



**“CAROL DAVILA” UNIVERSITY
OF MEDICINE AND PHARMACY BUCHAREST**
Faculty of Dentistry
Dental Medicine in English



DISCIPLINE GRID

1. Programme:

1.1.	CAROL DAVILA UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
1.2.	FACULTY OF DENTISTRY / 1 st DEPARTMENT
1.3.	Division: BIOCHEMISTRY
1.4.	Study domain: Healthcare – regulated sector within the EU
1.5.	Study level: BACHELOR’S DEGREE
1.6.	Study programme: DENTAL MEDICINE IN ENGLISH

2. Discipline:

2.1.	Discipline name: FUNDAMENTALS OF CHEMISTRY						
2.2.	Location: Faculty of Medicine, 8 Eroii Sanitari Blvd., Ground Floor, Sector 5, Bucharest						
2.3.	Lectures tenure: Prof. Alexandra Ripszky Totan, Ph.D.						
2.4.	Practical classes tenure: Daniela Miricescu, Lecturer, Ph.D.						
2.5. Study year	I	2.6. Semester	I	2.7. Evaluation	Colloquium	2.8. Type of discipline	ED/FD

3. Estimated total time (hours/semester)

No. hours/week	2	out of which	Lectures: 1	Laboratory session: 1
Total hours out of learning schedule	28	out of which	Lectures: 14	Laboratory sessions: 14

Time distribution	hours
Textbook study, lecture support, bibliography and notes	8
Supplementary documentation activity in the library, on online platforms	5
Practical activity support material, homework, portfolio and essays	6
Tutorial activity	-
Examinations	1
Other activities	2
Total hours of individual study	22
Total hours per semester	50
Credits	2

4. Preconditions

4.1. curriculum	Organic chemistry knowledge.
4.2. proficiencies	-

5. Conditions

5.1. for lecture activity	The course takes place in the Biochemistry Laboratory of the Faculty of Dentistry equipped with a projection system.
5.2. for laboratory 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. Accumulated skills

6.1. Proficiencies (knowledge and abilities)	• Accumulation of knowledge necessary to understand the general and basic chemical and biochemical principles. • Assimilation of knowledge about organic substances.
6.2. Transversal skills (role, professional and personal development)	• Concern for professional development. • Ability to use and correlate assimilated notions in a new context. • Development of basic biomedical scientific language. • Ability to understand the relationship between structure, physical and chemical properties of the studied compounds. • Ability to apply theoretical notions by solving exercises, problems and tests.

7. Objectives (based on the grid of acquired specific skills)

7.1. General Objective	• Acquiring basic knowledge and notions of chemistry necessary to understand the complex aspects and principles of Chemistry and Biochemistry taught for the students in the 1st year in 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 of the structure of some compounds with biological importance with the chemical, physical properties and the biological role. • Maintaining students' interest in the study of biochemistry.

8. Content

8.1. Lecture	No. hrs/topic	Teaching method	Obs.
1. General notions of inorganic chemistry.	2	*Interactive exposure of the material according to the analytical program, using multimedia resources, PowerPoint presentations *Lecture, systematic presentation, conversation, biochemistry-clinical aspects correlations *Exemplification, problematization, debate	*At the end of each course, there are discussions with the students regarding the presented material *The most interesting aspects that need to be further detailed are highlighted *Discussions with students about the usefulness of this course
2. The properties of the carbon atom. Intra- and intermolecular chemical bonds .	2		
3. Fundamental chemical reactions: substitution, addition, elimination, transposition condensation, redox, polymerization, alkylation, acylation.	2		
4. The structure of the macromolecular compounds.	2		
5. Isomerism of organic compounds.	2		
6. The main classes of organic compounds of biological importance (I): alcohols, phenols, amines, carbonyl compounds, carboxylic acids, esters.	2		
7. The main classes of organic compounds of biological importance (II): amino acids, peptides, carbohydrates and lipids.	2		

8.2. Laboratory sessions	No. hrs/topic	Teaching method	Obs.
1. Ionic balance in aqueous solutions	2	* The practical laboratory session is performed, and students present a paper. * Practical and theoretical applications (biological tests and chemical techniques) * Interactive programmed education * Use of multimedia resources, didactic films, practical demonstrations	* At each laboratory session the focus is on: -principle of determination -effective execution of the experiment -processing the obtained results -discussion and interpretation of the results of the experiment -the importance of determining the biochemical parameter and the clinical significance
2. Significance of chemical bonds in the physicochemical properties of organic compounds with biological importance	2		
3. Practical examples of fundamental reactions. Exemplification of the biological significance of functional groups	2		
4. Synthesis of PMMA	2		
5. Exemplification of isomerism for organic compounds of biological importance	2		
6. Practical highlighting of chemical properties of carbonyl compounds, carboxylic acids and esters	2		
7. Specific reactions of amino acids, carbohydrates and lipids	2		

8.3. Bibliography for lectures and laboratory/practical sessions
1. Bettelheim, F.A., Brown, W.H., Campbell, M.K., Farrell, S.O., Torres, O., Madsen, S., <i>Introduction to General, Organic and Biochemistry</i> , Twelfth Edition, Cengage, 2020 2. Carey, F., Giuliano, R., <i>Organic Chemistry</i> , McGraw-Hill Science/Engineering/Math, 11th edition, 2020 3. Devlin, T.M., <i>Textbook of Biochemistry with Clinical Correlations</i> , John Wiley & Sons, 8th Edition, 2019 4. Ferrier, D., <i>Lippincott Illustrated Reviews: Biochemistry</i> , Seventh Edition, Lippincott Williams and Wilkins, 2017 5. Karty, J., <i>Organic Chemistry</i> , WW Norton & Co, 2019 6. Lehninger, A.L., Nelson, D.L., Cox, M.M., <i>Principles of Biochemistry and eBook</i> , Seventh Edition, W.H. Freeman, 2017 7. Lieberman, M.A., Peet, A., <i>Marks' Basic Medical Biochemistry, A clinical approach</i> , 5th edition, Wolters Kluwer, 2018 8. Marks, D.B., Marks, A.D., Smith, C.M., <i>Basic Medical Biochemistry, A clinical approach</i> , 4th edition, Lippincott Williams & Wilkins, 2013 9. Murray, R.K., Bender, D.A., Botham, K.L., Kennelly, P.J., Rodwell, V.W., Weil, P.A., <i>Harper's Illustrated Biochemistry</i> , 31st Edition, Lange, 2018 10. Post, R., Snyder, C., Houk, C.C., <i>Chemistry. Concepts and Problems, A Self-Teaching Guide</i> , 3rd Edition, John Wiley & Sons Inc, 2020 11. Voet, D., Voet, J.G., Pratt, C.W., <i>Fundamentals of Biochemistry: Life at the Molecular Level</i> , John Wiley, 2016 12. Zumdahl, S.S., DeCoste, D.J., <i>Chemical Principles</i> , 8th edition, Books Cole/Cengage Learning, 2017

9. Corroborating the contents of the discipline with the expectations of epistemic community representatives, professional associations and employers in the field's representative for the program

The theme of this course aims to make up for the lack of basic notions and knowledge, basic in the field of chemistry with applicability in biochemistry. The optional course FUNDAMENTALS OF CHEMISTRY aims to support 1st year students in the Faculty of Dentistry and provide them with a methodology of learning and understanding chemistry, essential aspects for understanding and learning biochemistry. The course content is dynamic, permanently correlated with the course and the notions of biochemistry that student's study in the 1st year of the academic programme.
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10. Evaluation

10.1. Evaluation			
Activity type	Evaluation Criteria	Methods of evaluation	% out of final grade
Lecture	A. Knowledge for mark 5: -Attendance to the course, accuracy, correctness, degree of assimilation and understanding are taken into consideration -The properties of the carbon atom. Intra- and intermolecular chemical bonds -Fundamental chemical reactions: substitution, addition, elimination, transposition condensation, redox, polymerization, alkylation, acylation B. Additional knowledge for mark 10: -Attendance to the course, accuracy, correctness, degree of assimilation and understanding and the ability to correlate and apply the acquired knowledge are taken into consideration - Isomerism of organic compounds - The structure of the macromolecular compounds -The main classes of organic compounds of biological importance: alcohols, phenols, amines, carbonyl compounds, carboxylic acids, esters, amino acids, peptides, carbohydrates and lipids.	Written colloquium consisting of 25 single-choice questions.	100%
Laboratory sessions	A. Knowledge for mark 5: Periodic evaluation of the student through seminars - Ionic balance in aqueous solutions -Practical examples of fundamental reactions. Exemplification of the biological significance of functional groups - Synthesis of PMMA B. Additional knowledge for mark 10: - Knowledge of the principles of all the methods of determination presented in the laboratory sessions work -The correct interpretation of laboratory test results - Significance of chemical bonds in the physicochemical properties of organic compounds with biological importance - Exemplification of isomerism for organic compounds of biological importance - Specific reactions of amino acids, carbohydrates and lipids	Practical examination - Oral colloquium	

Minimum performance standards

- 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.

Date:
19.05.2023

Course holder,
Professor Alexandra Ripszky Totan, Ph.D.

Date of the approval in Department Board:
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Department director,
Professor Marina Imre, Ph.D.