



Academic Years 2019-20 and 2020-21  
Fifth Edition



# TIMELINE

International Master Course in  
“Protection Against CBRNe Events”

120 ECTS

1<sup>st</sup>

# Level Course - BASIC

for “CBRNe First Responders”

Official Course Language ENGLISH

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## COURSE DESCRIPTION – 1<sup>st</sup> Level (BASIC) CBRNe Master

The evolution of Safety and Security threats and their increase at an international level place remarkable focus on the improvement of emergency systems to deal with crises, including those connected to ordinary and non-conventional events (Chemical, Biological, Radiological, Nuclear, and explosive). In every industrial country there are multiple entities with specialized teams in very specific fields, but the complexity of the events requires professionals that not only have specific CBRNe know-how, but also expertise in relevant areas.

Given the global interest in these issues, the Department of Industrial Engineering and the Faculty of Medicine and Surgery of the University of Rome Tor Vergata organize the international Master Courses in “Protection against CBRNe events”: 1<sup>st</sup> Level Master Course in “Protection against CBRNe events” (120 ECTS) and 2<sup>nd</sup> Level Master Course in “Protection against CBRNe events” (60 ECTS).

These courses aim at providing attendees with comprehensive competences in the field of CBRNe Safety and Security, through teaching and training focused on real needs.

Both Master Courses are designed according to the spirit of the Bologna Process for Higher Education, the Italian law and educational System.

- The Master Courses are organised also in cooperation with: [LINK](#).
- The Master Courses are sponsored by: [LINK](#).
- The training centers cooperating with the Master Courses are: [LINK](#).

**The 1<sup>st</sup> level Master Course has officially granted the “NATO selected” status**

**The 1<sup>st</sup> level Master Course has been included in the NATO Education and Training Opportunities Catalogue (ETOC)**

**The 1<sup>st</sup> level Master Course is officially supported by OPCW through a Cooperation agreement**

**The 1<sup>st</sup> level Master Course is officially part of the CEPOL Training Network**

- The Master Course Directive Board is composed by: [LINK.](#)
- The Master Course Didactic Board is composed by: [LINK.](#)
- The Master Course Scientific Board is composed by: [LINK.](#)

The 1<sup>st</sup> Level Master Course aims at providing participants with appropriate technical, cognitive and operational skills in order to educate and train key figures in the field of CBRNe risk. In order to participate to the Master Course and obtain the official title, candidates must have a 180-ECTS Bachelor degree or equivalent. “Equivalence” of degrees such as Military, Police, Fire-fighter Academy degrees etc., will be assessed on a case-by-case basis by the University competent bodies and the Master Course Steering Committee.

This Course aims at training professional “CBRNe First Responders”.

At the end of Course, attendees will obtain a “1st Level Master Course in Protection Against CBRNe Events (120 ECTS)” degree.

The most important private entities operating in the CBRNe safety and security field support the Master Course with their expertise, are involved in the didactic activities through their experts and host the students for the period of the stage.

Among our lecturers there are also subject matter experts from the University of Rome Tor Vergata and from all the entities officially involved in the Master Course activities.

Classroom lessons are complemented with: laboratory activities, case studies to be dealt with by working groups, visits, internships at collaborating international entities, and the preparation of the Master thesis (the best ones will be selected for publication in scientific journals).

Please, **note that the modules may be subjected to a few changes** (dates, numbering of the modules, etc.) according to the availability of the lecturers involved and of the training centres cooperating with the Master Course.

**You can visit the website of the Master**

**([www.mastercbrn.com](http://www.mastercbrn.com))**

**to see all the initiative connected to our courses.**

## PHASE 1 – MODULES

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### MODULE 1 – CBRNe threats between past and current challenges

*30 March - 3 April 2020 (E-learning)*

The aim of the introductory module is to provide a preliminary and common CBRNe background to the attendees. It supplies information about roles and competences of first responders in case of CBRNe events, focusing on the best practices and international emergency response scenarios. This module will also provide a comprehensive overview of the different aspects relevant to CBRNe events prevention and response. The attendees will be introduced to the Civilian and the Military reference frameworks and they will familiarize with the concept of operational and tactical level.

#### MODULE 1 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

##### CBRNe EVENTS - OVERVIEW

By the end of the module, the student should be able to illustrate the main characteristics and effects of a CBR agents release and the principles to take into consideration for the first response in case of CBRNe events.

##### TEACHING POINTS

- Introduction to the 1<sup>st</sup> Level CBRNe mastercourse/Introductory Module
- CBRNe: introduction to the threat
- CBRNe and Terrorism (terrorism awareness and CBRN Terrorism building on the awareness
- CBRNe terminology
- CBRNe in Military environment
- CBRNe in Civil Defense environment
- CBRNe: the NATO doctrine
- CBRNe in Law Enforcement environment
- Who is a first responder - Roles and Duties
- CBRNe and Medical First Response

## **MODULE 2 – B Agents. Biological Warfare Agents, history, current challenges, properties, case study**

*06-10 April 2020 (E-learning)*

Module 2 provides information on biological agents and their implication in Biological Warfare Agents production and use, natural outbreaks, epidemics, pandemics and consequences for first responders. Detection, decontamination and protective equipment for first responders are among the topics addressed. Finally, part of the didactic activity will focus on specific case studies for the analysis of gaps and best practices.

### **MODULE 2 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS**

#### **B AGENTS and EVENTS - OVERVIEW**

By the end of the module, the student should be able to illustrate the main characteristics and effects of B agents release and principles.

#### **TEACHING POINTS**

- Biological risk - Generality
- Biological Convention - Generality
- Biological agent - Type and Characteristic
- Physical protection and decontamination in B environment
- Identification and detection of biological agents
- Biological laboratory – Types, characteristics and security level
- Bio-containment transport
- First response during a BIO event (case study)
- Bio sampling procedures – Lab. activities
- Ebola Outbreak (Case Study)

## **MODULE 3 – C Agents (P2). HazMat, TIM and Chemical Warfare Agents introduction, history, chemical / physical properties, ERG introduction**

*15-19 June 2020 (E-learning)*

This module introduces the chemical risk related both to conventional (industrial or man-made incidents) and unconventional events. It provides a description of the different agents, their way of action, prevention and treatment. The module also investigates the international regulation related to the illicit production and use of chemicals as weapons as well as other regulations on the production, use and transportation of chemical agents and their precursors.

### **MODULE 6 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS**

#### **C AGENTS and EVENTS**

By the end of the module, the student should be able to illustrate the main characteristics and effects of C agents release and principles.

#### **TEACHING POINTS**

- Chemical risk – Generality
- Chemical Weapon Convention – Generality
- Chemical Warfare agent- Types and characteristics
- Toxic Industrial Materials and Toxic Industrial Components
- Hazmat
- ERG introduction

## MODULE 4 – DSS, Software

22-26 June 2020 (E-learning)

Decision Support Systems are a key tool in the hands of first responders and decision makers. First responders have the duty to report information that are crucial for providing input data to DSS that will be used by decision makers to manage the scenario. Through module 10, attendees will familiarize with different software for CBRNe hazards prediction, CBRN agents diffusion and disaster management. They will get to know the related limits and opportunities and will also practice on some of these tools to understand their working principle. The module will end with Team Technical Report (with supervision of university experts for every team).

### MODULE 4 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

#### DECISION SUPPORT SYSTEM

The student will learn to use free license tools for CBRNe events numerical prediction.

#### TEACHING POINTS

- Generality on CBRN Prediction
- Meteorology
- Dispersion models
- What is a DSS software
- Hot-Spot
- HALOA
- WISER
- CBRN-Analysis-overview



## MODULE 5 – R/N Agents. Radiological and nuclear agents awareness, industry, medical & military

21-25 September 2020 (University of Rome Tor Vergata- SOGIN) *dates to be confirmed*

The purpose of this module is to give a detailed definition of radiological and nuclear agents and the associated risks arising from the conventional and unconventional use of such agents. The key objectives are to understand clearly the differences between Radiological and Nuclear risks, and achieve a good knowledge of dosimetry and bio-dosimetry. The attendees will also acquire theoretical and practical skills on techniques and instruments for radiological detection and identification, and will familiarize with protective equipment and decontamination procedures for first responders and victims. Finally, the attendees will receive background information on the international regulatory framework concerning nuclear and radiological agents use, transport and stockpiling.

### MODULE 5 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

#### R/N AGENTS, EVENTS AND OPERATIONS - OVERVIEW

By the end of the module, the student should be able to illustrate the main characteristics and effects of RN agents release and principles.

#### TEACHING POINTS

- Nuclear and Radiological Risk – Generality, Hazmat awareness and DGR, ADR, IATA, ICAO.
- Ionizing Radiation characteristics
- Nuclear weapon/Dirty Bomb - Differences, characteristics, effects
- Introduction of R/N effects on human body
- Generality on Radioprotection
- The Dosimeter - Type, characteristics and practical use
- Principles of detection
- Physical protection and decontamination in radiological environment
- Storage and disposal of radioactive waste
- Transport of radioactive material and irradiated nuclear fuel
- First response in dirty bomb incident (case study)
- First response in nuclear plant incident (case study)

## **MODULE 6 - C Agents: Chemical Warfare Agents detection, protection and decontamination operations**

30 November – 4 December 2020 (OPCW- The Hague-Netherlands) *dates to be confirmed*

Attendees will familiarize with the techniques and instruments for the detection, sampling and identification of chemical agents, risks for first responders and exposed personnel, personal and collective protective equipment and decontamination.

### **MODULE 6 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS**

#### **C AGENTS DETECTION, PROTECTION AND DECONTAMINATION**

By the end of the module, the student should be able to illustrate the main procedures and products to identify or detect C agents, protect and decontaminate.

#### **TEACHING POINTS**

- Detection and Identification techniques and methods for C agents
- Detection and Identification systems for C agents
- PPE: Personal Protection Equipment
- CBRNe suits, gas masks and filters: how and when use this device
- CPE: Collective Protection Equipment
- Tactical procedure on use of PPE
- Decontamination techniques
- Decontamination products
- How to decontaminate in operative scenario
- First response during a chemical event (case study)

## **MODULE 7 – Communication and Psychology**

*7- 12 December 2020 (University of Rome Tor Vergata)*

Communication and psychology are key issues to help to prevent, face and manage CBRNe events and their consequences on population as well as operators on the field. First responders are the first to arrive on the scene and are those who will have a direct contact with the victims of a CBRNe event as well as with the components of other teams on the hotspot. Having a good knowledge of the issues affecting psychology and communication at operational and tactical level are key components of an effective response.

### **MODULE 7 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS**

#### **PRINCIPLE AND TECHNIQUES OF COMMUNICATION**

The student will learn the main techniques and methods to communicate and investigate in case of CBRNe events.

#### **TEACHING POINTS**

- Cognitive psychology
- Analysis and evaluation of threats
- Communications skills
- Communication techniques
- Difference between communication of a journalist, a decision makers a first responders with the population

## **MODULE 8 – Medical Countermeasures, CBRNe First Aid**

*8-12 March 2021 (University of Rome Tor Vergata)*

Module 7 deals with medical aspects related to CBRNe events ranging from first aid to best practices and protocols for the management of medical CBRNe emergencies. This module is not only dedicated to professionals already working in the medical field but, first and foremost, to provide all the first responders with a clear overview of the mechanism governing the response to a CBRNe events from a medical point of view. This aspect is crucial to smoothen cooperation between first responders working in and out of the potentially contaminated area in close contact with health care personnel.

### **MODULE 8 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS**

#### **FIRST AID AND MEDICAL COUNTER MEASURES**

The student will learn the main principles of medical first AID in case of CBRNe events.

#### **TEACHING POINTS**

- Hazardous material epidemiology: Hazmat happens
- Hospital CBRNe preparedness
- Department of Health competences in Hazmat/CBRNe events and the National Antidotes Stockpile (SNA)
- Establishing and organizing a Hazmat/CBRNe Response Team
- Medical management of Hazmat Victims
- Medical management of victims of a Chemical warfare agents event
- Medical Management of Radiological Event Victims
- Medical Management of Biological Event Victims

## MODULE 9 – Investigation in case of CBRNe events

*15-19 March 2021 (University of Rome Tor Vergata)*

Investigation will be addressed in this module, to gain awareness on investigative requirements on the scene of a CBRNe event (be it of natural, industrial or malevolent cause), and minimize the impact of first responders operations on investigative issues. Practical activities will complement frontal lessons.

### MODULE 9 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

#### PRINCIPLE AND TECHNIQUES OF INVESTIGATION

The student will learn the main techniques and methods to investigate in case of CBRNe events.

#### TEACHING POINTS

- Investigation techniques
- Investigation activities and methods
- Hot zone: CBRNe first responders and police officers rules
- Intelligence skills
- Lab. Activities to learn investigation fundamentals - Practical investigations scenarios

## MODULE 10 – e Agents, CBR IED and EOD, challenges and case studies

22-26 March 2021 (University of Rome Tor Vergata)

Module 4 relates to the use of explosives as a mean to spread Chemical, Biological and Radiological agents. This module provides a technical overview of the different explosive agents and precursors, and information that are relevant for first responders, including their interplay with explosives professionals from civilian and military organizations.

### MODULE 10- LEARNING OBJECTIVES AND MAIN TEACHING POINTS

#### EXPLOSIVES

By the end of the module, the student should be able to illustrate the main characteristics and effects of explosives.

#### TEACHING POINTS

- Explosives – Military and Civilian – an overview about them from history and media
- Explosives Ordinance Disposal (EOD)
- Improvised Explosives Devices (IED)
- Dirty Bombs (DB)
- Toxic Industrial Materials (TIM) and Toxic Industrial Chemicals (TIC)
- Home Made Explosives (HME) and Precursors
- Explosive detection
- Disposal operation and render safe procedures – EU rules – Legal rules

## PHASE 2 – TRAINING ACTIVITIES

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### 4 Weeks of Training Activities

*September – November 2020*

The training activities will be scheduled in 4 weeks in 4 of the International Training Facilities in cooperation with the Master Course listed here below:

- [Joint Chemical, Biological, Radiological and Nuclear Defence Centre of Excellence \(JCBRN Defence COE\)](#)
- [Scuola Interforze per la Difesa Nbc](#)
- [Chornobyl Centre](#)
- [Voyenský Výzkumný Ústav](#)
- [Seibersdorf Laboratories](#)
- [ICI International CBRNe Institute](#)
- [Vinča Institute of Nuclear Science](#)

The Directive Board will choose the 4 training centers in 2020 (September- November) according to their availability.

## PHASE 3 – INTERNSHIP AND THESIS

### INTERNSHIP

*April- September2021*

The internship can be requested in one of the Institutions/Entities cooperating with the International Master Courses in Protection against CBRNe events.

### FINAL THESIS

*November - December 2021*

Students shall attend at least 80% of all classes, lectures and activities.

At the end of the Master Course, only the students who have attended at least 80% of all classes, lectures and activities, have passed the Module-related exams as well as the final exam (with Thesis dissertation), and have duly paid all fees and charges, shall obtain the educational qualification: “**1<sup>st</sup> level University Master Course in Protection against CBRNe Events (120 ECTS)**” (Master Universitario di I livello in Protezione da Eventi CBRNe, under the Italian L

### REMEDIAL SESSIONS

*May 2021*

*Jun 2021*

*July 2021*

*September 2021*



**SECRETARIAT OF THE INTERNATIONAL MASTER COURSES IN  
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