

## Analysis of FSES Texts of the Last Generations of Engineering Profiles (Speciality “Nuclear Physics and Technologies”, Bachelor Degree) in Foreign Language Subject

S.I. Prokopieva<sup>1</sup>

<sup>1</sup>North-Eastern Federal University in Yakutsk, Yakutsk, Russia

Received: 11.05.2017 / Accepted: 06.06.2017 / Published online: 31.12.2017

### Abstract

The article analyzes the Federal State Educational Standards (FSES) of the latest generation by the example of speciality “Nuclear Physics and Technologies”, Bachelor degree programme, Foreign language course. The principle changes in the components of the FSES 3 and FSES 3+ standards are considered in the higher education system..

**Key words:** education modernization, analysis, FSES standards, cross-cultural competencies, professional competencies.

At the moment, engineering education is one of the priorities for the state education policy. The RF Ministry for Education and Science has launched the project “Development of engineering education” which is aimed at modernization of engineering education content, defining the hour amount of engineering staff training structure based on involvement of employers in development of admission quotas, an increase in engineering specialties’ prestige.

The concept of the Russian education modernization demonstrates the necessity of education policy and education modernization for effective use: “...Education policy in Russia, reflecting the national interests in the sphere of education and presenting them for the world community, takes into account the general tendencies of the world development conditioning the necessity for essential changes in the education system: significant extension of international cooperation scale, as a result of which communicative and tolerance factors are of prime importance; as there are some

global problems that could be solved only via cooperation within the international community” [1].

Modernization of the Russian education in the system of higher professional education is focused on the practical enhancement of 3-level training system (Bachelor – Master – Post-graduate), improvement of education quality, optimization of content and structure of learning process, design of new educational programmes, development of the Federal State Educational Standards (FSES).

FSES is a set of compulsory requirements for basic education programmes of higher education. The HE FSES of the latest generation include the standards of HPE FSES 3 and HE FSES 3+. The Federal State Educational Standards of Higher Professional Education of the 3-d generation were approved as a part of Government Decree of the Russian Federation of 24 February 2009, no.142, the Order of the RF Ministry for Education and Science of 18 January 2010, no. 51 and adopted for implementation in educational institutions in 2011.

### REFERENCES

1. Remaud, B. European perspectives on the competences of engineering graduates. *Engineering Education*. 2013. № 12. pp. 12-21.
2. “O merakh gosudarstvennoi podderzhki razvitiya kooperatsii rossiiskikh obrazovatel'nykh organizatsii vysshego obrazovaniya, gosudarstvennykh nauchnykh uchrezhdenii i organizatsii, realizuyushchikh kompleksnye proekty po sozdaniyu vysokotekhnologichnogo proizvodstva, v ramkakh podprogrammy “Institutsional'noe razvitie nauchno-issledovatel'skogo sektora” gosudarstvennoi programmy Rossiiskoi Federatsii “Razvitie nauki i tekhnologii” na 2013 – 2020 gody” On measures of state support for the development of cooperation among Russian higher education institutions and organizations implementing integrated projects of creating high-technology production within the subprogram Institutional development of science and research sector” of the state program “Development of science and technology for years 2013 – 2020”: the Resolution No. 218 dated 09.04.2010 of the Government of the RF.
3. Crawley, F., et al. The CDIO Syllabus v2.0 An Updated Statement of Goals for Engineering Education [Electronic resource]. Proceedings of the 7th International CDIO Conference, Technical University of Denmark, Copenhagen, June 20–23, 2011 (usage date: 01.11.2013).



S.I. Prokopieva

Introduction of HPE FSES 3 attracted considerable criticism and debates among the pedagogic community, first of all, because of the great number of a graduate's developed competencies. For example, the speciality 140800 "Nuclear Physics and Technologies" (Bachelor Degree) listed 13 cross-cultural and 31 professional competencies.

At present, the RF Ministry for Education and Science is updating the FSES (information letter of the RF Ministry for Education and Science of 06.07.2016 № AK 1872/05 "On providing materials" due to mainstreaming the HE FSES to consider the requirements of professional standards and needs for development of basic educational programmes of higher education [2].

In 2015 the RF Ministry for Education and Science took the decision of developing HE FSES 3+ according to the Federal Laws of 29 December 2012 no. 273-FZ "On Education" and "On Higher and Postgraduate Vocational Education" of 2012 due to low quality of FSES 3, the great number of competences; technical errors; lack of choice in type (types) of professional activity and, as a consequence, competence clusters; disciplinary structure of the main curriculum, etc.

As a part of FSES projects presented on the site <http://fgosvo.ru> it is suggested reducing significantly the number of competencies. Cross-cultural competencies are replaced by universal ones (8 competencies) and general professional (3 competencies) for Bachelor curriculum. Besides, the list of a graduate's professional competencies is independently approved by educational institution, "based on the profile of curriculum, taking into account exemplary main curriculum, following the content of generalized job functions (depending completely or partially on the requirements for education and training provided by the professional standard) of the corresponding professional standards (if any) chosen in accordance with point 1.3 of the current HE FSES" [3].

The list of the universal competencies developed in the frame of a foreign language course contains as follows:

- ability to interact (UC-3);

- ability to communicate in business sphere orally and in writing using state and foreign languages (UC-4);
- ability to perceive cultural diversity in social-historical, ethic and philosophical contexts (UC-5) [3, 4].

Mention should be made that these competencies do not only show the tendency towards cross-cultural and social interaction but also demonstrate the ability to communicate in professional sphere.

Analysis of FSES of the latest generation using the profile "Nuclear Physics and Technologies" as an example demonstrates the fact that HE FSES 3+ in comparison with FSES 3 of HPE is distinguished by the essential decrease in competencies for university graduates. FSES 3+ contains 9 cross-cultural competencies, 2 general professional, and 12 professional ones. Besides, according to the Order of the RF Ministry for Education and Science of 12 September, 2013, no.1061 "On adopting the list of profiles and specialities in higher education" the programme of higher education includes two Bachelor degrees – academic and applied. The difference between them consists in different forms of professional activity. The Bachelor curriculum is designed depending on the types of learning activities and requirements for the curriculum outcomes. The curriculum of academic Bachelor degree is focused on research activity, whereas applied Bachelor curriculum is aimed at practice-oriented professional activity. Besides, when designing Bachelor curriculum the new standard implies the extension of graduates' competencies due to the curriculum focus on particular spheres of knowledge and activity. HPE FSES 3 provides the development of all 44 competencies: 13 cross-cultural and 31 professional), without an extension of competence list. In addition, it is necessary to note that HPE FSES 3 include the following list of compulsory disciplines as a basic part of the Bachelor curriculum: history, philosophy, foreign language, health and safety with specification of hours and content, whereas HE FSES 3+ do not provide the number of hours, content, order of delivery for the subjects listed above, as

these parameters are defined by an institution independently. Moreover, the institution has the right to establish the subjects of the basic part in terms of the HE FSES requirements.

Hence, we present the comparative table 1 of HPE FSES and HE FSES for the profile "Nuclear Physics and Technologies", Bachelor degree.

As for foreign language course, one can highlight the shift from abilities of mastering

foreign language in professional sphere towards communicative competencies.

Thus, according to HPE FSES 3 for Bachelor degree: 050100 Pedagogical education (Physics and information) and 011800 Radiophysics a graduate is to have the following competencies [4, 5]

- ability to master foreign language sufficient to read and understand foreign literature in speciality (CC-13);

Table 1.

Standard component	FSES 3	FSES 3+
Form of study	2: full time, evening classes	3: full time, evening-classes, extramural
Time of study, hours	Full time: 4 years, 240 h. At in-person-remote classes the study period increases 1 year	Full time: 4 years, 240 h. At in-person-remote and remote classes the study period increases not less than 6 months, but not more than 1 year
Types of professional activities	1. Research. 2. Project. 3. Production. 4. Management	1. Research. 2. Project. 3. Management. 4. Installation-setup
Differentiation of Bachelor qualifications	–	Academic and applied Bachelor degrees
The number of competencies	In total: 44 Cross-cultural – 13 Professional – 31	In total: 23 Cross-cultural – 9 General professional – 2 Professional – 12
Extension of competencies list	–	An educational institution has the right to extend the number of competencies
Educational technologies	–	E-learning, distant education, network of educational programmes
Structure of Bachelor curriculum	Basic part of the curriculum contains a particular list of subjects with specification of hours, content, and delivery order	Basic part of the curriculum contains a list of subjects; the number of hours, content, and delivery order are defined by an institution

- ability to speak one of foreign languages at the level sufficient to obtain and assess information in the sphere of professional activity from the foreign sources (CC-10).

Whereas the current HE FSES 3+ of engineering profiles updated by the Orders of the RF Ministry for Education and Science of 12.03.2015 specify the following cross-cultural competencies:

- ability to communicate orally and in written form in Russian and foreign languages to solve interpersonal and cross-cultural interaction problems (CC-5);
- mastering foreign language at the level sufficient to communicate (CC-12) [6].

As is seen, the main purpose of the foreign language course in engineering universities is to master communicative competence in foreign language for solving communicative problems. Foreign language course at university is of communicative character. Based on the analysis of university education programme one can conclude that as a result of foreign language mastering education engineering programmes, development of cross-cultural competencies (ability to communicate orally and in written form in Russian and foreign languages to solve interpersonal and cross-cultural interaction problems (CC-5); and mastering foreign language at the level sufficient to communicate (CC-12)) was provided.

#### REFERENCES

1. Kontseptsiya modernizatsii rossiiskogo obrazovaniya na period do 2010 goda [Elektronnyi resurs] [The concept of modernization of the Russian education for the period up to 2010]. Innovatsii v obrazovanii: spetsializirovannyi obrazovatel'nyi portal [Innovations in education: specialized educational portal]. 2005–2017. URL: <http://sinncom.ru/content/reforma/index1.htm>, free. Tit. screen (accessed: 28.11.2017).
2. O predostavlenii materialov [Elektronnyi resurs] [On providing materials]. A letter from 06.07.2016 № AK-1872/05. Min-vo obrazovaniya i nauki RF [Ministry for education and science of the RF]. URL: <http://fgosvo.ru/files/files/fgosvo/AK-1872-05.pdf>, free. Tit. screen (accessed: 28.11.2017).
3. FGOS VPO po napravleniyu podgotovki 140302 Yadernye fizika i tekhnologii (uroven' bakalavriat) [Elektronnyi resurs] [HPE FSES in the field of training 140302 Nuclear physics and technology (Bachelor degree)]. URL: [http://fgosvo.ru/uploadfiles/ProjectsFGOSVO/BAK/140302\\_B.pdf](http://fgosvo.ru/uploadfiles/ProjectsFGOSVO/BAK/140302_B.pdf), free. Tit. screen (accessed: 28.11.2017).
4. FGOS VPO po napravleniyu podgotovki 050100 Pedagogicheskoe obrazovanie (kvalifikatsiya (stepen') «bakalavr») [Elektronnyi resurs] [HPE FSES in the profile 050100 Pedagogical education (Bachelor degree)]. URL: <http://fgosvo.ru/uploadfiles/fgos/5/20111207163943.pdf>, free. Tit. screen (accessed: 28.11.2017).
5. FGOS VPO po napravleniyu podgotovki 011800 Radiofizika (kvalifikatsiya (stepen') «bakalavr») [Elektronnyi resurs] [HPE FSES in the profile 011800 radio Physics (Bachelor degree)] (Order of the Ministry for Education and Science of the RF of 31.05.2011 № 1975): appr. by the Order of the Ministry for Education and Science of the RF of 18 January 2010 № 51. URL: <http://fgosvo.ru/uploadfiles/fgos/28/20111115114254.pdf>, free. Tit. screen (accessed: 28.11.2017).
6. FGOS VPO po napravleniyu podgotovki 11.03.04 Elektronika i nanoelektronika (uroven' bakalavriata) [Elektronnyi resurs] [HPE FSES in the profile 11.03.04E and nanoelectronics (Bachelor degree)]: appr. by the Order of the Ministry for Education and Science of the RF of 12 March 2015 № 218. URL: <http://fgosvo.ru/uploadfiles/fgosvob/110304.pdf>, free. Tit. screen (accessed: 28.11.2017).

UDC 377.5

## Pedagogical Conditions for Research-Technical Creative Activity in Technology Training

M.K. Romanchenko<sup>1</sup>

<sup>1</sup>Novosibirsk Industrial-Power-Engineering College, Novosibirsk, Russia

Received: 11.08.2017 / Accepted: 12.12.2017 / Published online: 31.12.2017

#### Abstract

The article is concerned with the study in the issue of development teachers' creative potentials engaged in students' technology training.

Having analyzed the practice of research-technical creative work, the author shows the dynamics of students' achievements from the fifth to the eleventh form, observes the changes in general awareness of process technology and understanding the essence of these processes and their perspective improvement.

The work defines pedagogical conditions for research-technical creative activity in technology training consisting in the idea of students' special attitude towards labour, development of profile skills and features, such as: civil liability, patriotism, and need for labour activity. The principle aim of this development is to involve students in labour activity based on their in-born individual abilities, to teach them to apply modern scientific achievements.

Studying the dynamics of transforming a student's cognitive interest and the results of research in the sphere of pedagogy, the author justifies a number of concepts stated in the article to provide efficient technology training.

**Key words:** research-technical creative work; pedagogical conditions; technology training; conditions of creative activity organization.

The basic professional quality of a teacher is considered to be his/her potential ability to participate in teaching research-technical creativity within the framework of technology training. Creative pedagogical activity implies creativity, which is a result of a teacher's personal creative work and his/her creative abilities.

The distinguishing feature of research-technical activity is an effective result. An object of teaching creative activity is a student. The potential teaching creative abilities include not only development of its structural elements, but also establishing potential interactions between the creative elements, identifying uniform factors.

If targeted at qualified specialists' training, the institutions of higher vocational training

are required to find the leverage influencing the formation of students' motivation for creative activity.

The classes delivered at the teachers upgrading course do not reveal the formation of interaction among the creative elements or, if so, it is performed inefficiently. The teaching creative experience does not focus teachers' attention on development of creative search skills.

The issues of creative activity organization do not consider the urgent necessity of a teacher's involvement. The lack of some teachers' understanding the essence of teaching the bases of creative activity results in inconsistency between the expected results and existing expectation of society related to the issues of training



M.K. Romanchenko