

**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, Vilnius University Institute of clinical medicine Clinic of gastroenterology, nephrourology and surgery			
Course unit title (ECTS credits, hours)	Clinical Nutrition in Internal Diseases 5 credits (133 hours)			
Study method	Lectures	Seminars	Consultations	Self-study
Number of ECTS credits	-	-	1	4
Method of the assessment (in 10 point system)	Oral examination. 3 questions are given.			
PURPOSE OF THE COURSE UNIT				
To get acquainted with methods of dietetics in internal medicine and the principles of diet and clinical nutrition formation. To obtain the principles of dietetics – regular nourishment (medical diets), enteral feeding, parenteral feeding.				
THE MAIN TOPICS OF COURSE UNIT				
<p>Essential nutritional substances. Criteria for nutritional substances to be non-replaceable. Proteins, metabolism, requirements, sources. Amino acids: distribution in an organism, transport. Synthesis and utilization of amino acids. Nitrogen balance. Role of protein metabolism in organ and system function. Protein and amino acid requirements in healthy and sick organisms. Influence of a disease on protein requirements. Complete proteins. Dietary sources of proteins. Carbohydrates, metabolism, requirements, sources. Classification of carbohydrates. Glucose metabolism in an organism. Role of various organs and systems in carbohydrate metabolism. Fibrous substances. Fat, metabolism, requirements, sources. Structure, metabolism, requirements, dietary sources. Essential fatty acids. Oxidation of fatty acids. Liquid, electrolyte, acid-base balance.</p> <p>Organism liquids, metabolism, disorders. Metabolism of potassium, disorders. Hyperkalemia, hypokalemia. Sodium metabolism, disorders. Hyponatremia, hyponatremia. Acid-base metabolism, disorders (acidosis, alkalosis).</p> <p>Minerals, metabolism, requirements, sources. Calcium, phosphorus, magnesium, iron, zinc, copper, iodine, selenium, chrome, microelements (arsenic, fluorine, manganese, molybdenum, nickel, vanadium etc.). Biological importance, metabolism, requirements, sources.</p> <p>Vitamins, metabolism, requirements, sources. Fat soluble vitamins. Water soluble vitamins. Biochemistry, physiology, pathophysiology, dietary sources. Other nutritional substances. Carnitine, choline, carotenoids, homocysteine, cysteine, taurine, glutamine, arginine. Importance to the organism, metabolism, requirements, dietary sources.</p> <p>Energy metabolism. Essential energy metabolism. Day energy metabolism. Influence of physical activity, disease, other factors on energy requirements. Calculation of energy requirements. Methods for calculation of energy requirements. Indirect calorimetry. Calculation of nutritional materials requirements. Influence of disease on requirements of nutritional substances.</p> <p>Grouping of food products. Labelling of food products. Influence of technological processes on nutritional value. Food additives. Food supplements. Functional,</p>				

genetically modified food. Physiology of nutrition. Role of neuroendocrine system in eating physiology. Relationship between hormones, cytokines and nutritional substances. Interaction of drugs and food. Features of nutrition in different groups of people, nutritional care (children, elderly, pregnant women, breastfeeding women).

Role of gastrointestinal tract nutritional status. Structure, vasculature, innervation of gastrointestinal tract, gastrointestinal hormones. Physiology of eating. Digestion. Gut microbiome. Immune system of the gut. Oxidative stress. Evaluation of nutritional status. Methods for evaluating nutritional status (anthropometry, laboratory workup, examination, nutritional anamnesis). Evaluation of nutritional status in babies and children. Evaluation of nutritional status in adults.

Organization of dietetic treatment in health care institutions. Characteristics of diets intended for dietetic treatment (aim of prescription, composition of the diet, selection of products, meals for dietetic treatment). Malnutrition (severe, moderate and mild deficiency of protein and energy, kwashiorkor, marasmus; deficiency of the water soluble vitamins: deficiency of thiamine (beriberi, Wernicke encephalopathy), niacinamide, riboflavin, pyridoxine, biotin, cyanocobalamin, folates, pantothenic acid, ascorbic acid and choline; deficiency of fat soluble vitamins (A, D, E, K). Deficiency of minerals and other micronutrients: calcium, phosphorus, selenium, zinc, copper, iron, magnesium, manganese, iodine, molybdenum, chrome, fluoride. Electrolyte imbalance: excess and deficiency of sodium, potassium. Deficiency of multiple nutritional substances. Deficiency of other nutritional substances (constant deficiency of fatty acids, imbalance of the proportion of nutritional substances). Clinical presentation, diagnostics and dietetic treatment of nutritional disorders and deficiencies of nutritional substances. Excess of nutritional substances (obesity: alimentary, iatrogenic, endocrine, cerebral, local); hypervitaminoses (A, D, B6 etc.). Diseases of the gastrointestinal tract organs and their dietetic treatment. Gastric diseases, dietetic treatment. Foregut diseases and principles of dietetics. Colorectal diseases, dietetic treatment. Dietetic treatment after surgeries of gastrointestinal tract. Liver diseases, dietetic treatment. Pancreatic diseases and dietetic treatment. Diseases of the gallbladder and dietetic treatment. Cardiovascular diseases and dietetic treatment. Renal diseases and dietetic treatment. Metabolic diseases and dietetic treatment. Dietetic treatment after organ transplantation. Features of nutrition in specific ethnic and religious groups. Clinical nutrition. Enteral nutrition. Compounds for enteral nutrition.

Parenteral nutrition. Compounds for parenteral nutrition. Indications and contraindications for clinical nutrition.

RECOMMENDED LITERATURE SOURCES

1. Maurice E. Shils, James A. Olson, Moshe Shike , A. Catherine Ross Lippincott Williams //Modern Nutrition in Health and Disease//Wikkins// 12th edition p.2029//2013.
2. Boolm S., Webster G., Oxford Handbook of Gastroenterology and hepatology//Oxford university press//3rd Edition, 2021.
3. Feldman M., Friedman Lawrence S., Brandt Lawrence J. Gastrointestinal and Liver Disease Pathophysiology/Diagnosis/Management. 10th edition, vol. 1//Elsevier //2015.
4. Thomas D. Boyer, Teresa L. Wright, Michael P. Manns, Zakim and Boyer's Hepatology a textbook of Liver Disease//7th edition//Elsevier//2016.
5. Maisto produktų sudėtis. Metodiniai nurodymai ir mokomoji knyga. Aut. kolekt. Vilnius, 2002.
6. Gavelienė Edita; Lėtinio virusiniu hepatitu C sergančių pacientų maitinimosi ypatumų ir mitybos būklės vertinimas// Visuomenės sveikata//Nr.3(34),p.62- 65//2006.
7. G. Brimas, E. Gavelienė, V. Lipnickas, V. Valiukėnas, V. Brimienė, K. Strupas. Nutukimo gydymas// Medicinos teorija ir praktika//13 t, Nr. 2,p.120-131//2007.

8. Enterinės ir parenterinės mitybos rekomendacijos: [Austrijos klinikinės mitybos draugijos] versija 2008-2010 m. – Vilnius, „Briedis“, 2008. P. 143.
9. Laisvūnė Petkevičienė, Dietetikos praktika// Homo liber//p.598.//2008.
10. Autorių kolektyvas; Cukrinis diabetas// Vilniaus universiteto leidykla.//Cukrinio diabeto dietinis gydymas 163-183p.//2008.
11. Sudarytojas ir vyr. redaktorius Antanas Norkus //Nutukimas//Autorių kolektyvas // Mokomoji knyga.Kaunas//2009.
12. R.Stukas, G.Šurkienė. Mityba ir jos vertinimas. Mokomoji knyga – Vilniaus universiteto leidykla, 2009. 165 p.
13. Abraitienė Agnė, Ališauskas Jonas, Ambrozaitis Arvydas, Arlauskienė Audronė, Bagdžiūnienė Airida, Biliukas Mykolas, Byčkova Jekaterina, Budrys Valmantas, Dačkauskaitė Alvydė, Danila Edvardas, Domža Bronius, Drašutienė Gražina Stanislava, Drazdienė Nijolė, Dubakienė Rūta, Endzinienė Milda, Gražulevičiūtė Edita, Irnius Algimantas, Valantinas Jonas, Šeimos gydytojo vadovas//p. 796 UAB Vaistų žinios//2010.
14. A. Barzda, R.Bartkevičiūtė, R.Stukas, R.Šatkutė, J.A.Abaravičius. Lietuvos suaugusių gyventojų mitybos tendencijos per pastarąjį dešimtmetį // Sveikatos mokslai, 2010, Nr.1(67), tomas 20, P.28312835.
15. L.Kathleen Mahan, Janice L.Raymond. Krause's food, nutrition care process//Canada //p.1333//2016.
16. Internetinis mokymas: LLL programme in Clinical Nutrition and Metabolism// <http://lllnutrition.com/>.
17. Wilfred M Weinstein, C J Hawkey, Jaime Bosch; Clinical gastroenterology and hepatology//Elsevier//20052811-2816, Irnius A., Vasiliauskas A., ir kt.

CONSULTING LECTURERS

1. Coordinating lecturer: Edita Gavelienė (Assist. Prof. Dr.).

2. Goda Sadauskaitė (Assoc. Prof. Dr.).

3. Edita Kazėnaitė (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