Computer science

Name of the Educational Programme:	**Computer Science**
Awarded Qualification:	Doctor of Computer Science/კომპიუტერული მეცნიერების დოქტორი
Credit Value of the Programme:	60 ECTS
Language of Education:	English
Programme Admission Preconditions:	According to Georgian legislation, the candidate to enroll at this program should have a Master's degree in computer science or closely related fields. According to the university regulations, the candidate should have at least the B2 level in English certified by an international certificate and the relevance is approved by the IBSU School of Languages or a Master's diploma received from English language program during last five years. In addition, according to the university regulations, the candidate has to submit a dissertation (research) proposal. The correspondence of the proposal to the program requirements is assessed by the Dissertation Field Board commission according to the rubric below, afterwards the interview based on the proposal is held. The assessment criteria for the dissertation proposal are:

CRITERIA	Not reflected	Unacceptable	Acceptable (with major changes)	Acceptable (with minor changes)	Acceptable
	0	1-3	4-6	7-9	10-12
Title: neither too narrow, nor too wide; terms used adequately; sounds contemporary	[]	[]	[]	[]	[]
Significance and novelty: the topic is contemporary, less studied; the potential of novelty and value is presented	[]	[]	[]	[]	[]

Theoretical and practical value: it is presented how the research can impact the field	[ ]	[ ]	[ ]	[ ]	[ ]
Literature overview: presents main achievements and names; reference list includes at least 10 important titles	[ ]	[ ]	[ ]	[ ]	[ ]
Research questions / hypothesis are original and well-formulated	[ ]	[ ]	[ ]	[ ]	[ ]
Research methods are adequate to the topic and well defined	[ ]	[ ]	[ ]	[ ]	[ ]
Academic and clear language	[ ]	[ ]	[ ]	[ ]	[ ]
Sub-totals:	[ ]	[ ]	[ ]	[ ]	[ ]
Total:	[ ]				

Requirement for the next step:

A candidate who obtained at least 51 points (out of 84) is admitted to the interview/oral presentation. The proposal of a candidate, who obtained 41-50 points, will be reassessed if the candidate improves the proposal within the submission deadline

Interview / oral presentation: reveals a good knowledge of the topic, arguments	Not reflected	Unacceptable	Acceptable (with major changes)	Acceptable (with minor changes)	Acceptable
	0	1-4	5-8	9-12	13-16

	<table><tr><td>any point from the proposal</td><td>[]</td><td>[]</td><td>[]</td><td>[]</td><td>[]</td></tr></table> The candidate who obtained at least 9 from the interview / oral presentation will be considered as 'passed'.
Purpose of the Programme:	The goals of the PhD Program in Computer Science are: 1. Preparation of highly qualified personnel for academic and scientific careers in the field of computer science. The faculty has three directions of computer science: theoretical computer science, system design and security, artificial intelligence. The doctoral program is designed to take into account the interests of individual students, which means that students must make a distinct and important contribution to the study and development of at least one direction while studying for a doctorate. 2. To prepare computer science PhD students for industry, which means that PhD students will develop the ability to formulate, model, analyze, solve and implement complex problems coming from the industry. 3. To develop PhD students the skills necessary for a successful career in the market, to make it focused on finding ways to solve interdisciplinary scientific problems, to improve the vision of professional and ethical responsibility for academic, scientific and industrial work.
Learning outcome	1. Systematically reviews the field of computer science based on critical understanding; 2. Describes current research and challenges in computer science subfields (theoretical computer science, systems design and security, artificial intelligence). 3. critically evaluates the ways of solving complex research problems and the ways of planning their improvement; 4. Prepares a project proposal, a publication and a report based on the received scientific results. 5. Modeling real-world problems by using computer systems and creating software; 6. Conducts scientific researches, the process of reviewing scientific papers and dissertations and presents an article describing the received scientific product in a refereed high-rated journal and conference materials. 7. Plans the lecture process, undergraduate and graduate researches in various fields of computer science. 8. Analyzes potential ethical and social implications of research, review, technology creation and implementation. 9. Summarizes the achievements of experts in the field of computer science, from the point of view of a specialist in the field.

Evaluation Criteria	The goal of evaluation is to determine student's education results qualitatively in relation to academic program goals and parameters. Student may be assessed orally and/or in a written way. A student's knowledge and skills are assessed through 100 points grading system. It consists of midterm and final evaluations, sum of which makes up 100 points. The Grading system allows: five types of positive grades: a. (A) Excellent – 91-100 points; b. (B)Very good – 81-90 points; c. (C) Good - 71-80 points; d. (D) Satisfactory - 61-70 points; e. (E) Enough - 51-60 points; two types of negative grades: a. (FX) Fail – 41-50 points, meaning that a student requires some more work before passing and is given a chance to sit an additional examination after independent work; b. (F) Fail – 40 points and less, meaning that the work of a student isn't acceptable and he/she has to study the subject anew. For the midterm and final evaluations minimal passing grade is set. The final evaluation minimal passing grade must not exceed 60% of final evaluation grade. Midterm and final evaluation grade distribution, their minimal competence levels and assessment criteria are described in the corresponding syllabus. A credit can be awarded only after the attainment of learning outcomes, envisaged by the course syllabus and following requirements (both have to be fulfilled): a) Obtaining minimal competence levels set for midterm and final evaluations; b) Obtaining minimum 51 points out of 100 points of final grade. A student is allowed to take an additional (make-up) exam in case he/she scored 41-50 points of final grade or minimum 51 points, but did not obtain minimal competence level set for final evaluation. The format and evaluation criteria of the midterm and final evaluation components are determined according to the syllabus of each study course, taking into account their specificities and following the above criteria.

	The assessment of the scientific-research component is carried out as a whole, in the form of a final assessment. This includes the formative evaluation stage (evaluation of experts and presentation to the pre-defense) and the evaluation received at the defense. The prerequisite for awarding the academic degree of doctor is to pass the formative evaluation stage and the average of the points assigned by the Defense Commission, not less than 51 points. The assessment of dissertation finally is done with the following wording: a) Excellent (summa cum laude) – 91points and above – an excellent work; b) Very good (magna cum laude) – 81-90 points– a result that exceeds the requirements in every way; c) Good (cum laude) – 71-80 points – a result that exceeds the requirements; d) Medium (bene) – 61-70 points – an average level work that meets the basic requirements; e) Satisfactory (rite) – 51-60 points – result, which despite its shortcomings, still meets the requirements; f) Insufficient – 41-50 points – unsatisfactory level of work that does not meet the requirements; g) Completely unsatisfactory (sub omni canone) – 40 points and less – result that meets none of the requirements. The student is awarded the academic degree of doctor in case of obtaining any of the above mentioned grades considered by items from a) to e); in case of getting the grade considered by item f) – the student has a right to present the rewritten doctorate dissertation during the first year; and in case of getting the grade considered by item g) – the student has no right to present the same doctorate dissertation.
Field of Employment:	The PhD program in Computer Science will prepare internationally qualified competitive professionals. The knowledge and skills acquired by graduates will enable them to meet the challenges of modern scientific achievements. Graduates will be able to be employed in both private and public sectors, as a leading specialist, where they will practically perform the main professional activities both independently and in a group. In particular, they can occupy a scientist position at research unit, an academic position at educational organization and a leading specialist position at IT department in an industry.

#	Course / Module / Internship / Research Component	Status	Credit number	Distribution of credits per courses and semesters								Distribution of Hours						
				I Year		II Year		III Year		IV ს.წ.			Contact Hours				Independent work	Total number of hours
				I Semester	II Semester	III Semester	IV Semester	V semester	VI Semester	VII Semester	VIII Semester	Lecture	Seminar / Group Work / Laboratory Work / Practical work	Midterm exam(s)	Final exam	Total number of contact hours		
1	Pedagogy of Higher Education for Business and Technology	Mandatory	**5**	**5**								8	20	2	2	32	93	125
2	Research Methodology	Mandatory	10	10								15	13	2	2	32	218	250
3	PhD Seminar I	Mandatory	**5**	**5**								0	14	0	2	16	109	125
4	PhD Seminar II	Mandatory	**5**		**5**							0	14	0	2	16	109	125
5	Professor's Assistantship	Mandatory	**5**		**5**							0	30	0	2	32	93	125
6	PhD Thesis	Mandatory				√	√	√	√				112			112	2888	3000
7	Cyber Physical Systems	Elective	10	10								28	14	2	2	46	204	250
8	Wavelets Theory	Elective	10	10								28	14	2	2	46	204	250
9	Computational Thinking for Modeling and Simulation	Elective	10	10								14	28	2	2	46	204	250
10	Automated Reasoning	Elective	10	10								28	14	2	2	46	204	250
11	Internet of Things (IoT)	Elective	10	10								28	14	2	2	46	204	250
12	Access Control Models	Elective	10		10							14	14	2	2	32	218	250

13	Blockchain and Cybersecurity	Elective	10		10							14	14	2	2	32	218	250
14	Discrete Optimization Algorithms	Elective	10		10							14	14	2	2	32	218	250
15	Rewriting Theory	Elective	10		10							14	14	2	2	32	218	250
16	Pattern Recognition Applications	Elective	10		10							14	14	2	2	32	218	250
Total number			60	30	30													