

UNIVERSITATEA TEHNICĂ DE CONSTRUCȚII BUCUREȘTI  
 Roads, Railways and Construction Materials Department  
 Program de studii universitare (licență/studii masterale) Licence  
 Specializarea: Structural Engineering

## FIȘA DISCIPLINEI / COURSE DESCRIPTION

Denumirea disciplinei	Chemistry			Codul disciplinei	1.DF.OB04	
Anul de studiu	1	Semestrul	1	Tipul de evaluare finală (E, CO, V)		E
Regimul disciplinei (OB – obligatorie, OP – opțională, FC – facultativă)				OB	Număr de credite	4
Total ore din Planul de învățământ	56	Total ore studiu individual		28	Total ore pe semestru	28
Categoria formativă a disciplinei	DPF– fundamentală, PTG – tehnică generală, PIG – inginerescă generală, PET – economică și tehnologică generală, DPS – de specialitate, ELS – educație și pentru promovarea valorilor democrației, tehnicii de comunicare și limbilor străine, DPD – proiect de diplomă, DPP – pregătire psihopedagogică.					DPF
Titularul(a) disciplinei*	Lecturer.Ph.D. Adina Berbecaru					

Facultatea	Engineering in foreign languages Master study programme	<b>Numărul total de ore pe săptămână din Planul de învățământ</b>  <table border="1"> <thead> <tr> <th>Total</th> <th>C</th> <th>S</th> <th>L</th> <th>P</th> </tr> </thead> <tbody> <tr> <td>28</td> <td>14</td> <td></td> <td>14</td> <td></td> </tr> </tbody> </table>				Total	C	S	L	P	28	14		14	
Total	C					S	L	P							
28	14						14								
Domeniul de studii	Civil Engineering														
Ciclul de studii (Licență, Masterat, Doctorat)	Licence														
Programul de studii (Specializarea)	Structural Engineering														

Precondiții de curriculum	<b>Professional competences targeted by the course</b> The use of the types of chemical substances available, to understand their general behavior and capabilities, and recognize the effects on the building materials and on the environment.
Competențe profesionale vizate de disciplină	<b>Course objectives</b> The knowledge of physical-chemistry fundamental concepts in the building materials study for a basic fundamental training. The intent of this course is: <ul style="list-style-type: none"> <li>- To know the basic chemical substances from the building materials field;</li> <li>- To classify the substances;</li> </ul>

	<ul style="list-style-type: none"> <li>- To know the general properties of the substances;</li> <li>- Based on the physical-chemistry fundamental concepts to understand the process from the building materials field;</li> <li>- To know the factors that affect the rate of a process and of their mechanisms;</li> <li>- To identify the equilibrium processes and the factors that affect the position of equilibrium;</li> <li>- To know the factors that affect the corrosion process and the protection against corrosion;</li> <li>- To know the basic about disperse systems and their properties;</li> <li>- To know the basic chemical analysis methods, their conditions and limits;</li> <li>- To be capable to develop an experiment, to perform it and to make the interpretation of the results.</li> </ul>
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**Conținutul disciplinei** (se vor detalia: conținutul cursului, numărul de ore de predare pentru fiecare capitol al acestuia, lucrări de laborator, lucrări practice, proiect și altele), numărul total de ore, bibliografia)

Curs	Metode de predare (Clasice, clasice interactive, cu suport digital ș.a.)	Nr. de ore alocate
The structures of the substances and the influence on the properties (Atomic structure, Chemical and intermolecular bonds.)	<i>Fundamental, with digital suport</i>	3
Chemical thermodynamics (Laws of thermodynamics. Applications.)	<i>Fundamental, with digital suport</i>	1
Chemical Kinetics and Equilibrium. Chemical Kinetics – Rate of reaction in homogeneous and in heterogeneous systems. Corrosion of the metals. Chemical equilibrium (factors that affect the position of equilibrium). Phase equilibria. Phase rule. Application of phase rule. Phase diagrams.	<i>Fundamental, with digital suport</i>	4
States of matter (Solid, Liquid, Gaseous State) – Properties. Crystalline Solids, Glassy, Amorphous. Structure, properties, types of crystals. Imperfection in real crystals. Isomorphism and polymorphism. Allotropy. The fundamental principles of solidification.	<i>Fundamental, with digital suport</i>	2
Disperse systems. Classification. Homogenous disperse systems (solutions). Properties (Osmosis, Vapour pressure of solutions, The pH-concept, Hardness of water). Heterogeneous disperse systems. Surface phenomena (Surface tension, Sorption phenomena: Adsorption, Chemisorptions). Colloids (Sols, Gels, Emulsions). Microheterogeneous systems (Foams, Suspensions).	<i>Fundamental, with digital suport</i>	2
Chemical Substances from the building materials fields. Inorganic substances (Oxides, Hydroxides, Acids, Salts, Silicates, Aluminium silicates). Substances with metallic bond (Ferrous metals and alloys, Non-ferrous metals and alloys). Organic substances (Organic polymers, Silicones).	<i>Fundamental, with digital suport</i>	2
<b>TOTAL ORE</b>		<b>14</b>

Activități aplicative			
Tipuri de lucrări (seminar, laborator, lucrari practice, proiect)	Denumirea lucrărilor	Metode de lucru cu studentii	Nr. de ore alocate
Laboratory 1	Safety in chemistry laboratory. The equipment used in laboratory. The concentration units. The titration - volumetric quantitative analysis method.		2
Laboratory 2	The preparation of a solution with a given concentration. The determination of the solution density.		2
Laboratory 3	The determination of the dissolving enthalpy.		2
Laboratory 4	The reaction rate dependence on concentration and on temperature in homogeneous system. The corrosion rate of Zn in HCl.		2
Laboratory 5	The water qualitative analysis.		2
Laboratory 6	The determination of the hardness of water. The determination of the pH of a aqueous solutions.		2
Laboratory 7	The adsorption of acetic acid on activated charcoal.		2
<b>TOTAL ORE</b>			<b>14</b>
<b>Bibliography</b>			
<ol style="list-style-type: none"> <li>Adina Berbecaru, <i>Curs de chimie</i>, CONSPRESS, București, 2017.</li> <li>Constantin Dorinel Voinitchi, Aurelian Vulpasu, <i>Caiet de lucrari practice de chimie</i>, CONSPRESS, București, 2017</li> <li>Constantin Dorinel Voinitchi, <i>Chimie pentru Constructori</i>, CONSPRESS, București, 2014.</li> <li>Raymond Chang, <i>Chemistry</i>, Random House, New, York, 2013.</li> <li>Peter W. Atkins, Julio De Paula, <i>Atkins' Physical-Chemistry</i>, Oxford University Press, Oxford, New York, 2010.</li> <li>Monica Maria Dinu, <i>Chemistry</i>, Publistar, București, 2001.</li> <li>C.H.Snyder, <i>The Extraordinary Chemistry of Ordinary Things</i>, University of Miami, JOHN WILEY and SONS, Inc, 1992</li> </ol>			

Evaluare	Ponderea în procente din nota finală
Răspunsurile la examinarea finală	50
Susținerea lucrărilor practice de laborator	20
Susținerea finală a proiectelor	
Testarea periodică prin lucrări de control	10
Testarea continuă pe parcursul semestrului	
Referate elaborate în afara orelor de curs și de lucrări practice	20
Participarea la orele de curs și aplicații	
Alte activități (de precizat care).....	
Short description of the final evaluation procedure: written work with questions and problems	

Numărul total de ore de studiu individual (fiecare rând se completează după caz)			
Studiul notițelor de curs	10	Pregătirea pentru examinarea finală	40
Studiul suporturilor de curs - manuale, cărți etc.	5	Participarea la consultații	3
Studiul bibliografiei minimale recomandate		Documentarea în teren	
Activitățile specifice de pregătire pentru seminar, proiect, laborator etc.		Documentarea suplimentară în bibliotecă	
Elaborarea de teme, referate, eseuri etc.	5	Documentarea prin rețeaua internet	2
Pregătirea pentru lucrări de verificare		Alte activități .....	
Pregătirea pentru prezentări orale	3	.....	
<b>TOTAL ore studiu individual pe semestru</b>			<b>68</b>

Semnături:

Date: 16.09.2019

Signature of the Course Professor in charge:  
Lecturer Ph.D. Adina BERBECARU



Signature of the Assistant Professor in charge:  
Lecturer Ph.D. Adina BERBECARU



Signature of the Head of Department:  
University Professor Ph. D. Carmen RACANEL

