The expert training on information security at the Russian universities has its certain history. It is possible to assert that the basis of the state system of the expert training in this field has been created in Russia recently. The system features are the organizational maintenance, the normative and legal maintenance, and the educational and methodical maintenance of the expert training.

IS expert training (namely engineers) on the basis of higher education is conducted at the higher educational institutions. In the beginning of 2003 there were more than 80 such higher educational institutions located practically in all regions of Russia. Moreover despite of the opening of a great number of non-state universities in Russia, the expert training is conducted only at the state higher educational institutions. It is possible to explain this situation by the following reasons. First, short term of existence of non-state universities. Second, difficulties of support by a sufficient number of the skilled teaching staff. Third, insufficient technical and methodical assets of these higher educational institutions.

According to the Russian educational system first two years at the higher educational institutions are destined for basic education when the students are taught humanities and science. Only after that they begin to study disciplines of their speciality.

There are seven specialities on information security (IS) in Russia because this area is very complicated and includes not only technical but also legal, organizational and other aspects.

<table>
<thead>
<tr>
<th>Speciality title</th>
<th>Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer security</td>
<td>Mathematician</td>
</tr>
<tr>
<td>Organization and technology of information protection</td>
<td>Expert on information protection</td>
</tr>
<tr>
<td>Complex protection of informatization objects</td>
<td>Expert on information protection</td>
</tr>
<tr>
<td>Complex maintenance of automated system information security</td>
<td>Expert on information protection</td>
</tr>
<tr>
<td>Information security of telecommunication systems</td>
<td>Expert on information protection</td>
</tr>
<tr>
<td>Security and non-proliferation of nuclear materials</td>
<td>Engineer-physician</td>
</tr>
<tr>
<td>Jurisprudence</td>
<td>Lawyer</td>
</tr>
</tbody>
</table>

Teaching IS at undergraduate level is divided into three main streams.

1. For future specialists on IS that means teaching of introduction to their speciality. Duration of that educational course at the Moscow Engineering Physics Institute (State University) (MEPhI) is 32 hours (1 term). Some years ago we have tried to teach it at the 5th term (3rd year). But the practice has shown that it has been too late. The reason is the absence of links with their basic education. Now we teach "Introduction to IS" at the 1st term. Duration of the course is 68 hours including 34 hours of lectures. The other 34 hours are intended for self-work of the students ending with writing and protecting of an essay on the topic given by a Professor. The main parts of the course are the following: IS threats in
computer-based systems; main tasks and categories of information protection systems (IPS); problems of user identification and protection against information leakage via electromagnetic radiation; cryptology; computer viruses and protection against them; organizational and legal maintenance of IS; principles of IPS design. Every part of the course is logically connected with the educational courses taught on the following terms. A Professor points out what prerequisites from mathematics, computer science, cybernetics and electronics are needed for successful learning of those courses. "Introduction to IS" have become basic course for the Russian universities preparing experts on IS.

2. The "IS Basics" course has been taught for specialists on information technologies for the last ten years. At present the course is an integral component in the expert training for any field. Information exists at any area of knowledge and of our lives (for example, medical data, privacy, copyright, etc). It should be protected against different threats. Our experience has shown that it is more effective to teach IS for that category of students not as one separate course, but elements of IS maintenance should be described every time at every educational course when it is needed. Besides at the beginning of the education on the 1st year we should teach one introductory ISB course, discussing both IS problems for information technologies and methods and tools of information protection. The course should prepare the students for perception of the following specialized courses on information technologies. There is no single standard course on the topic in Russia. Every educational institution itself decides how to teach ISB and in what courses.

3. The "ISB" course is needed for non-professionals on information technologies as well. That is why we taught it for all MEPhI's faculties – for mathematicians, physicians and so on. There are some specifics that should be stressed specially. The best period for its teaching is the 5th term. There is such a basis course in Russia. But our society is not ready enough for teaching it at present because it is very difficult to approve that IS affects all spheres of human life including art, culture, literature etc.

What are the prerequisites for IS classes? The knowledge gained at school is sufficient. We clearly understand that it should be a separate course discussing different aspects of IS problematics at school. Unfortunately we do not have it at present. The potential students know about IS problems mainly from mass media. Russian universities as a rule have several basic secondary schools where it is necessary to begin teaching "ISB". "School – higher education" joint efforts are the best solution of the expert training on IS.

The main form of teaching IS at the undergraduate level is lectures. That is why the number of students of one faculty (100-120 trainees in MEPhI) determines the size of classes. The total amount of the 3rd year students is about 1000. All of them should pass progress testing in the middle and at the end of the term. It is a big problem for a Professor to talk with all of them. We have found a very effective solution – to use new educational technologies in the form of distance progress testing via the MEPhI Intranet.

We have no practical laboratory works for undergraduates. They are designed only for graduates for specialized courses on different IS aspects. While teaching IS ethics problems are discussed. But only graduates work at "Network Security" Scientific and Research Laboratory. They are old enough to understand responsibility for all their activities at the Laboratory.
By developing a direction of an educational activity we do not exclude the variants of deployment of the expert training on information security at non-state universities as well. Some of such universities have declared their readiness. The duration of the expert training on information security on the basis of higher education is 5 or 5,5 years depending on the speciality and opportunities of a certain university. For that the stipulated form of the expert training is only a classroom instruction. It is necessary to pay attention that all the cycle of the expert training has been conducted at least once and the final examination has taken place only at approximately 20 percent of the educational institutions. Other high schools are now conducting student training at the initial courses and their finals will be carried out in the next few years. It is expected that the given percent of the high schools will be essentially increased during the nearest years.

Taking into account the importance of the direction of the expert training, the Russian Ministry of Education (RME) has created a network of regional educational and research centers on the base of the most successfully working universities (16 centers). They are located in all the most developed regions of Russia with a head educational and research center in Moscow on the base of the Moscow State Engineering Physics Institute (Technical University) (MEPhI). Their task is to supply the needs of the appropriate region by the experts and to support the universities, located in this region and conducting the expert training on information security.

Each speciality has its own code, title, qualification and educational step. The three-step system of higher education is accepted in Russia. The first step - the first two years of training in a higher educational institution (called base education). The second step - the bachelors (4 years of training under the separate programs). The third step - the experts on a certain speciality (4 - 5,5 years of training) or masters (2 years of training after the bachelor degree).

The state educational standard of the higher vocational training on each speciality is developed and authorized. The standard contains the following sections:
1. general speciality characteristics.
2. requirements to an applicant preliminary educational level.
3. general requirements to the basic educational program of the graduate preparation.
4. requirements to an obligatory content minimum of the basic educational program on the following cycles (including discipline titles, basic sections and volume of studies in hours):
   – general humanitarian and social and economic disciplines;
   – general mathematical disciplines and natural sciences;
   – general professional disciplines;
   – disciplines of specialization.
5. terms of study of an educational program.
6. requirements to the development and implementation of the basic educational program.
7. requirements to a graduate educational level.

The standard is a basis of the development of a certain educational plan of the speciality and educational programs of the separate disciplines. The formation of a specialization is possible within the framework of each speciality. A certain university accepts such a decision.

The Moscow State Engineering Physics Institute (Technical University). The Information Security Faculty (6 departments) of MEPhI is a Head educational and scientific center on information security of the RME (www.fis.mephi.edu). It conducts the expert training and professional re-training on the following directions:

1. The speciality - "Complex maintenance of automated system information security". Qualification - an expert in information protection. Duration of training - 5,5 years. The training will be carried out on the specializations:
   - "Open information system security";
   - "Information security of the banking automated systems";
   - "Designing, monitoring and auditing of complex information security systems";
   - "Application of cryptological methods in information protection systems".

2. The speciality - "Complex protection of informatization objects". Qualification - an expert in information protection. Duration of training - 5,5 years.

3. The speciality - "Jurisprudence". Qualification - a lawyer. Duration of training - 5 years. Specialization - "Computer law".

4. The speciality - "Security and non-proliferation of nuclear materials". Qualification - an engineer-physician. Duration of training - 5,5 years. Specialization - "Physical protection of nuclear objects". There is a large cycle connected to information protection in automated systems of physical protection in the curriculum.

5. The direction - "Physical and technical problems of atomic engineering". The educational master program - "Physical protection, accounting and control of nuclear materials". The educational course "Information security in physical protection, accounting and control of nuclear material systems" is included in the curriculum.

6. The re-training courses for the experts from financial and banking sphere. The course catalogue contains more than 30 educational programs with duration of training from 5 to 12 days (40-96 educational hours).

7. The post-graduate training on a speciality "Methods and systems of information protection. Information security". Annual number of post-graduate students - 10.

8. The frontal training of all the students of the university under the program "Information security basis".