CLASS DESCRIPTION

1. Programme data

1.1 Higher education institution	**UNIVERSITY OF MEDICINE AND PHARMACY "VICTOR BABEŞ" TIMISOARA**
1.2 Faculty	**FACULTY OF DENTISTRY**
1.3 Department	I
1.4 Field of study .....[1)]	License
1.5 Cycle of studies[2)]	License
1.6 Study programme/ Qualification	MD

2. Discipline data

2.1. Name of subject	**Nanomaterials**							
2.2 Holder of course activities				SL Dr Hajaj Tareq				
2.3 Holder of laboratory activities				SL Dr Hajaj Tareq				
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of evaluation	**Colloquium**	2.7 Discipline regime	Content[3)]	**DS**
							Obligatory[3)]	**DS**

3. Estimated total time (hours per semester of teaching activities)

3.1 Number of hours per week	**1**	3.2 of which: course	**1**	3.3 laboratory	**0**
3.4 Total curriculum hours	**14**	3.5 of which: course	**14**	3.6 laboratory	**0**

Distribution of time fund	hours
Study according to the textbook, course material, bibliography and notes	7
Further documentation in the library, on specialist electronic platforms and in the field	2
Preparation of seminars/labs/projects, homework, papers, portfolios and essays	0
Tutorial	0
Examinations (**1 practical exam, 1 final exam)**	2
Other activities	0

3.7 Total individual study hours	**09**
3.8 Total hours per semester	**25**
3.9 Number of credits[5)]	**1**

4. Prerequisites (where applicable)

4.1 of curriculum	This is not the case
4.2 competences	This is not the case

5. Conditions (where applicable)

5.1 course schedule	• Telephone conversations are not tolerated during the course. • Tardiness of students in class will not be tolerated as it proves to be disruptive to the educational process. • Compulsory attendance is required and a maximum of 50% absences will be accepted in the course.
5.2 seminar/lab/project schedule	• Telephone conversations are not tolerated during labs. • Student lateness will not be tolerated as it proves to be disruptive to the educational process. • Mandatory attendance is required in the labs, with a maximum of 20% absences accepted. • Make-up is allowed up to 20% of the total number of paid absences in the last week of the semester prior to the practical exam (except in medical cases requiring individual dean approval). • The practical exam will take place in the last week of the semester or in the regular session, from the lab topics previously posted.

6. Specific competences acquired

Skills Professional	1. Inserting terminology into nanoapplications. 2. Understanding the structure and functioning of nanoapplications. 3. Applications of nanomedicine in dentistry 4. How to properly conduct research in nanomedicine and dental nanomedicine
Cross-cutting skills	1. Concern for professional development by engaging critical thinking skills demonstrated through active participation in the course and laboratory. 2. Involvement in scientific research activities by participating in the preparation of papers, studies, articles. 3. Efficient use of information sources and communication and assisted training resources (Internet portals, specialised software applications, databases, on-line courses, etc.) in both Romanian and foreign languages; 4. Ability to work in a team, to interact socially and to carry out tasks with responsibility and professionalism. 5. Openness to learning and continuing medical education.

7. Subject objectives (derived from the specific competences acquired)

7.1 General objective of the subject	Understanding the need for nanomedicine and its applications in dentistry
7.2 Specific objectives	Knowledge in nanomedicine and nanomedicine dentistry. Explanation of nanomedicine concepts and dental indications for testing in the field. Related applications Nanorobots and applications in dentistry

8. Content

8.1 Course	Teaching methods	Number of hours	Comments
1. General notions of nanomedicine. Definitions, terminology.	Interactive teaching	2	• Interactive oral lecture also presented in Power Point, systematic, accompanied by an extremely rich and suggestive iconography. • Available on the University's Moodle e-learning platform. • The course is updated annually with the latest information from the international literature. • Each course
2. Applications of nanotechnology in diagnostics, tissue engineering, pharmacology.		2	
3. Applications of nanotechnology in dentistry		2	
4. Nanotechnology in dental materials		2	
5. Nanotechnology in dental prosthetics technology		2	
6.Nanotechnologies in tissue engineering		2	
7. Nanotechnologies in orthodontics		2	
8. Nanotechnologies in medical imaging		2	
9. Nanotechnologies in cancer assessment and treatment		2	
10. Nanotechnologies in cavity and root canal treatments		2	
11. Nanotechnologies in the optimization of dental materials		2	
12. Nanotechnology and medical robots. Nanorobots		2	
13. The interface between micro and nanotechnology. Advantages and disadvantages		2	

14. Nanotechnology quo vadis.		2	begins with the educational objectives and ends with a summary of the concepts presented.

Bibliography required:

1. Emmanuel Craig - Nanomaterials: An Introduction to Properties, Synthesis and Applications Larsen and Keller Education, June 2019.

2. B. Rajkumar, Sandeep Dubey - Nanotechnology in Conservative Dentistry and Endodontics. LAP LAMBERT Academic Publishing, July 2023.

3. Husen Azamal - Advances in Smart Nanomaterials and Their Applications, Elsevier 2023.

4. Yarub Al-Douri - Nanomaterials. Springer Publishing House, Berlin, November 2022.

5. Dieter Vollath. Nanomaterials: An Introduction to Synthesis, Properties and Applications, 2nd Edition. 2023

6. Romînu M, Bratu D, Florița Z, Lakatos S, Ianeș C, Negruțiu Meda - *Dental materials. Theoretical co and clinical applications.* Ed. Brumar, Timișoara, 2003.

7. Bratu D, Colojoară C, Leretter M, Ciosescu Diana, Uram-Țuculescu S, Romînu M - *Dental materials dental laboratory.* Ed. Helicon, 1994.

8. Romînu M, Florița Z, Negruțiu Meda, Lakatos S, Sinescu C - *Guide to Practical Work on Dental Ma* Lito UMFT, 2000.

9. Romînu Roxana, Romînu M., Negruțiu Meda, Sinescu C., Pop Daniela, Petrescu Emanuela - *Adhe* Lito *Amelara* UMF Timișoara, 2011.

10. O'Brien Wj - Dental Materials and their selection Quintessence Books 2008.

9. Correlation of subject content with the expectations of representatives of the epistemic communities, professional associations and representative employers in the field related to the programme

The content of the subject is designed to facilitate skills training related to the utility and applicability of nanoparticles in dentistry. The advantages of some nanotechnologies, nanorobotics and the possibilities of nanosyntheses with effect in tissue engineering are also presented.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight of final mark
10.4 Course	- For grade 5 students must demonstrate knowledge of nanotechnology applications in dentistry - For a grade of 10, students must have a thorough knowledge of the applications of nanotechnology, nanorobotics and nanosynthesis in dentistry.	*Continuous assessment: (assessment of students' activities during the semester, focusing on aspects of knowledge and synthesis of information)* *Final evaluation:* *Exam: written multiple-choice test (50 questions, one hour)*	10% 90%

10.6 Minimum performance standard

The course presents the applications of nanomaterials, nanosynthesis and nanorobotics in dentistry. Special attention is given to the interface between nano and micro technologies, with their advantages and disadvantages.

Date of completion 01.03.2024.	Signature of course holder Dr Hajaj Tareq 	Signature of laboratory/internship holder Dr. Hajaj Tareq 
Signature of head of discipline Prof: Univ. Dr. Romînu Mihai.....		
Date of endorsement in the department	Signature of the Head of Department Prof. Dr.Jumanca Daniela	