

Study Programme: Master academic studies of forensics			
Course Unit Title: Methods of measurement of nuclear and other radioactive material			
Course Unit Code: FM-07			
Name of Lecturer(s): Associate Professor Jovana Nikolov			
Type and Level of Studies: Master Academic Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Summer			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 6			
Prerequisites: None			
Course Aims: Understanding of the basic principles of acting in the case of nuclear or other radioactive material out of the regulatory control (MORC). Basic properties of nuclear and radioactive material and main detection techniques.			
Learning Outcomes: Upon successful finishing of this course students are able to meet the needs of forensics in the following: <ul style="list-style-type: none"> 1. detect and adequately respond to a presence of nuclear and other radioactive material on the terrain; 2. apply the obtained knowledge and understanding in the case of finding MORC; 3. appropriate use of detection techniques and handling of the nuclear or radioactive samples respecting basic principles of radiation protection (ALARA principle); 4. reliably, precisely and accurately report the results of the preliminary analysis; 5. provide basic measurements and identification of MORC. 			
Syllabus: <i>Theory</i> Interaction of ionizing radiation with matter. Biological effects of ionizing radiation. Dosimetry and dosimetry quantities and units. Radiation detectors and detection systems. Detection of neutrons. Detection of charged particles. Gamma spectrometry. Activation analysis. Destructive measuring techniques. Radiation protection. <i>Practice</i> Demonstration of radiation detectors and in-situ measurements. Laboratory work: alpha, beta and gamma emitters.			
Required Reading: 1. INTERNATIONAL ATOMIC ENERGY AGENCY, Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2006). 2. INTERNATIONAL ATOMIC ENERGY AGENCY, Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency, EPR-METHOD 2003, IAEA, Vienna (2003). 3. INTERNATIONAL ATOMIC ENERGY AGENCY, Postgraduate Educational Course in Radiation Protection and the Safety of Radiation Sources, Standard Syllabus, Training Course Series No. 18, IAEA, Vienna (2002). 4. FIRESTONE, R.B., BAGLIN, C.M., FRANK-CHU, S.Y., Table of Isotopes, 8th edn, Wiley, New York (1999).			
Weekly Contact Hours: 5 (75)		Lectures: 2 (30)	Practical work: 2+1 (30+15)
Teaching Methods: Lectures, laboratory exercises and mentoring.			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	20
Practical work	30	oral exam	10
Seminar(s)	30		