Universitat de Lleida

DEGREE CURRICULUM

# NUTRITIONAL SUPORT

Coordination: HERNÁNDEZ GARCÍA, CRISTIAN DIDIER

Academic year 2023-24

# NUTRITIONAL SUPORT 2023-24

## Subject's general information

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<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
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<tr><td>Coordination</td><td>HERNÁNDEZ GARCÍA, CRISTIAN DIDIER</td></tr>
<tr><td>Department</td><td>MEDICINE AND SURGERY</td></tr>
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# NUTRITIONAL SUPORT 2023-24

| Teaching staff | E-mail addresses | Credits taught by teacher | Office and hour of attention |
|---|---|---|---|
| HERNÁNDEZ GARCÍA, CRISTIAN DIDIER | didier.hernandez@udl.cat | 5 | |
| MARTINEZ OLMEDO, NAILA | naila.martinez@udl.cat | 2,5 | |

## Subject's extra information

There is a whole range of diseases (digestive diseases, renal diseases, degenerative diseases, etc.) and conditions caused by current therapies (oncology treatments, surgeries, artificial life support in intensive care units) with a significant nutritional impact on the patient, requiring the application of nutritional support as part of their comprehensive treatment.

The use of clinical nutrition and dietetics as a fundamental therapeutic element in the treatment of all these conditions, coupled with the societal demand for attention to these pathologies, makes it essential for professionals who specifically treat these types of patients to acquire the necessary knowledge and skills.

Furthermore, artificial nutrition has been a scientifically significant advancement for modern clinical medicine. This technique allows for the maintenance of proper nutritional status in certain types of patients, particularly those with severe conditions where adequate oral feeding is not possible due to their critical state, the nature of the disease itself, complications, or side effects of treatments.

Currently, it is possible to provide total and indefinite artificial nutrition through enteral or parenteral routes for all types of patients who cannot be adequately fed orally. Complementary artificial nutrition, both enteral and parenteral, is also widely used in a significant proportion of patients for whom oral feeding is insufficient or not entirely effective. Both enteral and parenteral forms of artificial nutrition are commonly used worldwide, especially in hospital settings, as routine nutritional support techniques that are part of the therapeutic arsenal of modern medicine. The progressive increase in home-based artificial nutrition, especially enteral nutrition, should also be noted.

This core subject is taught in the fourth year of the Double Degree in Human Nutrition and Dietetics and Physiotherapy during the upcoming academic year. The aim is to provide students with the necessary knowledge and skills to develop their professional careers in the field of Human Nutrition.

## Learning objectives

To pass this subject, students must have achieved and accomplished the following teaching objectives:

1. Knowledge acquisition:

• Introduce students to the concept of artificial nutrition and its importance in the treatment of certain pathologies.

• Analyze the different techniques of nutritional support (supplementation, adapted basic feeding, enteral and parenteral nutrition).

• Understand the main indications and contraindications, access routes, administration, composition, risks, and complications of artificial nutrition.

• Be able to prescribe dietary supplementation orally and enteral nutrition orally or via a feeding tube.

• Be able to prescribe parenteral nutrition.

• Adapt the most appropriate nutritional regimen based on physiopathological processes.

• Understand the specific characteristics of home-based enteral and parenteral nutrition.

• Understand the specific characteristics of artificial nutrition in pediatrics.

2. Understand and have observed:

• Organization of nutritional support for a patient.

• Prescription of dietary treatment for specific pathologies.

• Placement of a nasogastric tube for enteral nutrition.

• Placement of a central venous catheter for parenteral nutrition.

• Implementation and assistance of patients with Home Enteral Nutrition.

2. Acquisition of skills in solving nutritional problems:

• Able to assess requirements and nutritional status in patients in specialized consultation.

• Able to estimate dietary requirements for specific pathologies.

• Able to assess nutritional status in hospitalized patients.

• Able to calculate nutritional needs.

• Able to implement an artificial nutritional support program and prescribe the necessary follow-up and controls. Adjustment of nutritional support.

• Familiarity with the placement and change of artificial nutrition units.

## Competences

Specific Competencies:

CE39 Interpret and integrate clinical, biochemical, and pharmacological data in the nutritional assessment and dietary-nutritional treatment of the patient.

CE42 Participate in the multidisciplinary team of a Hospital Nutrition Unit.

CE43 Understand different techniques and products for basic and advanced nutritional support.

CE44 Develop and implement dietary-nutritional transition plans.

General Competencies:

CG1 Recognize the essential elements of the dietitian-nutritionist profession, including ethical principles, legal responsibilities, and practicing the profession with social justice in mind, considering individuals' habits, beliefs, and cultures.

CG2 Develop the profession with respect for other healthcare professionals, acquiring skills to work in a team.

CG3. Recognize one's own limitations and the need to maintain and update professional competence, placing special emphasis on autonomous and continuous learning of new knowledge, products, and techniques in nutrition and food, as well as having a motivation for quality.

CG4. Communicate effectively, both orally and in writing, with individuals, healthcare professionals, industry, and

the media, utilizing information and communication technologies, especially those related to nutrition and lifestyle habits.

CG5. Know, critically evaluate, and effectively use and apply sources of information related to nutrition, food, lifestyle, and health aspects.

CG6. Understand the limits of the profession and one's competencies, identifying when interdisciplinary treatment or referral to another professional is necessary.

Basic Competencies:

CB2: Apply knowledge to their work or vocation in a professional manner and possess the competencies typically demonstrated through argumentation, problem-solving, and defense within their field of study.

CB3: Gather and interpret relevant data (typically within their field of study) to make judgments that include reflection on socially, scientifically, or ethically relevant issues.

CB4: Communicate information, ideas, problems, and solutions to both specialized and non-specialized audiences.

CB5: Develop the necessary learning skills to undertake further studies with a high degree of autonomy.

Cross-cutting Competencies at the University of Lleida (UdL):

CT1: Possess effective oral and written expression skills.

CT3: Master information and communication technologies (ICT).

CT5: Acquire essential notions of scientific thinking.

## Subject contents

| Nº | Training activities: | Hours of training activity: | % presencality |
|---|---|---|---|
| 1 | Lectures | 75 | 40 |
| 6 | Seminars | 37.5 | 40 |
| 9 | Clinical practices | 37.5 | 40 |
| | TOTAL | 150 | |

THEORETICAL CONTENTS:

Lectures (LC): These will be conducted with all students (larger group) and are not mandatory. Their purpose is to provide an overview of the educational contents related to the specific knowledge of the subject, highlighting aspects related to the acquisition of competencies in nutrition, clinical dietetics, and diet therapy. They will take place in the classroom.

| Nº | Topic | Teacher |
|---|---|---|
| | | |

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| | | |
|---|---|---|
| 1 | Introduction to artificial nutrition. Concept and types of artificial nutrition. Differences, advantages, and disadvantages compared to oral feeding. Differential characteristics of artificial nutrition. | C. Didier |
| 2 | Enteral nutrition. Definition, concept, types, indications, and contraindications. Main pathologies that can be treated with enteral nutrition. | C. Didier |
| 3 | Enteral nutrition. Administration routes for enteral nutrition. Types of feeding tubes for enteral nutrition. Risks and complications of feeding tubes. Precautions. | C. Didier |
| 4 | Enteral nutrition. Diets for enteral nutrition. Laboratory enteral diets. Complete and incomplete diets with or without fiber. Modular enteral nutrition. | C. Didier |
| 5 | Enteral nutrition. Dietary supplements. Types and functions. Main indications. How to prescribe nutritional supplements in clinical practice. | C. Didier |
| 6 | Enteral nutrition. Administration schedules for enteral nutrition. Procedure for implementing and monitoring enteral nutrition. | C. Didier |
| 7 | Enteral nutrition. Risks and dangers of enteral nutrition. Most common complications in clinical practice. Guidelines for prevention. Monitoring and follow-up of patients with enteral nutrition. | C. Didier |
| 8 | Enteral nutrition and medications. | C. Didier |
| 9 | Enteral nutrition initiation. | C. Didier |
| 10 | Enteral nutrition. Home enteral nutrition: Definition. Indications and contraindications. Main pathologies suitable for home enteral nutrition. Preferred access routes in a home setting. | C. Didier |
| 11 | Enteral nutrition. Home enteral nutrition: Planning a home enteral nutrition program. Patient and family education in home support techniques. Patient follow-up.. | C. Didier |
| 12 | Parenteral nutrition. Definition, concept, types, and indications. Main pathologies suitable for parenteral nutrition. | C. Didier |
| 13 | Parenteral nutrition. Administration routes and catheters for parenteral nutrition. Risks and dangers of the routes for administering parenteral nutrition. | C. Didier |
| 14 | Parenteral nutrition. Nutritional substrates in parenteral nutrition. Carbohydrate and protein solutions. Main characteristics and functions in parenteral nutrition units. | C. Didier |
| 15 | Parenteral nutrition. Nutritional substrates in parenteral nutrition. Lipid emulsions, electrolyte and vitamin formulations. Main characteristics and functions in parenteral nutrition units. | C. Didier |
| 16 | Parenteral nutrition. Mixtures in parenteral nutrition. Formulation of mixtures for parenteral nutrition. Laminar flow hoods. | C. Didier |
| 17 | Parenteral nutrition. Physicochemical and bacteriological quality control. Catering system. | C. Didier |
| 18 | Parenteral nutrition. Nutritional programs in parenteral nutrition. Standard nutrition, disease-specific nutrition, and organ-specific nutrition. Most common parenteral nutrition programs in clinical practice. | C. Didier |
| 19 | Parenteral nutrition. Methods of administering parenteral nutrition. Pump-assisted parenteral nutrition and gravity-assisted parenteral nutrition. Guidelines for initiation and maintenance of parenteral nutrition. Schemes for the withdrawal of parenteral nutrition. | C. Didier |

| | | |
|---|---|---|
| 20 | Narenteral nutrition. Risks and dangers of parenteral nutrition. Complications associated with parenteral nutrition: mechanical, metabolic, and septic complications. Procedure for controlling and preventing complications secondary to parenteral nutrition. | C. Didier |
| 21 | Parenteral nutrition. Monitoring and follow-up of parenteral nutrition. Monitoring of nutritional status: clinical, anthropometric, and biological parameters. Nitrogen balance. Nursing monitoring and controls. | C. Didier |
| 22 | Parenteral nutrition initiation. | C. Didier |
| 24 | Parenteral nutrition. Home parenteral nutrition: Definition, indications, and contraindications. Main pathologies suitable for home parenteral nutrition. Preferred access routes for home use. | C. Didier |
| 25 | Parenteral nutrition. Home parenteral nutrition: Planning a home artificial nutrition program. Education of the patient and family in home support techniques. Patient follow-up. | C. Didier |
| 26 | Parenteral nutrition. Artificial nutrition in pediatrics: Indications for artificial nutrition in pediatrics. Specific characteristics of access routes and administration. Pediatric enteral and parenteral nutrition. | Naila Martinez |
| 27 | Parenteral nutrition. Artificial nutrition in pediatrics: Indications for artificial nutrition in pediatrics. Specific characteristics of access routes and administration. Pediatric enteral and parenteral nutrition. II | Naila Martinez |

PRACTICAL CONTENTS:

Seminars (Sem):

These will be conducted in groups of 15-20 students (medium-sized group), and they are mandatory and must be attended by the corresponding student group. The seminars will revolve around clinical cases where exercises of analysis, discussion, and procedures in real clinical cases related to nutritional support will be worked on.

| **SEMINARS (2 hours ).** | | |
|---|---|---|
| **Núm.** | **Clinical case** | **Teacher** |
| 1 | • Feeding Tubes: Tubes for enteral nutrition<br>• Enteral Feeding Pump: Enteral feeding pump<br>• Central Venous Catheter: Central venous catheter<br>• Infusion Pump: Infusion pump | C. Didier |
| 2 | Formulas and Calculation of Nutritional Requirements | C. Didier |
| 3 | Enteral Clinical Cases | C. Didier |
| 4 | Hydration / Fluid Balance | C. Didier |
| 5 | Prepare an Individualized Parenteral Nutrition (PN) | C. Didier |
| 6 | Guess Whose Formula is This? | C. Didier |
| 7 | Parenteral Clinical Cases | C. Didier |

Clinical Practice (PC):

Clinical practices will be mandatory and will be carried out in the following manner:

- Anthropometry Practice (Small group)
- Visit to the Intensive Care Unit (ICU) of Arnau de Vilanova University Hospital in Lleida (Intensive care medicine and pharmacy services). These will be guided practices by the faculty, and students will be required to wear white lab coats. If possible, groups of 3 people will be formed. C. Didier.
- Practical cases in the classroom to develop and solve real cases of artificial nutrition. Directed Assignments (Treb): A written assignment will be completed based on the clinical practice activities; these assignments are academically directed and specifically focused on achieving competencies related to managing the medical history and clinical data of patients with nutrition-related conditions. Didier Hernández.

## Methodology

| Activities | Aim | Description |
|---|---|---|
| **Lectures(LEC)** | **1** | • Acquiring knowledge about artificial nutritional support techniques (enteral and parenteral nutrition) and their importance in the current treatment of certain diseases. |
| **Seminars (Sem)** | **1,2** | • Assessing nutritional status and devising an artificial nutrition plan. |
| **Clinical practice** | **1,2** | • Anthropometric assessment as part of the evaluation of nutritional status.<br>• Evaluation of real patients and implementation of a nutritional support program. |
| **Academically directed assignments (ADA)** | **2,3** | • Academically directed assignments specifically focused on achieving competencies related to the diagnosis and application of artificial nutrition. |

## Development plan

The course development plan mainly consists of:

1. Lectures: These sessions focus on acquiring theoretical knowledge and provide a space for debate and teamwork to develop skills and the learned content.

2. Seminars and practical sessions: These activities provide an opportunity to apply the learned content through real-life cases, allowing students to gain practical experience.

3. Teamwork projects: These projects promote interdisciplinary collaboration and mutual learning among students, fostering a collaborative learning environment.

Overall, the combination of lectures, seminars, practical sessions, and teamwork projects enhances students' understanding of the subject matter and helps them develop essential skills for their future professional practice.

## Evaluation

| Nº | Evaluation s | Minimum weighting | Maximum weighting. |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| 1 | Written tests on theoretical content and concepts. | 40 | 60 |
| 2 | Tests related to practical activities or problem-solving. | 20 | 40 |

The final grade will be the sum of the different assessed aspects:

- The conceptual and theoretical knowledge will be assessed through a multiple-choice test (80% of the exam grade) and a case study to be developed (20% of the exam grade). The result obtained in this exam will constitute 75% of the final grade.
- The completion and participation in all scheduled practical activities will represent 25% of the final grade. The evaluation of practical contents will be done through controlled attendance and assessment of directed assignments. Clinical practice is mandatory and will be evaluated through a report explaining the implementation of a nutritional support program based on the patient's pathology.
- Continuous assessment will be carried out with two tests on theoretical contents (multiple-choice exams). The first test will cover enteral nutrition support, and the second test will cover parenteral nutrition support. Each partial test will account for 37.5% of the final grade. The sum of all the tests will account for 75% of the final grade.
- The other 25% will correspond to the evaluation of practical contents, which will be done through a single assessment: 15% for the evaluation of seminars (controlled attendance) and 10% for the evaluation of practical activities (controlled attendance + assessment of practical work). In case of not passing any of the assessments, the student will have to take the exam again in the second session.
- The minimum passing grade for a partial test is 6 (the overall result of the class will be considered in each case. Each incorrect answer will deduct 0.25).

## Bibliography

**Books**


- Celaya Pérez S (ed). Tratado de nutrición artificial.  Tomos I y II. Grupo Aula Médica. Madrid, 1998.
- Gil, Angel. Tratado de Nutrición, 3ª edición. Tomos I, II, III y IV. Editorial médica panameriacana. Madrid 2017.
- Salas, A. Boada, R. Trallero, ME. Saló eds. Nutrición y dietética clínica. Doyma. Barcelona 2000.


**Sociedades cientificas**

Sociedad Española de Nutrición

http://www.sennutricion.org/

Sociedad Española de Nutrición Clínica y Metabolismo (SENPE)

https://senpe.com/

Grupo de trabajo de metabolismo y nutrición de la SEMICYUC

https://semicyuc.org/

Federación Latinoamericana de Terapia Nutricional, Nutrición Clínica y Metabolismo (FELANPE)

http://www.felanpeweb.org/

Sociedad Europea de Nutrición Clínica y Metabolismo (ESPEN).

https://www.espen.org/

American Society of Parenteral and Enteral Nutrition (ASPEN)

http://www.nutritioncare.org/

Federación Española de Sociedades de Nutrición, Alimentación y Dietética (FESNAD)

https://www.fesnad.org/

**Internet**

http://www.agapea.com/Nutricion-clinica-Nutricion-parenteral-n36303i.htm

http://www.bbraun.es/index.cfm?D8A75C0926134D3DAD40170095598436

http://www.sefh.es/revistas/vol19/n6/347_350.PDF

http://www.nutritioncare.org/

http://www.senc.es/

http://www.sennutricion.org/