating acute stroke. Know primary and secondary stroke prevention measures.

The list of practicals with description:

P1, P2, P3 History

Learning outcomes:

Explain the specifics of taking medical history in neurological patients. Know the necessary anamnestic data that should always be examined in a neurological patient.

P4, P5, P6, P7 Examination of the state of consciousness and function of the cranial nerves

Learning outcomes:

Be able to analyze clinical indicators of the depth of disturbances of consciousness. Be able to identify the clinical features in comatose patients. Be able to identify the types of respiratory disorders, examine the appearance of the pupils, get to know the methods of examining the oculocephalic and oculovestibular reflex as well as motor functions under teacher supervision. Be able to examine the function of each individual cranial nerve.

P8, P9, P10, P11 Testing of motor functions

Learning outcomes:

Be able to examine the motor functions of the upper and lower motor neurons and be able to interpret them correctly. Know the differences between upper and lower motor neuron lesions. Be able to recognize the symptoms of damage to the lower motor neuron and be able to examine the innervation area of a particular nerve or spinal nerve. Know how to perform tests of balance and coordination. Be able to recognize damage to the extrapyramidal system.

P12, P13, P14, P15 Sensory system test

Learning outcomes:

Be able to examine sensory functions - superficial and deep sensation. Be able to examine integrative sensory functions.

P16, P17, P18, P19 Reflex test
Learning outcomes:
Explain reflex motor activity. Be able to examine and correctly interpret myotatic reflexes, surface reflexes. Explain pathological reflex responses and pathological reflexes.

P20, P21, P22 Coordination and balance test
Learning outcomes:
Be able to perform experiments to test coordination; balance in walking and standing. Be able to interpret limb coordination disorder and body balance disorder

P23, P24, P25, P26 Examination of higher brain functions + neuropsychological tests
Learning outcomes:
Explain cognition and cognitive functions. Know the ways of examining speech functions, know how to recognize phonation and articulation disorders and aphasia. Know ways to test speech comprehension, reading, arithmetic, writing skills. Be able to examine gnostic functions and perform practice tests. Know how to examine memory and know how to use the Mini mental test and interpret it correctly.

P27, P28, P29, P30 Topographic diagnostics and important syndromes: hemispherical, brainstem, cerebellar syndromes
Learning outcomes:
Explain the function of individual parts of the CNS and understand neurological symptoms with regard to topographic or localization diagnostics.

Students' obligations:

Students are required to attend regularly and actively participate in all forms of the classes.

Assessment (exams, description of written / oral / practical exam, the scoring criteria):

Knowledge assessment (method of taking the exam, description of the written / oral part of the exam, method of scoring during classes, grading criteria)

Student assessment is carried out according to the current **Ordinance on studies at the University of Rijeka**, and according to the **Ordinance on student assessment at the Medical Faculty in Rijeka** (adopted by the Faculty Council of the Medical Faculty in Rijeka)

Student work will be evaluated and graded during classes and at the final exam. Out of a total of 100 points, a student can achieve a maximum of **70 points** during classes, and **30 points** at the final exam. A total of 4.5 ECTS.

I During classes, the following is evaluated:

a. acquired knowledge - up to 30 points
b. activity and knowledge during classes - up to 20 points

a. Acquired knowledge (up to 30 points)

During the classes, the acquired knowledge will be assessed with one colloquium (oral) after the completion of all seminars and practicals in terms of agreement (depending on the number of students) on working days with the possibility of inclusion of Saturday. The colloquium has to take place before the final exam. The maximum number of points is 60. Examiners are teachers of both seminars and practicals.

Colloquium: Neurological status + Clinical topical diagnostics

Grades from the colloquium will be converted into points as shown in the table:

Grade	Points
Excellent	30

Very good	25
Good	20
Sufficient	15

b. Activity and knowledge in teaching (up to 20 points)

Students' knowledge and activity are assessed in all exercises (except P1) orally with a practical part in each exercise leader. In the end, the total average grade obtained is converted into points:

Grade	**Points**
4,8-5 4,4-4,7	20 18
3,7-4,2 3,0-3,6	16 14
2,4-2,9 2,0-2,3	12 10

A student can take the Final Exam when he / she passes the Colloquium, i.e. when he / she achieves a minimum number of points of 15 and a passing grade in the final practicals (a total of at least 25 points). A student who did not collect 15 points from the Colloquium or who for justified reasons could not take the Colloquium in the given term, can take one remedial colloquium because otherwise he / she will not be able to take the final exam. The term of the "corrective" colloquium will be determined between the 1st and 2nd term of the final exam. The examiner at the remedial colloquium will be a teacher. A student who passed the colloquium but wants a higher grade and thus more points according to the final exam will be allowed a corrective colloquium, but the previous result is deleted and the one that is achieved in the correctional period is taken as final.

II Final exam (up to 50 points)

Key and specific competencies will be tested at the final (written test). The final (written) test has 50 questions (maximum 25, minimum 13 points) and is written for 1:00 h. Points on the final test are obtained when the student solves more than 50% of the test questions as shown in the table:

Corrent answers	**Points**
50,49	25
48,47,46,45	23
44,43,42,41	21
40,39,38,37	19
36,35,34	17
33,32,31	16
30,29,28	15
27,26	14
25	13

Students' can achieve a maximum of 25 and a minimum of 12 points in the oral part of the final exam according to the table. Students can take the oral part of the exam if they achieved at least 13 points in the written part (test) (correctly solved at least 50% of the questions). The practical part will be examined (the neurological status of the patient) as part of the oral part of the final exam.

Grade	**Points**
Excellent	25
Very good	20

Good	15
Sufficient	12

Who can take the final exam:

- Students who have achieved 25-50 points during the course can take the final exam where they can achieve a maximum of 50 points or a minimum of 25 points.
- For the passing grade of the final exam in the written part of the final exam they must achieve at least 13 points (solve at least 25 questions) and in the oral part at least get a passing grade with 12 points.

Who cannot take the final exam:

- Students who achieved 0-24.9% of points during classes or who miss more than 30% of teaching hours of each form of teaching (lectures, seminars or exercises). Such a student is insufficient (1) F and cannot take the final exam, i.e. he / she must re-enroll the subject in the following academic year.

II Final grade: application of ECTS grade during classes + final exam
Assessment within the ECTS system is done by absolute distribution.

A (90-100%)	Excellent (5)
B (75-89,9%)	Very good (4)
C (60-74,9%)	Good (3)
D (50-59,9%)	Sufficient (2)
F (0-49,9%)	Insufficient (1)

Within the oral part of the Final Exam, the theoretical knowledge of the student and the practical part are examined. In case the student did not pass the oral exam, it is not necessary to repeat the written part of the exam on the first following exam period. The student must re-enter the written part of the exam if he doesn't succeed to pass on the first following exam period (the student has 3 possible tries to the final exam of 5 offered terms). If the student is not satisfied with the achieved positive grade, he / she will be able to reject it, which he / she will prove with his / her signature, in which case he / she accepts an insufficient grade (using one of the possible three exams).

Other important information regarding to the course:

COURSE SCHEDULE (for academic year 2019/2020)

Date	Lectures (time and place)	Seminars (time and place)	Practicals (time and place)	Instructor
20.10.2021.	L 1,2 8:00 – 10:00 Lecture hall Rijeka			Assist. Prof. Vladimira Vuletić, MD, PhD
		S 1,2,3 12:00 - 15:00 Lecture hall Rijeka		Marina Bralić MD, PhD
21.10.2021.	L 3,4 10:00 -12:00 Lecture hall Rijeka			Assist. Prof. Ines Strenja, MD, PhD
		S 4,5,6 12:00-15:00 Lecture hall Rijeka		Anja Babić, MD
27.10.2021.	L 5, 6 10:00 – 12:00 Lecture hall Rijeka			Assoc. Prof. Olivio Perković, MD, PhD
28.10.2021.	L 7,8 8:00 – 10:00 Lecture hall Rijeka			Assoc. Prof. Ingrid Škarpa-Prpić, MD, PhD
		S 7,8,9 12:00-15:00 Lecture hall Rijeka		Marina Bralić MD, PhD
04.11.2021.	L 9,10 10:00 – 12:00 Lecture hall Rijeka			Assoc. Prof. Olivio Perković, MD, PhD Assist. Prof. Vladimira Vuletić, MD, PhD
		S 10,11,12 12:00 - 15:00 Lecture hall Rijeka		Assist. Prof. Vladimira Vuletić, MD, PhD
05.11.2021.	L 11,12 8:00 - 10:00 Lecture hall Rijeka			Assist. Prof. Vladimira Vuletić, MD, PhD Assist. Prof. Ines Strenja, MD, PhD
		S 13,14,15 12:00 – 15:00 Lecture hall Rijeka		Valentino Rački, MD
09.11.2021.				
		S 16,17,18 12:00 -15:00 Lecture hall Rijeka		Marina Bralić MD, PhD
10.11.2021.	L 13,14			Assist. Prof. Vladimira Vuletić,

	8:00 - 10:00 Lecture hall Rijeka			MD, PhD
11.11.2021.	L15, 16 10:00 – 12:00 Lecture hall Rijeka			Assist. Prof. David Bonifačić, MD, PhD
		S 19,20,21 12:00 – 15:00 Lecture hall Rijeka		Anja Babić, MD
12.11.2021.	L 17, 18 08:00 – 10:00 Lecture hall Rijeka			Assist. Prof. David Bonifačić, MD, PhD
		S 22,23,24 12,00 –15,00 Lecture hall Rijeka		Valentino Rački, MD
15.11.2021.	L 19, 20 11:00 – 13:00 Lecture hall Rijeka			Assist. Prof. Siniša Dunatov, MD, PhD
		S 25,26,27 08:00 – 11:00 Lecture hall Rijeka		Valentino Rački, MD
16.11.2021.		S 28,29,30 12:00 - 15:00 Lecture hall Rijeka		Valentino Rački, MD
17.11.2021.		S 31,32 08:00 – 10:00 Lecture hall Rijeka		Assist. Prof. David Bonifačić, MD, PhD
19.11.2021.		S 33,34,35 08:00 – 11:00 Lecture hall Rijeka		Assist. Prof. David Bonifačić, MD, PhD
22.11.2021.			P1, 2, 3 09: 00-11:15	Anja Babić, MD Valentino Rački, MD
25.11.2021.			P4, 5, 6, 7 09: 00-12:00	Anja Babić, MD Valentino Rački, MD
29.11.2021.			P8, 9, 10,11 09: 00-12:00	Anja Babić, MD Valentino Rački, MD
02.12.2021.			P12, 13, 14,15 09: 00-12:00	Anja Babić, MD Valentino Rački, MD
06.12.2021.			P16, 17, 18,19 09: 00-12:00	Anja Babić, MD Valentino Rački, MD
09.12.2021.			P20, 21,22 09: 00-11:15	Anja Babić, MD Valentino Rački, MD
13.12.2021.			P23, 24, 25,26 09: 00-12:00	Anja Babić, MD Valentino Rački, MD
16.12.2021.			P27, 28, 29,30 09: 00-12:00	Anja Babić, MD Valentino Rački, MD

Starting dates for the 1st oral colloquium: from the end of classes

For further examination dates, a list will be formed later (depending on the number of students) and the examination will be completed by the 1st deadline of the final exam.
The term of the 2nd oral colloquium (corrective) will be announced later and will be available between the 1st and 2nd term of the final exam

List of lectures and seminars:

	LECTURES (Topics)	Teaching hours	Location/Lecture room
L1, L2	Cerebrovascular diseases	2	Lecture hall Rijeka
L3, L4	Tumors of the central nervous system	2	Lecture hall Rijeka
L5, L6	Epilepsy and other paroxysmal disorders	2	Lecture hall Rijeka
L7, L8	Demyelinating and inflammatory diseases of the CNS	2	Lecture hall Rijeka
L9	Parkinson' s disease	1	Lecture hall Rijeka
L10	Other extrapyramidal diseases	1	Lecture hall Rijeka
L11	Dementias	1	Lecture hall Rijeka
L12	Vertigo	1	Lecture hall Rijeka
L13, L14	Headaches, Neuromuscular diseases	2	Lecture hall Rijeka
L15, L16	Neuromuscular diseases	2	Lecture hall Rijeka
L17, L18	Neuromuscular diseases	2	Lecture hall Rijeka
L19, L20	Emergencies in neurology	2	Lecture hall Rijeka
	Total number of lecture hours	**20**	

	SEMINARS (Topics)	Teaching hours	Location/Lecture room
S1, S2, S3	Consciousness and disorders of consciousness	3	Lecture hall Rijeka
S4, S5, S6	Cranial nerves	3	Lecture hall Rijeka
S7, S8, S9	Pyramidal system	3	Lecture hall Rijeka
S10, S11, S12	Extrapyramidal system	3	Lecture hall Rijeka
S13, S14, S15	Peripheral nervous system	3	Lecture hall Rijeka
S16, S17, S18	Sensory nervous system	3	Lecture hall Rijeka
S19, S20, S21	Balance and coordination	3	Lecture hall Rijeka
S22, S23, S24	Diagnosis and treatment of demyelinating diseases	3	Lecture hall Rijeka
S25, S26, S27	Painful syndromes of upper and lower extremities	3	Lecture hall Rijeka
S28, S29, S30	Unconsciousness and vertigo	3	Lecture hall Rijeka
S31, S32	Diagnosis of stroke	2	Lecture hall Rijeka
S33, S34, S35	Stroke treatment	3	Lecture hall Rijeka
	Total number of seminar hours	**35**	

	PRACTICALS (Topics)	Teaching hours	Location/Lecture room
P1, P2, P3	Medical history	3	Clinic of Neurology
P4, P5, P6, P7	Examination of the state of consciousness and function of cranial nerves	4	Clinic of Neurology
P8, P9, P10, P11	Examination of motor functions	4	Clinic of Neurology
P12, P13, P14, P15	Examination of sensory functions	4	Clinic of Neurology
P16, P17, P18, P19	Reflex examination	4	Clinic of Neurology
P20, P21, P22	Coordination and balance examination	3	Clinic of Neurology
P23, P24, P25, P26	Examination of higher brain functions + neuropsychological tests	4	Clinic of Neurology
P27, P28, P29, P30	Topographic diagnostics and important syndromes: hemispherical, brainstem, cerebellum syndromes	4	Clinic of Neurology

	FINAL EXAM DATES
1.	21.2.2022.
2.	11.4.2022.
3.	13.6.2022.
4.	4.7.2022.
5.	5.9.2021.
6.	19.9.2021.