



## FACULTY OF MEDICINE

Approved:

Dean:

(Prof. Yoto Yotov, MD, PhD)



## SYLLABUS

IN

***“Contemporary neuroscience: nanotechnologies,  
personalised and translational medicine”***

Specialty	MEDICINE
Educational - qualification degree	master
Organizational form of education	full-time
Auditorial activity (Lectures/Seminars)	30 (16/14)
Extra-auditorial activity	30
ECTS- credits	2
Discipline type	elective
Semester/s of education	Ninth
Semester of examination	Ninth
Developers of the Syllabus:	Prof. Silva Andonova, MD, PhD, DSc Assoc. Prof. Mihael Tsalta, MD, PhD

Varna, 2025

## ANNOTATION

<b>Aims of the course</b>	<p>The course "Modern Neuroscience: Nanotechnology, Personalized and Translational Medicine" is part of the curriculum for medical students in the ninth semester and aims to:</p> <ul style="list-style-type: none"> <li>• Update and specify knowledge in neurophysiology, neurogenetics, neurobiochemistry, pathological morphology, neuroimmunology, neuropsychology, and neuropharmacology, considering the latest advancements in neuroscience, particularly in early diagnosis, therapy, and rehabilitation of neurological diseases.</li> <li>• Introduce the most advanced laboratory and instrumental diagnostic methods for investigating socially significant neurological diseases, including their indications, capabilities, and interpretation.</li> <li>• Provide in-depth knowledge of imaging and specialized diagnostic methods in neurological practice, such as Doppler ultrasound, electromyography (EMG), electroencephalography (EEG), and evoked potentials (EP).</li> <li>• Acquaint students with the principles of diagnosis and management of emergency conditions in neurology, as well as the challenges and guidelines for brain death assessment from both a neurological and transplantology perspective.</li> <li>• Introduce consensus-based approaches in practical healthcare.</li> </ul>
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<b>Outcomes for students at the end of the course:</b>	
<b>Competences</b>	
<b>Competence group</b>	<ol style="list-style-type: none"> <li><b>1. Patient Care</b> that is compassionate, appropriate, and effective for treating health problems and promoting health. <ol style="list-style-type: none"> <li><i>a. Gather essential and accurate information about the patient</i></li> <li><i>b. Counsel patients and family members</i></li> <li><i>c. Recognize the indicators for procedures</i></li> <li><i>d. Describe the procedure in appropriate language for patients and caretakers</i></li> <li><i>e. Acknowledge the impact of the procedure on patient and family</i></li> <li><i>f. Competently perform all medical procedures required for their scope of practice</i></li> <li><i>g. Perform the procedure in a way that maximizes patient comfort</i></li> <li><i>h. Make informed diagnostic and therapeutic decisions</i></li> <li><i>i. Prescribe and perform essential medical procedures</i></li> <li><i>j. Provide effective health management, maintenance, and prevention guidance</i></li> </ol> </li> <li><b>2. Medical Knowledge</b> about established and evolving biomedical, clinical, and cognate (eg, epidemiological and social-behavioural) sciences and the application of this knowledge to patient care. <ol style="list-style-type: none"> <li><i>a. Acquire new scientific and clinical knowledge.</i></li> <li><i>b. Apply a research-based and analytical approach to solving clinical and scientific problems.</i></li> </ol> </li> </ol>

	<p><b>3. Practice-Based Learning and Improvement</b> that involves investigation and evaluation of their own patient care, appraisal, and assimilation of scientific evidence, and improvements in patient care.</p> <ul style="list-style-type: none"> <li><i>a. Investigate and evaluate patient care practices</i></li> <li><i>b. Appraise and assimilate scientific evidence, and</i></li> <li><i>c. Improve the practice of medicine.</i></li> </ul> <p><b>4. Interpersonal and Communication Skills</b> that result in effective information exchange and teaming with patients, their families, and other health professionals.</p> <ul style="list-style-type: none"> <li><i>a. Create and sustain a therapeutic relationship with patients and families</i></li> <li><i>b. Work effectively as a member or leader of a health care team</i></li> </ul> <p><b>5. Professionalism</b>, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.</p> <ul style="list-style-type: none"> <li><i>a. Demonstrating Professional Conduct and Accountability</i></li> <li><i>b. Demonstrating Humanism and Cultural Proficiency</i></li> <li><i>c. Maintaining Emotional, Physical, and Mental Health</i></li> <li><i>d. Pursuing Continual Personal and Professional Growth</i></li> </ul> <p><b>6. Systems-Based Practice</b>, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.</p> <ul style="list-style-type: none"> <li><i>a. Work in interprofessional teams to enhance patient safety and improve patient care quality.</i></li> <li><i>b. Participate in identifying system errors and implementing potential systems solutions.</i></li> </ul>
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>▪ The anatomy and physiology of the nervous system.</li> <li>▪ The main symptoms and syndromes in patients with neurological diseases, as well as the elements of topical diagnostics.</li> <li>▪ Knowledge of acute and chronic diseases of the nervous system.</li> <li>▪ Knowledge of neuroimaging and specific investigation methods in the neurological practice – Doppler ultrasound, EMG, EEG, EP.</li> <li>▪ Knowledge of the therapeutic options for acute and chronic diseases of the nervous system.</li> <li>▪ Knowledge of specific assessment methods and scales for various neurological diseases.</li> <li>▪ <i>Competence in diagnosing and managing emergency neurological conditions, including the challenges and guidelines for brain death assessment.</i></li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>▪ <i>Taking a detailed medical history in a neurological patient.</i></li> <li>▪ <i>Examination of detailed neurological status and its interpretation.</i></li> </ul>

	<ul style="list-style-type: none"> <li>▪ <i>Application of the rules of topical diagnosis in neurological practice.</i></li> <li>▪ <i>Recognition and adequate behaviour in emergency situations in neurology.</i></li> <li>▪ <i>Preparation of a treatment-diagnostic plan for patients with involvement of the CNS and PNS.</i></li> <li>▪ <i>Application of specific methods and scales for evaluation of neurological diseases.</i></li> </ul>
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<b>Key competencies for lifelong learning<sup>1</sup>, that the discipline develops:</b>	
<b>Literacy competence</b> Literacy is the ability to identify, understand, express, create, and interpret concepts, feelings, facts and opinions in both oral and written forms, using visual, sound/audio and digital materials across disciplines and contexts. It implies the ability to communicate and connect effectively with others, in an appropriate and creative way.	<b>X</b>
<b>Multilingual competence</b> This competence defines the ability to use different languages appropriately and effectively for communication. It broadly shares the main skill dimensions of literacy: it is based on the ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form (listening, speaking, reading and writing) in an appropriate range of societal and cultural contexts according to one's wants or needs.	<b>X</b>
<b>Mathematical competence and competence in science, technology, engineering</b> A. Mathematical competence is the ability to develop and apply mathematical thinking and insight in order to solve a range of problems in everyday situations. Building on a sound mastery of numeracy, the emphasis is on process and activity, as well as knowledge. Mathematical competence involves, to different degrees, the ability and willingness to use mathematical modes of thought and presentation (formulas, models, constructs, graphs, charts). B. Competence in science refers to the ability and willingness to explain the natural world by making use of the body of knowledge and methodology employed, including observation and experimentation, in order to identify questions and to draw evidence-based conclusions. Competences in technology and engineering are applications of that knowledge and methodology in response to perceived human wants or needs. Competence in science, technology and engineering involves an understanding of the changes caused by human activity and responsibility as an individual citizen.	<b>X</b>
<b>Digital competence</b> Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.	<b>X</b>
<b>Personal, social and learning to learn competence</b> Personal, social and learning to learn competence is the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career. It includes the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional well-being, to maintain physical and mental health, and to be able to lead a health-conscious, future-oriented life, empathize and manage conflict in an inclusive and supportive context.	<b>X</b>
<b>Citizenship competence</b> the ability to act as responsible citizens and to fully participate in civic and social life, based on an understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability.	<b>X</b>

<sup>1</sup> As defined in 2018 r. by the European Union Council ([https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32018H0604\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32018H0604(01)&from=EN))

**Entrepreneurship competence**

Entrepreneurship competence refers to the capacity to act upon opportunities and ideas, and to transform them into values for others. It is founded upon creativity, critical thinking and problem solving, taking initiative and perseverance and the ability to work collaboratively in order to plan and manage projects that are of cultural, social or financial value.

**Cultural awareness and expression competence**

Competence in cultural awareness and expression involves having an understanding of and respect for how ideas and meaning are creatively expressed and communicated in different cultures and through a range of arts and other cultural forms. It involves being engaged in understanding, developing and expressing one's own ideas and sense of place or role in society in a variety of ways and contexts.

**Methods of education**

- lectures
- seminar exercises
- practical exercises
- discussion of case studies
- consultations
- work with scientific literature
- analysis and interpretation of medical results
- presentations

**Links with other courses from the curriculum of the specialty**

- Builds upon knowledge acquired in:
  - Neurological diseases