DISCIPLINE SHEET

1. Study program

1.1.	"CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
1.2.	FACULTY OF DENTISTRY
1.3.	DEPARTMENT I
1.4.	DISCIPLINE Dental prosthesis technology
1.5.	STUDY DOMAIN: Health, sectoral regulated within the European Union
1.6.	STUDY LEVEL: I (Bachelor's degree) and II (Master's degree)
1.7.	STUDY PROGRAMME: DENTAL MEDICINE IN ENGLISH

2. Discipline

2.1.	Discipline name according to the study curriculum: DENTAL PROSTHESIS TECHNOLOGY I				
2.2.	Discipline code: MD02S01EN				
2.3.	Discipline type (FD/SD/CD): SD				
2.4.	Discipline optionality (COD/ED/FAD): COD				
2.5.	Lectures tenure: Lucian-Toma Ciocan (DDS, DMD, PhD) – University Professor Camelia Ionescu (DMD, MSc, PhD) - Lecturer Irina Ioana Donciu (DMD, MSc, PhD) – Lecturer Vlad Gabriel Vasilescu (DMD, PhD) - Lecturer				
2.6.	Practical classes / seminar tenure: Lucian-Toma Ciocan (DDS, DMD, PhD) – University Professor Irina Ioana Donciu (DMD, MSc, PhD) – Lecturer Camelia Ionescu (DMD, MSc, PhD) – Lecturer Vlad Gabriel Vasilescu (DMD, PhD) – Lecturer Daniela Aurelia Pîrvu (DMD, PhD) - Lecturer Cătălin – Constantin Andrei (DDS, DMD, PhD) - Assist. Prof. Ștefan Tudoran (DDS, DMD, PhD) - Assist. Prof.				
2.7. Year of study	II	2.8. Semester	I	2.9. Evaluation (E/C/V)	E

3. Estimated total time (hours/ semester of teaching and training activity /individual study)

I. University training						
3.1. Number of hours per week	6	from which:	3.2. lecture	2	3.3. practical class/ seminar	4
3.4. Total hours in the study curriculum	84	from which:	3.5. lecture	28	3.6. practical class/ seminar	56
II. Preparation/ individual study						
Time distribution						hours
Study of lecture materials, textbooks, books, study of the minimum recommended bibliography						24
Additional documentation activity in the library, on online platforms						14

Specific preparation activities for projects, practical classes, preparation of assignments, reports	**18**
Preparation for presentations or evaluations, preparation for the final examination	**4**
Tutoring activity	**4**
Other activities	**2**
3.7. Total hours of individual study	**66**
3.8. Total hours per semester (3.4.+3.7.)	**150**
3.9. Number of credits	**5**

4. Prerequisites

4.1. curriculum	Notions of morphology and function of the masticatory system Notions of dental embryology and anatomy of the head (Physiology, Anatomy, Teeth morphology, Embriology)
4.2. proficiencies	**Scientific skills:** **-** Ability to use specialized terminology appropriately and in context - The ability to apply the specialized knowledge previously obtained in the medical-biological sciences to evaluate and diagnose the pathology of the structures of the masticatory system. - The ability to correctly interpret and apply the fundamental notions regarding the mechanisms of operation of the masticatory system. - The ability to reproduce the morphology of the teeth (manual skills). **Digital skills:** - Ability to use a computer at a basic level: surfing the internet, using an e-learning platform, editing text, making presentations. **Language skills:** It is recommended to know English at level B1-B2 to be able to access the additional international bibliography.

5. Conditions

5.1. for lecture activity	**Location:** The courses take place in an amphitheater equipped with modern multimedia equipment (video projector, sound system, internet connection) to allow the presentation of dynamic visual supports (diagrams, 3D animations, videos). **Attendance:** Attendance at the course is necessary for an in-depth understanding of the subject and the clinical context presented by the teacher. **Materials:** Presentation of the course in printed and electronic format. **Interactivity:** Students are encouraged to actively participate in the course by asking questions and engaging in clinical case-based discussions, in order to turn the lecture into an active learning experience.
5.2. for practical class/ seminar activity	**Location and organization** The activities take place in Laboratories with specific equipment for practical activities , a room with modular furniture, which allows students to be organized into teams/groups. This structure is essential to facilitate collaboration, case debates and mutual learning. **Specific equipment** The teaching base is designed to support learning and the development of practical skills. - multimedia system (high-resolution screen) for viewing 3D animations, videos and CBCT scans - basic instruments (probes, tweezers) used exclusively for teaching purposes (e.g. for dimensional analysis and model manipulation).

	- dental materials and specific laboratory equipment. **Presence** Attendance at all practical work is mandatory. The motivation of absences is made according to the university regulations, and their recovery is necessary in order to participate in the final exam. **Mandatory individual equipment** Each student must wear a clean white coat and have a practical workbook and writing instruments with him. **Safety and conduct rules** - Punctuality is mandatory. Access to the seminar room after the start of the work may be restricted - Telephone conversations are not tolerated during the course -The delay of students at the lecture will not be tolerated, as it proves to be disruptive to the educational process -Strict compliance with labor protection norms and specific hygiene rules. -Careful use of teaching equipment (especially 3D models). Any malfunction must be reported immediately to the teacher. -It is forbidden to consume food and beverages in the laboratory. -A respectful working environment will be maintained, conducive to academic debates. **Training and participation** **-** Students have the obligation to study the protocol of the practical work before coming to the laboratory. - Active participation, carrying out practical tasks and engaging in discussions are essential to promote laboratory activity. - Compulsory participation is required in laboratories, with a maximum of 10% of absences not made up (maximum 1 absence per semester) being accepted according to the Regulation on the professional activity of students enrolled at U.M.F. "Carol Davila", Chapter VI, Art. 53 - Recovery is allowed according to the Regulation on the professional activity of students enrolled at U.M.F. "Carol Davila", Chapter VI, Art. 53

6. Learning outcomes

Knowledge
K1: Diagnosing dental lesions and types of edentation
K2: Theoretical bases regarding the phenomena of the processes in the clinical-technical stages in obtaining single-tooth and multiple teeth fixed prostheses.
K3: Obtaining prostheses through advanced methods based on optimizing the overall flow through digitization
K4: Knowledges of digital dentistry. Advantages and limits
K5: Knowledges of the current state of research and future directions in the field of technologies in dental practice.
Skills
S1: Analysis and evaluation of the structures of the masticatory system.
S2: Diagnosis of pathological changes and their treatment, in order to restore the anatomical and physiological functions of the masticatory system.
S3. Elaboration of a conceptual plan for a clinical case, justified choice of materials and workmanship by describing the therapeutic purpose.

S4: Structuring and synthesizing information in a scientific presentation format (e.g. outline of a poster or a short or PechaKucha presentation)
S5: The student demonstrates a good understanding of the use of digital technology and artificial intelligence in dentistry.
Responsibility and autonomy
RA1: The student identifies, locates, differentiates, describes pathological changes in the structures of the masticatory system and establishes the appropriate therapeutic attitude and treatment stages.
RA2: Developing ethical and responsible behavior, understanding the patient's needs and the effectiveness of advanced oral rehabilitation technologies
RA3: Manifest a critical spirit and scientific curiosity, by formulating pertinent questions and by critically analyzing the information presented in case studies and in the literature.
RA4: The ability to work effectively in a team (within practical work) and the development of the ability to integrate and collaborate, in order to analyze cases, debate solutions and achieve common learning objectives.
RA5: The student/graduate applies digital technology and artificial intelligence in dental practice, safely.

7. Discipline objectives (correlated with learning outcomes)

7.1. General objective	**TPD-GO:** The discipline aims to provide second-year dental students with the fundamental conceptual knowledge and skills of dentistry, regarding the practice of restoring the morphology and functions of the masticatory system, through classic and modern prosthetic technologies.
7.2. Specific objectives	**TPD-SO1:** recognition of the types of fixed dentures used in dentistry; **TPD-SO2:** knowledge of the ways to make a fixed dental prosthesis and the necessary clinical-technical steps to obtain it; **TPD-SO3:** acquisition of knowledge of pattern waxing in fixed prosthesis; **TPD-SO4:** acquiring knowledge of wax modeling of the main types of fixed dentures; **TPD-SO5:** acquiring knowledge about the laboratory steps necessary to make a fixed dental prosthesis, how to perform them, as well as the errors that may occur at each stage and the way to intervene to correct them **TPD-SO6:** digital flows in the design of technological steps and increasing precision in the execution of the prosthesis **TPD-SO7:** Leading materials and technologies in dental prosthodontics

8. Contents

8.1. Lecture	**Teaching methods**	**Observations**
TPD-C1. Introduction, classification of dental lesions, presentation of edentulous arches, classification of dental prostheses, types of materials for obtaining dental prostheses: metal, ceramic, polymeric, composites. General notions of processing materials for dental prostheses.	Lecture, interactive systematic presentation by use of multimedia devices, PowerPoint presentations, didactic videos	Oral presentation, Power-Point presentations, didactic videos
TPD-C2. Single tooth prosthetic restorations: classification, description, characteristics, indications, materials, prosthetic field		Oral presentation, Power-Point presentations, didactic videos
TPD-C3. Multiple teeth prosthetic restorations: description, components, classification, prosthetic field, indications, materials, prosthetic principles		Oral presentation, Power-Point presentations, didactic videos

TPD-C4. Prosthetic field and information transfer in the laboratory (impression/ scan), determination and recording of intermaxillary occlusion relationships, technological possibilities of transmitting the "color" in the laboratory;		Oral presentation, Power-Point presentations, didactic videos
TPD-C5. The cast in dental prosthesis technology: the real model - materials for models, technologies for obtaining real models, virtual models, advantages / disadvantages, mounting the models in the articulator		Oral presentation, Power-Point presentations, didactic videos
TPD-C6. Techniques and technologies in the diagnosis and design of the prosthetic treatment plan: wax-up, model - prosthetic restoration project. Materials, work technique, materials, properties, indications, virtual design.		Oral presentation, Power-Point presentations, didactic videos
TPD-C7. Technology for obtaining metallic / ceramic restorations by melting-casting - materials, indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C8. Technology for obtaining metallic / ceramic restorations by sintering, and metal by galvanizing - materials, indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C9. Technology for obtaining metallic / ceramic restorations by milling - materials, indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C10. Technology for obtaining polymetric restorations by self curing, light curing, milling and printing - materials, indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C11. Technology for obtaining mixed metal-ceramic restorations, zirconia-ceramics - materials, indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C12. Technology for obtaining mixed metal-polymeric restorations - indications, advantages / disadvantages, technological stages, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C13. Technological peculiarities for obtaining prosthetic restorations on implants - dental abutments, connections, transfer, model, technological possibilities for execution and fixing of prosthetic restorations on implants, errors		Oral presentation, Power-Point presentations, didactic videos
TPD-C14. Digital technological work-flow for obtaining fixed prosthetic restorations, robotics in dentistry		Oral presentation, Power-Point presentations, didactic videos
8.2. Practical classes/ seminar	**Teaching methods**	**Observations**
TDP-PC1. Presentation of the way of carrying out the practical activities, necessary instruments,	Presentation, practical	Didactic videos

introduction, definitions, presentation of fixed and mobile prosthetic restorations	demonstrations, interactive exercises	
TDP-PC2. Classification of single-tooth prosthetic restorations, clinical-technical stages of obtaining cast metal restorations - presentation, imprint, modelling of inlay wax pattern		Handicraft exercises
TDP-PC3. Patterning the metallic crown-patterning techniques (drip, graduated cooling, Adapta foil) - modelling of the wax pattern of full coverage crown		Handicraft exercises
TDP-PC4. Preparation of the investment for casting the all-metal coating crown		Handicraft exercises
TDP-PC5. Investing, melting, casting, modelling the pattern of the full coverage crown		Handicraft exercises
TDP-PC6. Polymeric crown obtained by self and light curing, modelling of the polymeric crown pattern		Handicraft exercises
TDP-PC7. Ceramic crown - obtaining technologies: sintering, melting-casting, CAD-CAM milling, modelling ceramic crown model		Handicraft exercises
TDP-PC8. Mixed metal-polymeric crown, plating of the mixed metal-polymeric crown (simple / composite polymer), modelling of the metal component pattern of the mixed metal-polymeric crown		Handicraft exercises
TDP-PC9. Mixed metal-ceramic crown, ceramic plating of the metal component, pattern modelling of the metal component of the mixed metal-ceramic crown		Handicraft exercises
TDP-PC10. Intraradicular retained crown and dowel core restoration, direct and indirect pattern, DCR pattern modelling		Handicraft exercises
TDP-PC11. Dental bridges, presentation of different dental bridges, modelling of the metal component pattern of the mandibular metal-ceramic bridge		Handicraft exercises
TDP-PC12. Mixed metal-polymer bridge, bridges on implants - presentation, modelling of the metallic component pattern of the mandibular metal-ceramic bridge		Handicraft exercises
TDP-PC13. Review, exercises for recognition different types of restorations, questions, discussions, patterns modeling and finishing		Handicraft exercises
TDP-PC14. Practical exam	Practical test	Handicraft test

Recent bibliography:

Minimum bibliography (recommended):

1. L. T. Ciocan, I. I. Donciu, C. Ionescu, Vlad Gabriel Vasilescu, ș.a, *„Dental Prostheses Technology: Fixed Dental Prostheses Technology – Handbook for students and residents”*, Editura Universitară “Carol Davila”, București, 2024. ISBN: 978-606-011-293-8; 978-606-011-294-5; 978-606-011-295-2.
2. Dental Prosthesis Technology I - Course Handouts, PPT format, current year of study

3. Dental Prosthesis Technology I - Course and Practical Works Notes, PDF format, current year of study
4. Att W - Digital Workflow in Reconstructive Dentistry, Quintessence 2019
5. Johnson T, Patrick DG, Stokes CW, Wildgoose DG, Wood DJ - Basics of Dental Technology: A Step by Step Approach, 2nd Edition, Wiley-Blackwell, 2015
6. Shen C, Rawls HR, Esquivel-Upshaw JF - Phillips' Science of Dental Materials, 13th Edition, Elsevier, 2021

Additional bibliography and educational resources (optional):

7. Carr AB, Brown DT - McCracken's Removable Partial Prosthodontics, 13th Edition, Elsevier, 2016
8. Nelson SJ - Wheeler's Dental Anatomy, Physiology and Occlusion, 11th edition, Elsevier, 2020
9. Randall MG - Sintering: From Empirical Observations to Scientific Principles, Elsevier, 2014
10. Rosenstiel SF, Land MF - Contemporary Fixed Prosthodontics, 5th Edition, Elsevier, 2015
11. Sailer I, Fehmer V, Pjetursson BE - Fixed restorations, A clinical guide to the selection of materials and fabrication technology, Quintessence 2021
12. Sakaguchi RL, Ferracane J, Powers J, Powers J. - Craig's restorative dental materials, 14th ed., 2019
13. Shillingburg HT et al - Fundamentals of fixed prosthodontics, 4th Edition, Chicago, Quintessence Publishing, 2012
14. Wismeijer D, Barter S, Donos N - ITI Treatment Guide, Vol 11: Digital Workflows in Implant Dentistry, Quintessence

Specialized publications:

- International Journal of Oral Science (ISSN: 2049-3169)
- Journal of Dental Research (ISSN: 0022-0345)
- Dentistry Journal (ISSN: 2304-6767)
- Frontiers in Dental Medicine (ISSN: 2673-4915)

Online resources for research and in-depth:

- PubMed: baza de date fundamentală pentru căutarea literaturii științifice medicale
- Educational platforms (pentru recapitularea și aprofundarea conceptelor fundamentale): Khan Academy, Osmosis, Ninja Nerd

9. Assessment

Activity type	**9.1. Evaluation criteria**	**9.2. Evaluation methods**	**9.3. Percentage of final grade**
9.4. Lecture	-correctness of knowledge, - the ability to correlate and synthesize, - the coherence of the argumentation, - the correct use of specialized terminology.	Final written examination (grid test). Control papers – grid tests and/or editorial questions with topics from the subject covered	**55%** **15%**

9.5. Practical classes/ seminar	- accuracy and precision in the execution of techniques, - compliance with work protocols, - manual dexterity, - correct interpretation of the results, - the ability to apply theory in practice	Periodic check Seminar/Interview Attitude in internship – internship grade Practical test (Assessment of the acquisition of practical notions regarding the technologies for obtaining dental prostheses)	**15%** **15%**

Minimum performance standard

In accordance with the university regulations in force, the promotion of the discipline is conditional on the **cumulative** and **mandatory fulfillment** of the following requirements:

- **promotion of the seminar/laboratory activity**, a mandatory condition to be able to participate in the final colloquium. Promotion implies **full attendance** at practical work and obtaining an **average of at least** 5 in the evaluations along the way.
- **obtaining the minimum grade of 5 in the practical test.**
- **obtaining a minimum grade of 5 in the written exam.**
- **obtaining a minimum average grade of 5.**

Failure to comply with **any** of these conditions automatically leads to non-promotion of the discipline.

The student demonstrates a basic familiarity with the fundamentals of the discipline. It can reproduce information, recognize key terms, and perform simple analysis tasks on a clinical case, although it shows difficulties in arguing therapeutic choices in depth.

Knowledges (reflected in the final colloquium):

- **Reproduction of information:** the student correctly defines and knows the central notions of fixed dental technology:
  - technical stages of manufacturing of the main current types of fixed uni- and multidental metal prostheses: model, mounting in articulator, model, investing, casting of metal alloys, sintering, milling;
  - technical stages of laboratory manufacturing of ceramic fixed prostheses (sintering, melting-pressing and milling of ceramics) and polymer prostheses (self-curing, photopolymerization, milling, printing);
  - the technique of processing materials for fixed dental prostheses in the laboratory;
  - technical steps for the realization in the laboratory of single- and multi-dental mixed fixed dental prostheses: metal-composite and metal-ceramic;
  - treatment of partial edentation by fixed partial dentures – principles of realization, component elements, materials used; ratio of bridge body to edentulous ridge
  - technology for the production of mixed metal-polymer, metal-ceramic and all-ceramic bridges.
- **Factual answers:** the student correctly answers factual questions, such as "what is it?", "where does it apply?" and "what are the steps?".

Skills (reflected in the final colloquium):

Application of a standard protocol: the student contributes to a simple case analysis, which correctly follows a given scheme, but without exploring multiple perspectives.

It meets the minimum requirements, being coherent, but without elements of originality. The presentation is schematic and strictly follows the imposed structure.

The student answers factual, direct questions, but has significant difficulty explaining reasoning ("why?") or the implications of decisions.