

Program Description

Program title	Chemistry
Qualification	Bachelor of Science (BSc) in Chemistry
ECTS Credits	240 ECTS credits <ul style="list-style-type: none">) General Compulsory Study Courses 57 ECTS Credits) Major Study Courses 141 Credits) Elective Study Courses - 42 Credits
Program Language	English
Program head/coordinator	Giorgi Jibuti Assistant Professor, TSU, Faculty of Exact and Natural Sciences, Department of Chemistry. Chair of Physical and Analytical Chemistry
Program prerequisites	For Georgian students <ul style="list-style-type: none">) National exams. For Foreign students <ul style="list-style-type: none">) In accordance with Georgian legislation;) One of the following valid English language certificates: Cambridge English First Certificate (Band C,B,A), IELTS (Band 5,5 and more), TOEFL (Internet - based- 65 and more; TOEFL (Paper -based- 513 and more) or English Language B2 level admission exam at TSU;) Admission by mobility will be available twice per year in accordance with Georgian legislation and regulations of TSU.
Program Goal	The main goals of this program are to: <ul style="list-style-type: none">) Prepare specialists with good knowledge in fundamental chemistry disciplines for future professional work or research carrier;) Also, with the ability to communicate and present their own knowledge or work, with the broad general education and with the ability to perform executed obligations responsibly and efficiently.
Learning outcomes	
Knowledge and Comprehension	After completing this program, students will be able to: <ul style="list-style-type: none">) Formulate facts, concepts and principles for major fields in chemistry such as general, inorganic, organic, polymer, analytical, physical and biochemistry;) Describe functions and design of chemical equipment;) Classify matter and its change from microscopic to macroscopic level.
Applying knowledge/ skills	<ul style="list-style-type: none">) Work in labs safely and efficiently;) Perform stoichiometric, analytical, thermodynamic, kinetic and quantum-mechanical calculations;) Work in groups or individually on various projects;) Demonstrate their professional and general knowledge orally and in written form.
Independence and responsibility	<ul style="list-style-type: none">) Independently plan and perform chemical experiments;) Describe (report) research results and conclusions;) Critically analyze modern theories and information available in the field of chemical sciences to solve existing problems;) Perform professional work with responsibility.
Learning/Teaching methods	Work in group Laboratory electronic learning Discussion Presentation Explanatory method Brainstorming

	<p>Analysis and synthesis method</p> <p>Flipped classroom - the lectures have been prerecorded and are available online. The lectures are to be watched as “homework” prior to coming to class. The class time will be used to work on problems and master the topics covered in the lectures.</p>																																																																				
Assessment system and criteria	<p>Components of student assessment depends on the specific course and includes:</p> <p>Laboratory work;</p> <p>Quizzes;</p> <p>Projects;</p> <p>Independent research and more.</p> <p>Assessment criteria are defined in specific syllabuses.</p> <ul style="list-style-type: none">) A (Excellent) : 91-100 points) B (Very Good) : 81-90 points) C (Good) : 71-80 points) D (Acceptable): 61-70 points) E (Passable): 51-60 points) FX (Insufficient): 41-50 points) F (Fail): <40 points <p>In case of FX grade, student can take additional exams with the date announced within 5 days of receiving the final grades</p>																																																																				
Field of employment	<p>After completing the Chemistry program, students will be able to find employment in the following fields:</p> <ul style="list-style-type: none">) Teaching-research institution with corresponding field of work;) Companies with chemistry/biochemistry research and production;) Chemical/Biochemical laboratories, e.g., agriculture, environmental monitoring, industrial, pharmaceutical, food quality control, forensic and chemical/biochemical defense laboratories;) Chemical production and application fields, such as agricultural and pharmaceutical industries;) Food and light industry. 																																																																				
Tuition fee	<ul style="list-style-type: none">) 2250 GEL for Georgian students) 10,000 GEL for Foreign students 																																																																				
Human and material resources for the program	<p>List of personnel</p> <table border="1"> <thead> <tr> <th>Last name</th> <th>First name</th> <th>Affil.</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Alania</td> <td>Magda</td> <td>TSU</td> <td>Associate professor</td> </tr> <tr> <td>Archuadze</td> <td>Maia</td> <td>TSU</td> <td>Assistant Professor</td> </tr> <tr> <td>Arjevanidze</td> <td>Nargiza</td> <td></td> <td>Invited lecturer</td> </tr> <tr> <td>Babilua</td> <td>Petre</td> <td>TSU</td> <td>Assistant Professor</td> </tr> <tr> <td>Barbakadze</td> <td>Nana</td> <td></td> <td>Invited lecturer</td> </tr> <tr> <td>Bukia</td> <td>Tinatini</td> <td></td> <td>PhD, Researcher</td> </tr> <tr> <td>Burjanadze</td> <td>Giorgi</td> <td>TSU</td> <td>Assistant Professor</td> </tr> <tr> <td>Gakhutishvili</td> <td>Marina</td> <td></td> <td>PhD, Teacher, Researcher</td> </tr> <tr> <td>Gogberashvili</td> <td>Merabi</td> <td>TSU</td> <td>Associate professor</td> </tr> <tr> <td>Gogolashvili</td> <td>Ann</td> <td></td> <td>Invited lecturer</td> </tr> <tr> <td>Gogvadze</td> <td>Tamar</td> <td></td> <td>PhD, Invited lecturer</td> </tr> <tr> <td>Goletiani</td> <td>Ana</td> <td>GTU</td> <td>Invited lecturer</td> </tr> <tr> <td>Davitashvili</td> <td>Tinatini</td> <td>TSU</td> <td>Assistant Professor</td> </tr> <tr> <td>Dalakishvili</td> <td>Giorgi</td> <td>ISU</td> <td>Invited lecturer</td> </tr> <tr> <td>Dachanidze</td> <td>Natalia</td> <td></td> <td>PhD, Invited lecturer</td> </tr> <tr> <td>Tavadze</td> <td>Leri</td> <td>TSU</td> <td>Assistant Professor</td> </tr> </tbody> </table>	Last name	First name	Affil.	Status	Alania	Magda	TSU	Associate professor	Archuadze	Maia	TSU	Assistant Professor	Arjevanidze	Nargiza		Invited lecturer	Babilua	Petre	TSU	Assistant Professor	Barbakadze	Nana		Invited lecturer	Bukia	Tinatini		PhD, Researcher	Burjanadze	Giorgi	TSU	Assistant Professor	Gakhutishvili	Marina		PhD, Teacher, Researcher	Gogberashvili	Merabi	TSU	Associate professor	Gogolashvili	Ann		Invited lecturer	Gogvadze	Tamar		PhD, Invited lecturer	Goletiani	Ana	GTU	Invited lecturer	Davitashvili	Tinatini	TSU	Assistant Professor	Dalakishvili	Giorgi	ISU	Invited lecturer	Dachanidze	Natalia		PhD, Invited lecturer	Tavadze	Leri	TSU	Assistant Professor
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Tatrishvi	Tamari		PhD, Invited lecturer
Tevzadze	Alexander	TSU	Associate professor
Totibadze	Sopio		Teacher of the language center of TSU
Kakava	Rusudani		PhD, Researcher
Mukbaniani	Omari	TSU	Professor
Murtskhvaladze	Irakli		PhD, Invited lecturer
Nebieridze	Mariami		Teacher of the language center of TSU
Nioradze	Nikoloz		PhD, Senior Researcher
Odishelidze	Nana	TSU	Assistant Professor
Ratiani	Irma	TSU	Professor
Soselia	Marina		PhD, Researcher
Tabidze	Tinatini		Teacher of the language center of TSU
Kokiashvili	Nino		PhD, Senior Researcher
Shatashvili	Nana	TSU	Professor
Shashiashvili	Malkhaz	TSU	Associate Professor
Shengelaya	Alexander	TSU	Professor
Chapichadze	Khatuna	GTU	Invited lecturer
Tsitsishvili	Giorgi	TSU	Associate professor
Tsitskishvili	Tamar		Invited lecturer
Tchelidze	Tamari	TSU	Associate professor
Chankvetadze	Bezhan	TSU	Professor
Chelidze	Giorgi	TSU	Assistant Professor
Qurdadze	Ramaz	TSU	Professor
Khachidze	Manana	TSU	Professor
Khechinashvili	Zaza	TSU	Assistant professor
Jibuti	Giorgi	TSU	Assistant Professor
Jojua	Nino		PhD, Teacher of the language center of TSU

Facilities:

Auditoriums

-) TSU Building 2, auditorium №044 (70 m²)-classroom, projector, smart-podium
-) TSU Building 2, auditorium № 102 (55 m²) – teaching / office space
-) TSU Building 2, auditorium № 102 (52 m²)-computer class, projector, smart podium
-) TSU Central Library, auditorium № 601 (73m²) classroom, projector, smart-podium
-) TSU Central Library, auditorium № 602 (72m²) classroom, projector, smart-podium
-) TSU Central Library, auditorium № 603 (82m²) classroom, projector, smart-podium
-) TSU Central Library, auditorium № 604 (82m²) classroom, projector, smart-podium
-) TSU Building 11, auditorium № 103 (144 m²)
-) TSU Building 11, auditorium № 105 (144 m²) classroom, projector, smart-podium
-) TSU Building 11, auditorium № 107 (159 m²) classroom, projector, smart-podium
-) TSU Building 11, auditorium № 108 (145 m²)
-) TSU Building 11, auditorium № 110-112 (70 m²)

Laboratories:

-) TSU Building 2, room № 173-Biochemical lab (82 m²) fume hood
-) TSU Building 2, room № 173-Biochemical lab storage (14 m²)
-) TSU Building 2, room № 173-Instrumental analysis teaching lab (100 m²) 2 fume hoods

	<ul style="list-style-type: none">) TSU Building 2, room № 173- Instrumental analysis lab (79 m²) 2 fume hoods) TSU building 2, room № 260-General chemistry teaching lab (115 m²) 2 fume hoods) TSU Building 2, room № 260-Organic chemistry teaching lab (122 m²) 12 fume hoods) TSU building 2, room № 260-Chemical storage/preparation room (40 m²) 2 fume hoods <p>Laboratory equipment:</p> <ul style="list-style-type: none">) Individualized chemical glassware sets for students) Analytical and micro-analytical balances (260, General chemistry)) Visible spectrometers (Thermo) (260, General chemistry)) Magnetic stirrer/electric hotplates (260, General chemistry)) Shakers (260, General chemistry)) Water distiller/ water de-ionizers (260, General chemistry)) Karl-Fischer titrators (260, General chemistry)) pH meters (260, General chemistry)) Gas chromatograph (260, General chemistry)) FTIR Themo Nicolet 5 (260, Organic Chemistry)) Benchtop NMR Thermo PicoSpin 40MHz (260 Organic Chemistry)) Rotary evaporator (260, Organic Chemistry)) Individualized set for organic chemistry glassware (260, Organic Chemistry)) 2 pcs Agilent Cary 630 FTIR (173, Instrumental analysis)) 2 pcs Agilent Cary 60 UV-VIS (173, Instrumental analysis)) Agilent 4200 Series MP-AES (173, Instrumental analysis)) Bruker Ascend 400 MHz NMR (173, Instrumental analysis)) National Instruments ELVIS kit (173, Instrumental analysis)) National Instruments Digital oscilloscope (173, Instrumental analysis)) 2 pcs Agilent 1260 Infinity II Series HPLC (173, Instrumental analysis)) 2 pcs Agilent 7890B GC (173, Instrumental analysis)) Agilent 6530 Q-TOF LC-MS triple quad MS (173, Instrumental analysis)) Agilent 6890N/5973N GC/MS (173, Instrumental analysis)) 4 pcs centrifuge various size (173, Biochemistry)) Gel electrophoresis with documentation system BIO-RAD (173, Biochemistry)) 10 pcs fraction collector BIO-RAD (173, Biochemistry)) 2 pcs pH meters (173, Biochemistry)) 2 pcs shaker (173, Biochemistry)) 2 pcs microplate shaker (173, Biochemistry)) T100 Thermal Cycler BIO-RAD (173, Biochemistry)) 2 pcs analytical balance (173, Biochemistry)
Additional information	<p>This program will follow the American Chemical Society-certified San Diego State University (USA) Chemistry-Biochemistry B.S. Degree Program in Georgia initiated in 2015. The faculty and staff members in this program have interned at the SDSU main campus in California and same instructors are already teaching SDSU-Georgia courses independently.</p> <p>After finishing the 4th semester, students will take placement test in English (critical thinking, reading and writing test). If students do not get passing points, LING 305 course will become compulsory for them in the 5th semester (instead of one elective course). If students get a passing grade, they can choose LING 305 as an elective.</p>



Attachment №2

Academic Plans

Faculty: Faculty of Exact and Natural Sciences

Department / Faculty / Institute: Department of Chemistry

Name of the educational program: Chemistry-Biochemistry

Study level: Bachelor's level (First cycle)

Total program load: 240 ECTS credits, amongst them:

) General Compulsory Study Courses 57 ECTS Credits

) Major Study Courses 141 Credits

) Elective Study Courses - 42 Credits

Study program Head(s) / Coordinator(s): Giorgi Jibuti

Date of Program approval by Academic Council, Date of enactment: #61/2019

Enactment date of study program (academic year): 2020



Program structure

Study Course / Module types: Major / Faculty Compulsory / Elective																		
N	Course Code	Course name	ECTS	Student Hourly Work					Prerequisite of the study course	Study term								Lecturer(s)
				Lecture	Seminar	Practical / Laboratory work	Teamwork			I	II	III	IV	V	VI	VII	VIII	
General Compulsory Study Courses 57 ECTS Credits																		
1	Ling 100A	English composition I	5	30	30				No Prerequisites	×								Nino Jojua, Mariam Nebieridze
2	Ling 100B	English composition II	6	30	30				Ling 100A		×							Nino Jojua, Tinarin Tabidze
3	Ling 200	English composition III	5	30	30				Ling 100B			×						Nino Jojua, Tinarin Tabidze
4	Math 141	Pre-calculus	6	30	30				No Prerequisites	×								Giorgi Chelidze Petre Babilua, Tinatin Davitashvili, Zaza Khechinashvili, Nana Odishelidze, Malkhaz Shashiashvili
5	Math 150	Calculus I	8	30	30				Math 141		×							Giorgi Chelidze Petre Babilua, Tinatin Davitashvili, Zaza Khechinashvili, Nana Odishelidze, Malkhaz Shashiashvili



6	Math 151	Calculus II	8	30	30			Math 150			×						Giorgi Chelidze Petre Babilua, Tinatin Davitashvili, Zaza Khechinashvili, Nana Odishelidze, Malkhaz Shashiashvili
7	Math 252	Calculus III	7	30	30			Math 151				×					Giorgi Chelidze Petre Babilua, Tinatin Davitashvili, Zaza Khechinashvili, Nana Odishelidze, Malkhaz Shashiashvili
8	COMM 103	Oral Communication	6	30	30			No Prerequisites		×							Mariam Nebieridze Sophio Totibadze
9	CS 101	ICT Literacy	6			30		No Prerequisites	×								Manana Khachidze Maia Archuadze
Major Study Courses 141 Credits																	
10	CHEM 100	Introduction to General Chemistry	8	60	30	39		No Prerequisites	×								Giorgi Jibuti, Marina Soselia, Tinatin Bukia
11	CHEM 200	General Chemistry 1	10	60	15	45		CHEM 100		×							Giorgi Jibuti, Marina Soselia
12	CHEM 201	General Chemistry 2	10	60	30	45		CHEM 200			×						Giorgi Jibuti, Marina Soselia
13	CHEM 232	Organic Chemistry 1	7	60	15	45		CHEM 201				×					Ana Goletiani Nana Barbakadze Tamar Tsitskishvili



14	CHEM 432	Organic Chemistry 2	8	60	15	45			CHEM 232										Ana Goletiani Nana Barbakadze Tamar Tsitskishvili
15	CHEM 251	Analytical Chemistry	9	60	30	60			CHEM 201										Nino Kokiashvili, Rusudan Kakava, Tinatin Bukia
16	CHEM 560	General Biochemistry	6	30					CHEM 201, CHEM 232, BIOL 203										George Burjanadze Natalia Dachanidze
17	CHEM 410A	Physical Chemistry A	8	60	30	48			CHEM 232, CHEM 251, MATH 252, PHYS 195, PHYS 196										Bezhan Chankvetadze Giorgi Dalakishvili
18	CHEM 410B	Physical Chemistry B	6	60	15				CHEM 410A										Bezhan Chankvetadze Giorgi Dalakishvili
19	CHEM 550	Instrumental Methods of Chemical Analysis	8	60		90			CHEM 232 CHEM 251 CHEM 410A										Giorgi Jibuti, Nino Kokiashvili, Ana Gogolashvili, Rusudan Kakava, Tinatin Bukia
20	CHEM 520A	Advanced Inorganic Chemistry 1	6	30	30				CHEM 201 CHEM 410A										Marina Gakhutishvili
21	CHEM 520B	Advanced Inorganic Chemistry 2	6	30	15	45			CHEM 520A										Marina Gakhutishvili, Nikoloz Nioradze
22	CHEM 417	Physical Chemistry Laboratory	4	10		80			CHEM 410B, CHEM 550										Giorgi Jibuti, Nino Kokiashvili, Ana Gogolashvili, Rusudan Kakava, Tinatin Bukia



23	CHEM 538	Polymer Chemistry	6	30	15	45			CHEM 232							×		Omar Mukbaniani, Tamar Tatrishvili	
24	PHYS 100	Introductory Physics	5	30	30				No Prerequisites	×								Alexander Shengelaya, Alexander Tevzadze	
25	PHYS 195	Mechanics	7	45	30	45			PHYS 100			×						Alexander Shengelaya, Merab Gogberashvili, Tamar Tchelidze	
26	PHYS 196	Electromagnetism (basic)	7	45	30	45			PHYS 195				×					Nana Shatashvili, Giorgi Tsitsishvili	
27	BIOL 203	Principles of General Biology	6	60					No Prerequisites					×				Magda Alania	
28	BIOL 203L	Principles of General Biology laboratory	2			45			No Prerequisites					×				Magda Alania, Natalia Dachanidze	
29	CHEM 497	Undergraduate Research	4			80			CHEM 201 CHEM 432 CHEM 251 MATH 252							×		*	
30	CHEM 498	Senior Project	2			40			CHEM 201 CHEM 432 CHEM 251 MATH 252 CHEM 497								×	*	
31	CHEM 567	Biochemistry laboratory	6	14		84			CHEM 560							×		George Burjanadze Natalia Dachanidze	
Elective Study Courses 84 Credit (Students Should Elect 42 Credits)																			



32	CHEM 562	Intermediary Metabolism	6	30					CHEM 560 BIOL 203						×		×	George Burjanadze Natalia Dachanidze
33	HIST 100	World History from beginnings to 1500 CE	6	30	30				No Prerequisites					×	×		×	Leri Tavadze
34	HIST 101	World History from 1500 CE to the Present	6	30	30				No Prerequisites						×	×		Leri Tavadze
35	HIST 103	History of Georgia	6	30	30				No Prerequisites							×	×	Leri Tavadze
36	ECON 102	Principles of Microeconomics	6	30	30				No Prerequisites					×		×		Irakli Murtskhvaladze
37	ECON 103	Principles of Macroeconomics	6	30	30				No Prerequisites						×	×		Irakli Murtskhvaladze
38	Pol S 102	Introduction to Georgian Politics: Democratization	6	30	30				No Prerequisites					×		×		Khatuna Chapichadze
39	Pol S 201	Contemporary Political Ideologies	6	15	30				No Prerequisites							×	×	Khatuna Chapichadze
40	WMNST 101	Self, Identity, Society	6	30	30				No Prerequisites					×	×			Nargiza Arjevanidze
41	CLT 270A	World Literature Before 1500	6	60					No Prerequisites							×	×	Irma Ratiani
42	LING 305*	Advanced English Composition	6	30	24		6		LING 200, Placement test					×		×		Nino Jojua
43	WMNST 375	Sex, Power. Politics	6	30	30				No Prerequisites							×	×	Nargiza Arjevanidze
44	Phil 101	Introduction to Philosophy: Ethics	6	60					No Prerequisites					×		×	×	Tamar Gogvadze
45	Phil 332	Philosophy: Environmental Ethics	6	60					No Prerequisites							×	×	Tamar Gogvadze
46	GEO101	The Georgian Language for Foreign Students (Beginner Level)	6	30	30				No Prerequisites					×		×	×	Ramaz Qurdadze



47	GEO 200	The Georgian Language for Foreign Students – Practical Course of the Georgian Verb (Pre-intermediate Level)	6	30	30				GEO 101										×	×	Ramaz Qurdadze
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