

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES
AT VILNIUS UNIVERSITY**

Scientific Area/eas, Field/ds of Science	Medical and Health Sciences (M 000): Medicine (M 001)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute of Clinical Medicine Clinic of Anesthesiology and Intensive Care			
Course unit title (ECTS credits, hours)	Sepsis 5 credits (135 hours)			
Study method	Lectures	Seminars	Consultations	Self-study
Number of ECTS credits	-	-	1	4
Method of the assessment (in 10 point system)	Written and oral exam. Two questions from the block of questions are answered in written form, followed by an oral discussion. The assessment is as follows: 10 (Excellent): Excellent performance, outstanding knowledge and skills. 9 (Very good): Strong performance, good knowledge and skills. 8 (Good): Above the average performance, knowledge and skills. 7 (Highly satisfactory): Average performance, knowledge and skills with unessential shortcomings. 6 (Satisfactory): Below average performance, knowledge and skills with substantial shortcomings. 5 (Sufficient): Knowledge and skills meet minimum criteria.			
PURPOSE OF THE COURSE UNIT				
To provide theoretical and practical knowledge based on the latest research on the epidemiology, etiology, pathological physiology, diagnosis, prevention and intensive care of sepsis and septic shock.				
THE MAIN TOPICS OF COURSE UNIT				
<p><u>Introduction.</u> Historical development, present and future of concepts related to sepsis. Epidemiology of sepsis, prevalence, origin (acquired in the community, hospital, intensive care unit). Risk factors for sepsis, factors increasing sepsis mortality. Influence of organ functions on outcome. Genetic predisposition to develop sepsis. Sepsis outcome prediction systems.</p> <p><u>Pathological physiology of sepsis and organ system disorders.</u> Congenital immunity and inflammatory response in onset of sepsis. Disbalance of coagulation activation and inhibition. Immunosuppression and apoptosis. Inflammatory mediators. Cellular factors. Humoral mediators. Local inflammation. Systemic inflammatory response.</p> <p><u>Pathological physiology of organ dysfunction.</u> Criteria for impairment of major organ systems. Organ dysfunction assessment systems. <u>Haemodynamic disorders in septic shock.</u> Diagnosis of sepsis. Significance of clinical evaluation and microbiological testing. Primary sources of infection in sepsis. Blood infection, vascular catheter infection. Classification and diagnostic criteria for pneumonia, community-acquired and hospital-acquired pneumonia. Infection of the abdomen, urinary tract, skin and soft tissues, infectious endocarditis, fungal infection.</p> <p><u>Clinical symptoms of sepsis and septic shock.</u> Criteria for the diagnosis of sepsis. Primary source of infection. Microbiological tests. Laboratory tests for inflammation of infectious origin. Inflammatory mediators. Procalcitonin. C reactive protein. Blood coagulation tests.</p> <p><u>General principles of treatment of sepsis.</u> Priority goals for sepsis treatment. Target for therapeutic interventions.</p>				

Principles and significance of antibiotic therapy. Pharmacokinetics, pharmacodynamics. Adverse effects of antibiotics. Resistance of microorganisms to antibiotics. Empirical antibiotic therapy. Sepsis-causing microorganisms. Inadequate antibiotic therapy. Monotherapy or combinations of antibiotics. Evaluation of antibiotic therapy. Recommendations for the treatment of sepsis with antibiotics. Treatment of severe infection (by primary focus) with antibiotics.

Objectives and tactics of septic shock treatment. Monitoring and treatment of septic shock. Purposes of treatment. Systemic and regional blood flow. Early treatment of goal-directed septic shock. Infusion therapy, objectives and monitoring. Choice of infusion solutions. Crystalloid and colloidal solutions. Blood transfusion therapy. Efficacy and complications of infusion and transfusion therapy. Vasopressors, inotropes and corticosteroids for the treatment of septic shock.

Recent Guidelines for Treating Septic Shock by Surviving Sepsis Campaign.

Sepsis and acute respiratory distress. Acute respiratory distress syndrome. Etiological factors and developmental risk. Clinical symptoms, diagnosis, pathogenesis, epidemiology, outcomes. Treatment of respiratory disorders. Non-invasive ventilation, its methods and techniques. High-flow oxygen therapy. Artificial lung ventilation. Acute lung injury due to artificial lung ventilation. Lung protective ventilation strategies. Positive end-expiratory pressure (PEEP). Permissive hypercapnia. Changing the position of the patient's body. Disconnection from an artificial lung ventilator. Tracheostomy. Infusion therapy. Corticosteroids. Nitric oxide. Surfactant and other treatments.

Other principles of treatment of sepsis and septic shock. Sedation, analgesia and muscle relaxation. Glycemic control. Renal replacement therapy. Sodium bicarbonate. Prevention of deep vein thrombosis. Prevention of stress ulcers. Immunotherapy. Enteral and parenteral nutrition and its significance in sepsis.

RECOMMENDED LITERATURE SOURCES

1. Mark F. Newman, Lee A. Fleisher, Clifford Ko, Michael Mythem. Perioperative Medicine. Managing for Outcome. 2nd edition, 2021:
<https://www.elsevier.com/books/perioperative-medicine/newman/978-0-323-56724-4>
2. Andrew Lumb, Caroline Thomas. Nunn and Lumb's Applied Respiratory Physiology. 9th edition, 2020:
<https://www.elsevier.com/books/nunn-and-lumb's-applied-respiratory-physiology/978-0-7020-7908-5>
3. Andrew D. Bersten, Jonathan M. Handy. Oh's Intensive Care Manual. 8th edition, 2018:
<https://www.elsevier.com/books/ohs-intensive-care-manual/bersten/978-0-7020-7221-5>
4. Jennifer Pai Lee, Pharm D. ICU Quick Drug Guide. 1st edition, 2020:
<https://www.store.elsevierhealth.com/asia/icu-quick-drug-guide-9780323680479.html>
5. Clifford S. Deutschman, Patrik J. Neligan. Evidence-Based Practice of Critical Care. 3rd edition, 2019:
<https://www.elsevier.com/books/evidence-based-practice-of-critical-care/deutschman/978-0-323-64068-8>
6. Jean-Louis Vincent, Edward Abraham, Frederick A. Moore, Patrick M. Kochanek, Mitchell P. Fink. Textbook of Critical Care. 7th edition, 2016:
<https://www.elsevier.com/books/textbook-of-critical-care/vincent/978-0-323-37638-9>
7. Joseph E. Parrillo, R. Phillip Dellinger. Critical Care Medicine. Principles of Diagnosis and Management in the Adult. 5th edition, 2018:
<https://www.elsevier.com/books/critical-care-medicine/parrillo/978-0-323-44676-1>

8. John G. Toffaletti, Craig R. Rackley. Blood Gases and Critical Care Testing. Physiology, Clinical Interpretations, and Laboratory Applications. 3rd edition, 2021:
<https://www.elsevier.com/books/blood-gases-and-critical-care-testing/toffaletti/978-0-323-89971-0>
 9. Polly E. Parsons, Jeanine P. Wiener-Kronish, Renee D. Stapleton, Lorenzo Berra. Critical Care Secrets. 6th edition, 2018:
<https://www.elsevier.com/books/critical-care-secrets/978-0-323-51064-6>
 10. Zalalem Temesgen, Larry M. Baddour, Stacey Rizza. A Rational Approach to Clinical Infectious Diseases. A Manual for House Officers and Other Non-infectious Diseases Clinicians. 1st edition, 2020:
<https://www.elsevier.com/books/a-rational-approach-to-clinical-infectious-diseases/978-0-323-69578-7>
 11. Adnan I. Qureshi, Omar Saeed, Uzma Syed. Coronavirus Disease. From Origin to Outbreak. 1st edition, 2021:
<https://www.elsevier.com/books/coronavirus-disease/qureshi/978-0-12-824409-8>
 12. Ron M. Walls, Robert S. Hockberger, Marianne Gausche-Hill. Rosens` s Emergency Medicine. Concepts and Critical Practice. 9 th edition, 2017:
<https://www.elsevier.com/books/rosens-emergency-medicine-concepts-and-clinical-practice/walls/978-0-323-35479-0>
- ONLINE:*
13. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021:
<https://link.springer.com/article/10.1007/s00134-021-06506-y>

CONSULTING LECTURERS

1. Coordinating lecturer: Jūratė Šipylaitė (Prof. Dr. HP).
2. Donata Ringaitienė (Assoc. Prof. Dr.).
3. Saulius Vosylius (Assoc. Prof. Dr.).
4. Andrius Klimašauskas (Assoc. Prof. Dr.).
5. Mindaugas Šerpytis (Assoc. Prof. Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:
29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė