Università di Roma Tor Vergata

MASTER CBRNe

Chemical, Biological, Radiological, Nuclear and explosive

Department of Industrial Engineering and School of Medicine and Surgery

A.Y. 2017-18 and **2018-19** | Eighth Edition

TIMELINE

International Master Course in

"Protection Against CBRNe Events"

120 ECTS

1st Level Course - BASIC

for **"CBRNe First Responders"**

Official Course Language **ENGLISH**

INDEX

COURSE DESCRIPTION

1st 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 crisis, 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": 1st Level Master Course in "Protection against CBRNe events" (120 ECTS) and 2nd 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 organized also in cooperation with: LINK.
- The Master Courses are sponsored by: LINK.
- The training centers cooperating with the Master Courses are: LINK.

The 1st level Master Course has officially granted the "NATO selected" status

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

The 1st level Master Course is officially supported by OPCW through a Cooperation agreement

The 1st level Master Course is officially part of the CEPOL (European Police College) Training Network

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Phone: 0039 0672597201 - Mail Address: info@mastercbrn.it – Website: www.mastercbrn.com

- **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 1st 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.

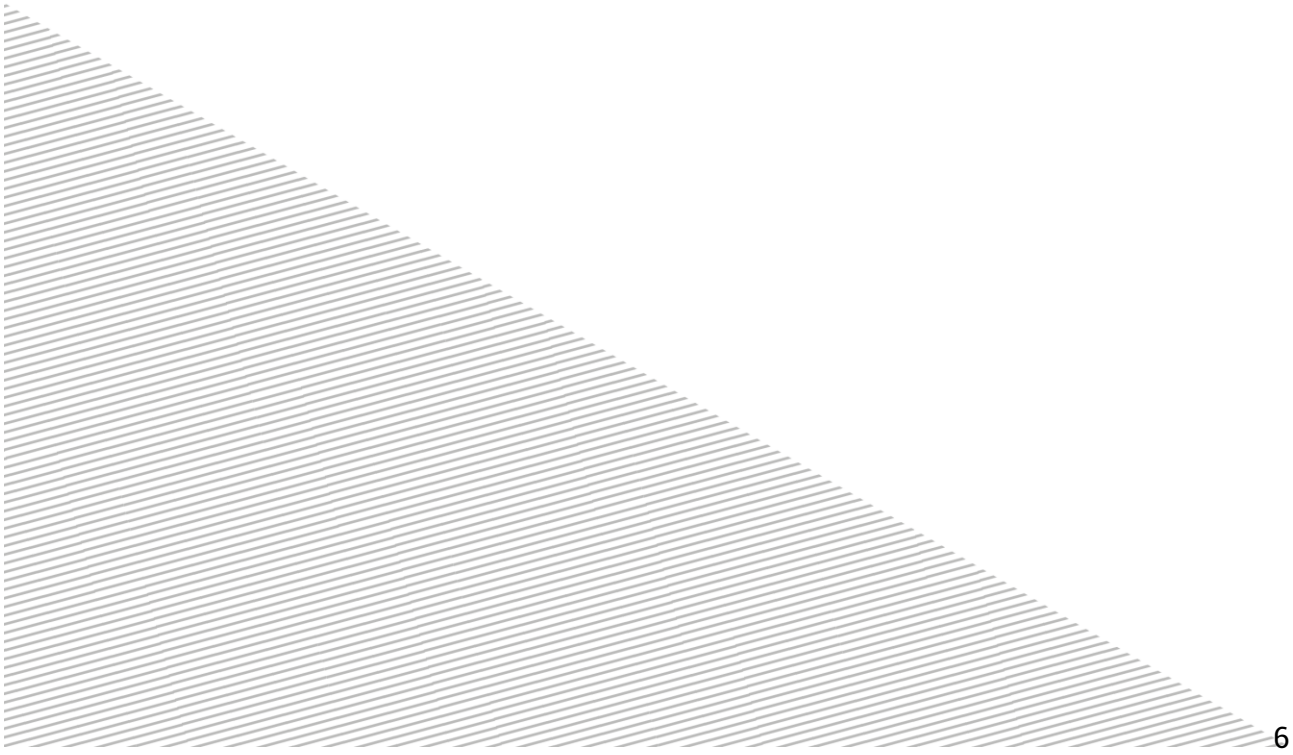
The most important private entities operating in the CBRNe safety and security field support the Master Course with their expertise, are involved in the didactic activities through their experts and hostthe students for the period of the stage.

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).

You can visit the website of the Master
(www.mastercbrn.com)
to see all the initiative connected to our courses.

PHASE 1 - MODULES



Module 0A

CBRNe harmonization, CBRNe main bodies intro: OPCW, NATO, UNICRI and non-proliferation intro (optional)

20-24 November 2017 (University of Rome Tor Vergata)

The aim of the module is to provide a harmonization about the fundamental concepts onCBRNe,

MODULE 0A - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LH 0A – CBRNe harmonization		
	By the end of the module, the students should be able to have a proper knowledge about the CBRNe meaning (from a civil and military point of view), they will learn the basic concepts about protection and prevention and they will know about the main international bodies operating in the sector.		
	Teaching Point	**Method**	**References and Notes**
	○ *CBRNe concepts*	*Individual Study*	*E-learning platform Docs*
	○ *CBRNe: military and civil perspectives*	*Individual Study*	*E-learning platform Docs*
	○ *CBRNe main Bodies*	*Individual Study*	*E-learning platform Docs*
	○ *Non proliferation concepts*	*Individual Study*	*E-learning platform Docs*

MODULE 0B

CBRNe subject from an academic discipline, technical reports, thesis, research (optional)

27-30 November 2017 (University of Rome Tor Vergata)

The aim of the module is to provide a to teach to the candidates the CBRNe glossary and harmonize the level of English. The students will be introduced also to the CBRNe academic concepts and they will learn how to write a tech report, a thesis and how to do bibliographic research.

MODULE 0B - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LH 0B – CBRNe : the academic point of view		
	By the end of the module, the students should be able to have an introduction on how use the CBRNe tech terms and how to prepare tech reports and write the final thesis.		
	Teaching Point	**Method**	**References and Notes**
	○ *CBRNe Glossary*	*Individual Study*	*E-learning platform Docs*
	○ *English harmonization*	*Classroom activities*	*E-learning platform Docs*
	○ *Tech reports preparation*	*Classroom activities*	*E-learning platform Docs*
	○ *Thesis preparation*	*Classroom activities*	*E-learning platform Docs*

MODULE 1

CBRNe threats between past and current challenges

15-19 January 2018 (University of Rome Tor Vergata)

The aim of the introductive 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

	LO 1 – CBRNe EVENTS - FUNDAMENTALS		
	By the end of the module, the students 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 Point	**Method**	**References and Notes**
	1.1 Introduction to the 1st level CBRNe master course/Introductive Module	*Individual Study*	*E-learning platform Docs* *Notes from the lecturers*
	1.2 CBRNe: introduction to the threat	*Individual Study*	
	1.3 CBRNe and Terrorism (terrorism awareness and CBRN Terrorism building on the awareness	*Individual Study*	
	1.4 CBRNe terminology	*Individual Study*	
	1.5 CBRNe in Military environment	*Individual Study*	
	1.6 CBRNe in Civil Defense environment	*Individual Study*	
	1.7 CBRNe: the NATO doctrine	*Individual Study*	
	1.8 CBRNe in Law Enforcement environment	*Individual Study*	
	1.9 Who is a first responder - Roles and Duties	*Individual Study*	
	1.10 CBRNe and Medical First Response	*Individual Study*	

MODULE 2

C AGENTS (P1). HazMat, TIM and Chemical Warfare Agents introduction, history, chemical / physical properties, ERG introduction

22-26 January 2018 (University of Rome Tor Vergata)

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 2 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 2 – C AGENTS and EVENTS		
	By the end of the module, the students should be able to illustrate the main characteristics and effects of C agents release and principles		
	Teaching Point	**Method**	**References and Notes**
	2.1 Chemical risk – Generality	*Individual Study*	*E-learning platform Docs*
	2.2 Chemical Weapon Convention – Generality	*Individual Study*	*Notes from the lecturers*
	2.3 Chemical Warfare agent- Types and characteristics	*Individual Study*	
	2.4 Toxic Industrial Materials and Toxic Industrial Components	*Individual Study*	
	2.5 Hazmat	*Individual Study*	
	2.6 ERG introduction	*Individual Study*	

MODULE 3

C AGENTS (P2). Chemical warfare agents detection, protection and decontamination operations

16-20 April 2018 (University of Rome Tor Vergata)

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 3 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 3 – C AGENTS DETECTION, protection and decontamination		
	By the end of the module, the students should be able to illustrate the main procedures and products to identify or detect C agents, protect and decontaminate		
	Teaching Point	**Method**	**References and Notes**
	3.1 Detection and Identification techniques and methods for C agents	*Individual Study*	*E-learning platform Docs* *Notes from the lecturers*
	3.2 Detection and Identification systems for C agents	*Individual Study and lab. activities*	
	3.3 PPE: Personal Protection Equipment	*Individual Study*	
	3.4 CBRNe suits, gas masks and filters: how and when use this device	*Individual Study and class training test*	
	3.5 CPE: Collective Protection Equipment	*Individual Study*	
	3.6 Tactical procedure on use of PPE	*Individual Study*	
	3.7 Decontamination techniques	*Individual Study*	
	3.8 Decontamination products	*Individual Study*	
	3.9 How to decontaminate in operative scenario	*Individual Study*	
	3.10 First response during a chemical event (case study)	*Group activities in class*	

MODULE 4

B AGENTS. Biological warfare agents, history, current challenges, properties, case study

23-27 April 2018 (University of Rome Tor Vergata)

Module 4 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 4 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 4 – B AGENTS and EVENTS - FUNDAMENTALS		
	By the end of the module, the students should be able to illustrate the main characteristics and effects of B agents release and principles		
	Teaching Point	**Method**	**References and Notes**
	4.1 Biological risk - Generality	*Individual Study*	*E-learning platform Docs*
	4.2 Biological Convention - Generality	*Individual Study*	*Notes from the lecturers*
	4.3 Biological agent - Type and Characteristic	*Individual Study*	*Lab. activities*
	4.4 Physical protection and decontamination in B environment	*Individual Study*	
	4.5 Identification and detection of biological agents	*Individual Study*	
	4.6 Biological laboratory – Types, characteristics and security level	*Lab. activities*	
	4.7 Bio-containment transport	*Individual Study*	
	4.8 First response during a BIO event (case study)	*Individual Study*	
	4.9 Bio sampling procedures – Lab. activities	*Lab. activities*	
	4.10 Ebola Outbreak (Case Study)	*Individual Study*	

MODULE 5

R/N AGENTS. Radiological and nuclear agents awareness, industry, medical & military

16-20 July 2018 (University of Rome Tor Vergata)

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

	LO 5 – R/N AGENTS, EVENTS AND OPERATIONS - FUNDAMENTALS		
	By the end of the module, the students should be able to illustrate the main characteristics and effects of RN agents release and principles		
	Teaching Point	**Method**	**References and Notes**
	5.1 Nuclear and Radiological Risk – Generality, Hazmat Hazmat awareness and DGR, ADR, IATA, ICAO.	*Individual Study*	*E-learning platform Docs* *Notes from the lecturers* *Text book*
	5.2 Ionizing Radiation characteristics	*Individual Study*	
	5.3 Nuclear weapon/Dirty Bomb - Differences, characteristics, effects	*Individual Study*	
	5.4 Introduction of R/N effects on human body	*Individual Study*	
	5.5 Generality on Radioprotection	*Individual Study*	
	5.6 The Dosimeter - Type, characteristics and practical use	*Individual Study*	
	5.7 Principles of detection	*Individual Study*	
	5.8 Physical protection and decontamination in radiological environment	*Individual Study*	
	5.9 Storage and disposal of radioactive waste	*Individual Study*	
	5.10 Transport of radioactive material and irradiated nuclear fuel	*Individual Study*	
	5.11 First response in dirty bomb incident (case study)	*Individual Study*	
	5.12 First response in nuclear plant incident (case study)	*Individual Study*	

MODULE 6

e AGENTS, CBR IED and EOD, challenges and case studies

23-27 July 2018 (University of Rome Tor Vergata)

Module 6 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 6 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 6 – Explosives		
	By the end of the module, the students should be able to illustrate the main characteristics and effects of explosives		
	Teaching Point	**Method**	**References and Notes**
	6.1 Explosives – Military and Civilian – an overview about them from history and media	*Individual Study*	*E-learning platform Docs* *Notes from the lecturers*
	6.2 Explosives Ordinance Disposal (EOD)	*Individual Study*	
	6.3 Improvised Explosives Devices (IED)	*Individual Study*	
	6.4 Dirty Bombs (DB)	*Individual Study*	
	6.5 Toxic Industrial Materials (TIM) and Toxic Industrial Chemicals (TIM)	*Individual Study*	
	6.6 Home Made Explosives (HME) and Precursors	*Individual Study*	
	6.7 Explosive detection	*Individual Study*	
	6.8 Disposal operation and render safe procedures – EU rules – Legal rules	*Individual Study*	

MODULE 7

Medical Countermeasures, CBRNe First Aid

15-19 October 2018 (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 7 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 7 – First AID and medical counter measures		
	The students will learn the main principles of medical first AID in case of CBRNe events		
	Teaching Point	**Method**	**References and Notes**
	7.1 Hazardous material epidemiology: Hazmat happens	*Individual Study*	*E-learning platform Docs*
	7.2 Hospital CBRNe preparedness	*Individual Study*	*Notes from the lecturers*
	7.3 Department of Health competences in Hazmat/CBRNe events and the National Antidotes Stockpile (SNA)	*Individual Study*	*Training activities*
	7.4 Establishing and organizing a Hazmat/CBRNe Response Team	*Collective Study*	
	7.5 Medical management of Hazmat Victims	*Individual Study*	
	7.6 Medical management of victims of a Chemical warfare agents event	*Individual Study*	
	7.7 Medical Management of Radiological Event Victims	*Individual Study*	
	7.8 Medical Management of Biological Event Victims	*Individual Study*	

MODULE 8

Communication and psychology

22 October-26 October 2018 (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 8 - LEARNING OBJECTIVES AND MAIN TEACHING POINTS

	LO 8 – Principle and techniques of communication		
	The students will learn the main techniques and methods to communicate and investigate in case of CBRNe events		
	Teaching Point	**Method**	**References and Notes**
	8.1 Cognitive psychology	*Individual Study*	*E-learning platform Docs*
	8.2 Analysis and evaluation of threats	*Individual Study*	*Notes from the lecturers*
	8.3 Communications skills	*Team work*	
	8.4 Communication techniques	*Team work*	
	8.5 Difference between communication of a journalist, a decision makers a first responders with the population	*Team work*	

MODULE 9

Investigation in case of CBRNe events

28 January-1 February 2019 (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

	LO 9 – Principles of investigation		
	The students will learn the main techniques and methods to communicate and investigate in case of CBRNe events		
	Teaching Point	**Method**	**References and Notes**
	9.1 Investigation techniques	*Individual study*	*E-learning platform Docs*
	9.2 Investigation activities and methods	*Individual study*	*Notes from the lecturers*
	9.3 Hot zone: CBRNe first responders and police officers rules	*Team work*	*Lab. activities*
	9.4 Intelligence skills	*Individual Study*	
	9.5 Lab. activities to learn investigation fundamentals	*Lab. activities*	
	9.6 Practical investigations scenario		

MODULE 10

DSS, Software

28 January-1 February 2019 (University of Rome Tor Vergata)

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).

	LO 10 – Decision Support System		
	The students will learn to use free license tools for CBRNe events numerical prediction		
	Teaching Point	**Method**	**References and Notes**
	10.1 Generality on CBRN Prediction	*Individual Study*	*E-learning platform Docs*
	10.2 Meteorology	*Individual Study*	*Notes from the lecturers*
	10.3 Dispersion models	*Individual Study*	*Software practice with computers*
	10.4 What is a DSS software	*Individual Study*	
	10.5 Hot-Spot	*Team work*	
	10.6 HALOA	*Team work*	
	10.7 WISER	*Team work*	
	10.8 CBRN-Analysis-overview	*Individual Study*	

PHASE 2 – Training Activities

4 WEEKS OF TRAINING ACTIVITIES

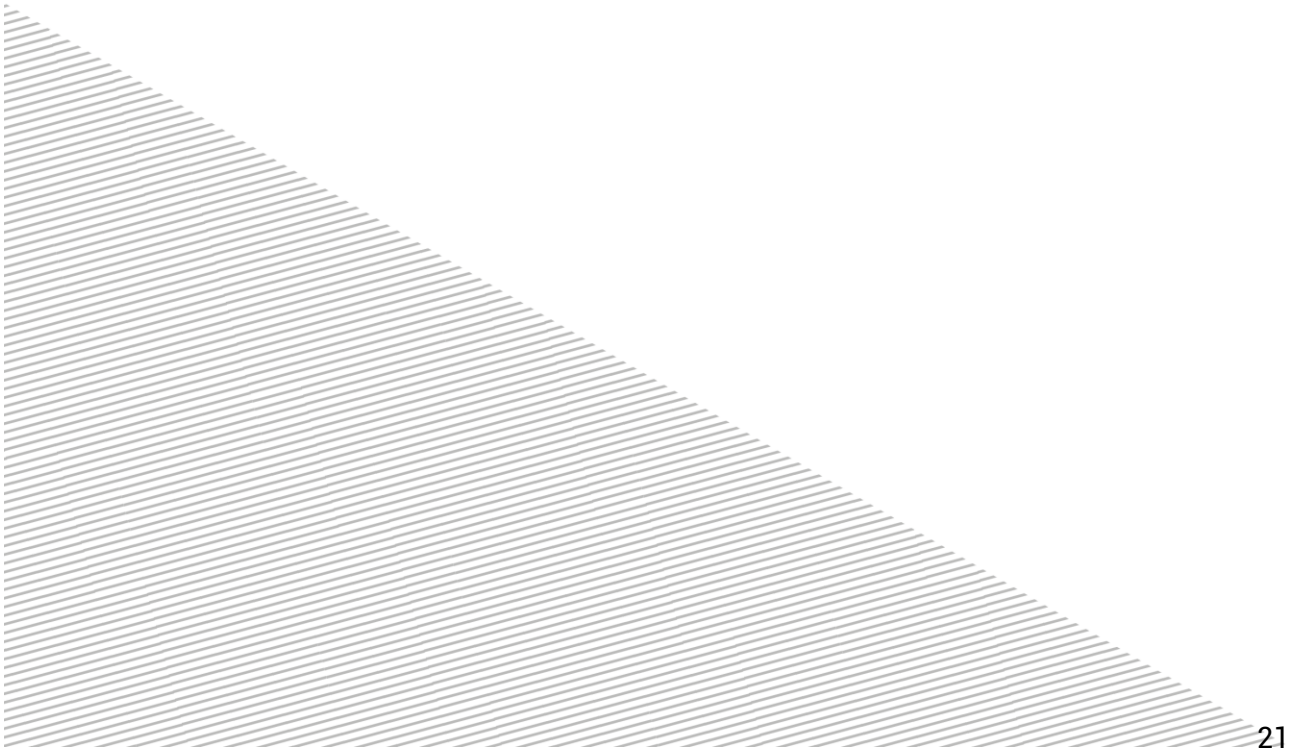
2019

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

- **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**
- **New schools**

The 4 centers will be chosen in 2018.

PHASE 3 – Internship and Thesis



INTERNSHIP

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

June-December 2019

FINAL THESIS

December 2019

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: **"1st level University Master Course in Protection against CBRNe Events (120 ECTS)"** (*Master Universitario di I livello* in Protezione da Eventi CBRNe, under the Italian Law)**".**

REMEDIAL SESSIONS

December 2018

February 2019

July 2019

October 2019