DOCTORAL SCHOOL OF MILITARY ENGINEERING

PROGRAMS OF SUBJECTS

(only for training in English language)

- 2015 -

Title of the course: Basics and knowledge in military technology	**Code: HKDID0001**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training)**:** Lecture 20/6 hours Seminar: - Consultation: -

Knowledge assessment (exam/academic grade/ other): midterm evaluation (CE)

The course place in the curricula (in which semester): 1. semester

Pre-subject requirements *(if any)*: none

Course description: Information and data on Doctoral School of Military Engineering of National University of Public Service (NUPS) based on NUPS and Hungarian Doctoral Council website. Research & development (R&D) in military technology, methodology and NATO aspects. Life cycle of military equipment. Actors and their functions in R&D activities. Quality assurance. Hungarian defense industrial base. Regulations. Military and military-technological databases. Case study: ÁRPÁD artillery fire control system.
Basics of multicriteria decision making (MCDM). Models of decision making. Analysis of main methodologies (PROMETHEE, *Analytic Hierarchy Process*, etc.). Comparison of military equipment using MCDM models. Case studies. Presentation of scientific findings achieved in PhD thesis related to this research topic.
Introduction to the GEPÁRD sniper rifle family. Basic ideas, development activities, field trials. Revelation of need for powerful sniper rifles, analysis of domestic possibilities. Accuracy, efficiency, capacity, and their technological implementation. Technological solutions adopted to reduce impact of reaction of high-performance shot. Reception and reputation of GEPÁRD rifle family in the international military-technological literature (eg. Jane's). Presentation of scientific findings achieved in PhD thesis related to this research topic.
History of Hungarian military technological development with special focus on the role of the Military Technical Institute. Framework, structure and organization of military technological research and development. It's role and operation in system of national defense. Presentation and interconnection between science and defense industry. Significant domestic defense technology development results and introduction of their project managers. Presentation of scientific findings achieved in PhD thesis related to this research topic.

Educational goal of subject - Competencies:
PhD students have to be acquainted with basics of military technology including details, milestones, processes and related areas. Students are supposed to acquire solid knowledge on methodologies, rules, regulations, specific data and information on armaments and research methods in this specific topic.

Required readings:

1. NATO Logistics Handbook http://www.nato.int/docu/logi-en/logist97.htm
2. Gyarmati József, Felházi Sándor, Kende György: Choosing the Optimal Mortar for an Infantry Battalion's Mortar Battery with Analytic Hierarchy Process using Multivariate Statistics. Brussels, Royal Military Academy, October 22-23. 2009. Conference organizer: NATO Research and Technology Organisation. Conference on Decision Support Methodologies for Acquisition of Military Equipment. ISBN 978-92-837-0101-9. Originator's Reference: RTO-MP-SAS-080 AC/323(SAS-080)TP/298. http://www.cso.nato.int/abstracts.aspx
3. Gyarmati József, Dr. Kende György, Rózsás Tamás, Dr. Turcsányi Károly: The

Hungarian field artillery fire control system ARPAD and its comparison with other systems. AARMS (Academic and Applied Research in Military Science), 2002. Volume 1 Issue 1. 9-38.pp. http://www.zmne.hu/aarms/index.htm
4. Földi Ferenc: Gepárd heavy rifle family. Haditechnika 1997 C+D Special Issue pp. 90-96. HU ISSN 0230-6891

Recommended readings:

1. Haditechnika 1997 C+D Special Issue pp. 58-112. HU ISSN 0230-6891

Recommended websites:

1. Defense Industry Association of Hungary: http://www.vedelmiipar.hu/?module=showpage&site=welcome&group=&menupath=&product=&lang=eng#
2. NATO Standardization Agreements: http://www.nato.int/docu/standard.htm
3. The NATO Science & Technology Organisation homepage: https://www.cso.nato.int/Main.asp?topic=22

Responsible for course (name, position, degree): Prof. dr. György Kende, professor, DSc

Other teachers (name, position, degree): Prof. dr. Zsolt Haig, professor, PhD; Dr. habil. József Gyarmati, associate professor, PhD; Dr. Ferenc Hajdú, assistant professor, PhD

Title of the course: Disaster Management, Environment Safety	**Code: HKDID0002**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lessons 20/6

Knowledge assessment (exam/academic grade): Midterm evaluation (CE)

The course place in the curricula (in which semester): 1. semester

Pre-subject requirements *(if any)*: none

Course description:
Within the framework of the subject the PhD student become acquainted with the academic basic knowledge of disaster management, the legal regulation and institution system of the Hungarian disaster management, the role of the MoD in disaster management, the relevant knowledge of chemical safety, nuclear safety, industrial safety and environment safety.

Competences:
High level academic knowledge in the field of disaster management and environment safety, implementation of organisational, managerial, scientific tasks related to the relevant field of science.

Required readings:

1. Fairman; Mead; Williems: Environmental Risk Assessment. Monitoring and Assessment Research Centre, King's College London; ISBN 92-9167-080-4
2. Földi László, Padányi József (szerk.): Effects of climate change on security and application of military force. Budapest: NKE, 2014. 270 p. (ISBN:978-615-5305-25-2)
3. Lucas Grégory, Halász László, Solymosi József : Exploring the Capacities of Airborne Technology for The Disaster Assessment, HADMÉRNÖK VIII: (3.): pp. 74-91.
4. Endrődi István: European cooperation forum of civilian protection organizations. In: Robert Zupan, Ana Kuvezdic Divjak. 3 rd International Conference Crisis Management Days. Konferencia helye, ideje: Velika Gorica, Horvátország, 2010.05.27-2010.05.28. Velika Gorica: University of Applied Sciences, 2010. pp. 718-735. (ISBN:978-953-7716-07-3)
5. Kátai-Urbán Lajos: Handbook for the Implementation of the Basic Tasks of the Hungarian Regulation on „Industrial Safety" Budapest: Nemzeti Közszolgálati Egyetem, 2014. 73 p. (ISBN 978-615-5491-70-2)
6. Restás, Á.: An Approach for Measuring the Economical Efficiency of Aerial Fire Fighting Wildfire2011: The 5th International Wildland Fire Conference: Sun City, South Africa, 09-13.05.2011.

Recommended readings:

1. Insarag preparedness and response. INSARAG Guidelines. URL.: http://www.insarag.org/en/methodology/guidelines.html (Downloaded: 2015.05.15.
2. Assigned sections of Act No. CXXVIII of 2011 concerning disaster management and amending certain related acts. Low in effect of Firefighting and Disaster management (BM OKF)
3. Special legislation: Government Decree No. 234 of 2011 (XI. 10.) of the Government, Ministry of Interior Decrees 62/2011 (XII. 29.) and 39/2011.

Responsible for course (name, position, scientific degree): Dr. Lajos Kátai-Urbán PhD, associate professor

Other teachers (name, position, scientific degree): Prof. dr. József Solymosi, professor emeritus DSc; Prof. dr. László Halász, professor emeritus, DSc; Dr. István Endrődi associate professor PhD; Dr. László Földi associate professor PhD; Dr. Árpád Muhoray associate professor PhD; Dr. Ágoston Restás, associate professor PhD

Title of the course: Protection of Critical Infrastructures	**Code: HKDID0003**	**Credits: 2**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 12/6 hours / Seminar: 6/2 hours / Consultation: 2/2		
Knowledge assessment (exam/academic grade): Midterm evaluation (CE)		
The course place in the curricula (in which semester): 1 semester		
Pre-subject requirements *(if any)*: none		
Course description: Infrastructures, information infrastructures, critical infrastructures and critical information infrastructures. Threats against infrastructures and information infrastructures. Cyberwarfare. Protection of critical infrastructure and critical information infrastructure. Information security. **Educational goal of subject - Competencies:** To give a general overview on the infrastructures, information infrastructures, critical infrastructures and critical information infrastructures.		
Required readings: 1. Lewis, G. Ted: Critical Infrastructure Protection in Homeland Security. Wiley, 2015. ISBN 978-1-118-81763-6 **Recommended readings:** 1. Green Paper on a European Programme for Critical Infrastructure Protection. Brussels, 17.11.2005. COM(2005) 576 final 2. László, Kovács: Possible methodology for protection of critical information infrastructures. in: Hadmérnök IV:(3) pp. 310-322. (2009)		
Responsible for course (name, position, scientific degree): Prof. dr. László Kovács, professor, PhD		
Other teachers (name, position, scientific degree): -		

Title of the course: Information operations	**Code: HKDID0004**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/2 hours / Consultation: 2/- hours

Knowledge assessment (exam/academic grade): midterm evaluation (CE)

The course place in the curricula (in which semester): 1 semester

Pre-subject requirements *(if any)*: none

Course description:
Development of information society. Features of information. Critical information infrastructures. *Information revolution* in *military* affairs. Information enviroment of military operations. Military information systems. Definition and interpretation of information superiority. Information-based warfare methodes. Definition, interpretation and elements of information operations. Main activities of information operations. Operation security. Military deception. Psychological operations. Electronic warfare. Computer network operations. Civil-military cooperations. Cyberwarfare in information operations. Critical information infrastructures protection. Complex information security.

Educational goal of subject - Competencies:
To give a general overview about the role of information and information superiority in the military operations, as well as make a basis of the information-based warfare methods focus on the information operations.

Required readings:

1. AJP-3.10 Allied Joint Doctrine for Information Operations. November, 2009 https://info.publicintelligence.net/NATO-IO.pdf
2. JP 3-13 Information Operations. 27. November, 2012 http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf
3. Zsolt, Haig: Connections between cyber warfare and information operations AARMS Vol. 8, No. 2 (2009) 329–337

Recommended readings:

1. Waltz, Edward: Information Warfare Principles and Operations, Artech House, 1998, ISBN 0-89006-511-X
2. Allen, Patric D.: Information operations planning, Artech House, 2007, ISBN 10: 1-58053-517-8
3. Toffler, Alvin: Third wave. Bantman, 1984, ISBN 0553246984

Responsible for course (name, position, scientific degree): Prof. dr. Zsolt Haig, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Theory and methodology of scientific research	**Code: HKDID0005**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 12/4 hours / Consultation: 8/2 hours

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 1. semester

Pre-subject requirements *(if any)*: none

Course description:
The concept system of the scientific research, the scientific cognition, introduction to the theory and practice of social science researches. Steps of professional and scientific research types from the idea to the published material, representative research strategies and tools. Online search and information processing. The institutional frames of EU and domestic researches, research ethics, the processing of professional literature from the Internet. The editing of scientific publications. Originality and plagiarism: the ethical requirements of the scientific activity. The evaluation, interpretation, publishing of the results of the personal researches. Analysis of the sources. The type of analyses. The peculiarities of military science researches. The evaluation aspects of analytic-nature researches.

Educational goal of subject - Competencies:
The aim of the subject is to form and develop the necessary skills in the students for the self-sufficient research work, and to get them acquainted the key elements of the research process. We urge the student to self-sufficient research during the course.

Required readings:

1. ECO, Umberto: How to write a thesis. Cambridge (MA): The MIT Press, 2015., ISBN 9780262527132
2. Thomas Kuhn: The Structure of Scientific Revolutions, The University of Chicago Press, 1996
3. Bousquet, Antoine: The Scientific Way of Warfare, Order and Chaos on the Battlefields of Modernity, Columbia University Press, 2009

Recommended readings:

1. Poincaré, Henri: The Value of Science, The Science Press, 1907
2. Popper, Karl: The Logic of Scientific Discovery, Routledge Classics, 2005
3. Poincaré, Henri: The Foundations of Science, The Science Press, 1921
4. Fuller, J. F. C.: The Foundations of the Science of War, Hutchinson and Co., A Military Classic Reprint, US. Army Command and General Staff Press, 1993
5. Henderson, G. F. R.: The Science of War, A Collection of Essays and Lectures 1881-1903, Longmans, Green and Co., 1912
6. Evola, Julius: The Metaphysics of War, Battle, Victory and Death in the World of Tradition, Arktos Media, 2011

Responsible for course (name, position, scientific degree): Prof. dr. József Solymosi, professor emeritus, DSc

Other teachers (name, position, scientific degree): Prof. dr. László Kovács, professor, PhD

Title of the course: Military Logistics	**Code: HKDID0006**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours

Knowledge assessment (exam/academic grade): midterm evaluation (CE)

The course place in the curricula (in which semester): 1st semester

Pre-subject requirements *(if any)*: none

Course description:
The primary objective is building avareness in the basics of Military Logistics that remains a specific segment of the wider term Logistics. As part of the course tudents will be aware of the subject, the concepts, the structure and methodologies of Military Logistics, as well as NATO principles, standards and standard procedures for the logistic support. This course also contain relevant information on the system of material supply and transportation support of the Hungarian Defence Force (HDF) and their use in the environment of multinational operation. It is also priority to demonstrate the historical milestones of the Military Logistics, and the developments of the technical and medical support of the troops, and the management of logistic procedures within the HDF.

Educational goal of subject - Competencies:
Students will be able to bound the key concepts and discrepancies of Civilian and Military Logistics and the related fields. They will also develop competencies to merge the specifics of these concepts to achieve objectives.

Required readings:

1. Allied Joint Logistic Doctrine AJP-4(A) NATO Standardization Agency. Brussels, 2003. 78 p.
2. Allied Joint Doctrine for Logistics AJP – 4(B) NATO Standardization Agency. Brussels, 2003. 107 p.
3. NATO Logistics Handbook, NATO Logistics Committee, Brussels, 2012. 242 p.
4. NATO MC - Military Committee (2003a): NATO MC 319/2, NATO Principles and Policies for Logistics.
5. Logistics in Support ofMultinational Operations. Joint Publication 4-08, Brussels, 2013. p. 122.

Recommended readings:

1. MC 326/2 NATO Principles and Policies of Medical Support
2. Cook A. Thomas: Managing Global Supply Chains. Auerbach Publications, New York, London, 2009.

Responsible for course (name, position, scientific degree): Dr. habil. Attila Horváth, CSc. associate professor

Other teachers (name, position, scientific degree):

Title of the course: Basics of military science	**Code: HKDID0007**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/2 hours / Consultation: 2/- hours

Knowledge assessment (exam/academic grade): midterm evaluation

The course place in the curricula (in which semester): 1 semester

Pre-subject requirements *(if any)*: none

Course description:
System of the science, the military science. Sources of military science. Hungarian military science. Basic concepts (military art). Types of arms, weapons, specialist troops (HDF). System of military operations. Typology of war. Development of the theory of military violence. War-cultures. Theory of insurgence. Consultation.

Educational goal of subject - Competencies:
To give a general knowledge of military science, and to establish the material of the professional subjects and the general literacy of military science. The student has to learn the place of the military science among the system of sciences. Get acquainted with military organizations, types of arms, weapons and specialist troops. Get acquainted with the system of military operations. The student has to be adept in the works reflecting the steps of the universal and domestic military science.

Required readings:

1. Clausewitz, Carl von: On War. New Jersey: Princeton University Pr., 1989, ISBN 0691018545
2. Liddell Hart, B.H.: Strategy: the indirect approach. London: Faber and Faber, 1967
3. Keegan, John: The face of battle. London: Penguin Books, 1978, ISBN 0140048979
4. Keegan, John: The mask of command. New York: Penguin Books, 1988, ISBN 0140114068
5. Baylis, John –Wirtz, James J. –Gray, Colin S. (ed.): Strategy in the Contemporary World

Recommended readings:

1. An Introduction to Strategic Studies. New York: Oxford Universitity Press, 2002.
2. Collins, John M.: Military strategy: principles, practices and historical perspectives. Washington, D.C.: Brassey's Inc., 2002., ISBN 1574884301

Responsible for course (name, position, scientific degree): Dr. Balázs Forgács lieutenant, university associate professor, PhD.

Other teachers (name, position, scientific degree): Prof. Dr. Klára Kecskeméthy professor, PhD

Title of the course: Classics of military science	**Code: HKDID0008**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/2 hours / Consultation: 2/- hours

Knowledge assessment (exam/academic grade): midterm evaluation

The course place in the curricula (in which semester): 1. semester

Pre-subject requirements *(if any)*: none

Course description:
The life and work of the classics of the military science, their most important works, and their effect on the universal development. The subject gives a summary from the ancient time up to the second world war, puts mainly the European and American classics in front, as well as the outstanding Hungarian military scientists.

Educational goal of subject - Competencies:
Giving a general knowledge of the classical authors of the foundation of military science and their works. The students should get to know the life and work of the most important, most well-known classics of military science, to realize the connection between the principles of the works of the foundation of military science and the principles operative today.

Required readings:

1. Sun Tzu: The art of war. Oxford, UK: Oxford University Press, 1971, ISBN 0195014766
2. Clausewitz, Carl von: On War. New Jersey: Princeton University Pr., 1989, ISBN 0691018545
3. Jomini, Baron de: The art of war. Westport: Greenwood Pr., [É. n.],
4. Liddell Hart, B.H.: Strategy: the indirect approach. London: Faber and Faber, 1967

Recommended readings:

1. Laqueur, Walter: The Guerrilla Reader. A Historical Anthology. Philadelphia: Temple University Press, 1977., ISBN 0877220956

Responsible for course (name, position, scientific degree): Prof. Dr. Tamás Csikány, professor, DSc

Other teachers (name, position, scientific degree): Prof. Dr. Zoltán Szenes, professor, PhD

Title of the course: New technical equipment to perform "FP" tasks and the principles and possibilities of applying them	**Code: HKDID1103**	**Credits: 6**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 30/10 hours / Practical lessons 30/10 hours

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): in the 4. semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: This course is based on the common consolidated mods exam of subjects of two PhD schools (The Basics of Scientific Work and the Military Technical Knowledge I.) and on the common exam subject of the Military Engineering PhD School (the Military Technical Knowledge II.).

Course description:
Our goal is to familiarize the new equipment and their new practices of the Force Protection to the PhD students. In the course of it, we present the novel, the enhancing of survivability's regulations, their technical equipment, its grouping and principles of these.
The course covers the planning, organizing and implementing of FP tasks, both in war and non-war operations as well. The course details the theoretical and practical aspects of the development, upgrading of FP tasks too.
Educational goal of subject - Competencies:
During the course the PhD students could obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:
1. STANAG 2394 Engr (Ed2) Land Force Combat Engineer Doctrine
2. Joint Forward Operations Base (JFOB) Force Protection Handbook. A publication of the Joint Staff J3 DeputyDirectorateforAntiterrorism/HomelandDefenseAntiterrorism/ForceProtectionDivision. Second printing 2006.
3. Joint Contingency Operations Base (JCOB) Force Protection Handbook (GTA 90-01-010). A publication of the Joint Staff J3 DeputyDirectorateforAntiterrorism/HomelandDefenseAntiterrorism/ForceProtectionDivision. October 2007.

Recommended readings:
1. "Force Protection key to Army XXI plan" – http://www.dtic.mil/armylink/news
2. Force Protection: antiterrorism, 1997. US Army Training and Doctrine Command-http://ftp.fas.org/irp/doddir/army
3. USFK 525-13: USFK Force Protection Program

Responsible for course (name, position, scientific degree): Dr. Tibor Kovács, honoured professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Blasting tasks and techniques	**Code: HKDID1211**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
The course of blast. General characteristics of explosives. Military and civilian explosives. Ignition of explosives. Shaped charges. Military blasting tasks and techniques. Planning, organizing and executing blasting tasks.

Educational goal of subject - Competencies:
To give a general overview about the different blasting equipment and technologies. PhD students may obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:

1. STANAG 2394 Engr (Ed2) Land Force Combat Engineer Doctrine (2011)
2. VALTERS, William: A Brief History of Shaped Charges, 24th International Symposium on Ballistics, vol. 1, pp. 3–10, New Orleans, LA, 22–26 September 2008.
3. TM 9-1300-214 Military explosives technical Manual, Headquarters, Department of the Army, Washington DC, USA, 1984.
4. KÖHLER, J. – MEYER, R.: Explosives – Fourth, revised and extended edition, VCH Verlagsgesellschaft mbH, Wenheim, Federal Republic of Germany, 1993.

Recommended readings:

1. Flood- and ice-prevention with explosives. Bolyai Szemle Különszám: Symposium Proceedings "Defence Technology VIIth International Symposium" CD-ROM. Zrínyi Miklós Nemzetvédelmi Egyetem Bolyai János Katonai Műszaki Főiskolai Kar, pp. 1-8.
2. Using explosives and landmines for coutermobility tasks. Proceedings of the International Conference on Military Technologies 2009., University of Defense, Brno, 2009. pp. 149-159. (ISBN:978-80-7231-649-6)
3. HARBER David: THE ANARCHIST ARSENAL, Improvised Incendiary and Explosives Techniques; Paladin Press Boulder, Colorado 1990. ISBN 0-87364-580-4; p. 112.

Responsible for course (name, position, scientific degree): Dr. Zoltán Kovács, associate professor, PhD

Other teachers (name, position, scientific degree):

Title of the course: IED & VBIED survey and neutralization	**Code: HKDID1214**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description: Improvised explosive devices. Main parts and characteristics os IED. Vehicle born improvised explosives devices. Tasks, equipment of IED & VBIED survey. Protective measures to defeat explosive devices.
Educational goal of subject - Competencies: To give a general overview about the IED & VBIED assets, possible protective and defensive measures. PhD students may obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:

1. Kovács Zoltán, Daruka Norbert: IEDD: Improvised Explosive Device Disposal. International Conference in Military Technology Proceeding: ICMT'13, Brno: University of Defence, 2013. pp. 383-390. (ISBN:978-80-7231-917-6)
2. STANAG 2394 Engr (Ed2) Land Force Combat Engineer Doctrine (2011)
3. JP 3-34 Engineer Doctrine for Joint Operations (2011)
4. IED Reference Guide; Kwikpoint; ISBN KP5-MIL-GEN26
5. IED SMART BOOK, 1st Edition CEXC-Afghanistan Combined Explosives Exploitacion Cell Current as of: 13 Sep. 2006.

Recommended readings:

1. JIEDDO – Joint Improvised Explosive Device Defeat Organization 2006, No.: 20110504-V1.
2. Afghan Counter IED Visual Awareness Guide, Visual Recognition of IED and HME Indikators; Kwikpoint ISBN K21-MIL-AF45
3. Counter-IED Smart Book Version 2.1, For Pre-deployment and Field Use; Kwikpoint; ISBN KP-MIL-GEN-FB01; p. 300.
4. Counter-IED Smart Guide, Visual Recognition of IED and HME Indicators; Kwikpoint; ISBN KP-MIL-GEN-FB04; p. 80.
5. Dismounted C–IED Smart-Book, Version 1.0 Dated 08 Nov. 2011, Joint IED Defeat Organization (JIEDDO) Joint Center of Excellence (JCOE)
6. Gonzales Jo Jo: Death by Deception, Advanced Improvised Booby Traps; Paladin Press, Boulder Colorado. ISBN 0-87364-651-7; p.120.
7. Harber David: The Anarchist Arsenal, Improvised Incendiary and Explosives Techniques; Paladin Press Boulder, Colorado 1990. ISBN 0-87364-580-4; p. 112.
8. NATO STANAG 2834 – The Operation Of The Explosive Ordnance Disposal Technical Information Centre (EOD TIC)
9. AJP–3.15 (B) Allied Joint for Countering – Improvised Explosive Devices; NATO ACT, Norfolk 2012.

Responsible for course (name, position, scientific degree): Dr. Tibor Kovács, honoured professor, PhD

Other teachers (name, position, scientific degree): Dr. Zoltán Kovács, associate professor, PhD

Title of the course: Tasks of country's preparation in particular the sheltered HQ's.	**Code: HKDID 1407**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 10/4 hours / Practical lessons 10/6 hours

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): in the 3-4. semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

Our goal is to familiarize the tasks of country's preparation and the requirements of this to the PhD students. In the course of it, we present the process of country's theatre-type preparation with specific regard to the requirements of the sheltered HQs.

This course describes the process of developing the theatre of war preparation, this period of it and the connected tasks. By focusing on the creation the sheltered HQs' operation and maintenance also in peace and war time

Educational goal of subject - Competencies:

During the course the PhD students could obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:

1. AAP-06 Edition 2014: NATO Glossary of Terms and Definitions
2. MC 334 NATO Principles and Policies for Host Nation Support
3. MC 336 NATO Principles and Policies for Movement and Transportation
4. ADP 3-28 Support of Civil Authorities

Recommended readings:

1. ADRP 3-0 Unified Land Operations
2. ADP 3-07 Stability Operations
3. ADA093975: Interoperability and Combined Operations

Responsible for course (name, position, scientific degree): Dr. Tibor Kovács, honoured professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Blasting tasks and techniques for iceflood protection	**Code: HKDID1412**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): academic grade

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Technical assets of iceflood protection. Blasting techniques. Equipment of flood prevention organizations. Cooperation between civilian and military demolition groups.

Educational goal of subject - Competencies:
To give a general overview about the flood protection blasting tasks. PhD students may obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:

1. STANAG 2394 Engr (Ed2) Land Force Combat Engineer Doctrine (2011)
2. Flood- and ice-prevention with explosives. Bolyai Szemle Különszám: Symposium Proceedings "Defence Technology VIIth International Symposium" CD-ROM. Zrínyi Miklós Nemzetvédelmi Egyetem Bolyai János Katonai Műszaki Főiskolai Kar, pp. 1-8.
3. TM 9-1300-214 Military explosives technical Manual, Headquarters, Department of the Army, Washington DC, USA, 1984.
4. KÖHLER, J. – MEYER, R.: Explosives – Fourth, revised and extended edition, VCH Verlagsgesellschaft mbH, Wenheim, Federal Republic of Germany, 1993.

Recommended readings:

1. JP 3-34 Engineer Doctrine for Joint Operationts (2011)
2. VALTERS, William: A Brief History of Shaped Charges, 24th International Symposium on Ballistics, vol. 1, pp. 3–10, New Orleans, LA, 22–26 September 2008.

Responsible for course (name, position, scientific degree): Dr. Zoltán Kovács, associate professor, PhD

Other teachers (name, position, scientific degree):

Title of the course: Environmental aspects of military blasting tasks	**Code: HKDID1414**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): academic grade

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Basic information about course of blast. Characteristics of blasting and its effect on environment. Charges and their characteristics. Environmental aspects of military blasting and demolition tasks. Technical and technological solutions to decrease damage to the environment.

Educational goal of subject - Competencies:
To give a general overview about the environmental aspects of balsting tasks. PhD students may obtain the following competencies: analytical skills; application of theoretical knowledge; system approach; planning and organizing skills; thinking of alternatives.

Required readings:

1. STANAG 2394 Engr (Ed2) Land Force Combat Engineer Doctrine (2011)
2. Flood- and ice-prevention with explosives. Bolyai Szemle Különszám: Symposium Proceedings "Defence Technology VIIth International Symposium" CD-ROM. ZMNE BJKMK, pp. 1-8.
3. TM 9-1300-214 Military explosives technical Manual, Headquarters, Department of the Army, Washington DC, USA, 1984.
4. KÖHLER, J. – MEYER, R.: Explosives – Fourth, revised and extended edition, VCH Verlagsgesellschaft mbH, Wenheim, Federal Republic of Germany, 1993.

Recommended readings:

1. Using explosives and landmines for coutermobility tasks. Proceedings of the International Conference on Military Technologies 2009., University of Defense, Brno, 2009. pp. 149-159. (ISBN:978-80-7231-649-6)
2. HARBER David: IMPROVISED LAND MINES, Their Employment and Destructive Capabilities; Paladin Press Book, Colorado, ISBN 0-87364-656-8; p. 88.
3. HARBER David: THE ANARCHIST ARSENAL, Improvised Incendiary and Explosives Techniques; Paladin Press Boulder, Colorado 1990. ISBN 0-87364-580-4; p. 112.
4. VALTERS, William: A Brief History of Shaped Charges, 24th International Symposium on Ballistics, vol. 1, pp. 3–10, New Orleans, LA, 22–26 September 2008.

Responsible for course (name, position, scientific degree): Dr. Zoltán Kovács, associate professor, PhD.

Other teachers (name, position, scientific degree):

Title of the course: Theory and practice of electronic warfare	**Code: HKDID3101**	**Credits: 6**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4 hours

Knowledge assessment (exam/academic grade): Comprehensive exam

The course place in the curricula (in which semester): 2. semester

Pre-subject requirements *(if any)*: none

Course description:
Basic concepts, categories of electronic warfare and its connections. Principles and methods of electronic reconnaissance and electronic support measures. Electronic support measures systems. Methods of electronic countermeasures. Basic of electronic jamming. Guided weapons. Directed energy weapons. Electronic countermeasures systems. Principles and methods of electronic protection. Electronic warfare in army and air force operations.

Educational goal of subject - Competencies:
To give a general overview about the role of electronic warfare in the military operations, as well as make a basis of the electronic warfare.

Required readings:

2. FM 3-36 Electronic Warfare. 2012. http://fas.org/irp/doddir/army/fm3-36.pdf
3. JP 3-13.1 Electronic Warfare. 08 February 2012. https://info.publicintelligence.net/JCS-EW.pdf
4. Haig, Zs.: Convergence between signals intelligence and electronic warfare support measures. Land Forces Academy Review Vol. XIX.:(Nr. 3. (75)) pp. 327-335. (2014) http://www.armyacademy.ro/reviste/rev3_2014/HAIG.pdf
5. Haig, Zs.: Intelligence and electronic warfare on the digital battlefield. Hadmérnök 4. évf.:(3. sz.) pp. 258-264. (2009) http://www.hadmernok.hu/2009_3_haig.pdf

Recommended readings:

3. Adamy, D.: EW101 A First Course in Electronic Warfare. Artech House, 2001.
4. Ryan, M. J. – Frater, M. R.: Tactical communications for the digitized battlefield. Artech House, 2012

Responsible for course (name, position, scientific degree): Prof. dr. Zsolt Haig, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Information infrastructures	**Code: HKDID3107**	**Credits: 6**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4

Knowledge assessment (exam/academic grade): comprehensive exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Information society and its technical history. Infrastructures, information infrastructures, critical infrastructures and critical information infrastructures. Threats against the information infrastructures. Cyberwarfare. Protection of critical information infrastructure. Information security.

Educational goal of subject - Competencies:
To give a general overview on the infrastructures, information infrastructures, critical infrastructures and critical information infrastructures.

Required readings:
1. Lewis, G. Ted: Critical Infrastructure Protection in Homeland Security. Wiley, 2015. ISBN 978-1-118-81763-6

Recommended readings:
1. Green Paper on a European Programme for Critical Infrastructure Protection. Brussels, 17.11.2005. COM(2005) 576 final
2. Kovács László: Possible methodology for protection of critical information infrastructures. in: HADMÉRNÖK IV:(3) pp. 310-322. (2009)

Responsible for course (name, position, scientific degree): Prof. dr. Laszlo Kovacs, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Information terrorism	**Code: HKDID3108**	**Credits: 6**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4		
Knowledge assessment (exam/academic grade): comprehensive exam		
The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: History of terrorism. IT in terrorism. IT tools and methods of terrorism. Threats of cyber terrorism. Portection against cyberterrorism. **Educational goal of subject - Competencies:** To give a general overview on information terrorism.		
Required readings: 1. Haig Zsolt, Kovács László: New way of terrorism: Internet- and cyber-terrorism. in: ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 6:(4) pp. 659-671. (2007) **Recommended readings:** 1. Council of Europe: Cyberterrorism: The Use of the Internet for Terrorist Purposes Terrorism and Law. Council of Europe, 2007. ISBN 9287162263, 9789287162267		
Responsible for course (name, position, scientific degree): Prof. dr. Laszlo Kovacs, professor, PhD		
Other teachers (name, position, scientific degree): -		

Title of the course: Multitasking, Network-Centric radar systems with common video signal processing, for researchers	**Code: HKDID3111**	**Credits: 6**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 30/10 hours / Seminar: 12/4 hours / Consultation: 18/6

Knowledge assessment (exam/academic grade): comprehensive exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Basic radar theory, Microsoft Excel

Course description:
Conventional task of modern air survaillance radar systems. New challenges for air surveillance system. Central points of radar Detection, Tracking and Recognition. Radar Trade-Offs, Blake chart and Performance-Driven Specifications. Bistatic radar taxonomy. Passive radar and its field application. Digital radar: Phased array antenna; Coherent signal processing. MIMO concept. ECCM of radar. Complex Targets based on spheres. Threshold optimalization for target detection. Challengies of Non Coperative Target Recognition. Radar systems with technical capabilities based on composite signal processing of VHF, "L" and/or "S" band radars. Twin radar concept. Twin VHF radar performance calculation. Extended air traffic control and monitoring network structure.

Educational goal of subject - Competencies:
Give overview on latest air surveillance radar technology and its orientation. Highlight radar topics could be important for researchers.

Required readings:

1. BARTON, David K. (2005): Radar system analysis and modeling. Boston, Artech House. 545 p. ISBN 1-580536-81-6
2. CHERNYAK, Victor S. (1998): Fundamentals of multisite radar systems. Amsterdam, Gordon & Breach Science Publ. 475 p. ISBN 90-5699-165-5
3. BALAJTI I., KENDE Gy., SINNER E. (2012): Increased importance of VHF radars in ground-based air defense. In: IEEE Aerospace and Electronic Systems Magazine, vol. 27, no.1. January, p. 4-18.

Recommended readings:

1. M. SKOLNIK: RADAR Handbook, Third Edition, Chapter 6, Mc Graw Hill, 2008,
2. BALAJTI I.: Short Study on Performance of Air Surveillance Augmented by Twin Radars http://uni-nke.hu/uploads/media_items/aarms-vol-13_-issue-1_-2014.original.pdf

Responsible for course (name, position, scientific degree): Dr. István Balajti CSc.

Other teachers (name, position, scientific degree):-

Title of the course: Bases of modeling of military system	**Code: HKDID3201**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2 hours

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Some military system model. Military air vehicle as a system. Air force as a system. Air defence as a system. Armed combat as a system. Air defence combat as a system. A possible variant of mathematical modeling of armed combat. Modeling a selected military system. Valuation of developed system models

Educational goal of subject - Competencies:
To give a general overview about the modeling of military systems.

Required readings:

1. Churchman, W.C. (1968) The systems approach, delta, New York, ny,
2. Gy. Seres: Margin of the digital theatre of war. Lecture on the robot warfare 1 conference 2001. (http://www.jata.org/drseres/publik/pdf/digit_eng.pdf)
3. Gy. Seres: Armed combat on the digital theatre of war. lecture on the robot warfare 2 conference, 2002 . (http://www.jata.org/drseres/publik/pdf/robot_eng.pdf)
4. Gy. Seres: Military technology comes from club to attack/defense robots by research and development (r&d). AARMS, vol. 3, no. 3 (2004) 361–372

Responsible for course (name, position, scientific degree): Dr. György Seres, DSc

Other teachers (name, position, scientific degree): -

Title of the course: Theory and practice of electronic warfare	**Code: HKDID3209**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2 hours

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Basic concepts, categories of electronic warfare and its connections. Principles and methods of electronic reconnaissance and electronic support measures. Electronic support measures systems. Methods of electronic countermeasures. Basic of electronic jamming. Guided weapons. Directed energy weapons. Electronic countermeasures systems. Principles and methods of electronic protection. Electronic warfare in army and air force operations.

Educational goal of subject - Competencies:
To give a general overview about the role of electronic warfare in the military operations, as well as make a basis of the electronic warfare.

Required readings:
1. FM 3-36 Electronic Warfare. 2012. http://fas.org/irp/doddir/army/fm3-36.pdf
2. JP 3-13.1 Electronic Warfare. 08 February 2012. https://info.publicintelligence.net/JCS-EW.pdf
3. Haig, Zs.: Convergence between signals intelligence and electronic warfare support measures. Land Forces Academy Review Vol. XIX.:(Nr. 3. (75)) pp. 327-335. (2014) http://www.armyacademy.ro/reviste/rev3_2014/HAIG.pdf
4. Haig, Zs.: Intelligence and electronic warfare on the digital battlefield. Hadmérnök 4. évf.:(3. sz.) pp. 258-264. (2009) http://www.hadmernok.hu/2009_3_haig.pdf

Recommended readings:
1. Adamy, D.: EW101 A First Course in Electronic Warfare. Artech House, 2001.
2. Ryan, M. J. – Frater, M. R.: Tactical communications for the digitized battlefield. Artech House, 2012

Responsible for course (name, position, scientific degree): Prof. dr. Zsolt Haig, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Information operations	**Code: HKDID3214**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2 hours

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Development of information society. Features of information. Critical information infrastructures. *Information revolution* in *military* affairs. Information enviroment of military operations. Military information systems. Definition and interpretation of information superiority. Information-based warfare methodes. Definition, interpretation and elements of information operations. Main activities of information operations. Operation security. Military deception. Psychological operations. Electronic warfare. Computer network operations. Civil-military cooperations. Cyberwarfare in information operations. Critical information infrastructures protection. Complex information security.

Educational goal of subject - Competencies:
To give a general overview about the role of information and information superiority in the military operations, as well as make a basis of the information-based warfare methods focus on the information operations.

Required readings:

1. AJP-3.10 Allied Joint Doctrine for Information Operations. November, 2009 https://info.publicintelligence.net/NATO-IO.pdf
2. JP 3-13 Information Operations. 27. November, 2012 http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf
3. Zsolt, Haig: Connections between cyber warfare and information operations AARMS Vol. 8, No. 2 (2009) 329–337

Recommended readings:

1. Waltz, Edward: Information Warfare Principles and Operations, Artech House, 1998, ISBN 0-89006-511-X
2. Allen, Patric D.: Information operations planning, Artech House, 2007, ISBN 10: 1-58053-517-8
3. Toffler, Alvin: Third wave. Bantman, 1984, ISBN 0553246984

Responsible for course (name, position, scientific degree): Prof. dr. Zsolt Haig, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: ICT basics of interactive knowledge transfer	**Code: HKDID3219**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: basic ICT skills

Course description: Data, information, knowledge. Knowledge module. Basic knowledges. Media, multimedia, interactivity. Efficiency of knowledge transfer. Special hardware tools of e-learning. Special software tools of e-learning. Elements of e-teaching. Elements of d-learning. Design of e-curriculums. Design of e-tests.

Educational goal of subject - Competencies:

To give a general overview about hardware and software tools of e-learning and design of e-learning or d-learning materials.

Required readings:

1. György Kende – György Seres – Sándor Gönczi: Let's learn quickly and easily – lifelong, AARMS, Vol. 5, Issue 1. (2006), p. 91-103 http://www.zmne.hu/aarms/docs/Volume5/Issue1/pdf/10gonc.pdf
2. György Kende - Erzsébet Noszkay - György Seres: Role of the Knowledge Management in Modern Higher Education – the e-Learning, AARMS, Vol. 6, Issue. 4 (2007) p. 559-573 http://drseres.com/publik/pdf/aarms_2007.pdf
3. György Kende - György Seres - Ildikó Miskolczi: Let's learn easily and quickly – lifelong, anytime, anywhere, Jampeper.eu, 3./III./2008. http://www.jampaper.eu/Jampaper_E-ARC/No.3_III._2008_files/JAM080302e.pdf
4. György Kende - György Seres - Ildikó Miskolczi - Gábor Hangya: Virtual Campus, http://drseres.com/publik/pdf/virtual_campus.pdf
5. György Seres - Péter Gerő: e-Learning from the point of view of methodology, AARMS, Vol. 9, No. 2 (2010), p. 377–394 http://www.zmne.hu/aarms/docs/Volume9/Issue2/pdf/14.pdf
6. György Seres - Antónia Berecz: Mobilizing e-learning, Journal of Applied Multimedia, 2./VIII./2013, pp.53-62 http://jampaper.eu/Jampaper_ENG/Issue_files/JAMPAPER130202e.pdf

Recommended readings:

1. György Seres - Péter Gerő - Ildikó Miskolczi - Krisztina Fórika - Piroska Lengyel: Cloud Learning, CONFERENCE NEW CHALLENGES, 2010, 28-30 September, Budapest, ZMNDU http://drseres.com/publik/pdf/cloudlearning.pdf

Responsible for course (name, position, scientific degree): Dr. György Seres, associete professor (ret.), DSc.

Other teachers (name, position, scientific degree): Dr. Krisztina Fórika, Tibenszkiné, PhD

Title of the course: Information infrastructures	**Code: HKDID3221**	**Credits: 3**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/6 hours / Seminar: 10/2 hours / Consultation: 4/2		
Knowledge assessment (exam/academic grade): exam		
The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: Information society and its technical history. Infrastructures, information infrastructures, critical infrastructures and critical information infrastructures. Threats against the information infrastructures. Cyberwarfare. Protection of critical information infrastructure. Information security. **Educational goal of subject - Competencies:** To give a general overview on the infrastructures, information infrastructures, critical infrastructures and critical information infrastructures.		
Required readings: 1. Lewis, G. Ted: Critical Infrastructure Protection in Homeland Security. Wiley, 2015. ISBN 978-1-118-81763-6 **Recommended readings:** 1. Green Paper on a European Programme for Critical Infrastructure Protection. Brussels, 17.11.2005. COM(2005) 576 final 2. Kovács László: Possible methodology for protection of critical information infrastructures. in: HADMÉRNÖK IV:(3) pp. 310-322. (2009)		
Responsible for course (name, position, scientific degree): Prof. dr. László Kovács, professor, PhD		
Other teachers (name, position, scientific degree): -		

Title of the course: Information terrorism	**Code: HKDID3222**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/6 hours / Seminar: 10/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
History of terrorism. IT in terrorism. IT tools and methods of terrorism. Threats of cyber terrorism. Portection against cyberterrorism.

Educational goal of subject - Competencies:
To give a general overview on cyber terrorism.

Required readings:

1. Haig Zsolt, Kovács László: New way of terrorism: Internet- and cyber-terrorism. in: ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 6:(4) pp. 659-671. (2007)

Recommended readings:

1. Council of Europe: Cyberterrorism: The Use of the Internet for Terrorist Purposes Terrorism and Law. Council of Europe, 2007. ISBN 9287162263, 9789287162267

Responsible for course (name, position, scientific degree): Prof. dr. László Kovács, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: IT capabilities and services	**Code: HKDID3230**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 12/4 hours / Seminar: 18/6 hours / Consultation: 0/0

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-3. (possibly 4.) semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Concepts and interpretation of IT networks. Basics of Internet-technology (Internet, intranet, extranet). Cloud-based services.
Basics of network centric approaches (NCW, NNEC). NATO NNEC network and IT infrastructure (NNI). Basics of system-of-systems and federation-of-systems, need-to-know and need-to share approaches.
Grouping, and types of Internet-based services. Support of information exchange. Support of information sharing. Wiki-based technologies. Internet-based social networks.

Educational goal of subject - Competencies:
To give a comprehensive overview about the concept of networks, the basics of Internet-technology; about the theoretical basics of network centric approaches, and their IT related tasks, components, and novel principles; as well as about the types, and characteristics of network, and Internet-based services.

Required readings:
1. Alberts-Gartska-Stein: Network Centric Warfare: developing and leveraging information superiority. CCRP Series. – Library of Congress, 2000. http://www.au.af.mil/au/awc/awcgate/ccrp/ncw.pdf
2. NNEC Feasibility Study. NATO C3 Agency, 2006.

Responsible for course (name, position, scientific degree): Dr. Sándor Munk, professor, DSc

Other teachers (name, position, scientific degree): none

Title of the course: **Basics of the computer cluster technology**	**Code: HKDID3231**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 22/6 hours / Seminar: 8/4 hours / Consultation:

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: basic ICT skills

Course description: The concept, features and application conditions of large computing clusters. Information storage, the term of data, large datasets. Definition, types and infrastructure of high-performance distributed computing systems. Software and hardware conditions of the network infrastructure. Key terms of the devices in high capacity storage systems, the importance of design and construction. Concept of Big data.

Educational goal of subject - Competencies:
To give a general overview about hardware and software tools of cluster computing network devices for IT systems. The purpose of lectures to introduce the storage system structure, the possibibilies and requirements of managing the clssic, virtualized and cloud environments.

Required Literature:

1. Greg Andrews,Foundations of Multithreaded, Parallel, and Distributed Programming, 1999, ISBN: 0201357526
2. Raykumar Buya, High Performance Cluster Computing: Architectures and Systems, Programming and applications Vol. 2, ISBN-10: 978-0-13-013784-5
3. MC Education Services,Information Storage and Management, John Wiley & Sons, ISBN10: 1118094832, 2012, US
4. A. Finn, P. Lownds, M. Luescher, D.Flynn,Windows Server 2012 Hyper-V Installation and Configuration Guide, John Wiley & Sons, 2013, US, ISBN: 9781118486498
5. J.Savill, Microsoft Virtualization Secrets, John Wiley & Sons, 2013, US, ISBN: 9781118293164
6. Park, Jong Hyuk (James); Arabnia, Hamid R.; Kim, Cheonshik; Shi, Weisong; Gil, Joon-Min; Grid and Pervasive Computing: 8th International Conference, GPC 2013, and Colocated Workshops, Seoul, Korea, May 9-11, 2013, Proceedings, Springer Verlag, 2013, ISBN: 9783642380266

Responsible for course (name, position, scientific degree): Dr. Krisztina Tibenszky-Fórika lecturer, PhD.

Other teachers (name, position, scientific degree):

Title of the course: Modern technological and organizational processes in the management of battlefield communication networks in the Hungarian Defence Forces	**Code: HKDID3234**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/4 hours / Seminar: 10/4 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
To present the national and NATO organizational methods of battlefield military communication and information systems (CIS), and the modern communication and information equipments.
PhD students learn about the personal conditionality of the CIS management.
They become familiar with the survey methodology of communication needs in battlefield communication, and the features of modern communication devices and technologies related to the organizational methodology.

Educational goal of subject - Competencies:
The PhD student has to be able to plan military communication network , and become familiar with modern technology and organizational procedures.

Required readings:

1. STANAG 5048; The minimum scale of communications for the NATO land forces - Requirements, principles and procedures; NATO 1995.
2. MC 0593/1; The Minimum Level of C2 Services, Interoperability and Connectivity Required to Ensure Effective Coordination, C2 of Forces and Elements Deployedon Land, Involved in a NATO-led Operation; NATO 2014
3. Allied Joint Doctrine for Communication and Information System AJP-6 ; NATO 2011

Recommended readings:

1. Joint Communication System JP 6-0; US 2010.
2. Signal Support to Theater Operations Fm 6-02.45; US 2007.
3. Signal Support to Operations FM 6-02; US 2014.

Responsible for course (name, position, scientific degree): Dr. Tibor Farkas, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Examination of the battlefield communication and information system in the Hungarian Defence Forces	**Code: HKDID3235**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/4 hours / Seminar: 10/4 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

To present the field communication and information system (CIS) of the Hungarian Defence Forces (HDF) and the areas of the recent development.

They become familiar with the current field CIS with its advantages and disadvantages.

Students examine the technical devices used in national and multinational cooperations.

In addition, they analyze the applied modern communication devices and the development trends.

Educational goal of subject - Competencies:

The PhD student has to be able to:

- analyze the HDF field communication and information system;
- prepare proposals in the light of ongoing developments.

Required readings:

1. STANAG 5048; The minimum scale of communications for the NATO land forces - Requirements, principles and procedures; NATO 1995.
2. MC 0593/1; The Minimum Level of C2 Services, Interoperability and Connectivity Required to Ensure Effective Coordination, C2 of Forces and Elements Deployed on Land, Involved in a NATO-led Operation; NATO 2014
3. Allied Joint Doctrine for Communication and Information System AJP-6 ; NATO 2011

Recommended readings:

1. Joint Communication System JP 6-0; US 2010.
2. Formats for orders and designations of timings, locations and boundaries STANAG 2014; NATO 2000.
3. Signal Soldier's Guide Fm 6.02-43; US 2009.

Responsible for course (name, position, scientific degree): Dr. Tibor Farkas, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Technical examination of the communication support in the NATO multinational operations	**Code: HKDID3236**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/4 hours / Seminar: 10/4 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
To present the basics of NATO Crisis Response Operations (CRO) and the tasks of the Hungarian Defence Forces (HDF) in NATO multinational operations.
They become familiar with the communication and information support of multinational operations and their technical devices.
To present the principles of NATO CROs, the tasks of allied forces and the system of support.
Analyze the devices, technologies and systems that are used in the multinational operations by the HDF (Iraq, the Balkans, Afghanistan).

Educational goal of subject - Competencies:
The PhD student has to be able to:
- analyze the HDF communication and information system in multinational operations;
- prepare proposals for the communication devices.

Required readings:
1. STANAG 5048; The minimum scale of communications for the NATO land forces - Requirements, principles and procedures; NATO 1995.
2. MC 0593/1; The Minimum Level of C2 Services, Interoperability and Connectivity Required to Ensure Effective Coordination, C2 of Forces and Elements Deployed on Land, Involved in a NATO-led Operation; NATO 2014
3. Allied Joint Doctrine for Communication and Information System AJP-6; NATO 2011
4. Formats for orders and designations of timings, locations and boundaries STANAG 2014; NATO 2000.

Recommended readings:
1. Joint Communication System JP 6-0; US 2010.
2. Signal Support to Theater Operations Fm 6-02.45; US 2007.
3. Signal Soldier's Guide Fm 6.02-43; US 2009.

Responsible for course (name, position, scientific degree): Dr. Tibor Farkas, PhD

Other teachers (name, position, scientific degree): -

Title of the course: GIS in the defence electronics systems	**Code: HKDID3407**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 6/2 hours / Seminar: 4/0 hours / Consultation: 10/2 hours

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Basics of GIS. General overview of GIS systems. Data collection, data processing, data analysis processes in GIS systems. Applications of GIS in the defence electronics systems. GIS analysis. Radio wave propagation supported by GIS. GIS-based C2 systems.

Educational goal of subject - Competencies:
To give a general overview about the GIS in defence electronics systems. The result of this practical course is a manuscript in the context of GIS and electronics systems.

Required readings:

1. Prof. Tamás János; Fórián Tünde: Geoinformatics. Debreceni Egyetem, 2008. http://www.tankonyvtar.hu/en/tartalom/tamop425/0032_terinformatika/adatok.html
2. Li Qing: GIS Aided Radio Wave Propagation Modelling and Analysis. May 12, 2005. http://scholar.lib.vt.edu/theses/available/etd-05272005-140752/unrestricted/Thesis_LiQing.pdf

Recommended readings:

1. GIS in the Defense and Intelligence Communities, Volume 2. ESRI http://www.esri.com/library/brochures/pdfs/gis-in-defense-vol2.pdf

Responsible for course (name, position, scientific degree): Prof. dr. Zsolt Haig, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Architectural issues related to defence IT systems	**Code: HKDID3408**	**Credits: 2**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 0/0 hours / Seminar: 0/0 hours / Consultation: 20/6		
Knowledge assessment (exam/academic grade): term mark		
The course place in the curricula (in which semester): 2-4. semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: During the research seminar, a research subtask – related to the architectural questions of defense IT systems, and to the PhD research topic of the PhD student – will be conducted, guided by the teacher. The result of the seminar, and the basis of the evaluation is a seminar paper, similar in content and format to a scientific journal paper. **Educational goal of subject - Competencies:** To ensure progress in formulating research subtask objectives, in processing the relevant scientific literature, in formulating scientific results, and in presenting the results in accordance the basic requirements of scientific publications.		
Required readings: **Recommended readings:** - as follows from the guided research nature of the research seminar, no specific literature can be given;		
Responsible for course (name, position, scientific degree): Dr. Sándor Munk, professor, DSc		
Other teachers (name, position, scientific degree): none		

Title of the course: Ruggedized IT devices	**Code: HKDID3409**	**Credits: 2**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 0/0 hours / Seminar: 0/0 hours / Consultation: 20/6		
Knowledge assessment (exam/academic grade): term mark		
The course place in the curricula (in which semester): 2-4. semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: During the research seminar, a research subtask – related to the application of ruggedized IT devices, and to the PhD research topic of the PhD student – will be conducted, guided by the teacher. The result of the seminar, and the basis of the evaluation is a seminar paper, similar in content and format to a scientific journal paper. **Educational goal of subject - Competencies:** To ensure progress in formulating research subtask objectives, in processing the relevant scientific literature, in formulating scientific results, and in presenting the results in accordance the basic requirements of scientific publications.		
Required readings: **Recommended readings:** - as follows from the guided research nature of the research seminar, no specific literature can be given;		
Responsible for course (name, position, scientific degree): Dr. Sándor Munk, professor, DSc		
Other teachers (name, position, scientific degree): none		

Title of the course: Personal and wearable IT devices	**Code: HKDID3410**	**Credits: 2**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 0/0 hours / Seminar: 0/0 hours / Consultation: 20/6		
Knowledge assessment (exam/academic grade): term mark		
The course place in the curricula (in which semester): 2-4. semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: During the research seminar, a research subtask – related to the application of personal and wearable IT devices, and to the PhD research topic of the PhD student – will be conducted, guided by the teacher. The result of the seminar, and the basis of the evaluation is a seminar paper, similar in content and format to a scientific journal paper. **Educational goal of subject - Competencies:** To ensure progress in formulating research subtask objectives, in processing the relevant scientific literature, in formulating scientific results, and in presenting the results in accordance the basic requirements of scientific publications.		
Required readings: **Recommended readings:** - as follows from the guided research nature of the research seminar, no specific literature can be given;		
Responsible for course (name, position, scientific degree): Dr. Sándor Munk, professor, DSc		
Other teachers (name, position, scientific degree): none		

Title of the course: Information infrastructures	**Code: HKDID3415**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 0/0 hours / Seminar: 14/4 hours / Consultation: 6/2

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Information society and its technical history. Infrastructures, information infrastructures, critical infrastructures and critical information infrastructures. Threats against the information infrastructures. Cyberwarfare. Protection of critical information infrastructure. Information security.

Educational goal of subject - Competencies:
To give a general overview on the infrastructures, information infrastructures, critical infrastructures and critical information infrastructures.

Required readings:
1. Lewis, G. Ted: Critical Infrastructure Protection in Homeland Security. Wiley, 2015. ISBN 978-1-118-81763-6

Recommended readings:
1. Green Paper on a European Programme for Critical Infrastructure Protection. Brussels, 17.11.2005. COM(2005) 576 final
2. Kovács László: Possible methodology for protection of critical information infrastructures. in: HADMÉRNÖK IV:(3) pp. 310-322. (2009)

Responsible for course (name, position, scientific degree): Prof. dr. László Kovács, professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Use of distributed computing network devices in IT systems	**Code: HKDID3427**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 10/10 hours; Seminar: 10/4hours; Consultation:

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: basic ICT skills

Course description: Usage of devices in high-performance distributed computing systems. The problems of the development of the network infrastructure. Key terms of the devices in high capacity storage systems, the importance of design and construction. The components of high capacity Network infrastructure. Comparison of the classic and virtualized data storage technique. Examination of linking devices that supports construct network infrastructure. Relationship between the Network throughput and Big data.

Educational goal of subject - Competencies:
To give a general overview about hardware and software tools of distributed computing network devices for IT systems.

Required literature:

1. Raykumar Buya, High Performance Cluster Computing: Architectures and Systems, Programming and applications Vol. 2, ISBN-10: 978-0-13-013784-5
2. Tibenszkyné Fórika Krisztina Application of cloud computing in the defense industry AARMS11:(1) pp. 195-206. (2012)
3. MC Education Services,Information Storage and Management, John Wiley & Sons, ISBN10: 1118094832, 2012, US
4. A. Finn, P. Lownds, M. Luescher, D.Flynn,Windows Server 2012 Hyper-V Installation and Configuration Guide, John Wiley & Sons, 2013, US, ISBN: 9781118486498
5. J.Savill, Microsoft Virtualization Secrets, John Wiley & Sons, 2013, US, ISBN: 9781118293164
6. Park, Jong Hyuk (James); Arabnia, Hamid R.; Kim, Cheonshik; Shi, Weisong; Gil, Joon-Min; Grid and Pervasive Computing: 8th International Conference, GPC 2013, and Colocated Workshops, Seoul, Korea, May 9-11, 2013, Proceedings, Springer Verlag, 2013, ISBN: 9783642380266

Responsible for course (name, position, scientific degree): Dr. Krisztina Tibenszky-Fórika lecturer, PhD.

Other teachers (name, position, scientific degree):

Title of the course: Development trends in the deployable communication and information system of the Hungarian Defence Forces	**Code: HKDID3428**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 6/2hours / Seminar: 10/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

To present the field communication and information system (CIS) of the Hungarian Defence Forces (HDF) and the current field of the recent development.

To examine the future directions in technical development highlighted the experiences.

The PhD students become familiar with the battlefield CIS by interpretation of doctrinal, technical, and technologial development.

Educational goal of subject - Competencies:

The PhD student has to be able to:

- analyze the communication and information system;
- interpret the capability based approach development.

Required readings:

1. STANAG 5048; The minimum scale of communications for the NATO land forces - Requirements, principles and procedures; NATO 1995.
2. MC 0593/1; The Minimum Level of C2 Services, Interoperability and Connectivity Required to Ensure Effective Coordination, C2 of Forces and Elements Deployed on Land, Involved in a NATO-led Operation; NATO 2014
3. Allied Joint Doctrine for Communication and Information System AJP-6 ; NATO 2011
4. Formats for orders and designations of timings, locations and boundaries STANAG 2014; NATO 2000.

Recommended readings:

1. Joint Communication System JP 6-0; US 2010.
2. Signal Soldier's Guide Fm 6.02-43; US 2009.

Responsible for course (name, position, scientific degree): Dr. Tibor Farkas, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Issues of communication capabilities, applications and technical equipment in the joint operations of the Hungarian Defence Forces	**Code: HKDID3429**	**Credits: 2**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 6/2hours / Seminar: 10/2 hours / Consultation: 4/2		
Knowledge assessment (exam/academic grade): seminar		
The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: none		
Course description: To present the: -capabilities of communication suppport for joint forces; -the capabilities of Communication and information System (CIS); -and the requirements, needs by the commanders. The Phd Students become familiar with the structure, capability of joint forces and features of their CIS and communication devices. **Educational goal of subject - Competencies:** The PhD student has to be able to analyze and to organize the CIS support of joint forces.		
Required readings: 1. STANAG 5048; The minimum scale of communications for the NATO land forces - Requirements, principles and procedures; NATO 1995. 2. MC 0593/1; The Minimum Level of C2 Services, Interoperability and Connectivity Required to Ensure Effective Coordination, C2 of Forces and Elements Deployed on Land, Involved in a NATO-led Operation; NATO 2014 3. Allied Joint Doctrine for Communication and Information System AJP-6 ; NATO 2011 **Recommended readings:** 1. Signal Support to Theater Operations Fm 6-02.45; US 2007. 2. Signal Support to Operations Fm 6-02; US 2014.		
Responsible for course (name, position, scientific degree): Dr. Tibor Farkas, PhD		
Other teachers (name, position, scientific degree): -		

Title of the course: Environmental Protection and Security	**Code: HKDID4102**	**Credits:** 6

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4

Knowledge assessment (exam/academic grade): comprehensive exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Technology

Course description:
Environmental protection and economics. Ecology, ecosystems. Legal environment of environmental protection, acts and other regulations. Environmental security. Environmental principles in the NATO. Air, water and soil quality management. Waste and hazardous waste management. Electromagnetic waves, vibration and noise protection. Environmental protection during military activities.

Educational goal of subject - Competencies:
To give a general overview about environmental protection, as well as make a basic knowledge of environmental security and related global threats and problems.

Required readings:

1. Földi László, Padányi József (szerk.): Effects of climate change on security and application of military force. Budapest: Nemzeti Közszolgálati Egyetem, 2014. 270 p. (ISBN:978-615-5305-25-2)
2. Kuti Rajmund, Földi László: Extreme weather phenomena 2. The process of remediation. HADMÉRNÖK 9:(2) pp. 250-256. (2014)

Recommended readings:

1. László Földi, Márta Hankó: Passive houses, as possible answers of environmental directed building for the challenge of climate change. HADMÉRNÖK 8:(2) pp. 173-181. (2013)
2. Halász László, Földi László, Padányi József: Climate change and CBRN defense. HADMÉRNÖK 7:(3) pp. 42-49. (2012)

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. László Halász, DSc

Title of the course: Chemical Safety	**Code: HKDID4105**	**Credits:** 6

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4

Knowledge assessment (exam/academic grade): comprehensive exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Cefinition of chemical safety, Act 25/2000. and the national program of chemical safety. Chemical risk assesment and risk management. Categories of dangerousness and report obligations. The system of REACH regulation in the European Union and its implementation in Hungary. Effects and tasks emanating from the GHS/CLP regulations.

Educational goal of subject - Competencies:
To give advanced capabilities in safe handling of different hazardous chemicals.

Required readings:
1. Act 25/2000. on chemical safety.
2. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), EC No 1907/2006.
3. CLP Regulation (for "Classification, Labelling and Packaging"), EC No 1272/2008

Recommended readings:
1. Globally Harmonized System of Classification and Labeling of Chemicals (GHS), United Nations Economic Commission for Europe, http://www.unece.org/trans/danger/publi/ghs/ghs_rev05/05files_e.html

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. László Halász, DSc

Title of the course: Weapons of mass destruction	**Code: HKDID4201**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Characteristics and Effects of CBRN Hazards. Environmental Effects . Chemical Hazards Characteristics and Effects. Biological Hazards Characteristics and Effects. Radiological Hazards Characteristics and Effects. Nuclear Hazards Characteristics and Effects. Principles of CBRN Defence. CBRN in the Operational Environment. Individual protection, collective protection. CBRN recce, CBRN decontamination.

Educational goal of subject - Competencies:
To give a general overview about the CBRN weapons and effects. To give knowledge about Fundamentals of CBRN Defence.

Required readings:

1. AJP-3.8 Allied Joint Doctrine for NBC, 2003.
2. STANAG 2112 Nuclear, biological and chemical reconnaissance, 2005.
3. L Halász, I Pintér, A Solymár: Remote sensing in the biological and chemical reconnaissance. ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 1:(1) *pp. 39-56.* (2002)
4. A Solymár, L Halász: Biological detection ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 1:(1) *pp. 57-62.* (2002)

Recommended readings:

1. Halász László, Földi László, Padányi József: Climate change and CBRN defense HADMÉRNÖK 7:(3) *pp. 42-49.* (2012)
2. Berek Tamás, Szabó Sándor: Hungarian establishing test of CBRN decontamination technologies from the aspect of CBRN decon platoon composition HADMÉRNÖK 9:(2) *pp. 226-233.* (2014)
3. Berek Tamás: Conditions of an NBC exercise field creation HADMÉRNÖK 2:(3) *pp. 4-8.* (2007)

Responsible for course (name, position, scientific degree): Prof. dr. László Halász, professor, DSc

Other teachers (name, position, scientific degree): Dr. Tamás Berek associate professor, PhD

Title of the course: Chemistry of toxic materials	**Code: HKDID4202**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Basics of toxicology. Active ingredients of chemical weapons. Types of chemical warfare agents: nerve agents (organophosphates, karbamates, highly toxic insecticides, binery nerve agents), blister agents (halogenated thioethers, nitrogene mustards, lewisite and its homologs), choking agents, generally toxic agents, non-lethal chemical agents (psychotoxic and somatic agents), herbicides, toxins.

Educational goal of subject - Competencies:
To achieve basic knowledge on the chemical structure and physico-chemical properties of chemical warfare agents, their production and chemical reactions, biological mode of action

Required readings:
1. Dr Timothy T. Marrs (Editor), Robert L. Maynard (Editor), Frederick Sidell (Editor): Chemical Warfare Agents: Toxicology and Treatment, 2007, ISBN-13: 978-0470013595
2. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (CWC), http://www.opcw.org/chemical-weapons-convention/

Recommended readings:
1. Richardt, Andre (2013), CBRN Protection: Managing the Threat of Chemical, Biological, Radioactive and Nuclear Weapons, Germany: Wiley-VCH Verlag & Co., ISBN 978-3-527-32413-2.

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. László Halász, DSc

Title of the course: Radioecology	**Code: HKDID4206**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Technology

Course description:
Radioecology is a scientific discipline which studies how radioactive substances interact with nature; how different mechanisms affect the substances' migration and uptake in food chain and ecosystems. Investigations in radioecology includes aspects of field sampling, designed field and laboratory experiments and the development of predictive simulation models.

Educational goal of subject - Competencies:
Giving a basics for detection and investigation of presence and environmental distribution of radioactive materials and their influence. Overviewing amount of nuclear emission and immission, the ways of control, and its effect on the population in case of different nuclear facilities. Giving general overview for Hungarian nuclear environmental protection underlining Paks NPP.

Required readings:

1. Csurgai J, Zelenák J, Lajos T, Goricsán I, Halász L, Vincze Á, Solymosi J: Numerical simulation of transmission of NBC materials. ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 5:(3) pp. 417-434. (2006)

Recommended readings:

5. Outola, I. & al.:Characterization of the NIST seaweed Standard Reference Material, International Conference on Radionuclide Metrology and its Applications, 15. Applied radiation and isotopes, Vol.64, No. 10/11 (October-November 2006), 1242-1247

Responsible for course (name, position, scientific degree): Dr. József Csurgai PhD

Other teachers (name, position, scientific degree): Dr. Árpád Vincze PhD

Title of the course: Non-proliferation actions against the weapons of mass destruction	**Code: HKDID4208**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Science, Military Technology

Course description:
History of nuclear, biological and chemical weapons till nowadays. Actual proliferation issues of CBRN weapons. Structure and operation of international non-proliferational agreements and organizations. Presentation of our domestic and international responsibilities and tasks. International inspection missions on the weapons of mass destruction.

Educational goal of subject - Competencies:
To give comprehensive knowledge on properties of weapons of mass destruction and their proliferation. Also a general overview on international agreements and organizations related to control of weapons of mass destruction, and the work of United Nations weapons inspectors.

Required readings:
1. Halász László - Grósz Zoltán: ABV védelem, ZMNE, 2000.
2. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (CWC), http://www.opcw.org/chemical-weapons-convention
3. Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Signed at London, Moscow and Washington on 10 April 1972. Entered into force on 26 March 1975. http://www.un.org/disarmament/WMD/Bio/pdf/Text_of_the_Convention.pdf

Recommended readings:
1. Richardt, Andre (2013), CBRN Protection: Managing the Threat of Chemical, Biological, Radioactive and Nuclear Weapons, Germany: Wiley-VCH Verlag & Co., ISBN 978-3-527-32413-2.
2. http://www.iaea.org
3. http://www.ctbto.org
4. http://www.unmovic.org

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Environmental management	**Code: HKDID4210**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
State and protection of the key elements of the environment and our natural resources. Principles of environmental management. Actions against economic and military threats to the environment, prevention, local, regional and global tasks and actions.

Educational goal of subject - Competencies:
To give comprehensive overview on the natural resources and the elements of the environment, their man-made damages and activities to protect them. Also knowledge on the task of environmental planning and environmental development.

Required readings:

1. Chris Barrow: Environmental Management for Sustainable Development, Routledge, 2006. ISBN-13: 978-0415365352
2. Gwendolyn Burke, Ben Ramnarine Singh, Louis Theodore: Handbook of Environmental Management and Technology, Wiley-Interscience; 2012. ISBN-13: 978-0471722373

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Nature conservation	**Code: HKDID4211**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Relations between environmental protection and nature conservation. History of nature conservation. Structure of nature conservation organization in Hungary. Legal regulations on nature conservation. International nature conservation agreements and organizations. EU legizlations on nature conservation. Categories of nature conservation interest. Evaluation systems on nature conservation.

Educational goal of subject - Competencies:
To give detailed knowledge for practical applications of nature conservation information.

Required readings:
1. Peter Bromley: Nature Conservation in Europe: Policy and Practice, Taylor & Francis, 2012. ISBN 978-113-5158-5-90

Recommended readings:
1. Journal for Nature Conservation: http://www.journals.elsevier.com/journal-for-nature-conservation/

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. Dr. László Halász, DSc

Title of the course: Technologies of monitoring and extermination of weapons of mass destruction	**Code: HKDID4215**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Science, Military Technology

Course description:
Governmental responsibilities from international non-proliferation and arms control agreements of nuclear, biological and chemical weapons. International inspection tasks of surveillance, monitoring and destruction of CBRN weapons stockpiles. Lessons learned from international inspection missions on the weapons of mass destruction.

Educational goal of subject - Competencies:
To give basic knowledge on the technical issues of destruction of arms and stockpiles of weapons of mass destruction, and also on the application and future development of destruction technologies.

Required readings:

1. Richardt, Andre (2013), CBRN Protection: Managing the Threat of Chemical, Biological, Radioactive and Nuclear Weapons, Germany: Wiley-VCH Verlag & Co., ISBN 978-3-527-32413-2.
2. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (CWC), http://www.opcw.org/chemical-weapons-convention/
3. Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Signed at London, Moscow and Washington on 10 April 1972. Entered into force on 26 March 1975. http://www.un.org/disarmament/WMD/Bio/pdf/Text_of_the_Convention.pdf

Recommended readings:

1. http://www.iaea.org
2. http://www.ctbto.org
3. http://www.unmovic.org

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Dr. József Csurgai, PhD

Title of the course: NBC threat analysis of the territory of Hungary	**Code: HKDID4216**	**Credits: 3**
Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2		
Knowledge assessment (exam/academic grade): exam		
The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)		
Pre-subject requirements *(if any)*: Military Technology		
Course description: Investigating potential sources of NBC (CBRN) threats in way of analising chemical and biological industrial objects and nuclear facilities. Comparative analysis of Hungarian and other NPPs. Radioactive waste management. Chemical facilities, transport of chemicals. Investigation meteorological particularities of Hungary for analysis of spreading NBC contamination. **Educational goal of subject - Competencies:** To give a general overview for investigating potential sources of HAZARD situations in Hungary.		
Required readings: 1. ATP-45(D) Warning and reporting and hazard prediction of chemical, biological, radiological and nuclear incidents (Operators Manual) 2. AEP-45(C) Warning and reporting and hazard prediction of chemical, biological, radiological and nuclear incidents (Reference Manual)		
Responsible for course (name, position, scientific degree): Prof. Dr. Solymosi József DSc		
Other teachers (name, position, scientific degree): Dr. József Csurgai PhD		

Title of the course: Mathematical methods of risk analysis	**Code: HKDID4221**	**Credits:** 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Technology

Course description:
Basics of the Probability theory and Mathematical statistics. Technical systems fault tree, HAZOP, and event tree analysis. Basics of the fuzzy logic.

Educational goal of subject - Competencies:
To give a general overview about methods of the operational risk assesment, as well as make a basic knowledge of risk analysis and its mathematical modelling.

Required readings:

1. Olav Kallenberg; Foundations of Modern Probability, 2nd ed. Springer Series in Statistics. (2002). 650 pp. ISBN 0-387-95313-2
2. Gut, Allan (2005). Probability: A Graduate Course. Springer-Verlag. ISBN 0-387-22833-0

Recommended readings:

1. http://en.wikipedia.org/wiki/Fuzzy_logic
2. http://en.wikipedia.org/wiki/Fault_tree_analysis

Responsible for course (name, position, scientific degree): Dr. Árpád Vincze PhD

Other teachers (name, position, scientific degree): Dr. József Csurgai PhD

Title of the course: Radiological dispersion devices (RDD)	**Code: HKDID4227**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

The nuclear risk categorization on the basis of International Atomic Energy Agency documents. The concept of radiological dispersion devices. Analysis of RCT for producing radioactive material. Industrial, medical, energy use of the isotopes.

Analysis of accidents involving radioactive substances in case studies. Modelling the effects of radiological dispersion devices HPAC simulation. The possibilities of protection against radiological dispersion devices.

Educational goal of subject - Competencies

Doctoral students are familiar with the concept of a radiological dispersion devices, radioactive materials used in their preparation and use, the protection against RDD.

Required readings:

1. R. Pellérdi: Risk of our time: nuclear terrorism. Spring Wind, Conference Publications 2007, Social Sciences
2. R. Pellérdi -T. Berek: Redefining the CBRN Risk Assessment, 2009. 1. AARMS
3. M. El Baradei Nuclear Terrorism: Identifying and Combating the Risk, International Conference on Nuclear Security, IAEA, May 2005
4. C. D Ferguson, T. Kazi, J. Perera: Commercial Radioactive Sources: Surveying the Security Risks, Center for Nonproliferation Studies, Monterey Institute of International Studies, January 2003rd

Recommended readings:

1. Argonne National Laboratory: Radiological Dispersal Device (RDD), EVS Human Health Fact Sheet, August 2005
2. Nuclear Accident in Goiania, www.wikipedia.org/goiania May 11, 2007
3. 4. F. Barnaby: Dirty Bomb Nuclear and Primitive Weapons, Oxford Research Group, June 2005

Responsible for course (name, position, scientific degree): Dr. Rezső Pellérdi, associate professor, PhD

Other teachers (name, position, scientific degree):

Title of the course: Air purity protection	**Code: HKDID4401**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Overview of air contamination sources and chemicals. Steps of pollution spreading (emission, transmission, immission). Effects of air pollution, human impacts. Possibilities of reduction of air pollution.

Educational goal of subject - Competencies:
To give overview on the air pollution processes, and also knowledge on the proper evaluation, the assesment of air pollution consequences of different industrial and other activities.

Required readings:

1. Ronald E. Hester, Roy M. Harrison: Air Quality Management, Royal Society of Chemistry, 1997. ISBN 978-085-4042-3-57.
2. Donald W. Moffat: Handbook of Indoor Air Quality Management, Prentice Hall, 1997. ISBN 978-013-2353-0-07.

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. Dr. László Halász, DSc

Title of the course: Waste treatment and management	**Code: HKDID4405**	**Credits:** 2

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:
Definition and categories of wastes. Possibilities of waste reduction. Principles of waste utilization. Industrial and communal wastes. Hazardous wastes. Waste disposal technologies. Collection and recycling of selected wastes. Incineration and deposition of hazardous wastes.

Educational goal of subject - Competencies:
To give overview on the different types of wastes and the ways of their proper handling, Also bring knowledge on the up-to-date waste management, 3-R (reduce, reuse, recycle). Give competency for problem solving of institutional and workplace waste management.

Required readings:

1. Jacqueline Vaughn: Waste Management: A Reference Handbook, ABC-CLIO, 2009. ISBN 978-159-8841-5-03
2. Act CLXXXV./2012. on waste management (26th November 2012.)

Responsible for course (name, position, scientific degree): Dr. László Földi, PhD

Other teachers (name, position, scientific degree): Prof. Em. Dr. László Halász, DSc

Title of the course: Turbulent diffusion of air pollutants	**Code: HKDID4406**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/4 hours / Seminar: 2/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Technology

Course description:

1. Emission source term models
2. Atmospheric dispersion models
    a. Gaussian dispersion model
    b. Lagrangian dispersion model
    c. Eulerian dispersions model
    d. Dense gas model
3. Release and spread of Toxic Industrial Materials (TIM) during accidents
4. Meteorological conditions for spreading. Air stability, atmospheric models, using meteodata for prediction of spread.
5. Prediction procedures and monitoring systems for spreading air pollutants
6. Using softwares for atmospheric dispersion modelling

Educational goal of subject - Competencies:

To give a general overview about emission, transmission and immission of air pollutants paying attention to heavy gases, toxic and radioactive materials.

Required readings:

1. József Csurgai, János Zelenák, Árpád Vincze, József Solymosi, István Goricsán, László Halász, Tamás Lajos, István Pintér: Numerical simulation of transmission of NBC materials (Military technology, 2005/1. pp. 13-19)
2. József Csurgai, János Zelenák, Tamás Lajos, István Goricsán, László Halász, Árpád Vincze, József Solymosi: Numerical simulation of transmission of NBC materials, Academic and Applied Research in Military Science, Vol 5 (2006), Issue 3, pp. 414-437

Responsible for course (name, position, scientific degree): Prof. Dr. László Halász DSc

Other teachers (name, position, scientific degree): Dr. József Csurgai PhD

Title of the course: Evaluation of NBC and fire situations	**Code: HKDID4421**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 16/4 hours / Seminar: 2/1 hours / Consultation: 2/1

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: Military Technology

Course description:
Warning and reporting and hazard prediction of chemical, biological, radiological and nuclear incidents. Physical and chemical foundations of emission, transmission and immission of the toxic chemicals and radioactive materials. Consequences of serious incidents, accidents (Tokyo Sarin Attack, Chernobyl, Tokai Mura, Enschede, AZF Toluouse, Fukusima). Functional structure and operational principals of the CBRN Warning and Reporting System and Hungarian disaster relief system.

Educational goal of subject - Competencies:
To give a general overview for implementation and investigation of the procedures of the CBRN Warning and Reporting System.

Recommended readings:
1. ATP-45(D) Warning and reporting and hazard prediction of chemical, biological, radiological and nuclear incidents (Operators Manual)
2. AEP-45(C) Warning and reporting and hazard prediction of chemical, biological, radiological and nuclear incidents (Reference Manual)

Responsible for course (name, position, scientific degree): Dr. József Csurgai PhD

Other teachers (name, position, scientific degree):

Title of the course: Nuclear safety and events/accidents	**Code: HKDID7112**	**Credits: 6**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 40/12 hours / Seminar: 12/4 hours / Consultation: 8/4

Knowledge assessment (exam/academic grade): comprehensive exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

1) Basic knowledge in radiochemistry and nuclear energetics
2) Types constraction and service of NPPs
3) Basic of nuclear safety in NPP
4) Events and accidents in NPPs
5) Legal background of nuclear safety emergency preparedness
6) Technical, logistical, organizational background of emergency preparedness in NPP
7) Aspects of safety and nuclear preparedness in Paks NPP

Educational goal of subject - Competencies:

Basic knowledge in nuclear energetics and characterize of events and accidents. Students learn about safety rules and equipments. They will got knowledge about the methods of nuclear disaster preparedness. They will got detailed information about the safety and nuclear disaster preparedness in NPP Paks.

Required readings:

1. J. Shapiro, Radiation Protection, Harvard University Press Cambridge, Massachusetts, and London, England, www.ilea.ufrgs.br/radioisotopos/livroradio.pdf
2. Doe Fundamentals Handbook, Nuclear Physics And Reactor Theory, Volume 1 and 2, JANUARY 1993
   http://energy.gov/sites/prod/files/2013/06/f2/h1019v1.pdf
   http://www.steamtablesonline.com/pdf/Nuclear-Volume2.pdf

Responsible for course (name, position, scientific degree):

Dr. habil. György Pátzay, associate professor, PhD

Other teachers (name, position, scientific degree): Dr. Kristóf Horváth PhD

Title of the course: Radiology	Code: HKDID7219	Credits: 3

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 20/6 hours / Seminar: 6/2 hours / Consultation: 4/2

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

8) Basic knowledge in Radiochemistry, isotope technique and nuclear energetics
9) The use of radioactive isotopes in nuclear energetics, industry, medical institutions and other fields
10) Isotopes in nuclear energetics
11) Types characteristics and treatment of radioactive waste
12) Measurement of radioactive radiation (alpha, beta, gamma, neutron) and detectors
13) Characteristics of environmental radioactivity
14) Use of radioactive isotopes in medical and diagnostical practice
15) Basic knowledge in dosimetry

Educational goal of subject - Competencies:

Student got information in the fields of radiochemistry isotope techniques and nuclear energetics. Student learn about the environmental radioactivity, the measurement of radiations (alpha, beta, neutron), and dosimetry. The learn about the medical and diagnostical use of radioactive isotopes.

Required readings:

1. J. Shapiro, Radiation Protection, Harvard University Press Cambridge, Massachusetts, and London, England, www.ilea.ufrgs.br/radioisotopos/livroradio.pdf
2. Doe Fundamentals Handbook, Nuclear Physics And Reactor Theory, Volume 1 and 2, JANUARY 1993
   http://energy.gov/sites/prod/files/2013/06/f2/h1019v1.pdf
   http://www.steamtablesonline.com/pdf/Nuclear-Volume2.pdf

Responsible for course (name, position, scientific degree):

Dr. habil. György Pátzay, associate professor, PhD

Title of the course: Environmental & Disaster Monitoring Systems	**Code: HKDID7220**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): **30/10**

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-6.

Pre-subject requirements *(if any)*: none

Course description:

1. The purpose of environmental and disaster monitoring systems.
2. Environmental load, emissions and pollution.
3. Processes threatening human life, health and material goods.
4. Types, application, structure and operation of environmental monitoring systems.
5. Types, application, structure and operation of disaster monitoring systems.
6. Types, operation and application rules of mobile and stable reconnaissance devices for hazardous materials.
7. Structure and application of the Monitoring and Public Alert (MoLaRi) system.

Competences:

The course acquaints students with the theoretical and practical background on the use of environmental and disaster monitoring systems. They acquire knowledge on the structure, operation and the installation of monitoring systems.

Required readings:

1. Lees, F. P., (1996). Loss Prevention in the Process Industries, Second Edition, Butterworth-Heinemann, London. ISBN 0-7506-1547-8.
2. TNO (1999, Purple Book). Committee for the Prevention of Disasters. CPR 18E . Guidelines for Quantitative Risk Assessment. The Director-General of Labour, The Netherlands
3. TNO: Methods for Calculation of Physical Effects of the Escape of Dangerous Materials (Liquids and Gases), Nederlands Organisation for Applied Scientific Research, Voorburg, Directorate-General of Labour.

Recommended readings:

1. Szakál B, Lévai Z., Tatár A.: Examination of risk assessment procedures of major industrial accidents: Analysis of a professional dilemma surfaced when drafting the respective Hungarian regulations. ACADEMIC AND APPLIED RESEARCH IN MILITARY SCIENCE 1.:(2.) pp. 315-327. (2002)

Responsible for course: Dr. László Halász DSc, professor emeritus

Other teachers: Dr. Gyula Vass PhD

Title of the course: Protection against major accidents	**Code: HKDID7226**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): 30/10

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-6

Pre-subject requirements *(if any)*: none

Course description:

1. International, EU and national legislation related to the protection against major accidents involving dangerous materials.
2. Fulfilment of operator obligations. Content and formal requirements of safety documents and their inspection.
3. Preparing, reviewing and applying internal and external safety plans.
4. Tasks and procedures related to public information and publicity. Report, information and inspection related to malfunctions and accidents involving dangerous materials.
5. Sanctions system and their imposition on dangerous establishments.
6. Authority regulations on technical, organisational and management measures to mitigate risks and consequences and their implementation by the operator.
7. The system and content of settlement planning. Designation of danger zone.
8. Methodology and procedure of authority tasks related to licensing, supervising and inspecting.

Competences:

Students are introduced to international and national legislation related to the protection against major accidents involving dangerous materials; industrial safety and disaster management procedures of the operator and the authority as well as the methods of risk analyses supporting them. The course acquaints students with the procedures of inspection of safety documents in dangerous establishments, with special regard to the inspection procedures of risk analysis as well as external safety plans and public information.

Required readings:

1. Kátai-Urbán L.: Handbook for the Implementation of the Basic Tasks of the Hungarian Regulation on „Industrial Safety" NKE, 2014. 73 p. (ISBN 978-615-5491-70-2)
2. Kátai-Urbán L.: Establisment and Operation of the System for Industrial Safety within the Hungarian Disaster Management. Ecoterra: Journal Of Environmental Research And Protection (ISSN: 1584-7071) 11: (2) pp. 27-45. (2014)
3. Lajos Kátai-Urbán (ed.): Guidance on the implementation of regional and local tasks for the prevention of major accidents involving dangerous substances. Budapest: Akaprint Kft., 2005. pp. 40-53. (ISBN: 963 219 112 9)
4. Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC. URL.: eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:

Recommended readings:

1. Kátai-Urbán L., Vass Gy-. Safety of Hungarian Dangerous Establisments - Review of the Industrial Safety's Authority. Hadmérnök IX.:(1) pp. 88-95. (2014)
2. Kátai-Urbán L., Vass Gy.: Development of Hungarian System for Protection against Industrial Accidents. In: Ladislav ŠIMÁK Jozef Ristvej (szerk.) 18. medzinárodná vedecká konferencia Riešenie krízových situácií v špecifickom prostredí. Zilina, Szlovákia, 2013. pp. 229-239. (ISBN:978-80-554-0699-2)

Responsible for course: Dr. Lajos Kátai-Urbán associate professor, PhD

Other teachers: -

Title of the course: Carriage and Logistics of Dangerous Goods	**Code: HKDID7228**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): 30/10

Knowledge assessment (exam/academic grade): exam

The course place in the curricula (in which semester): 2-6

Pre-subject requirements *(if any)*: none

Course description:

1. Comprehensive assessment of international and national legislation. Criteria for the transport of hazardous materials by road, rail, air and inland waterway.
2. Dangerous goods logistics. Preparation for transport of goods. Storage and warehousing of dangerous goods. Rules for cargo securing.
3. The specifics of risk management and safety planning in establishments for dangerous goods transport.
4. Disaster management tasks and authorities of industrial supervision.

Competences:

This course provides a comprehensive understanding of theoretical and practical issues related to the safe transport and logistics of dangerous materials and goods. Students are introduced to the authorities, tasks and procedures set out in sectoral and international and national disaster management legislation related to the state supervision over transportation of dangerous goods.

Required readings:

1. UN Economic Commission for Europe: European Agreement concerning the International Carriage of Dangerous Goods by Road ADR applicable as from 1 January 2015. URL.: www.unece.org/trans/publications/dg_adr_2015.html
2. UN Economic Commission for Europe: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways URL.: www.unece.org/index.php?id=38257&L=0

Recommended readings:

1. Kátai-Urbán L.: Establisment and Operation of the System for Industrial Safety within the Hungarian Disaster Management. Ecoterra: Journal Of Environmental Research And Protection (ISSN: 1584-7071) 11: (2) pp. 27-45. (2014)
2. Horváth Hermina, Kátai-Urbán Lajos: Assessment of the Implementation Practice of Emergency Planning Regulations Dedicated to the Rail Transportation of Dangerous Goods. AARMS 12:(1) pp. 73-82. (2013)
3. Kátai-Urbán Lajos: Handbook for the Implementation of the Basic Tasks of the Hungarian Regulation on „Industrial Safety" Budapest: NKE, 2014. 73 p. (ISBN 978-615-5491-70-2)
4. Kátai–Urbán Lajos; Kiss Enikő: Inspection of the Transportation of Dangerous Goods by Inland Waterways in Hungary. AARMS (ISSN: 1588-8789) (eISSN: 1788-0017) 13: (2) pp. 261-266. (2014)

Responsible for course: Dr. Lajos Kátai-Urbán associate professor, PhD

Title of the course: Planning, organising and executing technical rescue	**Code: HKDID7229**	**Credits: 3**

Type of lessons (lecture/seminar/consultation) and learning hours: Lecture 12/4h Seminar: 12/5 h Consultation: 6/1 h

Knowledge assessment (colloquium/academic grade/ other): exam

The course place in the curricula (in which semester): 2-4 semester

Pre-subject requirements *(if any)*: *none*

Description - **Knowledge:**

Organisational elements guaranteeing first intervention, technical rescue capabilities. Their operation and typical intervention, technical rescue situations.

Educational goal of subject - **Competences:**

Developing wide knowledge about the organisation, staff and technology related to first interventions. Ability to determine the circumstances and requirements of certain situations, technical rescues.

Required readings:

1) Pántya P., Restás Á., Horváth L.: Preparing for Firefighter's Interventions during Designing Buildings: basic planning requirements in Hungary, The Main School of Fire Service Faculty of Fire Safety Engineering, VIII. International Conference "Fire Safety of Buildings", Warszawa: Szkoły Głównej Służby Pożarniczej, 2014. pp. 1-8.
2) Pántya P.: The issue of safety during the interventions of fire fighting units of disaster management, In: NISPAcee Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Presented Papers from the 22nd NISPAcee Annual Conference. Budapest, Hungary, 2014. (ISBN:978-80-89013-72-2)
3) Pántya P.: The basic equipments for protection of Hungarian firemen, Bolyai Szemle 20:(1) pp. 9-18. (2011), ISSN 1416-1443
4) Restás Á.: Chapter 11: UAVs and Firefighting, In: Jerry LeMieux: Introduction to Unmanned Systems: Air, Ground, Sea & Space: Technologies and Commercial Applications. Phoenix: Unmanned Vehicle University Press, 2013. pp. 232-245., (ISBN:978-1480150836)
5) Restás Á.: Special Decision Making Method of Internal Security Managers at Tactical Level, In: NISPAcee Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Budapest, Hungary, 2014. (ISBN:978-80-89013-72-2)

Recommended readings:

1. Pántya P., Restás Á, Horváth L.: Disaster Management of Fire Protection View of Hungary, In: A J Jordaan, Ionel Hajdu-Kinga Ivan, Agoston Restas, etc., Environmental Legislation, Safety Engineering and Disaster Management: ELSEDIMA 10th Edition: Book of Abstracts. 197 p. Romania, Cluj-Napoca: EFES, 2014., (ISBN:978-973-606-526-183-9)
2. Restás Á., Pántya P., Horváth L.: Complexity of the Firefighters' Work in Crisis Situations: from the effectiveness of fire prevention to the safety of firefighters, In: Andrea Peterkova, Riešenie krízových situácií v špecifickom prostredí: 19. medzinárodná vedecká konferencia, Žilina 2014. pp. 279-284. (ISBN:978-80-554-0872-9)

Responsible for course (name, position, degree): Dr. Péter Pántya, PhD., assistant professor

Title of the course: Basic knowledge in radiation protection and nuclear accident preparedness	**Code: HKDID7418**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): Lecture 14/4 hours / Seminar: 4/2 hours / Consultation: 2/-

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

1. Radiation protection, radiological funds, dosimetry
2. The use of radioactive materials in everyday life
3. The importance of nuclear power generation and risks
4. The radiation protection authorities, inspection services
5. Description of nuclear accidents occurring in recent decades
6. Monitoring systems in our country and in Europe
7. Emergency preparedness tools, opportunities, achievement

Educational goal of subject - Competencies:

The course students acquire knowledge of radiation protection and the radiology. Within this measurement networks, organizations responsible for radiation protection, nuclear accidents have occurred in recent decades, and the mitigation and remediation possibilities toolkit also get to know the students.

Required readings:

1. J. Shapiro, Radiation Protection, Harvard University Press Cambridge, Massachusetts, and London, England, www.ilea.ufrgs.br/radioisotopos/livroradio.pdf
2. Doe Fundamentals Handbook, Nuclear Physics And Reactor Theory, Volume 1 and 2, JANUARY 1993
   http://energy.gov/sites/prod/files/2013/06/f2/h1019v1.pdf
   http://www.steamtablesonline.com/pdf/Nuclear-Volume2.pdf

Responsible for course (name, position, scientific degree):

Dr. habil. György Pátzay, associate professor, PhD

Other teachers (name, position, scientific degree): -

Title of the course: Case studies of industrial safety	**Code: HKDID7419**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): 20/6

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

1. The definition, organisation (fields of activity, functions) of industrial safety
2. Professional evaluation of major national incidents
3. Professional evaluation of major European incidents
4. Response to incidents and the importance of (national and international) drills

Educational goal of subject - Competencies:

The course acquaints students with knowledge of industrial safety. More specifically, incidents over the last decades relevant to industrial safety are covered. Finally, students are introduced to the possibilities of interventions and the importance of drills.

Required readings:

1. Approved Code Of Practice For: Managing Hazards To Prevent Major Industrial Accidents http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/acop-managing-hazards-prevent-major-industrial-accidents/hazardac.pdf
2. Bureau of Workers Compensation (Ohio): Safety Industry Manual https://www.bwc.ohio.gov/downloads/blankpdf/Industry.pdf

Recommended readings:

1. Working Group "Leadership in Safety": Leadership in Safety Industrial Practice www.icsi-eu.org/docsi/fr/download.php?id_doc=195

Responsible for course (name, position, scientific degree): Dr. József Dobor senior lecturer, PhD

Other teachers (name, position, scientific degree):

Title of the course: Fire investigation activities	**Code: HKDID7422**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): **20/6**

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

The goal of fire inspection is data collection and reporting. The procedure of fire inspection. Related regulations of administrative procedures. The launch of a fire inspection procedure and the classification of fire incidents from the viewpoint of fire inspection. Circumstances to be examined in fire inspection. The practice of fire inspection. Different types of fire ignition and spread, their distinctive features and changes in the fire ground caused by fire extinguishment. Collaboration of fire service and police in fire inspection.

Competences:

The course acquaints students with the goal of fire inspection, the procedure of data collection and reporting. They are introduced to the procedure of fire inspection and related regulations of administrative procedures. They are acquainted with the classification of fire incidents from the viewpoint of fire inspection and circumstances to be examined in fire inspection. The course provides a theoretical background on the methodology of fire inspection and students apply it to practice. Students learn how to create a comprehensive report and a fire inspection report.

Required readings:

1. Restás Á.: R-20 Method: An approach for measuring the isolation effect of foams used fighting forest fires AARMS 11:(2) pp. 233-247. (2012)
2. Assigned firefighting and fire investigating studies

Recommended readings:

1. Restás, Á.: An Approach for Measuring the Economical Efficiency of Aerial Fire Fighting Wildfire2011: The 5th International Wildland Fire Conference: Sun City, South Africa, 09-13.05.2011.

Responsible for course (name, position, scientific degree): Dr. János Bleszity, CSc, professor

Other teachers (name, position, scientific degree): -

Title of the course: Fire prevention activities	**Code: HKDID7423**	**Credits: 2**

Type of lessons (lecture/seminar/consultation) **and learning hours** (full time training/part time training): **20/6**

Knowledge assessment (exam/academic grade): term mark

The course place in the curricula (in which semester): 2-4 semester (depends on the individual educational program)

Pre-subject requirements *(if any)*: none

Course description:

Legislation on fire prevention, legislative environment. Basic related concepts. Basic guidelines in fire prevention planning, risk-based planning. Fire safety requirements of building materials and building structures, performance indicators. Requirements of evacuation. Creating conditions for interventions. General rules for fire alarms and sprinklers. Installation and regular maintenance. Flammable liquids and melts. General fire protection rules of their use.

Competences:

This course provides students with a basic understanding of fire prevention. They receive a comprehensive and detailed overview of basic guidelines and concepts in fire protection and fire safety requirements of buildings. Students are introduced to the conditions that ensure fire interventions through practical examples. The course acquaints students with practical knowledge on fire protection equipments and rules on their installation and use.

Required readings:

1. Restás Á.: R-20 Method: An approach for measuring the isolation effect of foams used fighting forest fires AARMS 11:(2) pp. 233-247. (2012)

Recommended readings:

1. Restás, Á.: An Approach for Measuring the Economical Efficiency of Aerial Fire Fighting Wildfire2011: The 5th International Wildland Fire Conference: Sun City, South Africa, 09-13.05.2011.
2. Assigned firefighting study

Responsible for course (name, position, scientific degree): Dr. habil. Ágoston Restás associate professor, PhD,

Other teachers (name, position, scientific degree): -

Title of the course: The safety of firefighter interventions	Code: HKDID7424	Credits: 2

Type of lessons (lecture/seminar/consultation) and learning hours: 20/6

Knowledge assessment (colloquium/academic grade/ other): term mark

The course place in the curricula (in which semester): 2-4. semester

Pre-subject requirements *(if any)*: *none*

Description - **Knowledge:**

During the firefighter interventions, examining safety of intervention, including the issues of safety of victims, the intervention teams and the success of the intervention. Organizational elements guaranteeing first intervention capabilities, the circumstances of interventions, the options to improve the safety.

Educational goal of subject - **Competences:**

The knowledge of the primary interventions, situations at the scene, the first responder forces and technical opportunities. Competences to find danger sources at the different scenes, to discover the best ways of protection against them.

Required readings:

1. Pántya Péter, Restás Ágoston, Horváth Lajos: Preparing for Firefighter's Interventions during Designing Buildings: basic planning requirements in Hungary, The Main School of Fire Service Faculty of Fire Safety Engineering, VIII. International Conference "Fire Safety of Buildings", Warszawa: Szkoły Głównej Służby Pożarniczej, 2014. pp. 1-8.
2. Pántya Péter: The issue of safety during the interventions of fire fighting units of disaster management, In: NISPAcee Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Presented Papers from the 22nd NISPAcee Annual Conference. Budapest, Hungary, 2014. (ISBN:978-80-89013-72-2)
3. Pántya Péter: The basic equipments for protection of Hungarian firemen, Bolyai Szemle 20:(1) pp. 9-18. (2011), ISSN 1416-1443
4. Restás Ágoston: Chapter 11: UAVs and Firefighting, In: Jerry LeMieux: Introduction to Unmanned Systems: Air, Ground, Sea & Space: Technologies and Commercial Applications. Phoenix: Unmanned Vehicle University Press, 2013. pp. 232-245., (ISBN:978-1480150836)
5. Restás Ágoston: Special Decision Making Method of Internal Security Managers at Tactical Level, In: NISPAcee Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Budapest, Hungary,2014. (ISBN:978-80-89013-72-2)

Recommended readings:

1. Pántya Péter, Restás Ágoston, Horváth Lajos: Disaster Management of Fire Protection View of Hungary, In: A J Jordaan, Ionel Hajdu-Kinga Ivan, Agoston Restas, etc., Environmental Legislation, Safety Engineering and Disaster Management: ELSEDIMA 10th Edition: Book of Abstracts. 197 p. Romania, Cluj-Napoca: EFES, 2014., (ISBN:978-973-606-526-183-9)
2. Restás Ágoston, Pántya Péter, Horváth Lajos: Complexity of the Firefighters' Work in Crisis Situations: from the effectiveness of fire prevention to the safety of firefighters, In: Andrea Peterkova, Riešenie krízových situácií v špecifickom prostredí: 19. medzinárodná vedecká konferencia, 21.-22.máj 2014, Žilina : zborník. 1. část., Slovakia, Žilinská univerzita v Žiline, 2014. pp. 279-284. (ISBN:978-80-554-0872-9)

Responsible for course (name, position, degree): Dr. Péter Pántya, PhD., assistant professor

Other teachers (name, position, degree): Dr. Ágoston Restás, PhD., associate professor,