# SUBJECT OUTLINE

## 1. Program of study description

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| **1.1.** | **“CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY** |
| **1.2.** | **FACULTY OF MEDICINE** |
| **1.3.** | **CLINICAL DEPARTMENT 2** |
| **1.4.** | **DISCIPLINE: ENDOCRINOLOGY AND DIABETES, NUTRITION AND METABOLIC DISEASES** |
| **1.5.** | **DOMAIN OF STUDY:** Health – sectorally regulated within the European Union |
| **1.6.** | **CYCLE OF STUDIES:** BACHELOR’S DEGREE |
| **1.7.** | **PROGRAM OF STUDY:** MEDICINE |

## 2. Subject description

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| **2.1.** | **Name of the discipline in the curriculum: SCIENCE AND TECHNOLOGY IN DIABETES MELLITUS** | | | | |
| **2.2.** | **Discipline code: DS IV 18M** | | | | |
| **2.3.** | **Type of discipline (DF/DS/DC): DS** | | | | |
| **2.4.** | **Discipline regime (DOB/DOP/DFA): DOP** | | | | |
| **2.5.** | **Course tenured coordinator: Conf. Univ. Dr. Sorin Dorian Ioacără** | | | | |
| **2.6.** | **Practical work tenured coordinator: Conf. Univ. Dr. Sorin Dorian Ioacără** | | | | |
| **2.7. Year of study** | **IV** | **2.8. Semester** | **VII + VIII** | **2.9. Type of assessment (E/C)** | **C (colloquium)** |

## 3. Total estimated time (hours/semester of didactic activity and individual training/study)

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| **I. Academic preparation (teaching, practical work, evaluation)** | | | | | | |
| **3.1. Number of hours per week** | **4** | **out of which:** | **3.2. course** | **2** | **3.3. seminar/ laboratory** | **2** |
| **3.4. Total number of hours in the curriculum** | **28** | **out of which:** | **3.5. course** | **14** | **3.6. seminar/ laboratory** | **14** |
| **Evaluation (number of hours): 2** | | | | | | |
| **II. Individual preparation (study)** | | | | | | |
| **Time distribution** | | | | | | **hours** |
| **Study of course materials, textbooks and books, study of the minimum recommended bibliography** | | | | | | 8 |
| **Additional documentation in the library and online** | | | | | | 8 |
| **Specific preparation activities for the project, laboratory, assignments, reports** | | | | | | 10 |
| **Preparation for presentations or tests, preparation for the final examination** | | | | | | 6 |
| **Tutoring** | | | | | | |
| **Other activities** | | | | | | |
| **3.7. Total hours of individual study** | | | | | | 32 |
| **3.9. Total hours per semester (3.4.+3.7.)** | 60 | | | | | |

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| **3.10. Number of credit points** | 2 |

**4. Prerequisites (where applicable)**

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| **4.1. of curriculum** | No |
| **4.2. of competencies** | No |

**5. Requirements (where applicable)**

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| **5.1. for delivering the course** | Lecture room, video projector |
| **5.2. for delivering the seminar / laboratory** | Practical work room and Clinical Department, Elias Emergency University Hospital. Demonstration devices (insulin pumps, infusion sets, continuous glucose monitoring sensors), computer with data download and analysis software, video projector |

**6. Learning outcomes***

| Knowledge | Skills | Responsibility and autonomy |
|---|---|---|
| *Acquiring the ability to combine medicine with technology*<br><br>*Adopting a way of thinking from the perspective of technology*<br><br>*Knowledge of the operating principles, indications and limitations of insulin pumps and continuous glucose monitoring systems* | *Inserting an infusion set and programming the basic settings of an insulin pump*<br><br>*Applying a continuous glucose monitoring sensor and configuring its alerts* | *Making therapeutic decisions based on device-generated data, while taking responsibility toward the patient*<br><br>*Educating the patient and the family on the correct and safe use of the devices* |
| *Acquiring the ability to understand how the insulin pump works and how to use it correctly*<br><br>*The ability to understand how biosensors work*<br><br>*Knowledge of the current status of automated insulin delivery systems, cell therapies, metabolic surgery and neonatal diabetes* | *Interpreting standardized continuous glucose monitoring reports and the data downloaded from the pump*<br><br>*Identifying and solving common technical problems (occlusion, disconnection, sensor errors)*<br><br>*Critical analysis of the scientific evidence on new technologies* | *Working within the multidisciplinary team caring for the patient with diabetes*<br><br>*Respecting the confidentiality of the medical data generated by the devices*<br><br>*Continuous learning in a rapidly evolving field* |

**7. Subject learning objectives (correlated with learning outcomes)**

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| **7.1. General learning objective** | Developing the students' ability to understand and use modern diabetes technologies (insulin pumps, continuous glucose monitoring systems, automated insulin delivery systems) and to know the current status of innovative therapies (cell therapies, metabolic surgery), in order to integrate them into the care of the patient with diabetes. |
| **7.2. Specific learning objectives** | Explaining the operating principles, indications, benefits and limitations of insulin pumps and continuous glucose monitoring systems.<br>Acquiring the practical skills of inserting, programming and using insulin pumps and sensors.<br>Interpreting continuous glucose monitoring reports and device-downloaded data, and proposing therapeutic adjustments.<br>Understanding the algorithms of automated insulin delivery systems and the special situations (physical exercise, intercurrent illness, ketone bodies).<br>Knowing the state of research on stem cell-based therapies, pancreatic islet transplantation, metabolic surgery and neonatal diabetes.<br>Developing the ability to critically analyze clinical trials in the field of diabetes technology. |

**8. Contents**

| **8.1. Course** | **Teaching methods** | **Observations** |
|---|---|---|
| Lecture 1. Insulin pump therapy: principles, indications, pump types, settings | Interactive lecture, multimedia presentation, discussions | 2 hours |
| Lecture 2. Continuous glucose monitoring systems: principles, metrics, interpretation | Interactive lecture, multimedia presentation, discussions | 2 hours |
| Lecture 3. Implantable devices in diabetes (pumps + CGMS) | Interactive lecture, multimedia presentation, discussions | 2 hours. Includes insulin pumps and continuous glucose monitoring sensors |
| Lecture 4. The artificial pancreas: automated insulin delivery systems (pumps + CGMS) | Interactive lecture, multimedia presentation, discussions | 2 hours. Includes insulin pumps and continuous glucose monitoring sensors |
| Lecture 5. Stem cell-based technologies in diabetes mellitus | Interactive lecture, multimedia presentation, discussions | 2 hours |
| Lecture 6. Surgery as a treatment for diabetes mellitus | Interactive lecture, multimedia presentation, discussions | 2 hours |
| Lecture 7. Neonatal diabetes. Discussions. Final test | Interactive lecture, multimedia presentation, discussions<br>Colloquium (multiple choice | 2 hours |

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|---|---|---|
| | test) | |
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| **Recent bibliography:**<br>1. Timar B (coordinator). Tratat de Diabet, Nutriție și Boli Metabolice [Textbook of Diabetes, Nutrition and Metabolic Diseases]. Timișoara: „Victor Babeș" Publishing House; 2026. ISBN 978-606-786-533-2. Available at: https://societate-diabet.ro/tratat-diabet/<br>2. American Diabetes Association Professional Practice Committee. Standards of Care in Diabetes—2026. Diabetes Care. 2026;49(Suppl 1). | | |
| **8.2. Laboratory/ practical work** | **Teaching methods** | **Observations** |
| Practical session 1. Insulin pump: components, infusion sets, insertion, programming of the basal rate, boluses and calculation settings (insulin sensitivity factor, insulin-to-carbohydrate ratio) | Practical demonstration on demonstration devices, individual exercises | 2 hours |
| Practical session 2. Continuous glucose monitoring sensors: application, start-up, calibration, alerts. Reading standardized reports (ambulatory glucose profile, time in range, glycemic variability) | Practical demonstration, individual exercises, report interpretation | 2 hours |
| Practical session 3. Interpreting data downloaded from the pump and the sensor: identifying glycemic patterns and adjusting the settings. Case studies | Case studies, report interpretation | 2 hours |
| Practical session 4. Automated insulin delivery systems: initiation, settings, operating modes, special situations (physical exercise, intercurrent illness, ketone bodies). Case studies | Practical demonstration, case studies | 2 hours |
| Practical session 5. Cell therapies and pancreatic islet transplantation: critical analysis of clinical trials | Critical analysis of articles (journal club), discussions | 2 hours |
| Practical session 6. Metabolic surgery in diabetes mellitus: patient selection, postoperative follow-up, treatment adjustment. Case studies | Case studies, discussions | 2 hours |
| Practical session 7. Neonatal diabetes and monogenic diabetes: clinical cases, genetic testing, transition from insulin to sulfonylureas. Review | Case studies, discussions, review | 2 hours |
| **Recent bibliography:** | | |

1. Timar B (coordinator). Tratat de Diabet, Nutriție și Boli Metabolice [Textbook of Diabetes, Nutrition and Metabolic Diseases]. Timișoara: „Victor Babeș" Publishing House; 2026. ISBN 978-606-786-533-2. Available at: https://societate-diabet.ro/tratat-diabet/
2. American Diabetes Association Professional Practice Committee. Standards of Care in Diabetes—2026. Diabetes Care. 2026;49(Suppl 1).

**9. Assessment**

| **Type of activity** | **9.1. Assessment criteria** | **9.2. Assessment methods** | **9.3. Assessment weighting within the final grade** |
|---|---|---|---|
| **9.4. Lectures** | Understanding of the notions taught and the ability to apply them in clinical situations | Final written exam (multiple choice test) | 100% |
| **9.5. Seminar/ laboratory** | Attendance at the practical sessions | Attendance (condition for admission to the exam). Not graded separately | 0 % |
| **9.5.1. Individual project** (if applicable) | | | |
| **9.6. Minimum performance standard** | | | |
| • General knowledge of the use of insulin pumps<br>• General knowledge of the use of continuous glucose monitoring sensors<br>• Programming the basic settings of an insulin pump and interpreting a standardized continuous glucose monitoring report<br>• Minimum grade 5 in the final written exam | | | |

**Date of completion:**

**Signature of the course holder**

**Conf. Univ. Dr. Sorin Dorian Ioacără**

**Signature of the practical work holder**

**Conf. Univ. Dr. Sorin Dorian Ioacără**

**13.10.2026**

**Date of approval by the Department Council:**

**Signature of the head of department**

**Head of Clinical Department 2:**
**Prof. Dr. Adrian Streinu-Cercel**