

APPROVED BY

Vice-Rector for Academic Affairs

_____ V.V. Dyomin

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**Ministry of Education and Science
of The Russian Federation
National Research
Tomsk State University**

Curriculum

Subject area

03.04.02 Physics**Physics Methods and Information Technologies in Biomedicine**

Degree

Master of Science

Duration

2 years

No	Modules, disciplines, practices	Workload		Distribution by semesters				Types of learning	Forms of midterm assessment	Competencies
		ECTS	hours total/ in class	1	2	3	4			
<i>Study block 1. Disciplines (modules)</i>		60	2160/600	22	25	13				
Basic part		15	540/156	7		8				
1.1	Philosophic issues of natural science	2	72/24	2				Lecture, Seminar	Pass/fail exam	GC-2, GPC-7
1.2	Special physics practice	5	180/48	5				Lecture, Lab.	Exam	GPC-5, GPC-6, PC-1
1.3	Trends in physics	3	108/24			3		Lecture, Seminar	Exam	GC-1, GPC-4, GPC-7, PC-1, PC-4, PC-5

1.4	History and methodology of physics	2	72/24			2		Lecture, Seminar	Pass/fail exam	GC-1, GPC-7
1.5	Organization of scientific activity	3	108/36			3		Lecture, Practical task	Pass/fail exam	GC-3, GPC-1, GPC-2, GPC-3, PC-1, PC-4, PC-5
Optional part, including electives		45	1620/444	15	25	5				
1.6	Current methodology and innovative research in diagnosis, prevention and therapy of disease	6	216/60			6		Lecture, Seminar, Practical task	Exam	GC-3, GPC-1, GPC-2, SPC-1
1.7	Physical fields and forces in biological systems	3	108/24			3		Lecture, Lab, Seminar	Exam	GC-3, PC-1
1.8	High-performance computing in biomedicine	4	144/36			4		Lecture, Practical task	Exam	GC-3, GPC-5, PC-1
1.9	Methods of measurement and control in biomedicine	3	108/36	3				Lecture, Lab	Pass/fail exam	GC-3, GPC-1, GPC-6, PC-1
1.10	Safety of microbiological study	3	108/36			3		Lecture, Lab, Seminar	Pass/fail exam	GC-2, SPC-5, SPC-8
1.11	Animal models in research	2	72/24			2		Lecture, Lab, Seminar	Pass/fail exam	GC-3, SPC-4, SPC-7, SPC-8
1.12	Data analysis in biomedicine	3	108/24			3		Lecture, Practical task	Exam	GC-1, GPC-5, SPC-6
1.13	Molecular basis of health and pathologies	3	108/24			3		Lecture, Seminar, Practical task	Exam	GC-3, GPC-1, GPC-2, SPC-2, SPC-3
1.14	Computing in biomedicine	3	108/36	3				Lecture, Practical task	Pass/fail exam	GC-1, GPC-5

Electives		15	540/144	9	4	2				
1.15	Data acquisition and processing systems in biomedicine	5	180/48	5				Lecture, Lab, Seminar	Exam	GC-3, GPC-1, GPC-5
	Matlab in modeling complex physical processes									
1.16	Laser methods in biomedicine	4	144/36	4				Lecture, Lab	Exam	GC-3, GPC-1, GPC-6, PC-1, SPC-8
	Laser therapy									
1.17	Optical methods in biomedicine	6	216/60		4	2		Lecture, Lab	Exam/Pass/fail exam	GC-3, GPC-1, GPC-6, PC-1, SPC-8
	Fundamentals of spectroscopy									
Study block 2. Practices, including research		54	1944	8	5	17	24			
2.1	Research	42	1512	8	5	17	12		Pass/fail exam/ Pass/fail exam/ Pass/fail exam / Graded exam	GC-1-3, GPC-1-6, PC-1, 4, 5, SPC-1, 2, 3, 6, 8
2.2	Pre-graduation practice	12	432				12		Graded exam	GC-1-3, GPC-1-6, PC-1, 4, 5, SPC-1, 2, 3, 6, 8
Study block 3. Final state examination		6	216				6			
3.1	Master's Thesis Defense	6	216				6		Grade	GPC-1, PC-1, 4, 5, SPC-1, 3, 6, 8
Total		120	4320	30	30	30	30			
Optional disciplines										
4.1	C++ Programming	2	72/24		2			Lecture, Practical task	Pass/fail exam	GPC-5