**ACADEMIC DISCIPLINE OVERVIEW**

1. **Program data**

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| 1.1. Higher education institution | Grigore T. Popa University of Medicine and Pharmacy Iasi |
| 1.2. Faculty | Medical Bioengineering |
| 1.3. Department | Biomedical Sciences |
| 1.4. Field of study | Health |
| 1.5. The cycle of studies | Bachelor |
| 1.6. Study program / qualification | Balneo-physiokinetotherapy and rehabilitation – english language / Physiokinetotherapist |

**2. Discipline data**

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| 2.1. Name of the discipline / Code | | | | **a. Devices for Functional Electrical Stimulation** | | **RE1322** |
| 2.2. Teaching staff in charge with lectures | | | | **-** | | |
| 2.3. Teaching staff in charge with practical activities | | | | **Associate professor Dan Zaharia, MD, PhD** | | |
| 2.4. Year of study | **III** | 2.5. Semester | **1** | 2.6. The type of assessment | **Colloquium, C1** | |
| 2.7. Discipline type | | **Elective** | | **Specialty discipline** | | |

**3. Estimated total time (hours/semester of didactic activity)**

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| 3.1. Number of hours / week: | | 3.2. Courses number of hours / week | | 3.3. Seminars / practical classes  number of hours / week | | | |
| Semester 1 | **1** |  | | **1** | | | |
| Semester 2 |  |  | |  | | | |
| 3.4. Total number of learning hours: | **14** | 3.5. Of which: Courses |  | 3.6. Of which: Seminars / practical classes: | | | **14** |
| 3.7. Distribution of individual study time: | | | | | Hours sem. 1 | Hours sem. 2 | |
| Study time using course book materials, bibliography and hand notes | | | | | 15 |  | |
| Supplementary documentation in the library, using specialised platforms via internet and by field work | | | | | 15 |  | |
| Preparation time for seminars / practical classes, study themes, reviews, portfolio and essays | | | | | 6 |  | |
| Tutorship | | | | | 2 |  | |
| Examinations | | | | | 2 |  | |
| Other activities | | | | |  |  | |
| Total hours of individual study (*without examinations*) | | | | | **36** |  | |
| 3.8. Total hours per semester | | | | | **50** |  | |
| 3.9. Number of credits | | | | | **2** |  | |

**4. Preconditions (where applicable)**

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| 4.1. of curriculum | Anatomy, Physiology, Biophysics, Exploration and evaluation methods in medical rehabilitation, Biomedical instrumentation for rehabilitation |
| 4.2. of competences | Knowledge of the concepts, theories and fundamental concepts of physiological phenomena of the body. The ability to use biomedical instrumentation for rehabilitation |

5. **Conditions (where applicable)**

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| 5.1. for lectures | Logistic support video |
| 5.2. for seminars / practical classes | Students will wear protective clothing (lab coat) |

**6. Specific competences acquired**

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| **Professional competencies** | C .4.1 | Description of concepts, theories and basic notions for functional electric stimulation techniques, functional devices, appreciation of the quality of life of patients with this devices |
| C 4.3 | Using the knowledge base for choosing methods of functional electric stimulation assessment in different pathological situations |

7**.** **Objectives of the study discipline (according to the grid of specific competences acquired)**

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| 7.1. General objective | Those providing basic knowledge and skills with which the student can use in functional electrical stimulation for recovery in the best conditions and maximum performance. |
| 7.2. Specific objectives | Facilitate collaboration between specialist in physical therapy and functional electric stimulation specialists to achieve results consistent with clinical observation for monitoring rehabilitation. |

**8. Contents**

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| **8.2. Practical activities - seminar** | | **Teaching methods** | **Observations** |
| 1 | Devices for functional neuromuscular stimulation, transcutaneous stimulation of sequential muscle groups of ambulation with computer control, used for walking by spinal cord injured, entire system, after completion of training program | Explanatory text, discussion documents, practical examples, conclusions | 6 hour |
| 2 | 2. Neuromuscular electrical stimulation (NMES) | Explanatory text, discussion documents, practical examples, conclusions | 4 hour |
| 3 | 3. Electrical stimulation for the treatment of pain | Explanatory text, discussion documents, practical examples, conclusions | 4 hour |

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| **8.3. Bibliography:** |
| ***Mandatory:*** |
| 1. Thrasher TA, Flett HM, Popovic MR. Gait training regimen for incomplete spinal cord injury using functional electrical stimulation. Spinal Cord 44: 2006. |
| 1. N. Kapadia, K. Masani, B.C. Craven, L.M. Giangregorio, S.L. Hitzig, K. Richards, M.R. Popovic, A randomized trial of functional electrical stimulation for walking in incomplete spinal cord injury: Effects on walking competency,The Journal of Spinal Cord Medicine, vol. 37, no. 5, 2014. |
| 1. Triolo RJ, Bieri C, Uhlir J, Kobetic R, Scheiner A, Marsolais EB. Implanted Functional Neuromuscular Stimulation systems for individuals with cervical spinal cord injuries: clinical case reports. Archives of physical medicine and rehabilitation. |
| 1. Kobetic R, To CS, Schnellenberger JR, Audu ML, Bulea TC, Gaudio R, Pinault G, Tashman S, Triolo RJ. Development of hybrid orthosis for standing, walking, and stair climbing after spinal cord injury. Journal of rehabilitation research and development 46: 2009. |
| 1. Burridge JH, Haugland M, Larsen B, Svaneborg N, Iversen HK, Christensen PB, Pickering RM, Sinkjaer T, Patients' perceptions of the benefits and problems of using the ActiGait implanted drop-foot stimulator. J Rehabil Med 40: 2008 |

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| **Elective:** |
| 1. Popovic D, Tomović R, Schwirtlich L. Hybrid assistive system--the motor neuroprosthesis. IEEE transactions on bio-medical engineering 36: 1989. |
| 1. Solomonow M, Baratta R, Hirokawa S, Rightor N, Walker W, Beaudette P, Shoji H, D'Ambrosia R. The RGO Generation II: muscle stimulation powered orthosis as a practical walking system for thoracic paraplegics. Orthopedics 12: 1989. |

**9. *Correlation of the discipline contents with the expectations of the epistemic community, professional associations, and representative employers from the afferent program field***

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| Knowledge and abilities are established as didactic objectives and specified as such in the analytic programs that are revised yearly. After their analysis by the study discipline staff, these are discussed and approved in the Curricular Committee, towards curricular harmonization among the various study disciplines. Along this entire process systematic evaluation is performed, directly if possible, regarding the correspondence of the contents to the expectations of the academic community and of the representatives of the social community, professional associations, and employers. |

**10. Evaluation**

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| Type of activity | Assessment criteria | Evaluation methods | Contribution to the final grade |
| Lectures | Acquiring theoretical notions and presented in the course | Written exam.  MCQ Examination |  |
| Practical activities | Activities carried out in laboratory and conducted quality essays. | Colloquium practical activity | 80 % |
| Individual study | Preparation time for seminars / practical classes, study themes, reviews, portfolio and essays.  Study time using coursebook materials, bibliography and hand notes, documentation in the library, using specialised platforms via internet and by field work. | Tests during the semester | 20 % |
| Minimal performance standard:   * Knowing the basic notions for functional electric stimulation in medical rehabilitation | | | |

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| Date | Holder of course / signature, | Holder of practical activities / signature, |
| 13.09.2023 |  | Associate professor Dan Zaharia, MD, PhD |

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| Date of approval in the Department Council/Teaching Council, | | |
| 14.09.2023 |  | Department director / signature, |
|  |  | Associate Professor Daniela-Viorelia Matei, MD, PhD |