

TEMPUS project

HUMAN Security (environment, quality of food, public health and society) on Territories Contaminated by Radioactive Agents

Concept of Interdisciplinary Training (CIT) for Master and PhD students in Human Security

1. GENERALITY

1.1. The aim

CIT will deliver the approach to develop and introduce EU modern methods of Master and PhD students' training in the field of human security (HS) including environment, quality of food, public health and society for territories of Byelorussia, Russia and Ukraine contaminated by radioactive agents.

1.2.The outcome

CIT will provide:

- the general approach to develop and introduce EU modern methods of Master and PhD students' training in the field of human security including environment, quality of food, public health and society
- specific approaches to develop and introduce EU modern methods of Master and PhD students' training in the areas :
 - HS and Society
 - HS and Environment
 - Quality of Food for HS
 - Public Health for HS.

1.3.The contributors

The CIT is developed by the project WG1 consisted of the PC partners representatives listed in the Table 1:

Table 1.**WG1 PC representatives of the partners**

Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Email address of the Partner representative	Skype nick
P6	VSU	Prof. Semen Kurolap	skurolap@mail.ru	skurolap
P7	CSU	Prof. Sergey Likhachev	likhashev@mail.ru	likhashev
P8	T SMA	Prof. Eduard Kashuba	tgma@tyumsma.ru	tempus_tgma
	T SMA	Prof. Ludmila Suplotova	pro-rector@tyumsma.ru	tempus_tgma
P9	UrFU	Prof. Valeriy Mikhaylenko	valermik@gmail.com	valermik946
P11	SNUNEI	Prof. Yulya Omelchuk	julja.omelchuk@rambler.ru	yulya19720915
P12	ZSTU	Zoia Shelest	szm1960@i.ua	
P13	VNMU	Doc. Ruslana Kharkovenko	ruslanatrk@ukr.net	Ruslanatrk
P14	KIU	Prof. Boris Samotokin	samotokin@ukr.net	borysam1
P16	ISEU	Ass. Prof. Aleh Rodzkin	aleh.rodzkin@rambler.ru	aleh.rodzkin
P17	GSAU	Candidate of Agricultural Sciences Pavel Baradzin	inter.ggau@yandex.ru	ggau_grodno
P18	GSMU	Assistant Yauhenii Maisiayonak	remar@tut.by	remar-by
P19	BSU	Ass. Prof. Albert Zhloba	albert.zhloba@gmail.com	albert.zhloba1

The representatives of the partners joined WG1 for discussions and contributions are listed in the Table 2.

Table 2.

Representatives of the partners joined WG1

Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Emil address of the Partner representative	Skype nick
P2	UNIPR	Prof. Elena Maestri	elena.maestri@unipr.it	maestrie
P3	SLU	Ass.Prof. Klas Rosén	Klas.Rosen@slu.se	klas.rosen.slu
P4	UNIFI	Prof. Franco Milano	franco.milano@unifi.it	franco-fi

1.4. Management

The representative of the partner P5 has been arranged of the WG1 leader:

Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Emil address of the Partner representative	Skype nick
P5	RTU	Prof. Yuri Dekhtyar	dekhtyar@latnet.lv	yuridek

The main idea of CIT has been delivered at the Cordoba's meeting, 2012. Next, CIT has been prepared in three drafts.

The first one has provided the general approach to reach the main idea of CIT (February-March, 2013).

The second draft has been directed to develop specific approaches, the Internet meetings and discussions were provided (March, April, 2013).

The draft focused the approaches in the areas:

- HS and Society
- HS and Environment
- Quality of Food for HS
- Public Health for HS.

To reach the above the members of the WG1 were be collected in the teams, each of them delivered the approach in accordance with the specific expertise. The specific approaches and composition of the corresponding teams are listed in Table 3.

The third draft finalized CIT and has been resulted due to partial discussions by the partners during their skill improvement mobilities at the EU universities (May 2013).

Table 3.

The specific approaches and WG1 teams compositions

Specific approach in the direction	Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Emil address of the Partner representative	Skype nick
HS and Society	P7	CSU	Prof. Sergey Likhachev	likhashev@mail.ru	likhashev
			Prof. Irina Getmanec	igetmanec@mail.ru	
			Dr. Dmitriy Haritonov		
			Dr. Sergey Sosnenko	Sosnenko@front.ru	tehnogen1
	P9	UrFU	Prof. Valeriy Mikhaylenko; leader of the group	valermik@gmail.com	valermik946
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			As. Prof. Igor Krsasvin	krasavin.i@gmail.com	somebuddy9
			As. Prof. Dmitry Pobedash	pobedash@mail.ru	d.pobedash
			As. Prof. Ekaterina Mikhaylenko	ekamikhaylenko@gmail.com	ekamikh
	P14	KIU	Prof. Borys Samotokin	samotokin@ukr.net	borysam1
			Prof. Olexandr Pylypenko		
	P19	BSU	Prof. Sergey Balashenko	balashenko@bsu.by	
			Ass. Prof. Albert Zhloba; group leader assistant	albert.zhloba@gmail.com	albert.zhloba1
	HS and Environment	P2	UNIPR	Prof Elena Maestri; leader of the group	elena.maestri@unipr.it
P6		VSU	Prof. Semen Kurolap	skurolap@mail.ru	skurolap

Specific approach in the direction	Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Emil address of the Partner representative	Skype nick
	P11	SNUNEI	Prof. Yulya Omelchuk	julja.omelchuk@rambler.ru	yulya19720915
			Teacher Frolova Mariia; group leader assistant	frolova-85@mail.ru	frolova.85@mail.ru
	P16	ISEU	Prof. Sergej Golovatij	ssience@rambler.ru	
			Ass.Prof. Aleh Rodzkin	aleh.rodzkin@rambler.ru	aleh.rodzkin
Quality of Food for HS	P2	UNIPR	Prof. Elena Maestri	elena.maestri@unipr.it	maestrie
	P3	SLU	Ass.Prof. Klas Rosén; group leader assistant	Klas.Rosen@slu.se	klas.rosen.slu
			Mykhailo.Vinichuk	Mykhailo.Vinichuk@slu.se	mykhailo411
	P7	CSU	Prof. Boris Krasutsky	boris_k.63@mail.ru	
			Dr. Sergey Ovchinnikov	ovch@me.com	
			Prof. Irina Getmanec	igetmanec@mail.ru	
			Dr. Tatjana Maltceva	oberemok2006@mail.ru	
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			Maria Schimanskaja	olsa-bel@yandex.ru	
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			Volodymyr Krasnov	krasnov_vp@mail.ru	
			Ass.Prof. Davidova Iryna	ztu.eco@rambler.ru	
	P17	GSAU	Svetlana Mazurek	inter.ggau@yandex.ru	ggau_grodno
Asoc. Prof. Pavel Borodin; group leader			inter@ggau.by		
Public Health for HS	P4	UNIFI	Prof. Franco Milano; group leader	franco.milano@unifi.it	

Specific approach in the direction	Partner ID in the project	Partner abbreviation	Title, first name and family name of the Partner representative	Emil address of the Partner representative	Skype nick
	P8	TSMA	Doctor of Med.Sci. Ass. Prof. Evgeniy Zhilyakov	evnaso@yandex.ru	tempus_tgma
			Prof. Ludmila Suplotova, Doctor of Med. Scie.	pro-rector@tyumsma.ru	
			Marina Banzarakcaeva	marinabanz@mail.ru	
			Cand.of Med.Sci. Vladimir Yelishhev; group leader assistance	elishhev-vladimir@yandex.ru	
			Cand.of Med.Sci. Anna Beltikova	anna_beltikova@mail.ru	
	P13	VNMU	Doc. Ruslana Kharkovenko	ruslanatr@ukr.net	Ruslanatr
	P18	GSMU	Assistant Yauhenii Maisiayonak	remar@tut.by	remar-by
			Ass. Prof. Ihar Naumau	kge_grgm@mail.ru	

The CIT is planned for discussions to be approved by the PC Universities (located in Byelorussia, Russia and Ukraine) and coordinated with the PC Ministries of Education during 7-12 p.m., however before 2013, September 15.

After the CIT is approved it is planned to publish in the Brochure and presented at the 2-nd Conference of the (PWT) in November 2013.

The Brochure "Concept of Interdisciplinary Training" should be published in English and national languages of PC participants. P9, P14, P16 will be accordingly responsible for publishing of the Brochure.

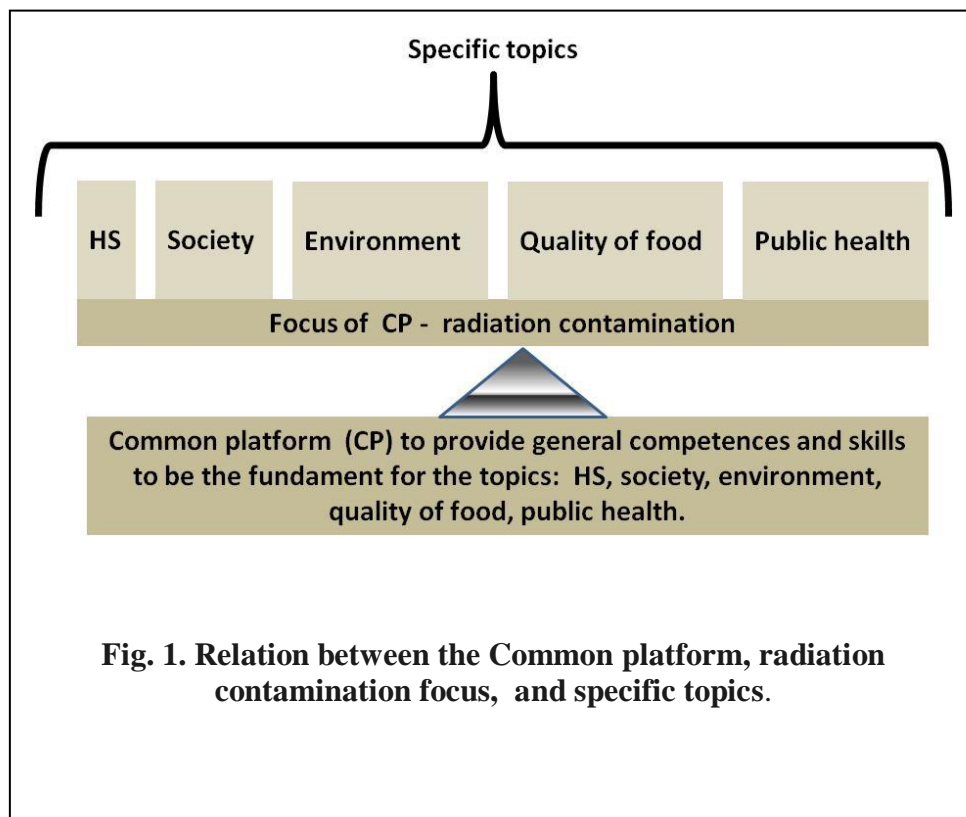
2. CONCEPT OF INTERDISCIPLINARY TRAINING

2.1. CIT general approach

The competences and skills targeted to HS, society, environment, quality of food and public health should be focused to the problems of the radiation contaminated territories. The specific fundamental competences in the single disciplines have also to be considered. For instance, after the fundamentals of the single discipline are delivered, particular attention and efforts will focus practical applications to employ all competencies related to contaminated territories and a risk of population. Therefore, the above topics of education have to preferably have a common platform (CP) of education that will provide scientific achievements based general competences and skills targeted to the specific wide range applications in contaminated area. The competences and skills in the specific topics will be delivered on the base of the platform (Fig. 1).

So, the education could consist of two levels:

- fundamental topics of the CP (Level I)
- specific topics (Level II).



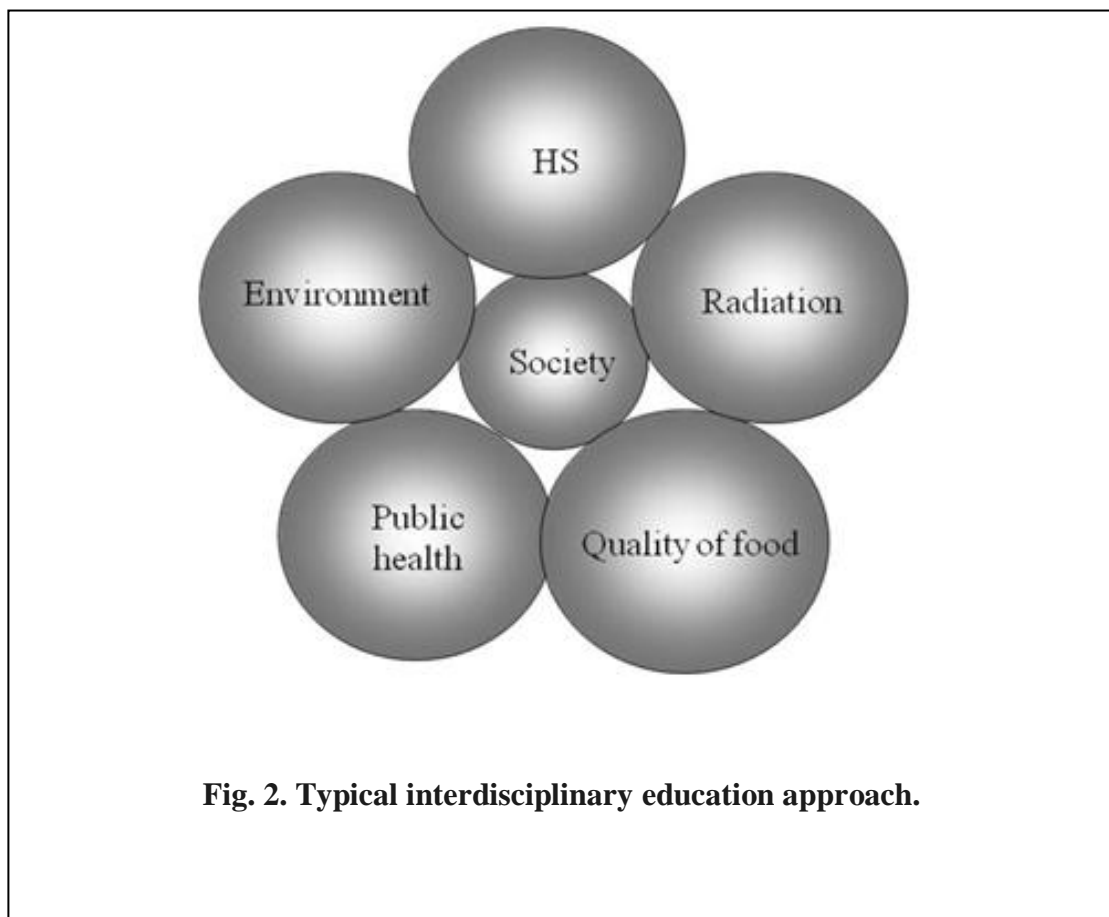
The two level structure could be provided for the trainees, too. The trainees could acquire the fundamental basic knowledge first and apply it to practical cases, as the second.

The CP is aimed to provide general competences and skills that should be multifaceted to the radiation contamination.

The CP will deliver general competences and skills in:

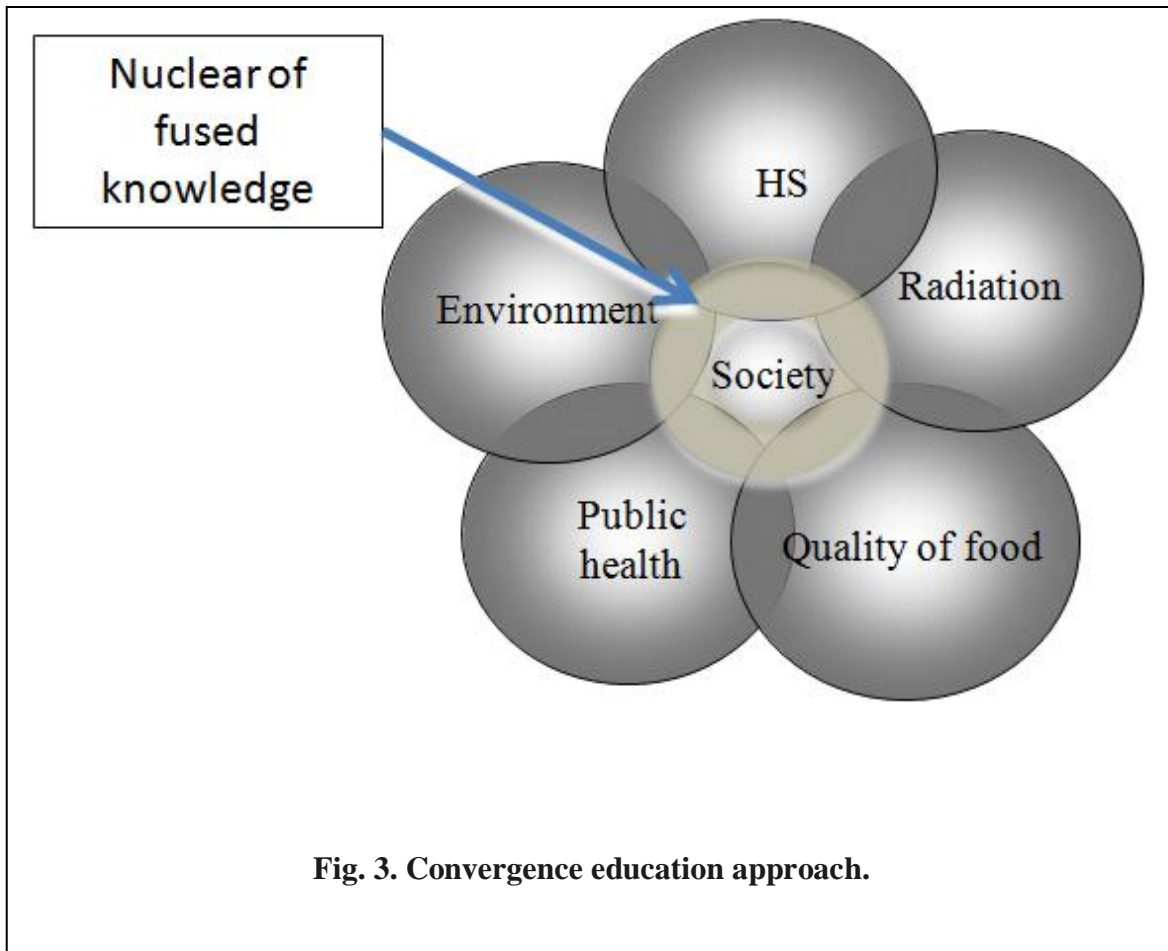
- HS,
- society,
- environment,
- quality of food,
- public health,
- radiation,
- statistics.

To reach this the education that employs interacting topics should be provided alongside with training. Typically an interdisciplinary approach is in use, when education supplies competences because of teaching the areas that have joint boundaries (Fig. 2).



Such the approach does not multiface the areas of knowledge. They are touching each other and interfere minimally. The areas do not penetrate to each other. In this case the education does not promote significant fusion of knowledge.

The alternative advanced novel approach is based on the knowledge convergence of sciences education [Identification of New and Emerging Trends Using Advanced Science Convergence Based Curriculum. A. Vaseashta, E. Braman, Yu. Dekhtyar, P. Susmann, J. Giordano. Material Research Spring meeting, USA, 2011., SS1.4.]. In this case the areas are overlapped and the knowledge easily penetrate among the fields. In addition the novel knowledge development nuclear is fused because of the merged areas (Fig. 3).



The topics of the fused knowledge could be created on a base of the formula:

$$[X_A]A[Y_A] + [X_B]B[Y_B] = [X_{AB}]AB[Y_{AB}] ,$$

A, B – roots of the words indentifying essences of topics to fuse the new one,
 AB – root of the word indentifying the essence of the fused topic,

$[X_A], [X_B], [X_{AB}]$ - prefixes of the words identifying topics to fuse the new one and the fused topic, correspondingly,

$[Y_A], [Y_B], [Y_{AB}]$ - suffixes of the words identifying topics to fuse the new one and the fused topic, correspondingly.

For instance the topics to fuse the new one are “ecology” and “biology”:

$[X_A] = [Y_A] = [X_B] = [Y_B] = 0; A = eco, B = bio, AB = ecobio.$

The fused topic is “ecobiology”.

The convergence of sciences education (CSE) approach has been selected to reach CIT.

2.1.1. The topics for CP

The fused topics derived on the base of CSE and offered for the CP are listed in Table 4.

Table 4.

The topics of CP

Topic
Fundamentals of ionizing radiation
Fundamentals of radioactivity (general knowledge of nuclear and atoms; radioactivity, types of radiation; the radioactive decay law; half-life time; activity, valuation procedure for radioactive contamination)
Detection and dosimetry of ionizing radiations
Fundamentals of statistics
Fundamentals of radiaccontamination
Human and society in contaminated area
Environment and contaminated environment
Radiation and quality of food
Fundamentals of radiation and public health -- evaluation and control of risks

2.1.2. Skill improvement

To develop the topics in the Table 4 the teaching staff and trainers are recommended to improve the skill to bring it in accordance with CSE.

2.1.3. Modularization

The CIT specific approach has to design education/training in order to provide modularized education. The modules are recommended to be available for selection by the student in

dependence on the interests. The modules are preferable to be delivered in the short intensive course manner.

2.2. CIT specific approaches /modules

2.2.1. HS and Society

Objective

The module refers to the cross-disciplinary studies of radiation influenced human security at the contaminated territories as well as the role of the society to build human-directed security policy. The module prepares students to identify, develop and implement effective activities that respond environmental challenges at radiation contaminated territories. The module focuses both the national and international contexts.

Tasks:

- to educate students for decision-making at international institutions, national governmental structures and business.
- to offers convergence disciplinary curricula for both theoretical and environmental studies. This will promote students' ability to integrate theory and practice for systematic analysis, and management of key radiation stipulated environmental problems.

Structure

The module consists of the submodules:

- Society and Human Security in Radioactive Areas;
- Chernobyl Disaster: Social and Psychological Problems;
- Human Rights at the Contaminated Territories.

The submodules will deliver integrated approaches towards theoretical understanding of the human security from the radiology point of view, radiation catastrophe in human psychology and

Recommended topics:

Submodule	Topic	ECTS credit points
Society and Human Security in Radioactive Areas	Theoretical fundamentals on the Human Radioactive Security	3
	Radioactive catastrophe and Human Security historical and social issues	3
Chernobyl Disaster: Social and Psychological Problems	Chernobyl Disaster: socio-psychological effects	3
	Ranking of the radiation contaminated territories and rescue activities inspired by the radiation hazardous.	3
Human Rights at the Contaminated Territories	The legal status of the radiation contaminated territories	3
	Radio-Security and human rights	3
TOTAL		18

2.2.2. HS and Environment

Objective

The module will focus education and skill on radionuclides and their migration.

Tasks

- to deliver general approach to the radiation resistance of the human organism
- to provided analytics and instrumentation.

Recommended topics

- Radioisotopical environment, natural and anthropic origin, including air, soil, waters
- Migration of radioisotopes in the environment: microorganisms, plants, animals, humans; bioaccumulation
- Fundamentals on the radiation influence on living organisms at the level of individuals and populations including toxic, genotoxic effects
- Mechanisms of the organisms resistance to radiation.
- Radioecological monitoring: technical tools, techniques, radiomeasurements, geoanalytical support.
- Analysis, assessment, management, prognosis, of radioecological risks and methods of protection in emergencies
- Fundamentals on decontamination of substrates

- Legal aspects of radiocontamination, study of national and international regulations

The number of the credit points will be discussed further by corresponding WG that will focus the development of the courses.

2.2.3. Quality of Food for HS

Objective

Improving the knowledge, skills and professional competences to get ecologically safe products on the territories contaminated by radioactive agents.

Tasks

- A. optimization of nature use on contaminated territories
- B. countermeasures to prevent and reduce contamination of agriculture, fishery and forestry products
- C. technological processing of products contaminated with radionuclides

Recommended topics

Task A.

- investigation of radiation situation on agricultural territories, in forests and water bodies for further prognostication of radiation pollution levels in food;
- prediction of radiation situation on agricultural territories, in forests and water bodies; rehabilitation processes on the territories contaminated by radionuclides; factors that determine these processes and measures for their intensification;
- specification of the role of different food products in the complex assessment of body radiation burden;
- ecological and economical validation of countermeasures for reduction of radiation contamination in forestry and fishery food products;
- the system of measures to reduce the intensity of radionuclides' income into food products.

Task B.

- investigation of radionuclides migration in man-made ecosystems for further development of measures on reduction of radionuclides uptake in agricultural production, forestry and fishery food products;
- the efficiency of countermeasures that are directed on the intensity reduction of radionuclides' penetration into food products;
- standardization of the food products use considering the legislation, normative documents and information as for the food products' radiation contamination;
- making decision on the further agricultural production and on the use of forestry and fishery food resources;
- the analysis of radiation situation on the territories polluted by radionuclides for making decisions on the changes in the field of an enterprise activity, in their separate directions or subdivisions.

Task C

- the techniques for determining the allowable radionuclides levels in food products;
- scientific validation of optimal technologies for agricultural, forestry and fishery food products processing;
- foods and radioprotectors that reduce contamination of a human body;
- the use of mathematical model for radiation pollution levels prediction in agricultural, forestry and fishery products for determining the possible risks for a human.

2.2.4. Public Health for HS

Objective

The module will introduce up-to-date European approaches to train MSc and PhD students in the field of Public Health for Human Security, particularly in connection with possible nuclear accidents and the subsequent radiation contamination. The module will focus the education and skill on radioactive contaminants, their migration in the environment and their presence in the alimentary chain in order to prevent or reduce the internal contamination of population

Tasks:

- to improve the theoretical knowledge and the practical skill to protect population from radioactive shock hazard
- to improve the theoretical knowledge and the practical skill to for an efficient management in public health for human security in cases of natural and man-made radiation related emergency situations.

Structure:

- general basic topics
- specific topics

Recommended topics

The general topics:

1. Physics of ionizing radiation
2. Dosimetry
3. Radiobiology
4. Radioprotection
5. Statistics for public health

The specific topics:

Principles of public health	Health and disease: definition of health, etiologic agents and risk factors, natural history of the disease.
	Determinants of health: modifiable and non-modifiable determinants, proximal and distal determinants.
	Public health: definition and aims.
	Health promotion: the interventions aimed at improving the quality of life and the health status of each single person and of the communities as a whole.
	The evolution of health systems: Beveridge and Bismarck models, Declaration of Alma-Ata and definition of Primary Health Care.
Radiation inspired prevention of health and its promotion.	<p>Prevention:</p> <ul style="list-style-type: none"> • primary prevention: the removal of risk factors from the impact towards the population. • secondary prevention: the sum of the interventions aimed at lowering the incidence of diseases, acting in the so-called latency period. Population screening.
Epidemiology	<p>Basic concept</p> <ul style="list-style-type: none"> • Causation and causal inference: casualty, strength of effect, causal criteria. • Measures of occurrence: absolute counts, proportions, ratios and rates. Indicators of population health. • Measures of effect and measures of association: risk measures, confounders. • Data sources
	<p>Epidemiologic studies:</p> <ul style="list-style-type: none"> • Experimental studies: clinical trials, field trials, community intervention and cluster randomized trials • Non-experimental (observational) studies: <ul style="list-style-type: none"> ✓ Descriptive studies ✓ Analytical studies: cross-sectional, cohort, case-control, ecological ✓ Evaluative Epidemiology: evaluation of screening interventions • Strategies to improve validity, precision and accuracy in epidemiological studies. • Environmental epidemiology
Radiation contamination inspired risk analysis of health.	<p>Principles of risk analysis</p> <p>Risk assessment: hazard identification, dose-response assessment, exposure assessment, risk characterization.</p> <p>Risk management.</p> <p>Risk perception and communication.</p>

The CIT text has been consolidated by Yuri Dekhtyar.

2013.30 May.