



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



## DISCIPLINE GRID

### 1. Programme:

1.1.	<b>CAROL DAVILA UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST</b>
1.2.	<b>FACULTY OF DENTISTRY / 1<sup>st</sup> DEPARTMENT DENTISTRY</b>
1.3.	<b>DIVISION: Biochemistry</b>
1.4.	<b>STUDY DOMAIN: Health, sectoral regulated within European Union</b>
1.5.	<b>STUDY LEVEL: LICENCE</b>
1.6.	<b>STUDY PROGRAMME: DENTISTRY IN ENGLISH</b>

### 2. Discipline:

2.1.	DISCIPLINE NAME/ Optional subject within the discipline: <b>FUNDAMENTALS OF CHEMISTRY</b>						
2.2.	LOCATION: <b>Faculty of Medicine, 8 Eroii Sanitari Blvd., Ground Floor, Sector 5, Bucharest</b>						
2.3.	Lectures tenure: <b>Alexandra Ripszky Totan - Professor, PhD</b>						
2.4.	Practical classes tenure: <b>Daniela Miricescu, Lecturer, PhD</b>						
2.5.	I	2.6.	I	2.7.	Colloquium	2.8. Type of discipline	ED/FD
Study year		Semester		Evaluation			

### 3. Estimated total time (hours/semester)

No. hours/week	2	out of which	Lecture: 1	Laboratory session: 1
Total hours out of learning schedule	28	out of which	Lectures: 14	Laboratory session: 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 ( <i>knowledge and abilities</i> )	<ul style="list-style-type: none"> <li>• Accumulation of knowledge necessary to understand the general and basic chemical and biochemical principles</li> <li>• Assimilation of knowledge about organic substances</li> </ul>
6.2. Transversal skills ( <i>role, professional and personal development</i> )	<ul style="list-style-type: none"> <li>• Concern for professional development</li> <li>• Ability to use and correlate assimilated notions in a new context</li> <li>• Development of basic biomedical scientific language</li> <li>• Ability to understand the relationship between structure, physical and chemical properties of the studied compounds</li> <li>• Ability to apply theoretical notions by solving exercises, problems and tests</li> </ul>

## 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 1 <sup>st</sup> year in the Faculty of Dentistry
7.2. Specific Objectives	<ul style="list-style-type: none"> <li>• Description of the important structural aspects of organic compounds with biological action</li> <li>• Presentation of the fundamental chemical reactions</li> <li>• Correlation of the structure of some compounds with biological importance with the chemical, physical properties and the biological role</li> <li>• Maintaining students' interest in the study of biochemistry</li> </ul>

## 8. Content

8.1.1. Lecture (SEM. I)	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,	*At the end of each course, there are discussions with the students regarding the presented material *The most interesting aspects that need to be
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. <b>The main classes of organic compounds of biological importance (II):</b> amino acids, peptides, carbohydrates and lipids	2	conversation, biochemistry-clinical aspects correlations * Exemplification, problematization, debate	further detailed are highlighted *Discussions with students about the usefulness of this course
--	---	--	--

8.2.1. Laboratory Session (SEM. I)	No. hrs/topic	Teaching method	Obs.
1. <b>Ionic balance in aqueous solutions</b>	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. <b>Significance of chemical bonds in the physicochemical properties of organic compounds with biological importance</b>	2		
3. <b>Practical examples of fundamental reactions. Exemplification of the biological significance of functional groups</b>	2		
4. <b>Synthesis of PMMA</b>	2		
5. <b>Exemplification of isomerism for organic compounds of biological importance</b>	2		
6. <b>Practical highlighting of chemical properties of carbonyl compounds, carboxylic acids and esters</b>	2		
7. <b>Specific reactions of amino acids, carbohydrates and lipids</b>	2		

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

## 9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and representative employers in the field related to 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 1<sup>st</sup> 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 students study in the 1<sup>st</sup> year of the academic programme.

## 10. Evaluation

Activity type	Evaluation Criteria	Methods of evaluation	% out of final grade
Lecture	<p><b>A. Knowledge for mark 5:</b>                      -Attendance to the course, accuracy, correctness, degree of assimilation and understanding are taken into consideration                      -The written colloquium consists of a single-choice 25 questions; 11 correct answers represent mark 5</p> <p><b>B. Additional knowledge for mark 10</b>                      -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                      - The written colloquium consists of a single-choice 25 questions; 23 correct answers represent mark 10</p>	Single-choice questions Colloquium	80%
Laboratory Sessions	<p><b>A. Knowledge for mark 5:</b>                      Periodic evaluation of the student through seminars                      - Practical examination - Oral colloquium</p> <p><b>B. Additional knowledge for mark 10:</b>                      - Knowledge of the principles of all the methods of determination presented in the laboratory sessions work                      -The correct interpretation of laboratory test results</p>	Oral exam	20%
<b>Minimum performance standards</b>			
<ul style="list-style-type: none"> <li>• 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)</li> <li>• 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</li> </ul>			

**Date:**  
**17.06.2024**

**Chair of Biochemistry,**  
**Prof. Alexandra Ripszky Totan**

**Date of the approval in**  
**Department Board:**

**Department director,**  
**Prof. Marina Imre**