DISCIPLINE SHEET

1. Study programme

1.1.	"CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
1.2.	FACULTY OF DENTISTRY
1.3.	DEPARTMENT: 1
1.4.	DISCIPLINE: Biochemistry
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: FUNDAMENTALS OF CHEMISTRY				
2.2.	Discipline code: MD04OP18EN				
2.3.	Discipline type (FD/SD/CD): -				
2.4.	Discipline optionality (COD/ED/FAD): ED				
2.5.	Lectures tenure: Prof. Dr. Alexandra Ripszky Totan - Professor, PhD				
2.6.	Practical classes / seminar tenure: Assoc. Prof. Dr. Daniela Miricescu, PhD				
2.7. Year of study	I	2.8. Semester	I	2.9. Evaluation (E/C/V)	C

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

I. University training						
3.1. Number of hours per week	2	from which:	3.2. lecture	1	3.3. practical class/ seminar	1
3.4. Total hours in the study curriculum	28	from which:	3.5. lecture	14	3.6. practical class/ seminar	14
II. Preparation/ individual study						
Time distribution						hours
Study of lecture materials, textbooks, books, study of the minimum recommended bibliography						10
Additional documentation activity in the library, on online platforms						5
Specific preparation activities for projects, practical classes, preparation of assignments, and reports						10
Preparation for presentations or evaluations, preparation for the final examination						5
Tutoring activity						-
Other activities						2
3.7. Total hours of individual study						32
3.8. Total hours per semester (3.4.+3.7.)						60
3.9. Number of credits						2

4. Prerequisites (where appropriate)

4.1. curriculum	General and oganic chemistry knowledge
4.2. proficiencies	-

5. Conditions (where appropriate)

5.1. for lecture activity	The course takes place in the Biochemistry Laboratory of the Faculty of Dentistry equipped with a projection system. Interactive exposure of the material according to the analytical program, using multimedia resources, PowerPoint presentations, and educational films
5.2. for practical class/ seminar activity	Laboratories have facilities specific to practical activities. Each student must complete his/her practical workbook with the obtained results. At each laboratory session, there is a seminar on the subject of the lecture, the practical laboratory session is performed, and students present a report.

6. Learning outcomes*

Knowledge	Skills	Responsibility and autonomy
Accumulation of knowledge necessary to understand the fundamental chemical and biochemical principles. Assimilation of knowledge regarding organic substances	Ability to use and correlate assimilated notions in a new context Ability to understand the relationship between the structure, physical, and chemical properties of the studied compounds Ability to apply theoretical notions by solving exercises, problems, and tests.	Development of basic biomedical scientific language Development of fundamental biomedical scientific terminology Ability to implement theoretical concepts in medical practice Ability to develop interdisciplinary connections Concern for professional development

7. Discipline objectives (correlated with learning outcomes)

7.1. General objective	Acquiring basic knowledge and concepts of chemistry necessary to understand the complex aspects and principles of Chemistry and Biochemistry taught to 1st-year students at the Faculty of Dentistry.
7.2. Specific objectives	Description of the important structural aspects of organic compounds with biological action Presentation of the fundamental chemical reactions Correlation between the structure of certain compounds and their biological significance with their chemical, physical properties, and biological roles. Maintaining students' interest in studying biochemistry. Maintaining interest in progress in dental biomedical research.

8. Contents

8.1. Lecture	Teaching methods	Observations
1. **General notions of inorganic and organic chemistry**	Interactive exposure to the material after the analytical program, using multimedia resources, PowerPoint presentations, and educational films. *Lecture, systematic presentation, conversation, biochemistry-clinical aspects correlations *Exemplification, problematization, debate *The content of the course is dynamic, permanently correlated with similar courses from the Faculties of Dentistry in the country and abroad, with which we collaborate, and according to the latest discoveries in the field	Ability to understand questions related to: - Mendeleev's periodic table of elements -inorganic and organic compounds
2. **The properties of the carbon atom. Intra- and intermolecular chemical bonds**		Ability to understand chemical bonds
3. **Fundamental chemical reactions:** substitution, addition, elimination, transposition, condensation, redox, polymerization, alkylation, acylation		Ability to write different types of reactions.
4. **Isomerism of organic compounds The structure of the macromolecular compounds.**		Ability to: -identify compounds with isomerism -identify macromolecular compounds
5.**The main classes of organic compounds of biological importance (I):** alcohols, phenols, amines, carbonyl compounds, carboxylic acids, esters		Ability to make differences between organic compound classes according to functional group
6.**The main classes of organic compounds of biological importance (II):** amino acids, peptides, carbohydrates, and lipids		Ability to understand amino-acids, carbohydrates, and lipids chemistry
7. **Compounds that derive from sugars**: esters of monosaccharides,deoxysaccharides, aminosugars, monosaccharide oxidation products, reduction products		Ability to understand sugar chemistry and its significance in sugar metabolism.

Recent bibliography:

1. Bettelheim, F.A., Brown, W.H., Campbell, M.K., Farrell, S.O., Torres, O., Madsen, S., *Introduction to General, Organic and Biochemistry,* Twelfth Edition, Cengage, 2020
2. Carey, F., Giuliano, R., *Organic Chemistry* , McGraw-Hill Science/Engineering/Math, 11th edition, 20203. Karty, J., *Organic Chemistry*, WW Norton & Co, 2019
3.. Lehninger, A.L., Nelson, D.L., Cox, M.M., *Principles of Biochemistry and eBook*, Seventh Edition, W.H. Freeman, 2017

Journals

Clinical Biochemistry

8.2. Practical classes/ seminar (Sem 1)	Teaching methods	Observations
1. **Ionic balance in aqueous solutions**	* At each laboratory session, there is a seminar on the subject of the lecture, the practical laboratory session is performed, and students present a paper. * Presentation of papers by students, competitions * Practical and theoretical applications (biological tests, chemical and biochemical techniques) * Interactive programmed education * Use of multimedia resources, didactic films, presentations of analysis bulletins, and their discussion with students, and practical demonstrations	The ability to understand the ionic balance in solutions and its importance in oral biochemical processes
2. **Significance of chemical bonds in the physicochemical properties of organic compounds with biological importance**		The ability to identify chemical bonds
3. **Practical examples of fundamental reactions. Exemplification of the biological significance of functional groups**		The ability to write different types of chemical reactions
4. **Synthesis of PMMA. Exemplification of isomerism for organic compounds of biological importance**		The ability to write: -identify compounds with isomerism -PMMA synthesis
5. **Practical highlighting of the chemical properties of carbonyl compounds, carboxylic acids, and esters**		The ability to write specific reactions
6. **Specific reactions of amino acids, carbohydrates, and lipids**		The ability to write specific reactions
7. **Specific reactions to obtain monosaccharide esters, deoxysaccharides, amino-sugars, oxidation, and reduction of monosaccharides**		The ability to write specific reactions

Recent bibliography:

1.Post, R., Snyder, C., Houk, C.C., *Chemistry. Concepts and Problems, A Self-Teaching Guide*, 3rd Edition, John Wiley & Sons Inc, 2020

2. Voet, D., Voet, J.G., Pratt, C.W., *Fundamentals of Biochemistry: Life at the Molecular Level*, John Wiley , 2016

3. Zumdahl, S.S., DeCoste, D.J., *Chemical Principles,* 8th edition, Books Cole/Cengage Learning, 2017

9. Assessment

Activity type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Percentage of final grade
9.4. Lecture	**A. Knowledge for mark 5:** -The written colloquium consists of a single-choice 25 questions; 11 correct answers represent mark 5	Single-choice questiones	80%

	B. Additional knowledge for mark 10 -Attendance to the course, criteria such as accuracy, correctness, degree of assimilation and understanding, as well as the ability to correlate and apply the acquired knowledge, are taken into consideration. - The written colloquium consists of a single-choice 25-question test; 23 correct answers represent a mark 10		
9.5. Practical classes/ seminar	**A. Knowledge for mark 5:** Periodic evaluation of the student through seminars - Practical examination - Oral colloquium **B. Additional knowledge for mark 10:** - Knowledge of the principles of all the methods of determination presented in the laboratory sessions work	Oral exam	20%
9.5.1. Individual project (if any)	-	-	-
Minimum performance standard			
• The student must know the fundamental chemical reactions in organic chemistry (substitution, addition, elimination, transposition, condensation, redox, polymerization, alkylation, acylation) and the structure of macromolecular compounds (PMMA) • The student must know the main classes of organic compounds of biological importance (alcohols, phenols, amines, carbonyl compounds, carboxylic acids, esters, amino acids, peptides, carbohydrates, lipids) and properties / biological roles			