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ITMO University's educational standard of higher education: Master's programs

St. Petersburg
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ITMO University's educational standard of higher education (ITMO ES) is developed in accordance with the procedure approved by ITMO University, federal law № 273-FZ "On Education in the Russian Federation," including paragraph 10 subparagraph 11 which gives educational organizations of the *national research university* category the right to develop and approve their own educational standards for higher education programs and educational tracks.

At the core of the new ITMO ES are elements of the ITMO Code: values, fundamental, soft skills, and professional skills, abbreviated as V+F+SS+PS.

ITMO ES is similar to the federal standards of higher education and aligns with them in regard to ensuring consistency, variety of content, and quality of education, as well as establishing requirements for the development of educational programs (EP) offered at ITMO University.

The requirements for implementation and results of completion of educational programs of higher education which are part of ITMO ES cannot be lower than the requirements of the federal educational standards for higher education.

ITMO ES was developed as a common standard for Master's programs and is based on common requirements for results (graduates' competencies) and structure of educational programs.

The purpose of ITMO ES is to create conditions for social, personal and professional development of students via the personalization of higher education based on ITMO's values.

ITMO's educational environment provides for balanced comprehensive development and training of professionally competitive graduates via the acquirement and development of the following competencies:

- fundamental (social, personal and cultural) and soft skills;
- basic professional skills;
- professional skills.

An educational program – as an aggregate of basic characteristics of education (the scope, content, expected results), the organizational and pedagogic environment, and the formats of assessment – is developed by the respective head of program based on educational standards of educational products produced by ITMO, its corporate partners, and other universities, including educational products delivered in an online format, with regard to the specifics of the target audience of the program and every student, under the condition that graduates receive the corresponding competencies and the systemic approach to education within the framework of the educational program is preserved.

While designing and implementing an EP, the head of the program must ensure conditions in which students can make a conscious choice of the content, formats, pace, and length of study in the program.

For an ITMO student, an educational program is a personal learning track that is tailored with regard to their personal and professional needs (professional development in their chosen field, familiarization with an adjacent field, or the study of an unrelated field), contributes to the training of high-class specialists with a unique set of competencies (soft and hard skills), and ensures a "zero" (minimal) period for adaptation to their professional activities.

Legal documents

- Federal law № 273-FZ “On Education in the Russian Federation” (with effective amendments) dated December 29, 2012;
- The list of specializations and subject areas of higher education programs approved by the order № 1061 (with effective amendments) of the Ministry of Education and Science of the Russian Federation dated September 12, 2013;
- The list of specializations and subject areas of higher education programs approved by the order № 89 of the Ministry of Science and Higher Education of the Russian Federation dated February 1, 2022;
- Federal state educational standards for subject areas;
- The procedure for the organization and conduct of educational activities in accordance with educational programs of higher education – Bachelor’s, Specialist and Master’s programs approved by the order № 245 of the Ministry of Science and Higher Education dated April 6, 2021;
- The procedure for the conduct of State Final Examination for educational programs of higher education – Bachelor’s, Specialist and Master’s programs approved by the order № 636 (with effective amendments) of the Ministry of Education and Science dated June 29, 2015;
- Order on the practical training of students approved by the order № 885/390 of the Ministry of Science and Higher Education dated August 5, 2020;
- Professional standards approved by orders of the Ministry of Labour and Social Protection of the Russian Federation.

Key terms used in ITMO ES

- **type of professional activity** — a combination of labor functions that require statutory professional training and are considered in the context of application in a particular field characterized by specific objects, conditions, instruments, character, and results of labor;
- **individual educational program** — the educational program of a specific student that is developed by them for the formation of a personalized set of their competencies as a future graduate using the educational products from the pool of disciplines (modules) and projects based on the educational program they joined;
- **competency mastery indicators** — generalized characteristics that clarify and expand the definition of a competency through specific actions that a graduate who mastered the competency is capable of. The competency mastery indicators have to be measurable by means available as part of the educational process;
- **qualification** — the level of competencies that characterizes a graduate's preparedness to solve specific types of tasks associated with the professional activities specified in the educational program;
- **additional qualification** — the level of competencies that characterizes a graduate's preparedness to solve specific types of tasks associated with professional activities of a different type than those specified in the educational program;
- **fundamental competencies (social, personal, and cultural competencies)** — the combination of competencies that relate to an individual's personal qualities as well as their interactions with other people, communities, and the society in general; these competencies contribute to the individual's inclusion in the global cultural space, their self-identification in this space, and their capability to apply their knowledge and skills in practice, including the ability to navigate in the society;
- **competency** — the ability and preparedness to apply knowledge, skills and personal qualities for successful operation in a specific field;
- **module** — a combination of parts of an educational discipline or several disciplines that has a specific scope and logical consistency in regards to the tasks and expected results of training;
- **minor** — a module that is aimed at the formation of additional competencies in fields that differ from the field of professional activity associated with the educational program. Mastering a minor can be a sign of additional qualification;
- **soft skills** — general unspecialized skills that are associated with personal qualities, social attitudes, and managerial skills that increase the efficiency of work and interactions with other people;
- **field of professional activities** — a combination of professional activities in their scientific, social, economic, and production aspects (is established by an order of the Ministry of Labour and Social Protection of the Russian Federation);
- **basic professional skills** — a combination of competencies that correspond with the demands of the labor market in regard to the graduates' mastery of fundamental basics of their professional field and in light of the field's potential development (regardless of the program's focus on specific professional activities or fields of knowledge);
- **objects of professional activity** — objects, phenomena, and processes at which professional activities are directed;
- **mandatory part of the educational program** — the part of the program that includes modules and disciplines that contribute to the formation of fundamental competencies (social, personal, and cultural) and soft skills;
- **expected results of training for all disciplines (modules) and practical training** — knowledge and skills that a student has to demonstrate in every discipline (module) and internship upon graduation;
- **expected results of completion of educational program** — graduates' fundamental competencies (social, personal, and cultural), soft skills, and basic professional skills;

- **professional skills** — a combination of competencies that correspond with the demands of the labor market in regards to the graduates' ability to conduct specific types of professional activity and the associated labor functions;
- **subject-specific part of an educational program** — the part of a program that includes modules, disciplines, and practical training for the corresponding specializations (tracks) of programs and is aimed at the formation of basic professional and professional skills, as well as the development of fundamental competencies (social, personal, and cultural) and soft skills;
- **System 360** — a system for the assessment of the quality of implementation of modules (disciplines) and the quality of the support for the implementation of modules (disciplines);
- **specialization** — in-depth study of a relatively narrow field of professional activity that ensures the graduates' appropriate level of qualification as required for the conduct of labor functions;
- **field of professional activity** — field of activity that defines the trajectory and scope of a graduate's professional activity. Is formed additionally to a graduate's fields of professional activity listed by the Ministry of Labour and Social Protection of the Russian Federation;
- **types of professional activity** — provisional classification of tasks associated with professional activity by the character of actions performed;
- **learning analytics** — data on a student's experience, including educational experience, the mechanisms of its collection and analysis, as well as services for provision of students with this data so they can design their individual educational program;
- **format of the implementation of an educational program** — the technology and (or) means of interaction between lecturers and students of an educational program, including with the use of e-learning and remote learning technologies. Among those are the following formats:
 - **online format** — synchronous and asynchronous interaction of lecturers and students in a remote format;
 - **offline format** — direct synchronous interaction of lecturers and students in classrooms, laboratories, and other spaces where educational activities take place, as well as supervision of students' individual studies;
 - **blended format** — synchronous and asynchronous interaction of lecturers and students that combines the traditional format of studying in classrooms with elements of e-learning and the use of remote learning technologies.

I. General provisions

1.1. ITMO University's educational standard for higher education is a combination of mandatory requirements for the development and implementation of basic professional educational Master's programs of higher education. A Master's program is developed and implemented for one or several program tracks.

1.2. Master's programs at ITMO University are conducted intramurally.

1.3. The content of training is defined by educational Master's programs that are developed and approved at ITMO University. During the development of educational programs, requirements for their completion are presented as a list of fundamental (social, personal and cultural) skills, soft skills, basic professional skills, and professional skills.

1.4. In the course of the implementation of an educational program, ITMO University has the right to make use of e-learning and remote learning technologies. E-learning and remote learning technologies used in the course of training people with disabilities shall feature options for information exchange in formats accessible to these individuals.

1.5. An educational program can be implemented in the following formats: online (if that does not contradict the requirements of federal state educational standards for higher education for the corresponding educational track); offline; blended.

1.6. The implementation of an educational program can be conducted by ITMO University on its own or jointly with a partner organization.

1.7. Master's programs are delivered in the official language of the Russian Federation (Russian) or in another language in accordance with ITMO University's local regulations.

1.8. The length of completion of an educational program (irrespective of the educational technologies used):

- including the time off provided after the completion of the state final examination – no longer than 2 years;
- when following an individual study plan for people with disabilities, the term can be prolonged per their request by no longer than six months than the length of completion established for the corresponding educational format.

1.9. The academic workload of an educational program (including in the accelerated education format) amounts to 120 credits irrespective of format, educational technologies used, whether the program is implemented by ITMO University on its own or jointly with a partner organization, or whether the student follows an individual curriculum.

The academic workload of an educational program implemented in one academic year can amount to no more than 80 credits;

1.10. The head of an educational program, jointly with the student, determines the length of completion of an individual educational program (individual curriculum), including in the format of accelerated education, within the term and workload established in paragraphs 1.8 and 1.9 of ITMO ES.

1.11. The length of completion of an educational program is the time required to acquire competencies specified as the results of completing the educational program.

1.12. An educational program that contains information which is a state secret is developed and implemented in accordance with the requirements envisioned in the legislation of the Russian Federation and other regulations in the field of state secret protection.

1.13. The fields of professional activity in which graduates who have mastered their program (hereinafter graduates) are defined by the head of the program in accordance with the lists of fields and types of professional activities published by the Ministry of Labour and Social Protection of the Russian Federation¹, top-priority areas of scientific and technological development of the Russian Federation, and ITMO University's development program.

¹ <https://profstandart.rosmintrud.ru/>

1.14. As part of their training in their chosen Master's program, the graduates can prepare to carry out professional tasks of the following types:

- audit;
- analytical;
- communicative;
- consulting;
- creative;
- design;
- development;
- entrepreneurial;
- experimental;
- financial and economic;
- informational;
- innovative;
- maintenance;
- managerial;
- operational;
- pedagogical;
- production;
- project;
- research;
- social;
- technical;
- technological;
- testing.

1.15. For the purpose of decreasing the period for adaptation to professional activities, the program head establishes the program's focus during its development, with regard to:

- field (fields) of graduates' professional activity;
- type (types) of tasks included in graduates' professional activity;
- objects of graduates' professional activity;
- field (fields) of knowledge.

II. Requirements for completion of an educational program

2.1 As a result of completing their educational program, a graduate has to acquire competencies established by the Master's program.

2.2 The educational program has to establish the following requirements for completion of an educational program (competencies):

Fundamental (social, personal, and cultural) competencies

Competency category	Competency code and name	Competency mastery indicator code and name
Outlook, values and self-fulfillment	CC-1. The graduate can define and follow the priorities of their own activity and ways to improve it based on their self-assessment and worldview, as well as plan their personal and professional development based on the concept of continuous education	<p>CC-1.1. Identifies the priorities of their activity; designs and implements their self-fulfillment path based on the principles of their worldview and ethical and sociocultural values</p> <p>CC-1.2. Uses their own potential in the social environment for the attainment of set goals</p> <p>CC-1.3. Bears responsibility for their decisions, takes into account the legal and cultural aspects, supports the implementation of sustainable development</p> <p>CC-1.4. Assesses the results of their activity, comports the methods and means for the conduct of their activity with its goal</p>
Thinking	CC-2. Can conduct critical analysis of problematic situations based on a systemic approach, generate new ideas, and come up with strategies, including with the use of design thinking	<p>CC-2.1. Identifies and analyzes a problematic situation as a system by identifying its components and their interrelations</p> <p>CC-2.2. Searches for possible solutions for the identified problem situation based on available information sources. Proposes various solutions and justifies their choice.</p> <p>CC-2.3. Develops a strategy for attaining the set goal as a sequence of steps, foreseeing the result of each, assessing their effect on the environment in which the activity is to take place and the interactions between the participants of this activity</p>
Intercultural interaction	CC-3. Can analyze and account for cultural diversity in the process of intercultural interactions	<p>CC-3.1. When interacting with people of various social and cultural backgrounds, takes into account the specifics of behavior and motivation based on knowledge of the origins of social customs and the differences in human behavior.</p> <p>CC-3.2. Creates and maintains an environment that is comfortable for interaction when working on professional tasks</p>
Digital culture and artificial intelligence	CC-4. Can conduct meaningful independent activity aimed at optimal satisfaction of individual and professional informational needs with the use of digital technologies and artificial intelligence, develop rules and standards for the interaction of human and	<p>CC-4.1. Uses digital technologies to acquire, process, and relay information with the help of technical means and methods</p> <p>CC-4.2. Conducts professional activities using digital technologies</p>

	artificial intelligence	CC-4.3 Relies on legal and ethical rules during the development of standards, rules, and regulations in the field of artificial intelligence
Professional ethics	CC-5. Comprehends the values that lie at the basis of professional decisions and act in accordance with ethical standards relevant to their professional activity	<p>CC-5.1. Comprehends the importance of academic and professional ethical standards that regulate scientific research and technical development</p> <p>CC-5.2. Makes decisions based on professional codes of conduct that are relevant in the corresponding field at the current moment</p> <p>CC-5.3. Can distinguish between effective, ethical, and that which aligns with legal standards of research (R&D)</p>

Soft skills

Competency category	Competency code and name	Competency mastery indicator code and name
Development and implementation of projects	SS-1. Can manage a project on all stages of its life cycle	<p>SS-1.1. Formulates the goals, tasks, relevance, importance, expected results and possible fields of application within the context of the set problem, assesses the risks</p> <p>SS-1.2. Forecasts the results of project activity, assesses resources. Forms a roadmap of the project's implementation in general and a progress monitoring plan</p> <p>SS-1.3. Is able to publicly present a project's results (or the results of its specific stages) as reports, articles, presentations at conferences, seminars, etc.</p>
Teamwork and leadership	SS-2. Can organize and manage a team, develop a team strategy for attaining the set goal, including in a remote format with the use of digital technologies	<p>SS-2.1. Organizes and coordinates the work of a project's participants, contributes to the prevention and solution of disputes and conflicts</p> <p>SS-2.2. In their social and professional activity – accounts for interests, specifics, and opinions (including critical) of the people they work/interact with, including by adjusting their (graduate's) actions</p> <p>SS-2.3. Forecasts the results (consequences) of both personal and collective actions</p> <p>SS-2.4. Plans teamwork, assigned tasks and grants powers to team members. Organizes the discussion of various ideas and opinions</p>
Communication and cooperation	SS-3. Is capable of using modern communication technologies, including in foreign languages, for academic and professional interactions, all while observing the principles of academic, corporate and professional ethics and social responsibility	<p>SS-3.1. Writes, translates and edits various academic texts (reports, essays, reviews, articles, etc.)</p> <p>SS-3.2. Presents results of academic and professional activity at various scientific events, including international events</p>

		SS-3.3. Is a productive participant of academic and professional discussions
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Basic professional skills

Competency category	Competency code and name	Competency mastery indicator code and name
Research	BPS-1. Can organize and conduct scientific research, as well as present, document, and defend result of intellectual activity	<p>BPS-1.1. Identifies and analyzes problems that emerge in the process of professional activity based on the contemporary scientific worldview</p> <p>BPS-1.2. Collects, analyzes and organizes information on the research subject, including with the use of digital technologies</p> <p>BPS-1.3. Formulates the problems and hypotheses of research projects, chooses methods. develops and conducts research</p> <p>BPS-1.4. Analyzes, interprets, assesses, presents, and defends the results of the research conducted, with substantiated conclusions and recommendations</p> <p>BPS-1.5. Compiles documentation on intellectual property protection and commercialization of intellectual property rights</p>
Digital tools and systems	BPS-2. Can apply and (or) design digital tools and systems and create digital content in order to carry out tasks with regard to the field of professional activity, including with the use of artificial intelligence systems	<p>BPS-2.1. Demonstrates skills in acquisition of new knowledge in the field of their professional activity, including with the use and (or) development of new digital tools and systems</p> <p>BPS-2.2. Applies knowledge of digital technologies in solving professional tasks</p>
Project and managerial activities	BPS-3. Can organize the process of making, substantiating, and assessing the efficiency of project and managerial solutions in their professional field with regard to financial, economic, ecological, social, legal, ethical, and other limitations	<p>BPS-3.1. Substantiates managerial and (or) strategic solutions in their professional field</p> <p>BPS-3.2. Assesses risks and manages the process of development and adoption of solutions based on modern research methods and technological solutions</p> <p>BPS-3.3. Formulates and uses criteria for the assessment of the obtained results of professional activity with regard to the established limitations</p>

2.3 Professional competencies established by the educational program are chosen by the program head based on their analysis of the labor market demands, generalization of national and international experience, trends in global research and technological development, consultations with the leading employers in the field, as well as professional standards that correspond with graduates' professional activity (if applicable).

2.4 The program head chooses professional standards in order to identify professional competencies based on professional standards.

For each of the chosen standards, the program head selects one or several generalized labor functions (hereinafter GLF) that correspond with graduates' professional activity based on the

level of qualification and requirements of paragraph “Requirements for education and learning” as established in the professional standard for GLF². A GLF can be selected partially or in its entirety.

2.5 The combination of competencies established by the educational program has to give the graduate the ability to conduct professional activity in no less than one field of professional activity in accordance with 1.13 of ITMO ES, and solve tasks associated with professional activity of no less than one type, established in accordance with paragraph 1.14 of this educational standard.

2.6 The head of the program establishes the indicators for the mastering of professional skills for the educational program.

2.7 The combination of expected results of training for disciplines (modules) and internships has to ensure that graduates master all competencies established for the educational program.

2.8 The program head establishes the expected results for disciplines (modules) and internships that have to correspond with competency mastery indicators established for the educational program, and supervises their attainment.

² Order of the Ministry of Labour and Social Protection of the Russian Federation № 148н “On approval of the levels of qualification with the purpose of the development of projects of professional standards” dated April 12, 2013 (registered by Ministry of Justice of the Russian Federation on May 27, 2013, № 28534).

III. Requirements for the structure of an educational program

3.1 An educational program includes the following elements:

- Element 1 Modules (disciplines);
- Element 2 Practical training;
- Element 3 State final examination;
- Element 4 Elective modules (disciplines).

3.2 Structure and workload of an educational program

An educational program has two parts – the core part and the field-specific part, both of which include mandatory and elective (chosen by the student) modules (disciplines) and practical training.

Modules (disciplines) of the core and elective parts, as well as various types of practical training from Element 2. Practical training, provide for the formation of fundamental competencies and soft skills.

Modules (disciplines) of the elective part and various types of practical training from Element 2. Practical training, provide for the formation of basic professional skills, professional skills, fundamental competencies, and soft skills.

Table1. Structure and workload of an educational program in accordance with ITMO Code (V+F+SS+PS)

Elements	Parts	Competencies	Program structure	Credits
Element 1. Modules (disciplines)	Modules (disciplines)			no less than 54
	Core	CC, SS	Fundamental training (soft skills)	
	Field-specific	BPS, PS, CC*, SS*	Individual professional training (in accordance with professional fields, professional roles, difficulty level, etc.)	
Element 2. Internship	Field-specific	PS, CC*, SS*, BPS*	Practical training	no less than 42
			Industrial practical training and (or) Research training and (or) Project work and (or) other types of practical training that provide students with authentic career-building experience	no less than 36
			Pre-graduation internship	6
Element 3. State Final Examination		confirmation of qualifications and competencies	Preparation for thesis defense and thesis defense	6
Workload of a Master's program				120
Element 4. Elective modules		CC*, SS*, BPS*, PS*	<ul style="list-style-type: none"> ● University's common pool of elective disciplines ● Program-specific pool of elective disciplines 	

(disciplines)			● Adaptive electives for students with disabilities	
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* the competency set is established by the program head

3.3 Element 1. Modules (disciplines) consist of fundamental training (soft skills), as well as professional skills.

3.4 Fundamental training consists of modules (disciplines) aimed at the development of CC and SS and includes modules (disciplines) on thinking, foreign language, entrepreneurship, creative technologies, digital culture and artificial intelligence, soft skills. The list of modules (disciplines) is formed by heads of ITMO competency centers, and may be formed on request from program heads.

3.5 Individual professional training consists of modules (disciplines) aimed at forming BPS and PS, as well as further development of CC and SS, ensuring the continuity of the results of training and individual levels of their attainment. The set of modules (disciplines) is formed by the program head.

3.6 For the purpose of personalizing education, pools of modules (minors included), disciplines, and projects (hereinafter – pools of educational products) are created, including with participation of ITMO’s partners.

3.7 Head of the program designs the program using various educational products from these pools for the purpose of attaining the results of mastering the program.

3.8 A student who joins the educational program uses educational products to assemble an individual educational program (IEP) based on educational analytics and on the condition that competencies correspond to each other. No later than by the end of the first academic year, every student has to form an IEP that can be updated within the term established by ITMO University.

3.9 Fundamental and professional training takes into account the student’s experience with organizing and participation in events that are not part of the educational program (student competitions, contests, conferences, etc.) that confirms their attainment of the educational results of the program.

3.10 Element 2. Practical training includes industrial practical training and (or) research work and (or) project work and (or) other types of practical training that provide students with authentic career-building experience. Types of practical training are established by the program head.

3.11 Pre-graduation internship and research and project work can be in the format of a research and (or) project seminar by decision of the program head.

3.12 Pre-graduation internship is conducted for the purpose of completing the student’s thesis and is mandatory.

3.13 Results attained within the course of an internship or any other practical training can be counted as educational results under the condition that they correspond with the purpose of practical training.

For people with disabilities, the choice of venue for practical training is made with regard to their health conditions and accessibility requirements.

3.14 Element 3. State Final Examination includes preparation for thesis defense and thesis defense.

3.15 Element 4. Elective modules (disciplines) includes adaptive electives for students with disabilities, and can also include modules (disciplines) from the University’s common pool of elective disciplines and a program-specific pool of elective disciplines for ensuring the formation of a unique set of graduate’s competencies.

3.16 Elective modules (disciplines) are aimed at the formation of fundamental competencies, soft skills, basic professional skills, professional skills.

3.17 Elective modules (disciplines) aren’t included into the scope of the educational program.

3.18 ITMO University offers people with disabilities (upon their request) an opportunity to follow an educational program that accounts for the specifics of their psychological and physical development and individual capabilities and, if necessary, supports the treatment of their developmental disabilities and their social integration on the condition they have a corresponding medical certificate.

3.19 The implementation of a part (parts) of an educational program and the State Final Examination that are associated with students getting access to confidential information and (or) use of classified weaponry, military hardware, and their components cannot take place with the use of e-learning and distance learning technologies.

IV. Requirements for implementation of a Master's program

4.1 The requirements for implementation of a Master's program include general requirements, requirements for material, technical, and methodological support of a program, requirements for personnel and financial aspects of the implementation of a program, as well as requirements for the methods used for assessing the quality of educational activities and training of students following the educational program.

4.2 General requirements for the implementation of an educational program.

4.2.1 ITMO University manages, on the right of ownership, or other legal grounds, the material and technical support of the conduct of educational activities (spaces and equipment) for the implementation of elements 1 and 3 of educational programs in accordance with the curricula, as well as for the implementation of elements 2 and 3 with the involvement of resources from ITMO's partners in accordance with the rules and regulations in place.

4.2.2 Throughout the whole term of their education, every student must be granted unlimited access to ITMO's digital informational and educational system from any location that has internet access. The conditions for the operation of the digital informational and educational system can be created with the help of a third party.

ITMO University's digital informational and educational system has to provide:

access to curricula, syllabi of disciplines (modules), practical training, State Final Examination, teaching materials in a digital format and digital learning resources specified in the syllabi of disciplines (modules), internships;

formation of a student's digital portfolio, record-keeping of their assignments and the associated grades.

In case a program is implemented with the use of e-learning and remote learning technologies, ITMO University's digital informational and educational system also has to provide:

record-keeping of the course of the educational process, interim assessment results, and the results of mastering the program;

the conduct of study sessions and procedures for assessment of the results of education which were designed to be implemented with the use of e-learning and distance learning technologies;

interaction between the participants of the educational process (synchronous and (or) asynchronous) via the internet.

The operation of the digital informational and educational system is maintained by the corresponding means of infocommunication technologies and the qualification of specialists that use and maintain it. The operation of the digital informational and educational system has to comply with the legislation of the Russian Federation³.

4.2.3 When implementing the educational program jointly with partner organizations, the requirements for the implementation of the Master's program have to be met by the aggregate of resources of material, technical, and methodological support provided by organizations that participate in the implementation of the program.

4.3 Requirements for material, technical, and methodological support of a program.

4.3.1 The spaces used have to be classrooms suitable for the delivery of study sessions of the Master's program, with the corresponding equipment and technical means, the list of which is established by the syllabi of disciplines (modules).

³ Federal Law No. 149-FZ dated July 27, 2006, "On Information, Information Technologies and Protection of Information (Corpus of Legislation of the Russian Federation)", 2006, № 31, art. 3448; 2010, № 31, art. 4196; 2011, № 15, art. 2038; № 30, art. 4600; 2012, № 31, art. 4328; 2013, № 14, art. 1658; № 23, art. 2870; № 27, art. 3479; № 52, art. 6961, art. 6963; 2014, № 19, art. 2302; № 30, art. 4223, art. 4243, № 48, art. 6645; 2015, № 1, art. 84; № 27, art. 3979; № 29, art. 4389, art. 4390; 2016, № 26, art. 3877; № 28, art. 4558; № 52, art. 7491; 2017, № 18, art. 2664; № 24, art. 3478; № 25, art. 3596; № 31, art. 4825), Federal Law of 27 July 2006 N 152-FZ "On Personal Data" (Corpus of Legislation of the Russian Federation, 2006, № 31, art. 3451; 2009, № 48, art. 5716; № 52, art. 6439; 2010, № 27, art. 3407; № 31, art. 4173, art. 4196; № 49, art. 6409; 2011, № 23, art. 3263; № 31, art. 4701; 2013, № 14, art. 1651; № 30, art. 4038; № 51, art. 6683; 2014, № 23, art. 2927; № 30, art. 4217, art. 4243; 2016, № 27, art. 4164; 2017, № 9, art. 1276; № 27, art. 3945; № 31, art. 4772).

Spaces for individual study must be equipped with computers, internet access, and access to ITMO University's digital informational and educational system.

Equipment can be replaced by its virtual counterparts.

4.3.2 ITMO University is in possession of an essential set of licensed and freely distributable software, including software developed in Russia (the list of software is established in the syllabi of disciplines (modules) and can be updated when necessary).

4.3.3 If printed materials have to be used in the course of the educational process, the library stock has to have these materials in the amount calculated as follows: no less than 0.25 items of every title specified in the syllabi of disciplines (modules) per one student from among those who simultaneously study the corresponding discipline (module) or participate in a corresponding internship.

4.3.4 Students must have access (remote access), including with the use of e-learning and distance learning technologies, to modern professional databases, the list of which is established in the syllabi of disciplines (modules) and can be updated when necessary.

4.3.5 Students with disabilities must be provided with printed and (or) electronic materials in formats adapted to their conditions.

4.4 Requirements for personnel involved in the implementation of a Master's program.

4.4.1 The implementation of a Master's program is carried out by ITMO's academic staff as well as persons involved by ITMO in the implementation of the educational program on other conditions.

4.4.2 The qualification of ITMO's academic staff has to correspond with the requirements specified in the corresponding guides and (or) professional standards (if applicable).

4.4.3 The share of ITMO academic staff participating in the implementation of a program to persons involved by ITMO in the implementation of the educational program on other conditions (calculated based on the number of replaced positions taken as integer numbers) who will conduct research, pedagogical, methodological and (or) practical work that corresponds with the subject area of the associated discipline (module) is established by the requirements of federal state educational standards for higher education.

4.4.4 The share of ITMO academic staff participating in the implementation of a program and persons involved by ITMO in the implementation of the educational program on other conditions (calculated based on the number of replaced positions taken as integer numbers) who must be heads and (or) employees of other organizations that work in the professional field (i.e. have no less than 3 years of experience in this professional field) corresponding with those that graduates aspire to master is established by the requirements of federal state educational standards for higher education for the corresponding program track.

4.4.5 The share of ITMO academic staff participating in the implementation of a program and persons involved by ITMO in the implementation of the educational program on other conditions (calculated based on the number of replaced positions taken as integer numbers) who must have a degree (including a degree received in a different country and recognized in the Russian Federation) is established by the requirements of federal state educational standards for higher education for the corresponding program track.

4.4.6 The general management of an educational program is conducted by a program head chosen from among ITMO's academic staff with an academic degree (including a degree received in a different country and recognized in the Russian Federation) and (or) experience as a senior manager in a field that corresponds with the professional activity that the graduates are training for.

4.4.7 The head of an educational program conducts their own research (creative) projects and (or) R&D projects (participates in such projects) in the field that corresponds to the subject area of the program, has publications based on the results of these activities in the last two years in leading peer-reviewed journals, and (or) presents these results at national and international conferences.

4.4.8 The scientific content of a Master's program is supervised by the program head or another member of ITMO's academic staff with an academic degree (including a degree received

in a different country and recognized in the Russian Federation) and who corresponds to the requirements specified in paragraph 4.4.7.

4.5 Requirements for the financial aspect of the implementation of a program.

4.5.1 Financial support for the implementation of a program has to amount to no less than the basic standard costs for the provision of public services for the implementation of educational programs of higher education, namely Master's programs, and values of adjustment factor for basic cost standards established by the Ministry of Education and Science of the Russian Federation⁴.

4.6 Requirements for methods used to assess the quality of educational activities and training of students following the educational program.

4.6.1 The quality of educational activities and training of students following the educational program is assessed by means of an internal assessment system as well as via an external assessment system in which ITMO University and the program participate voluntarily.

4.6.2 With the purpose of confirming the correspondence of educational activities to ITMO ES and the improvement of educational programs, ITMO University involves employers and (or) their associations, as well as other legal and (or) physical entities, including academic staff, students and graduates of ITMO University, in the conduct of regular assessments of the quality of educational activities and students' training in Master's programs (interim and State Final Examinations).

4.6.3 The assessment of the quality of educational programs is conducted in accordance with the principles of collegial assessment, including with the involvement of independent experts.

4.6.4 As part of the internal system for the assessment of the quality of education, students have the opportunity to assess the conditions in which the the educational process takes place, its content, organization, and overall quality, as well as the quality of its modules (disciplines) and practical training, including with the use of tools provided by System 360.

4.6.5 The external assessment of the quality of education of an educational program is conducted as part of the procedures of state certification, as well as professional and public certifications conducted by employers and authorized organizations, including international ones, or authorized national professional and public organizations that are part of international structures.

⁴ Paragraph 10 of the Decree of the Government of the Russian Federation № 640 dated June 24, 2015 "On the procedure for the formation of a state order for the provision of public services (performance of work) in regard to federal establishments and financial support of the conduct of a state order" (Corpus of Legislation of the Russian Federation, 2015, № 28, art. 4226; 2016, № 24, art. 3525; № 42, art. 5926; № 46, art. 6468).