



# MEDICAL NUTRITIONAL THERAPY

Project number: 101082863-BIOSINT-ERASMUS-EDU-2022-CBHE

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**Erasmus+ KA2 Capacity Building in the field of Higher Education**

Strengthening capacities and digital competences in biomedical education through  
internationalization at home BIOSINT

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Subject:

Medical nutritional therapy

Description of the course:

The science of nutrition is important in the treatment of malnutrition, in the prevention of diseases, and in improving the outcome of the treatment of numerous pathological conditions. This course aims to improve students' knowledge of the physiology of macro and micronutrients, from daily needs - through absorption and metabolic pathways, to point out the necessity of diagnosing malnutrition, as well as the consequences of that condition. Students will master the basic methods of nutritional screening and assessment, and based on that, determine which patients require medical nutritional intervention. Also, they will be introduced to the main modalities of nutritional therapy, as well as the complications they entail. The latest research on genetic population differences will be accentuated, in the domain of metabolizing macronutrients, body composition, and the microbiome.

The subject is evaluated with 4 of the ECTS. In total, there are 3 hours of active teaching per week (1 hour of lectures and 2 hours of work in a small group).

TEACHERS AND ASSOCIATES:

| N  | Name and surname     | Email address  | Title               |
|----|----------------------|--|---------------------|
| 1. | Vladimir Jakovljevic | <a href="mailto:drvkladakgbg@yahoo.com">drvkladakgbg@yahoo.com</a>                     | Full professor      |
| 2. | Danijela Jovanovic   | <a href="mailto:danieladrjovanovic@gmail.com">danieladrjovanovic@gmail.com</a>         | Assistant professor |
| 3. | Katarina Mihajlovic  | <a href="mailto:katarina.mihajlovic@fmn.kg.ac.rs">katarina.mihajlovic@fmn.kg.ac.rs</a> | Assistant professor |
| 4. | ...                  |  |                     |
| 5. |                      |  |                     |

COURSE STRUCTURE:

| Module | Name of the module   | Week | Lectures weekly | Practical classes | Lecturer - head of the module |
|--------|--|------|-----------------|-------------------|-------------------------------|
| 1      | Physiology of nutrition  | 4    | 1               | 2                 |                               |
| 2      | Medical nutritional therapy - general principles               | 5    | 1               | 2                 |                               |
| 3      | Medical nutritional therapy in various pathological conditions | 6    | 1               | 2                 |                               |
|        |  |      |                 |                   | $\Sigma 15+30=45$             |

## GRADING:

Points are earned in the following way:

**ACTIVITY DURING CLASSES:** By attending all forms of classes, the student can earn up to 15 points.

**SEMINAR:** In this way, the student can earn up to 15 points. During the third module, each student receives a topic for a seminar that he presents during the practical classes. The presentation, content and form of the seminar are evaluated.

**COLLOQUIUM:** In this way, the student can earn up to 20 points.

**FINAL EXAM:** The student can earn up to 50 points by taking the written final exam.

| Module | Name of the module   | MAXIMUM POINTS          |         |            |            |     |
|--------|--|-------------------------|---------|------------|------------|-----|
|        |  | Activity during classes | Seminar | Colloquium | Final exam | Σ   |
| 1.     | Physiology of nutrition  | 4                       | /       |            |            |     |
| 2.     | Medical nutritional therapy - general principles               | 5                       | /       |            |            |     |
| 3.     | Medical nutritional therapy in various pathological conditions | 6                       | 15      |            |            |     |
| Σ      |  | 30                      |         | 20         | 50         | 100 |

The final grade is formed as follows:

In order to pass the course, the student must obtain a minimum of 51 points according to the following table.

| the number of earned points | final grade |
|-----------------------------|-------------|
| 0 - 50                      | 5           |
| 51-60                       | 6           |
| 61-70                       | 7           |
| 71-80                       | 8           |
| 81 - 90                     | 9           |
| 91 - 100                    | 10          |

## LITERATURE:

1. Mahan, L. K., Raymond, J. L., & Escott-Stump, S. (2022). *Krause's Food & the Nutrition Care Process* (16<sup>th</sup> ed.). St. Louis, MO: Elsevier.
2. Frates, E., Hivert, M.-F., & Duggan, C. (2024). *Essentials of Clinical Nutrition in Healthcare*. New York, NY: Cengage Learning.
3. Ross, A. C., Caballero, B., Cousins, R. J., Tucker, K. L., & Ziegler, T. R. (2020). *Modern Nutrition in Health and Disease* (12<sup>th</sup> ed.). Philadelphia, PA: Wolters Kluwer Health.

## SCHEDULE:

### FIRST MODULE: PHYSIOLOGY OF NUTRITION

| TEACHING UNIT 1 (FIRST WEEK):   |   |
|---|---|
| PHYSIOLOGY OF NUTRIENTS   |   |
| Lectures - 1 hour   | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Physiology of digestion and absorption</li> <li>• Protein metabolism</li> <li>• Lipid metabolism</li> <li>• Metabolism of carbohydrates</li> </ul> | <ul style="list-style-type: none"> <li>• Proportion of proteins, lipids and carbohydrates in the diet in different genetic populations</li> </ul> |

| TEACHING UNIT 2 (SECOND WEEK):   |  |
|--|--|
| NUTRITIONAL NEEDS  |  |
| Lectures - 1 hour  | Practical classes - 2 hours  |
| <ul style="list-style-type: none"> <li>• Nutritional needs for energy and macronutrients</li> <li>• Water and electrolyte needs</li> <li>• Nutritional needs and frequent deficiencies of vitamins and trace elements</li> </ul> | <ul style="list-style-type: none"> <li>• Determination of nutritional needs (for energy and macronutrients)</li> <li>• Examples from clinical practice and interpretation</li> </ul> |

| TEACHING UNIT 3 (THIRD WEEK):   |   |
|---|---|
| MALNUTRITION AND NUTRITIONAL SCREENING/ MALNUTRITION IN DENTAL PATIENTS   |   |
| Lectures - 1 hour   | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Malnutrition (definition, diagnosis and importance)</li> <li>• Anthropometry and variations in relation to genetic population affiliation</li> <li>• Screening and assessment methods. Diagnostic criteria for malnutrition</li> </ul> | <ul style="list-style-type: none"> <li>• Determination of nutritional risk (nutritional scores: NRS, NUTRIC score)</li> <li>• Nutritional screening and assessment (anthropometry, function assessment)</li> <li>• Assessment of body composition (using the bioimpedance method) in relation to genetic population affiliation</li> <li>• Case examples of nutritional deficiencies affecting oral health</li> </ul> |

| TEACHING UNIT 4 (FOURTH WEEK):  |  |
|---|--|
| Lectures - 1 hour   | Practical classes - 2 hours  |
| MICROBIOM AND GENETIC VARIABILITY/ MICROBIOME, GENETICS AND ORAL HEALTH   |  |
| <ul style="list-style-type: none"> <li>• <i>Human microbiome and variation in relation to genetic population affiliation</i></li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and interpretation</li> </ul> |

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• <i>Role of gut and oral microbiomes in nutrient metabolism. Genetic factors influencing oral and systemic health.</i></li> </ul> |  |
|---|--|

## SECOND MODULE: MEDICAL NUTRITIONAL THERAPY - GENERAL PRINCIPLES

| TEACHING UNIT 5 (FIFTH WEEK):  |   |
|--|---|
| Lectures - 1 hour  | Practical classes - 2 hours   |
| MEDICAL NUTRITIONAL INTERVENTION/ NUTRITIONAL INTERVENTIONS FOR ORAL DISEASES  |   |
| <ul style="list-style-type: none"> <li>• Medical nutritional intervention - indications</li> <li>• Oral nutritional supplements</li> <li>• Methods of administration (enteral, parenteral nutrition)</li> </ul> / <ul style="list-style-type: none"> <li>• Principles of Medical Nutritional Therapy. Addressing periodontal diseases, dental caries, and oral mucosal conditions. Role of anti-inflammatory and antioxidant diets.</li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and interpretation</li> <li>• Calculation of nutritional needs and gradual caloric intake (refeeding)</li> <li>• Patient monitoring and complications</li> </ul> |

| TEACHING UNIT 6 (SIXTH WEEK):   |   |
|---|---|
| Lectures - 1 hour   | Practical classes - 2 hours   |
| METABOLIC RESPONSE TO STARVATION, SURGERY AND ACUTE DISEASE   |   |
| <ul style="list-style-type: none"> <li>• Metabolic changes during starvation</li> <li>• Effects of major surgery and critical illness on metabolism</li> <li>• Perioperative nutrition</li> </ul> | <ul style="list-style-type: none"> <li>• Determining nutritional needs depending on the stress phase</li> <li>• Calculation of nutritional needs</li> <li>• ERAS protocols (prehabilitation)</li> </ul> |

| TEACHING UNIT 7 (SEVENTH WEEK):  |  |
|--|--|
| FOOD INTOLERANCES AND ALLERGIES  |  |
| Lectures - 1 hour  | Practical classes - 2 hours  |
| <ul style="list-style-type: none"> <li>• Food intolerances and allergies. Genetic specificities of members of different <i>population groups</i></li> <li>• Disorders caused by enzyme deficiency</li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and interpretation</li> </ul> |

| TEACHING UNIT 8 (EIGHTH WEEK):   |   |
|--|---|
| DIETARY PATTERNS AS A CAUSE OF DISEASE   |   |
| Lectures - 1 hour  | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Dietary patterns as a cause of disease</li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and</li> </ul> |

|   |                |
|---|----------------|
| <ul style="list-style-type: none"> <li>• <i>Intercultural and religious aspects of dietary patterns and their influence on disease development</i></li> </ul> | interpretation |
|---|----------------|

|  |   |
|--|---|
| TEACHING UNIT 9 (NINTH WEEK):  |   |
| MEDICAL NUTRITIONAL THERAPY IN CHILDREN AND ELDERLY  |   |
| Lectures - 1 hour  | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Nutritional needs and nutrition of infants - the importance of breastfeeding</li> <li>• Growth monitoring and nutritional risk screening in children</li> <li>• Causes and consequences of malnutrition in the elderly</li> <li>• Senile sarcopenia and nutritional screening of the elderly</li> </ul> | <ul style="list-style-type: none"> <li>• Formulas of complementary nutrition for children</li> <li>• Spectrum of nutritional support in children</li> <li>• The most common deficiencies of micronutrients in the elderly</li> <li>• Treatment of geriatric malnutrition</li> </ul> |

### THIRD MODULE: MEDICAL NUTRITIONAL THERAPY IN VARIOUS PATHOLOGICAL CONDITIONS

|  |  |
|--|--|
| TEACHING UNIT 10 (TENTH WEEK):   |  |
| MEDICAL NUTRITIONAL THERAPY OF OBESITY   |  |
| Lectures - 1 hour  | Practical classes - 2 hours  |
| <ul style="list-style-type: none"> <li>• Recognize obesity as a serious and difficult disease</li> <li>• Definition and classification of obesity based on body mass index</li> <li>• <i>Obesity and variations in the relation to nutrigenetic and intercultural specificities</i></li> <li>• Medical nutritional therapy of obesity</li> </ul> | <ul style="list-style-type: none"> <li>• Clinical example of a patient with obesity and current associated pathological conditions with inability to enteral feed</li> <li>• Thematic student seminar</li> </ul> |

|   |   |
|---|---|
| TEACHING UNIT 11 (ELEVENTH WEEK):   |   |
| MEDICAL NUTRITIONAL THERAPY IN GASTROINTESTINAL TRACT DISEASES  |   |
| Lectures - 1 hour   | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Pathophysiology and consequences of malnutrition in gastrointestinal tract diseases (celiac disease)</li> <li>• Diagnosis and medical nutritional therapy of malnutrition in gastrointestinal tract diseases</li> <li>• <i>Nutrigenetic and intercultural specificities of celiac disease</i></li> </ul> | <ul style="list-style-type: none"> <li>• Nutrition in inflammatory bowel diseases</li> <li>• Nutrition in short bowel syndrome - case report</li> <li>• Thematic student seminar</li> </ul> |

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|---|--|
| TEACHING UNIT 12 (TWELFTH WEEK):                  |  |
| MEDICAL NUTRITIONAL THERAPY IN MALIGNANT DISEASES |  |

| Lectures - 1 hour  | Practical classes - 2 hours   |
|--|---|
| <ul style="list-style-type: none"> <li>• Significance of cachexia caused by cancer on clinical outcome</li> <li>• Specificities (clinical and nutritional) of cachexia in cancer</li> <li>• Benefits and limitations of available therapies for cancer cachexia</li> <li>• Potential anticancer effects of certain nutrients</li> <li>• <i>Nutrigenetic and intercultural specificities of malignant diseases</i></li> </ul> | <ul style="list-style-type: none"> <li>• Perioperative nutritional support in patients with malignant diseases</li> <li>• Immunonutritive formulas</li> <li>• The concept of prehabilitation</li> <li>• Thematic student seminar</li> </ul> |

| TEACHING UNIT 13 (THIRTEENTH WEEK):   |  |
|---|--|
| MEDICAL NUTRITIONAL THERAPY IN KIDNEY DISEASES  |  |
| Lectures - 1 hour   | Practical classes - 2 hours  |
| <ul style="list-style-type: none"> <li>• Medical nutritional therapy and prevention of kidney diseases</li> <li>• <i>Nutrigenetic and intercultural specificities of kidney diseases</i></li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and interpretation</li> <li>• Thematic student seminar</li> </ul> |

| TEACHING UNIT 14 (FOURTEENTH WEEK):   |   |
|---|---|
| MEDICAL NUTRITIONAL THERAPY IN DIABETES AND METABOLIC SYNDROME  |   |
| Lectures - 1 hour   | Practical classes - 2 hours   |
| <ul style="list-style-type: none"> <li>• Diagnosis of diabetes</li> <li>• Optimal composition of macronutrients (glycemic index, fibers, proteins, lipids)</li> <li>• Physical activity</li> <li>• Diagnostic criteria of metabolic syndrome</li> <li>• Medical nutritional therapy of diabetes and metabolic syndrome</li> <li>• <i>Nutrigenetic and intercultural specificities of diabetes and metabolic syndrome</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Clinical presentation of a patient with diabetes in clinical deterioration: genetic population affiliation - nutrition and hyperglycemia</i></li> <li>• Thematic student seminar</li> </ul> |

| TEACHING UNIT 15 (FIFTEENTH WEEK):   |  |
|--|--|
| MEDICAL NUTRITIONAL THERAPY IN CARDIOVASCULAR AND REUMATIC DISEASES  |  |
| Lectures - 1 hour  | Practical classes - 2 hours  |
| <ul style="list-style-type: none"> <li>• Medical nutritional therapy and prevention of cardiovascular diseases</li> <li>• <i>Nutrigenetic and intercultural specificities of cardiovascular diseases</i></li> <li>• Diagnosing and medical nutritional therapy of rheumatic diseases</li> <li>• <i>Nutrigenetic and intercultural specificities of rheumatic diseases</i></li> </ul> | <ul style="list-style-type: none"> <li>• Examples from clinical practice and interpretation</li> <li>• Thematic student seminar</li> </ul> |



