Cilvēka fizioloģijas un bioķīmijas katedras
http://aris.gusc.lv/2020-21MFLat1LekcLdVK1sem073; sanāksme 12.07.2020., protokola nr. 24.14.-1/5

Study course **"Medical Chemistry"** Winter semester 2020/21 Year 1, Semester 1

Lectures (Sep 7 – Nov 9); On Monday, Lecture hall 3, 8:30 – 10:00 (2 x 45 min lectures)

Nedēļa	Lekciju tēma
1. Sep 7, 2020	Priggine attractors: Solutions as reactions equilibria products Nobel Prize in Chemistry 1977: http://aris.gusc.lv/BioThermodynamics/Solution_Reaction.pdf
2. Sep 14, 2020	osmolar concentration gradient calculations, electrolyte, osmosis http://aris.gusc.lv/BioThermodynamics/ColigatConcOsmos.pdf
3. Sep 21, 2020	Membrane potential. Oxidation-Reduction, Nernst's half reactions and membrane potential; http://aris.gusc.lv/BioThermodynamics/NernstOxRedMembranPotential.pdf
4. Sep 28, 2020	Kinetic, catalysis, destructive oxidative stress, acidosis: http://aris.gusc.lv/BioThermodynamics/KinEnzPrigogineAttractor.pdf
5. oKT 5, 2020	Prigogine thermodynamics, homeostasis and equilibrium attractors as Le Chatelier's principle drive complex collaborate reactions enzymes reactivity for homeostasis: http://aris.gusc.lv/BioThermodynamics/ThermEquilibrPrigogineAttractor.pdf
6. oKT 12, 2020	Water dissociation, pH, pOH, pK_w, Ostvald dilution law; Three type Buffer solutions in human body, Prigogine attractor pH=7.36 stability in Human: http://aris.gusc.lv/BioThermodynamics/H2OBuferCO2.pdf
7. Okt 19, 2020	Atoms, molecules, chemical bonds; inter molecular bonds: hydrogen, hydrophobic, salt bridges, disulfīde, coordinative, Van der Wālls London dispersion forces; http://aris.gusc.lv/BioThermodynamics/AtomBondMolForce.pdf
8. Okt 26, 2020	Carbohydrates in human organism; http://aris.gusc.lv/BioThermodynamics/Carbohydrates.pdf
9. Nov 2, 2020	Amino acids, Polypeptides and Proteins in human organism; http://aris.gusc.lv/BioThermodynamics/Proteins.pdf
10. Nov 9, 2020	Lipids and surface active compounds diversity in human organism Complex structures: Glyco-, Chromo-, Lipo-and Nucleo-proteins in human organism; http://aris.gusc.lv/BioThermodynamics/LipCholestFatSAC.pdf

Practical laboratory classes (Sep 7 – decembris16)

Room and time– **According to individual group Schedule** (duration 3 h 4x45 min)

Nedēļa	Praktisko nodarbību tēma
1. Sep 7.-13.	Introduction. Prigogine attractors: Solutions as reactions equilibria products Nobel Prize in Chemistry 1977:
2. Sep 14.-20	Amounts of substance, concentration, molarity, mol fraction, mass fraction %, concentration gradient cell membranes, dissociation stoichiometry, ionic force, dissociation degree, isotonic coefficient, osmolar concentration gradient
3. Sep 21.-27	Oxidation-reduction Nernst's half reactions for balancing. Nernst's Ox-Red and membrane potential: Oxidation enzymatic and anenzymatic oxidative stress-acidosis destructive hazard
4.Sep 28.- Okt. 4.	Prigogine Thermodynamics with dissipative structure minimum of energy attractors for equilibrium. Hess law enthalpy H, entropy S and free Gibbs energy, G change in spontaneous irreversible Life processes..
5. Okt 5.-11.	Reaction kinetics – velocity depends proportionally on concentration, velocity constant, activation energy Ea. Active mass law attractors. Metabolites molecules half-life period. Enzymes complex reactions Prigogine attractors in human organism pH=7,36, reactivity, ΔG_{eq} minimum.
6. Okt 12.-18	Equilibrium constant K_{eq} expression, affecting factors concentration, gradient, T, ΔG_r, Crystalic compound solubility product constant K_{sp}, Prigogine attractor as Le Chatelier's Principle drive homeostasis processes with O_2 breath in osmosis through aquaporins and with bicarbonate HCO_3^- concentration gradient drive CO_2 respiration out as exchange.
7. Okt 19- 25	Colloquium I
8. Okt 26.-31	pH calculation.. Ostwald's dilution law pH calculation, pKa values for carboxylic acids, amino acids, protonated amines and proteins. Henderson–Haselbalh equation titration graph and it's analysis buffer middle point pH=pKa and equivalence point experimental determination.
9. Nov 2.-8.	Human Buffer solutions at middle point pH=pK_a, buffer capacity β_{max} maximum for carboxylic acids, amino acids, proteins. Two pH=7,36 determinants: Bicarbonate HCO_3^- Carbonic Anhydrase, Phosphate $H_2PO_4^-$ buffer system. 7,36 pH inactive broadband silencing protein buffer system region at pH from 6 to 7,36 . Shuttle hemoglobin of H^+, HCO_3^-, O_2 stabilises physiologic pH=7,36 and isooxia in Human organism .
10. Nov 9-11	Complex coordinative compound studies. Coordination geometry and stability constant K_{instab}. Oxidised form of vitamin B2 as water soluble electron carrier "JunyWay" spectrophotometry A=log(Io/I); A=aCl
11 12-17 Nov	Monosaccharide properties (main functional groups, atom chirality, numbering) Forms of carbohydrate projections (linear Fisher projections and cyclic Haworth projections) Monosaccharide chemical properties – hydrolysis, oxidation, reduction, complex formation, esterification.

Nedēļa	Praktiskās nodarbību tēma
12.Nov 19-25	Condensation-synthesis of mono saccharides; hydrolysis of di-and polysaccharides. Glycosidic bond formation. Di-and polysaccharide structures drawing, identification and publication
13.Nov 26 Dec 2	Lipids as well as Surface active substances (SAC) in human organism. Esterification and hydrolysis of fats, oils, phospholipids, sphingolipids. Human cell membrane related lipids sphingolipids , eicosanoids, cholesterol, steroids. Membrane phospholipid - cholesterol composition in erythrocytes.
14. Dec. 3–9	Peptide and protein primary 1° structure synthesis (poly condensation) and hydrolyse reactions Protein primary 1° structure folding and assemble to secondary 2°, tertiary 3°, quaternary 4° structures Intermolecular forces: hydrogen bond, salt bridge, hydrophobic, disulphide and coordinative bonds Protein denaturation: destroying intermolecular forces in naturally formed protein 2°, 3°, 4° structures
15. Dec 10–16	***Colloquium II***

Eksāmens; Otrdien, 19. janvārī, 2021. auditorijās Nr 2 un Nr 3**;**
Teacher stuff : Agnese Brangule, Karina Kalerija, Kostrjukova, Ilmārs Rikmanis, Mihails Haļitovs, Eduards Baķis, Līga Prieciņa . RSU CFBK 062 Medical Chemistry , assist. profesor **Āris Kaksis**,
Literatūra : 2020.gada mācību grāmatas, lekcijas, publikācijas.

0. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/Data_bookSpring2015CTL.pdf
1 Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/H2OSolution_ReactionLat.pdf
2 Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/ColigatConcOsmos.pdf
3. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/ColigativeProperties.pdf
4. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/NernstOxRedMembranPotential.pdf
4.a Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/OxRedBiologicalW.pdf
5. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/ElektrodsM.pdf
6. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/MembraneElektrodsLat.pdf
7. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/KinEnzPrigogineAttractor.pdf
8. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/BioThermodynamics.pdf
9. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/BioThermodynamicAttractor7-36L.pdf
10. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/KineticsLat.pdf
11. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/ThermEquilibrPrigogineAttractor.pdf
11.a Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/74LidzsvarsDaba.pdf
12. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/H2OBuferCO2L.pdf
13. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/H2ODissociationLat.pdf
14. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/BufferSolutionLat.pdf
15. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/AtomBondMolForceL.pdf
16. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/34AtomaUzbuveS.pdf
17. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/CrystalloGraphyL.pdf
18. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/4KimiskaSaite.pdf
19. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/4Kompleksi.pdf
20. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/4HydrogenBondL.pdf
21. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/Carbohydrates.pdf
22. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/Proteins.pdf
22.a Ā.Kaksis RSU 2020:http://aris.gusc.lv/NutritionBioChem/32ProteinsC.pdf
23. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/38Olbalt10311.pdf
24. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/Lipidi.pdf
25. Ā.Kaksis RSU 2020:http://aris.gusc.lv/06Daugavpils/Research/LipdBiLayerMemb.pdf
26. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/LipCholestFatSAC.pdf
27. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/35Ogl45Hidr150211.pdf
28. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/12CarbohydratesDisacchari.pdf
29. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/38Olbalt10311.pdf
30. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/32ProteinsLatC.pdf
31. Ā.Kaksis RSU 2020: http://aris.gusc.lv/ChemFiles/FatAcLiverProt11/1/FABP8myp2PMP2.pdf
32. Ā.Kaksis RSU 2020: http://aris.gusc.lv/06Daugavpils/Research/HSAs.pdf
33. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/DNAproteinRNAS.pdf
34. Ā.Kaksis RSU 2020: http://aris.gusc.lv/BioThermodynamics/ImmunoGlobulASmed.pdf
35. Ā.Kaksis RSU 2020: http://aris.gusc.lv/NutritionBioChem/39NuklSk310311.pdf
36. Ā.Kaksis RSU 2020:http://aris.gusc.lv/BioThermodynamics/FABPlipocalinsS.pdf

36+3

1.kolokvijs Medicīniskā ķīmija CFBK 19.-25. oktobrī visas grupas;
2. kolokvijs Medicīniskā ķīmija CFBK 10.- 16. decembrI visas grupas

Kursa kods	CFUBK_062	**Kursa statuss**	Aktīvs	**Kursa tips**	RSU kurss
Kursa apraksta periods	2020./2021. Akadēmiskais gads	**Kursa apraksta latv. val. statuss**	Apstiprināts	**Kursa apraksta angļ. val. statuss**	Pārskatīšanā
Studiju kursa nosaukums	Medicīniskā ķīmija				
Studiju kursa nosaukums (EN)	Medical Chemistry				
Īstenotājs	Cilvēka fizioloģijas un bioķīmijas katedra				
Kursa vadītājs	Āris Kaksis				

LKI	7. līmenis	**Brīvās izvēles kurss**	Nē
Kredītpunkti	4.00	**ECTS**	6.00
Zinātnes nozare	Ķīmija	**Zinātnes apakšnozare**	Medicīnas ķīmija
Īstenošanas valoda	angļu, latviešu	**Kursu var īstenot**	angļu, latviešu
Mērķauditorija	ārstniecība		
Mērķis	Padziļināt izpratni par pārvērtībām, procesiem un to norises likumsakarībām, sagatavojot studentus tālākām medicīnas studijām.		
Mērķis (EN)	Deepen understanding of transformations, processes and their regularities, preparing students for further medical studies..		
Nepieciešamās priekšzināšanas	Valodas prasmes (rakstiski un mutiski); dabas zinības un matemātika: ķīmija, matemātika (algebra, ģeometrija), bioloģija, fizika vidusskolas programmas apjomā.		
Nepieciešamās priekšzināšanas (EN)	In accordance with the standard for secondary education adopted by National Centre for Education: chemistry, physics, biology and mathematics.		
Pēdējo reizi labots	04.07.2020 22:14:53		

Šajā sadaļā ir norādīta kursa pamatinformācija, kas ir nepieciešamais minums kursa pieteikšanai.

2020/2119-Studiju kursa apraksts Medicīniskā ķīmija

Studiju kursa informācija			
Kursa kods:	CFUBK_062	**Zinātnes nozare:**	Ķīmija; Bioķīmija
Kursa līmenis:	7. līmenis	**Kredītpunkti:**	4
Tematiskā joma:		**ECTS kredītpunkti:**	6
Studiju kursa vadītājs			
Kursa vadītājs:	Docents Āris Kaksis; Aris.Kaksis@rsu.lv		
Studiju kursa realizētājs			
Struktūrvienība:	Cilvēka fizioloģijas un bioķīmijas katedra		
Vadītājs:	Pēteris Tretjakovs		
Kontaktinformācija:	Dzirciema iela 16, Riga , tālrunis:+371 67061550; e-pasts:cfbk@rsu.lv		
Kontaktinformācija (EN):	Riga, 16 Dzirciema Street, :cfbk@rsu.lv, +371 67061550		
Studiju kursa plānojums			
Lekciju ilgums:	2 akadēmiskās stundas	**Nodarbību ilgums:**	4 akadēmiskās stundas
Pilna laika studijas:	10 lekcijas, 15 nodarbības; 80 kontakt stundas.		
Nepilna laika studijas:	0 lekcijas, 0 nodarbibas;0 kontakt stundas.		
Studiju kursa apraksts			
Nepieciešamās priekšzināšanas studiju kursa apguves uzsākšanai:			
Valodas prasmes (rakstiski un mutiski); dabas zinības un matemātika: ķīmija, matemātika (algebra un ģeometrija), bioloģija, fizika un datorzinības vidusskolas programmas apjomā.			
Studiju kursa mērķis:			
Merkis: Padziļināt izpratni par pārvērtībām, procesiem un to norises likumsakarībām, sagatavojot studentus tālākām medicīnas studijām. **Objective:** Deepen understanding of transformations, processes and their regularities, preparing students for further medical studies.			

Studiju kursa plānojums

Pilns laiks

Lekciju un video lekciju (skaits)	Lekciju un video lekciju ilgums (ak.st.)	Kopā lekciju un video lekciju kontaktstundas (ak.st.)	Nodarbību un semināru (skaits)	Nodarbību un semināru ilgums (ak.st.)	Kopā nodarbību un semināru kontaktstundas (ak.st.)	Kopā kontaktstundas (ak.st.)	Gala pārbaudījuma veids	KP
10	2	20	15	4	60	80	Eksāmens (Rakstisks)	4
10		20	15	4	60	80	Eksāmens (Rakstisks)	4

Studiju kursa temu plāns:

Nr.	Temata nosaukums	Lekcijas Skaits Gab.	Nodarbiba Skaits Gab.	Cits
1	Priggine attractors: Solutions as reactions equilibria products Nobel Prize in Chemistry 1977: http://aris.gusc.lv/BioThermodynamics/Solution_Reaction.pdf	1		
1.	Introduction. Prigogine attractors: Solutions as reactions equilibria products Nobel Prize in Chemistry 1977:		1	
2	osmolar concentration gradient calculations, electrolyte, osmosis http://aris.gusc.lv/BioThermodynamics/ColigatConcOsmos.pdf	1		
2.	Amounts of substance, concentration, molarity, mol fraction, mass fraction %, concentration gradient cell membranes, dissociation stoichiometry, ionic force, dissociation degree, isotonic coefficient, osmolar concentration gradient		1	
3	Membrane potential. Oxidation-Reduction, Nernst's half reactions and membrane potential; http://aris.gusc.lv/BioThermodynamics/NernstOxRedMembranPotential.pdf	1		
3	Oxidation-reduction Nernst's half reactions for balancing. Nernst's Ox-Red and membrane potential: Oxidation enzymatic and anenzymatic oxidative stress-acidosis destructive hazard		1	
4	Kinetic, catalysis, destructive oxidative stress, acidosis: http://aris.gusc.lv/BioThermodynamics/KinEnzPrigogineAttractor.pdf	1		
4	Prigogine Thermodynamics with dissipative structure minimum of energy attractors for equilibrium. Hess law enthalpy H, entropy S and free Gibbs energy, G change in spontaneous irreversible Life processes..		1	
5	Prigogine thermodynamics, homeostasis and equilibrium attractors as Le Chatelier's principle drive complex collaborate reactions enzymes reactivity for homeostasis: http://aris.gusc.lv/BioThermodynamics/ThermEquilibrPrigogineAttractor.pdf	1		
5	Reaction kinetics – velocity depends proportionally on concentration, velocity constant, activation energy Ea. Active mass law attractors. Metabolites molecules half-life period. Enzymes complex reactions Prigogine attractors in human organism pH=7,36, reactivity, ΔG_{eq} minimum.		1	
6	Water dissociation, pH, pOH, pK_w, Ostwald dilution law; Three type Buffer solutions in human body, Prigogine attractor pH=7.36 stability in Human: http://aris.gusc.lv/BioThermodynamics/H2OBuferCO2.pdf	1		
6	Equilibrium constant K_{eq} expression, affecting factors concentration, gradient, T, ΔG_r, Crystalic compound solubility product constant K_{sp}, Prigogine attractor as Le Chatelier's Principle drive homeostasis processes with O_2 breath in osmosis through aquaporins and bicarbonate HCO_3^- concentration gradient drive CO_2 respiration out metablism.		1	
7	Atoms, molecules, chemical bonds; inter molecular bonds: hydrogen, hydrophobic, salt bridges, disulfīde, coordinative, Van der Wālls London dispersion forces; http://aris.gusc.lv/BioThermodynamics/AtomBondMolForce.pdf	1		
7	Colloquium I		1	
8	Carbohydrates in human organism; http://aris.gusc.lv/BioThermodynamics/Carbohydrates.pdf	1		
8	pH calculation.. Ostwald's dilution law pH calculation, pKa values for carboxylic acids, amino acids, protonated amines and proteins. Henderson–Haselbalh equation titration graph and it's analysis buffer middle point pH=pKa and equivalence point experimental determination.		1	
9.	Amino acids and Proteins in human organism; http://aris.gusc.lv/BioThermodynamics/Proteins.pdf	1		
9	Human Buffer solutions at middle point $pH=pK_a$, buffer capacity β_{max} maximum for carboxylic acids, amino acids, proteins. Two pH=7,36 determinants: Bicarbonate HCO_3^- Carbonic Anhydrase, Phosphate $H_2PO_4^-$ buffer system. Inactive broadband silencing protein buffer system region at pH from 6 to 7,36 . Shuttle hemoglobin of H^+, HCO_3^-, O_2 exchange pH=7,36 and isooxia stabilization in organism		1	
10	Lipids surface active compounds Complex structures:;http://aris.gusc.lv/BioThermodynamics/LipCholestFatSAC.pdf	1		

10.	Complex coordinative compound studies. Coordination geometry and stability constant K_{instab}. Oxidised form of vitamin B2 as water soluble electron carrier "JunyWay" spectrophotometry A=log(Io/I); A=aCl		1	10.
11.	Monosaccharide properties (main functional groups, atom chirality, numbering) Forms of carbohydrate projections (linear Fisher projections and cyclic Haworth projections) Monosaccharide chemical properties – hydrolysis, oxidation, reduction, complex formation, esterification.		1	11.
12.	Condensation-synthesis of mono saccharides; hydrolysis of di-and polysaccharides. Glycosidic bond formation. Di-and polysaccharide structures drawing, identification and publication		1	
13.	Lipids as well as Surface active substances (SAC) in human organism. Esterification and hydrolysis of fats, oils, phospholipids, sphingolipids. Human cell membrane related lipids sphingolipids , eicosanoids, cholesterol, steroids. Membrane phospholipid - cholesterol composition in erythrocyte and functions..		1	
14.	Peptide and protein primary 1° structure synthesis (poly condensation) and hydrolyse reactions Protein primary 1° structure folding and assemble to secondary 2°, tertiary 3°, quaternary 4° structures Intermolecular forces: hydrogen bond, salt bridge, hydrophobic, disulphide and coordinative bonds Protein denaturation: destroying intermolecular forces in naturally formed protein 2°, 3°, 4° structures		1	
15.	***II kolokvijs***		1	

Merkis: Padziļināt izpratni par pārvērtībām, procesiem un to norises likumsakarībām, sagatavojot studentus tālākām medicīnas studijām.
Objective: Deepen understanding of transformations, processes and their regularities, preparing students for further medical studies.
Studiju rezultāti: Studiju kursa apguves rezultātā students spēj:

Zināšanas izpratne	Studenti zinās un izpratīs, atbilstoši studiju kursa tēmu sadalījumam: 1. Zinās un izpratīs medicīniskās ķimijas faktus, jēdzienus, definīcijas un terminoloģiju (šķīdumi, to nozīme medicīnā, koligatīvie procesi, osmoze, oksidēšanās procesi neorganiskos un organiskos procesos, ķinētika, līdzsvars, skābju-bāzu teorijas, pH un buferšķīdumi). 2. Izmantos un veidos izpratni par medicīniskajā ķīmijā izmantotajiem paņēmieniem un metodiku gan rezultātu iegūšanā, gan to apstrādē un dažādu procesu skaidrošanā (piemēram, kinētika, homeostāze). 3. Izpratīs zinātniskās informācijas izmantošanas nozīmi.
Knowledge understanding	Students will (according to the course topics): 1. Demonstrate knowledge and understanding of facts, concepts, and terminology (solutions, colligative properties, osmosis, oxidation process in inorganic and organic environment, kinetics and equilibrium, acid-base theories, pH and buffer solutions). 2. Apply methodologies and techniques. Use and develop an understanding of the techniques and methodologies used in medical chemistry both in obtaining and processing results and in explaining different processes (for example, kinetics and homeostasis). 3. Understand the role of scientific information.
Prasmes	Izmantošana, Analīze un Sintēze. Skaidrojot procesus un likumsakarības: 1. Pratīs izmantot medicīniskās ķimijas faktus, jēdzienus un terminoloģiju jaunās situācijās un atšķirīgos veidos. 2. Analizēt, salīdzināt, izvērtēt medicīniskajā ķīmijā izmantotās metodes un paņēmienus. 3. Pilnveidos prasmes izmantot un analizēt zinātniskās informācijas nodošanas metodes: a. Izmantos problēmu risināšanas prasmes. Pilnveidos prasmi risināt situāciju uzdevumus. b. Pilnveidos prasmes izmantot zinātnisko literatūru kā informācijas avotu. c. Novērtēs un izmantos drošas darba metodes laboratorijā. d. Izmantos komunikācijas prasmes, darbojoties organizētā grupu darbā.
Skills	Application. Analysis and synthesis. When explaining processes and regularities students will be able to: 1. Apply and analyse facts, concepts, and terminology of medical chemistry in new situations and different ways. 2. Analyse, compare and evaluate methodologies and techniques used in medical chemistry. 3. Improve their skills in using and analysing methods for transferring scientific information: a. use problem-solving skills. Improve skills in examining and solving cases. b. Improve their skills in using scientific literature as a source of information. c. Assess and apply safe work methods in the laboratory. d. Use communication skills gained in organised group work.

Klīniskās prasmes: Ne

Kompetences:	Sekmīgi apgūstot studiju kursu, studenti: izmantos iegūtās zināšanas un prasmes par daudzveidīgajiem vispārīgās un neorganiskās ķimijas procesiem un ķīmisko reakciju norises mehānismiem un prognozēs to ietekmi uz cilvēka homeostāzi; izmantos laboratorijas darbos iegūtās prasmes – sagatavot, veikt eksperimentu, izmantot atbilstošos piederumus un iekārtas, novērtēt rezultātus – tālākā praktiskā vai zinātniskā darbā; pilnveidos prasmi integrēt medicīniskās ķimijas zināšanas kā daļu no kopējām zināšanām par cilvēku, veicinot pilnvērtīgu cilvēka kā vienota organisma uztveri.
Competence:	On completion of the course students will be able to apply the acquired knowledge and skills of the diverse processes of general and inorganic chemistry and the mechanisms of chemical reactions; predict their impact on human homeostasis; use the skills acquired in laboratory work – to prepare, to conduct an experiment, to use appropriate devices and equipment, to evaluate the results – for further practical or scientific work; will develop the ability to integrate knowledge of medical chemistry as part of the overall knowledge of the human body.

Vērtēšana

Patstāvīgais darbs	Individuālais un studentu darbs pāros – praktisko darbu izstrādē atbilstoši kursa tēmām. Patstāvīga atsevišķu teorētisko kursu tēmu apguve, izmantojot mācību grāmatas vai citus avotus tai skaitā zinātniskās publikācijas.
Vērtēšanas kritēriji	Rakstisko risinājumu kvalitātes pārbaude praktisko nodarbību izvirzītajiem uzdevumiem, jautājumiem un problēmu risinājumiem patstāvīgās nodarbības protokolos. Rakstiski kontroldarbi prasmju un iemaņu pārbaudei. Kolokviji – apgūto teorētisko un praktisko zināšanu un prasmju pārbaude, kurā tiek apliecināta mācību materiāla izpratne. Rakstveida noslēguma eksāmens Medicīniskajā ķīmijā.

Gala pārbaudījums

Gala pārbaudījuma veids pilnam laikam	Eksāmens (Rakstisks)

Kursa pārbaudījumi
Šajā sadaļā ir skaidri un uzskatāmi formulētas kursa apgūšanas procesā iegūstamās zināšanas, prasmes un kompetences, kā arī šo rezultātu sasniegšanas kritēriji.

Obligātā Literatūras 39 avoti atsauču saraksts 2020.gada studijām:

http://aris.gusc.lv/2020-21MFArz1LekcLdVK1sem062.pdf

RSU Cilvēka fizioloģijas un bioķīmijas katedras metodiskie līdzekli.

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Citi informācijas avoti

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