**Name of the Course :** ADB227 - Forensic CBRN

**Medium of the Course :** Turkish

**Aim of the Objective :** The aim of the course is to provide students with basic information about the definition of Chemical, Biological, Radioactive and Nuclear (CBRN) threats and the general characteristics, risks and characteristics of dirty bomb (CBRN-P) incidents in which the effectiveness of these threats is increased through improvised explosive devices, the structure of CBRN-P incidents in terms of its unique characteristics, CBRN detection and diagnosis methods, personal protective equipment and decontamination methods, participants' correct and safe crime scene investigation and management in CBRN incidents, detection and decontamination of findings.

**Level of the Course :** Master's Degree

**Type/ Content of the Course :** Elective/ The general characteristics, risks and characteristics of Chemical, Biological, Radioactive and Nuclear (CBRN) threats and dirty bomb (CBRN-P) cases, the structure of CBRN-P cases, CBRN detection and diagnosis methods, personal protective equipment and decontamination methods, correct and safe crime scene investigation and management in CBRN cases, detection and decontamination of findings, preventive intervention methods to these events constitute the content of this course.

**Credit of the Course :** 3

**Term / Weekly Hour :** Fall / 3

**Name(s)/Surname(s) of Instructors :** Dr. Lec. Neslihan KÜLAHLIOĞLU

**Contect Number of Insts. :** 05416632768

**Program Coordinator :** Prof. Dr. Gökhan İbrahim ÖĞÜNÇ

**Prerequisites :** None

**Teaching Methods :** Theoretical

**Resources :**

1. Kimyasal, Biyolojik, Radyolojik, Nükleer Tehdit ve Tehlikelere Dair Görev Yönetmeliği
2. Kimyasal Silahların Geliştirilmesi, Üretimi, Stoklanması ve Kullanımının Yasaklanması Hakkında Kanunun Uygulanmasına İlişkin Usul ve Esaslar ile Kanun Kapsamındaki Toksik Kimyasal Maddeler ve Prekürsörleri ile Farklı Kimyasal Maddelerin Bildirimlerinin Yapılması Hakkında Yönetmelik
3. Tehlikeli Maddelerin Karayoluyla Taşınması Hakkında Yönetmelik
4. Nükleer Tesislerin ve Nükleer Maddelerin Emniyetine İlişkin Yönetmelik
5. Radyoaktif Maddenin Güvenli Taşınması Yönetmeliği
6. Radyasyon Acil Durumlarının Yönetimine Dair Yönetmelik
7. CBRN Crime Scene Management: A Guide by the Organisation for the Prohibition of Chemical Weapons (OPCW)
8. Practical Crime Scene Investigations for Hot Zones By Jacqueline T. Fish, Robert N. Stout, Edward Wallace
9. Field Confirmation Testing for Suspicious Substances by Rick Houghton
10. Strengthening Crime Scene Forensics Capabilities in Investigating CBRN Incidents, Dutch National Institute for Public Health and the Environment (RIVM)
11. The Science and Technology of Counterterrorism: Measuring Physical and Electronic Security Risk, Carl S. Roper

**WEEKLY TOPICS**

|  |  |
| --- | --- |
| **Weeks** | **Units** |
| **1** | **Introduction and Conceptual Framework of Forensic CBRN Science**1. CBRN Threats
2. Chemical, Biological, Radiological, Nuclear Events
3. Intersection of Forensic Sciences and CBRN Events
4. Investigation of Past CBRN Incidents in terms of Forensic CBRN
 |
| **2** | **Chemical Phenomena-I**Chemical Warfare Agents, Classification, Physicochemical Properties, Physiological Effects and Tactical Approach1. Nerve Agents
2. Caustic Agents
3. Choking Agents
4. Blood Poisoning Agents
 |
| **3** | **Chemical Phenomena-II**1. Mayhem Control and Capacity Disruption Agents

Environmental and Biological Residues of Chemical Warfare Agents1. Environmental Residues of Chemical Warfare Agents

Residues of Chemical Warfare Agents in Biological Fluids |
| **4** | **Incidents caused by Toxic Industrial Chemicals and Dangerous Goods Transport**Toxic Industrial Chemicals 1. Classification of Toxic Industrial Chemicals and ERG
2. Forensic Approach to Toxic Industrial Chemical Incidents

Dangerous goods1. Chemical Risks in Dangerous Goods Transport
2. Forensic Approach to Dangerous Goods Transport Incidents
3. Toxic Industrial Accident Scenario Study
4. Dangerous Goods Transport Accident Scenario Study
 |
| **5** | **Biological Events**1. Biological Threats and Hazards
2. Bioterrorism
3. Biocide
4. Biological Warfare Agents and Classification
5. Forensic Approach to Biological Events
 |
| **6** | **Radiological and Nuclear Events in the Perspective of Nuclear Forensic Science:** Nuclear Forensic Science Radiological and Nuclear Events1. Types of Radiation
2. Properties of ionising radiation and its effects on health
3. Radiation Dose Measurement Units and Dosimeters
4. Radiation Detection Systems
5. Radiation Protection Principles
6. Storage and Disposal of Radioactive Waste
7. Nuclear Weapon / Dirty Bomb: Differences, Characteristics, Effects
8. Nuclear Power Plant Accidents and Nuclear Safety
9. National Radiation Emergency Plan (URAP)
 |
| **7** | ***Midterm*** |
| **8** | **CBRN Protection Systems: Personal Protective Equipment**1. Personal Protective Equipment (PPE)
2. Respiratory Protection
3. Air Purifying Respirators (APR)

 Negative Pressure APR Positive Pressure Air Purifying Respirators (PAPR)1. Self-Contained Breathing Apparatus (SCBA)
2. Air Supplied Breathing Apparatus
3. Skin Protection
4. Levels of Personal Protective Equipment
	1. Level A
	2. Level B
	3. Level C
	4. Level D
5. Proper donning and doffing procedures of personal protective equipment
6. Importance of Personal Protective Equipment in CBRN Crime Scene Investigation
 |
| **9** | **Decontamination** 1. Decontamination
2. Decontamination Methods
3. Decontaminants
4. Types of Decontamination
5. Personal Decontamination
6. Mass Decontamination
7. Technical Decontamination
8. Evidence and Equipment Decontamination
9. Importance of Decontamination in CBRN Events
 |
| **10** | **Detection and Diagnosis in CBRN Events**1. CBRN Detection Technologies
2. Point Detection Systems
3. Remote Detection Systems
4. Methods of Identifying Agents in CBRN Events
5. Laboratory Analysis Methods
6. On-Scene Identification
7. Portable Diagnostic Kits and Devices
 |
| **11** | **CBRN Crime Scene Investigation: Collection, Packaging, Labelling, Reporting and Safe Transport of Evidence**1. CBRN Evidence Collection Protocols and Equipment Used
2. Protocols and Equipment for Visible Suspicious Chemical Liquid Residue Collection on Non-Porous and Porous Surfaces
3. Protocols and Equipment Used for Suspicious Chemical Liquid in the Container
4. Biological Suspicious Dust Protocols and Equipment Used on Non-Porous and Porous Surfaces
	* 1. Dry Swab Protocol
		2. Wet Swab Protocol
5. Radiological and Nuclear Evidence Collection Protocols and Equipment
6. CBRN Sample Packaging and Labelling
7. Chemical Evidence Packaging
8. Packaging of Biological Evidence
9. Packaging of Radiological and Nuclear Evidence
10. Reporting of CBRN Crime Scene Investigation
11. Safe Transport of CBRN Evidence
 |
| **12** | CBRN-related National Legislation and Regulations and International Agreements |
| **13** | **CBRN Crime Scene Management**1. Components of CBRN Crime Scene Management
2. Duties and Responsibilities of Institutions and Organisations Taking Part in CBRN Crime Scene
3. Duties and Responsibilities of Law Enforcement Officers at CBRN Crime Scene
 |
| **14** | CBRN Crime Scene Investigation Scenario Study and Evaluation |
| **15** | ***Final*** |

**EVALUATION SYSTEM**

|  |  |  |
| --- | --- | --- |
| **Semester Studies** | **Number** | **Contribution Margin %** |
| **Attandence** | 14 | 10 |
| **Quiz** | - | - |
| **Midterm** | 1 | 30 |
| **Practice** | - | - |
| **Project** | - | - |
| **Assignment / Presentation** | 1 | 30 |
| **Final** | 1 | 30 |
| **Total** |  | 100 |

**ECTS / WORKLOAD TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **ACTIVITES** | **NUMBER** | **DURATION****(Hour)** | **Total workload (Hour)** |
| **Theoretical Course (+Practice)** | 14 | 3 | 42 |
| **Duration of Out-of-Class Study** | 14 | 3 | 42 |
| **Presentation/Seminar Preparation** | - | - | - |
| **Project** | - | - | - |
| **Assignments** | 1 | 22 | 22 |
| **Midterm**1. **Exam**
2. **Individual Study For The Exam**
 | 1 | 20 | 20 |
| **Final**1. **Exam**
2. **Individual Study For The Exam**
 | 1 | 24 | 24 |
| **Total workload (hours)** | 31 | 72 | 150 |
| **ECTS Credit of The Course (Total workload (hours) / 25)**  |  |  | **6** |

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| **No.** | **Explanation** |
| **O1** | Understands chemical, biological, radiological and nuclear threats. Learns the conceptual framework of the intersection of CBRN events and forensic sciences. Understands how past CBRN incidents have been examined in terms of forensic sciences. Comprehends how CBRN incidents are handled legally within the scope of CBRN-related National Legislation and Regulations and International Agreements. |
| **O2** | Recognises and classifies chemical warfare agents. Learns the tactical approach according to the physicochemical properties of chemical warfare agents when used as weapons of mass destruction and their effects on the environment and human beings. |
| **O3** | Understands toxic industrial chemicals and comprehends the forensic approach to dangerous goods transport incidents. |
| **O4** | Biological threats and hazards, bioterrorism and bioterrorism and bioterrorism, bioterrorism and bioterrorism, biological warfare agents, and forensic approach to biological events through past events. |
| **O5** | Learns radiological and nuclear events. Understands the types of radiation, the properties of ionising radiation and the effects of radiation on health. Understands the systems used for the detection of radiation and gains the ability to evaluate. Understands the principles of radiation protection and develops the ability to apply. Learns safe storage and disposal methods of radioactive wastes. Gains the ability to evaluate the differences between nuclear weapons and dirty bombs, their properties and potential effects. Understands the possible causes of nuclear power plant accidents and nuclear safety measures. Understands the National Radiation Emergency Plan (URAP) and learns its duties and responsibilities. |
| **O6** | Personal Protective Equipment (PPE) learns the properties of equipment used in respiratory and skin protection. Understands the levels of PPE. Understands the ability to apply the correct donning and doffing procedures of PPE. |
| **O7** | Defines CBRN decontamination, defines different decontamination methods and explains how they are applied. Understands the properties and uses of various decontaminants. Understands the appropriate procedures for PPE decontamination and how to carry out decontamination of mass or large areas, decontamination of equipment and equipment; also determines the necessary procedures for decontamination of forensic evidence and equipment. Emphasise the importance of proper decontamination in CBRN incidents and gain the ability to assess the impact on public health, safety and forensic processes. |
| **O8** | Understand CBRN detection technologies, point and remote detection systems and how they are used. Learn how to use laboratory analysis methods to identify agents found in CBRN incidents and how to use portable diagnostic kits and devices at the scene. |
| **O9** | Understands the collection, packaging, labelling, labelling, reporting and safe transport of evidence within the scope of CBRN crime scene investigation. Learns CBRN evidence collection protocols and equipment used. Gains the ability to apply visible suspicious chemical liquid residue on non-porous and porous surfaces, suspicious chemical liquid in the container, biological suspicious dust protocols on non-porous and porous surfaces and the equipment used for these protocols. Gains the ability to comprehend and apply especially dry and wet swab protocols. Also, learns radiological and nuclear evidence collection protocols and the equipment used. Understands the importance of packaging, labelling, reporting and safe transport of chemical, biological and radiological / nuclear evidence. |
| **O10** | Knows the National Legislation and Regulations and International Agreements related to CBRN. Understands the national legislation and regulations for CBRN incidents and gains the competence to evaluate the applicability of these legislation and regulations in the management of CBRN incidents. In addition, by understanding the role and importance of international agreements in the field of CBRN, it understands how these agreements are integrated with national legal regulations and develops the ability to use this information effectively in CBRN incidents. |
| **O11** | Understands CBRN crime scene management and the components of CBRN crime scene management. Have the competence to define the necessary steps for an effective CBRN crime scene management. Understand the duties and responsibilities of the institutions and organisations involved in the CBRN crime scene in detail and explain the roles of these institutions in the crime scene management process. In addition, by understanding the duties and responsibilities of law enforcement officers at the CBRN scene, they gain the ability to apply this information effectively in ensuring scene security and coordination with other institutions. |
| **O12** | With CBRN Crime Scene Investigation Scenario Study, it has the competence to apply the CBRN crime scene investigation process in practice through realistic scenario studies. By analysing these scenarios, they gain the ability to effectively carry out evidence collection, packaging, labelling, reporting and safe transport processes at the scene. In addition, by evaluating the difficulties encountered during scenario studies, they can improve their strategic decision-making and problem-solving skills in crime scene management. |

**PROGRAM QUALIFICATIONS**

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| **No.** | **Explanation** | **Contribution Level of the Course** |
| **0** | **1** | **2** | **3** | **4** | **5** |
| **P1** | To have a understanding of forensic science ethics and protection of personal data |  |  |  |  | X |  |
| **P2** | To have a knowledge of the principles and techniques of scientific research. |  |  |  |  | X |  |
| **P3** | To reach proficiency about the effects of forensic sciences on ensuring the rule of law. |  |  |  |  | X |  |
| **P4** | To have theoretical and practical knowledge in the fields of Forensic Science Investigation. |  |  |  |  |  | X |
| **P5** | To recognise the importance of using forensic science methods in criminal investigations. |  |  |  |  | X |  |
| **P6** | To have command of crime scene investigation techniques and forensic photography principles. |  |  |  |  | X |  |
| **P7** | To understand the importance of crime scene investigation process in criminal investigations |  |  |  |  |  | X |
| **P8** | To apply the developments in the fields of positive science to the fields of criminalistics. |  |  |  | X |  |  |
| **P9** | To know and apply the hierarchy of forensic sciences, which are multidisciplinary and interdisciplinary, and their relations with each other. |  |  |  |  | X |  |
| **P10** | To have basic theoretical and practical knowledge in at least one of the fields of criminalistics. |  |  |  |  | X |  |
| **P11** | To be able to relate the results of reports prepared by forensic science laboratories to the criminal investigation by reasoning. |  |  |  |  |  | X |
| **P12** | To recognise the legal responsibilities of the expert witness and to internalise the ethical rules. |  |  |  |  | X |  |

**CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM PROFICIENCY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **All** | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** | **P7** | **P8** | **P9** | **P10** | **P11** | **P12** |
| **O1** | **4** | **3** | **5** | **5** | **4** | **1** | **5** | **5** | **3** | **4** | **4** | **3** |
| **O2** | **3** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **3** | **4** | **3** | **2** |
| **O3** | **3** | **4** | **3** | **4** | **5** | **5** | **5** | **5** | **3** | **3** | **3** | **2** |
| **O4** | **3** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **3** | **3** | **3** | **2** |
| **O5** | **2** | **1** | **2** | **5** | **1** | **3** | **3** | **2** | **4** | **4** | **4** | **2** |
| **O6** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **2** | **2** | **2** | **2** |
| **O7** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **5** | **5** | **3** | **2** |
| **O8** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **5** | **5** | **3** | **2** |
| **O9** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **5** | **5** | **3** | **2** |
| **O10** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **4** | **4** | **4** | **4** |
| **O11** | **3** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **4** | **4** | **5** | **2** |
| **O12** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **5** | **3** |

 **0- None 1- Very Low 2- Low 3- Moderate 4- High 5- Very High**

Dr. Lec. Neslihan KÜLAHLIOĞLU

**.../…/2024**

**Prof.Dr. Gökhan İbrahim ÖĞÜNÇ**

**Director of the Institute of Forensic Sciences**