Università di Roma Tor Vergata

INTERNATIONAL CBRNe MASTER COURSES

Chemical, Biological, Radiological, Nuclear and explosive

Department of Industrial Engineering and School of Medicine and Surgery

International Master Courses in

"PROTECTION AGAINST CBRNe EVENTS"

2nd Level Course

EDITION 2015-2016

60 ECTS

TIMELINE

ESSENTIAL INFORMATION

Official Course Language

English

International CBRNe Master Courses
Department of Industrial Engineering, University of Rome "Tor Vergata"
Via del Politecnico 1, Roma, Italy - Zip Code 00173
Phone: 0039 0672597201 - Mail Address: info@mastercbrn.it

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The evolution and increase in Safety and Security threats at an international level place remarkable focus on the improvement of the emergency systems to deal with crisis, including those connected to ordinary and non-conventional events (Chemical, Biological, Radiological, Nuclear, and explosives).

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 know-how, but also expertise in the relevant areas.

Given the global interest in these issues, the Department of Industrial Engineering and the Faculty of Medicine and Surgery of the Tor Vergata University organize the international Master Courses in "Protection against CBRNe events": I Level Master Course in "Protection against CBRNe events" (120 ECTS) and II 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 specifically focusing 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 the following Italian Public Entities:

- Presidenza del Consiglio dei Ministri (Prime Minister's Office)
- Ministero della Difesa (Minister of Defence)
- Ministero dell'Interno (Minister of Interior)
- ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development)
- Istituto Nazionale Geofisica e Vulcanologia (National Institute for Geophysics and Vulcanology)
- Istituto Superiore di Sanità (National Health Institute)
- Comitato Parlamentare per l'innovazione tecnologica (Parlamentary Committee for Technological Innovation)
- University consortia CRATI, MARIS and SCIRE

And together with the following International Entities:

- OPCW (Organization for the Prohibition of Chemical Weapons)
- NATO Joint Centre Of Excellence (Czech Republic)
- NATO SCHOOL of Oberammergau (Germany)
- HotZone Solutions Group (The Netherlands)
- VVU-026 Sternberk (Czech Republic)
- Seibersdorf Laboratories GmbH (Austria)
- Chornobyl Centre (Ukraine)

All the above-mentioned organizations have signed official cooperation agreements with the University of Rome Tor Vergata.

Both Master Courses have been officially granted the "NATO selected" status and have been included in the NATO Education and Training Opportunities Catalogue (ETOC) and also they are supported by OPCW.

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The II 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 in the Master Course and obtain the official title (which has legal value according to the Italian law), candidates must have a 300-ECTS point Master 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's competent bodies and the Master Course's Steering Committee.

This Course aims at training professional "**CBRNe Advisors of Decision Makers**", with specific skills in the following areas:

- CBRNe threats and risk
- Analysis of CBRNe agents
- Effects of CBRNe agents
- Diffusion and dispersion of CBRNe agents
- Software, codes, tools, and DSS for CBRNe emergencies
- Detection of CBRNe agents: instruments and techniques
- CBRNe protection
- CBRNe decontamination
- International emergency systems in case of CBRNe events
- Sanitary rescue and psychological approach to emergencies in case of CBRNe events
- Critical infrastructures
- Investigation and mitigation
- Communication and information in case of CBRNe events
- High-Level Experiences in two specialized European Facilities

At the end of Course, attendees will obtain a degree " 2nd Level Master Course in Protection Against CBRNe Events (60 ECTS)".

The most important private entities operating in the CBRNe safety and security field support the Master Courses with their expertise and are involved in the teaching activities through their experts. Among our teachers are also subject matter experts from the University of Rome Tor Vergata and from all the Entities that officially involved in the Master Courses' activities.

Classroom lessons are complemented with: Laboratory activities, Case studies to be dealt with in working groups, Visits, Internships, and the preparation of the Master Theses (the best ones will be selected for publication in scientific journals).

The University cooperates also with the companies and the students to publish the best work during the Master and the companies can have, for free, students from the Master for a period of stage on one topic that you propose.

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

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MODULE 1

INTRODUCTION TO CBRNe RISKS
THE ROLE OF THE ADVISOR FOR DECISION MAKERS

Rome (Italy) **21-25 March 2016**

Area responsible: Dr. Eng. Andrea Malizia, Didactical Board.

The aim of the module is to provide students with foundational knowledge of CBRNe Defense and current and emerging hazards, risks, threats and implications of CBRNe scenarios. The module will be conducted by experts from NATO, OPCW, ECDC, OSCE and ITA National Organizations (Fire Brigade, Police, Army, Navy, Air Force and Universities). Subject Matter Experts will explain the role of their Organizations in possible CBRNe scenarios and the different nature of CBRNe events. The students will be also involved in classroom training..

Subjects

- Introduction to the II level CBRNe Master Courses/module introduction
- CBRNe: introduction to the threat and the point of view of the advisor
- CBRNe and Terrorism: a military point of view
- CBRNe and Terrorism: a civil point of view
- CBRNe Terminology
- CBRNe in Military environment
- CBRNe in Civil Defense environment
- CBRNe in NATO doctrine
- What is an Advisor of the Decision Makers - Role and Duty
- CBRNe and Medical Management
- Exam/module closure/and final feedback

Test: written technical report

MODULE 2

RADIOLOGICAL AND NUCLEAR AGENTS/EVENTS
RISK ASSESMENT AND MANAGEMENT

Rome (Italy) **18-22 April 2016**

Area responsible: Prof. Carlo Bellecci

The aim of the module is to provide students with foundational knowledge of Nuclear Power and radiological agents, main characteristics and effects of radiations on the human body and environment. The students will learn in broad terms the main aspects related to nuclear fission, nuclear decay, nuclear fusion, civil and military use and possible specific threats within the context of International Policy and main legal references.

Subjects

- Fundamentals of radioactivity
- The nuclear fission
- Nuclear energy and nuclear reactors
- Principles of R/N detection
- Introduction of R/N effects on humans and on the environment
- R/N agents
- Management of unexpected radiation events
- Security management of radioactive waste
- Detection/identification on R/N agents: limits and criticalities
- Transport of radioactive materials and of irradiated nuclear fuel
- Storage and disposal of radioactive waste
- Exam/module closure/and final feedback

Test: written examination. Multiple choice questions + short answers

MODULE 3

CHEMICAL AND EXPLOSIVE AGENTS/EVENTS – RISK ASSESMENT AND MANAGEMENT. INTRODUCTION TO BIOLOGICAL AGENTS AND RISKS

Rome (Italy) **16-20 May 2016**

Area responsible: Dr. Alessandro Sassolini

The module provides students with the scientific background necessary to learn about chemical and biological agents, what they are and how they are detected and identified. In order to analyse the prevention aspects, the dual use concept will be explored and the students will learn in which context are used highly toxic substances (Toxic Industrial Material) are used for civil purpose and security and safety measures and procedures to manage these classes of compounds. The students will learn the chemistry of explosives and how the use of these compounds can be associated with chemical, radiological and biological agents. The effects on human body and the toxicology problems connected to the release of chemical agents will be deeply analysed based on real events.

Subjects

- Chemical Weapon Convention (CWC) - Generality
- Organization for the Prohibition of Chemical Weapons (OPCW)
- Toxic Industrial Chemicals (TIC) and Toxic Industrial Materials (TIM)
- Chemical Warfare Agents (CWA) – Risks and management
- Introduction to explosives
- Advanced analytic chemistry
- Explosive materials – Explosives Ordinance Disposal (EOD), Improvised Explosives Devices (IOD), Dirty Bombs (DB)
- Chemical events
- Toxins and toxicology
- Detection/identification of C agents: limits and criticalities
- Exam/Module closure/and final feedback

Test: written examination. Multiple choice questions + short answers

MODULE 4

DECISION SUPPORT SYSTEMS AND SOFTWARE FOR THE PREVISION AND MANAGEMENT OF CBRNe EVENTS

Rome (Italy) **20-24 June 2016**

Area responsible: CDR. Gaetano Carminati

The aim of this module is to provide a comprehensive overview of the Decision Support Systems (DSS) and software that can be applied to make previsions or manage a CBRNe event. The students will practice on some of these tools to understand their working principles.

Subjects

- Generality on CBRNe events prediction
- Meteorology in CBRNe events
- Models of dispersion
- What is a Decision Support Systems (DSS) software
- Hot-Spot software: an overview
- ALOHA software: an overview
- WISER software: an overview
- CBRN-Analysis software: an overview
- STEM software: an overview
- GLEAMWIZ software: an overview
- GATE: an innovative software for Table Top Exercise (TTX) evaluations
- Q-SAR software: an overview

Test: DSS Software Exercises (HotSpot-ALOHA-Wiser)

MODULE 5

INTERNATIONAL CBRNe EMERGENCY SYSTEM

Rome (Italy) **18-22 July 2016**

Area responsible: Dr. Giovanni Ferrari

The module provides students with an appropriate knowledge about the International CBRNe emergency system. The students will start analyzing as a case study the Italian CBRNe emergency system and how Italy has applied the International legislations and directives. After the analysis of this particular case study the students will face with international experts to analyze the international CBRNe system from a military point of view (the approach of NATO) and from a civil point of view (the approach of OSCE). The module will close with the analysis of a non EU country and its CBRNe system. Each lecture will be integrated with examples, case studies and lesson learned.

Subjects

- The International CBRNe Response System
- The National CBRNe Response system - The Point of view of Prime Minister Office
- International and National Legal Framework on CBRNe
- NATO future initiative to fight CBRNe
- Consequence management and emergency planning in battle field : the military point of view
- Weapons of Mass Destruction (WMD), Mass Casualties and Critical Infrastructure
- Italian safety system
- Technological risk (Seveso installations, hazardous materials transportation, mass events, critical infrastructure)
- Method for the improvement of HNS process according to ISO31000
- Drill Exercises (Mini TTX played in class)

Test: drill exercitation

MODULE 6

NATO BIOLOGICAL WARFARE DEFENCE AWARENESS COURSE

Oberammergau (Germany) **19-23 September 2016**

Area responsible: Lt.Col. Andrea Gloria

The aim of this module is to provide students with foundational knowledge of current and emerging biological warfare hazards, risks, threats and implications for Medical Countermeasures within the context of the International Biological Defense Policy.

Subjects

- Biological Agents & TIB
- History of BIO Weapons
- Biological Threats and BIO terrorism
- Personal Protective Equipment for Response to Biological Incidents
- Detection & Identification of Biological Agents
- Medical INTEL and Epidemiological Surveillance
- Prophylaxis, Treatment of BIO Accident Victims and Medical Countermeasures
- BIO Decontamination, procedures and equipment
- Biosecurity and Biosafety
- Bioforensics
- Globalization, climate changes & infectious diseases
- Emergent and zoonotic diseases
- BIO Technology Development
- Legal considerations
- Case Study: EHEC Outbreak in Europe (2011)
- Case Study: Ebola Outbreak in West Africa (2015)
- Case Study: Anthrax in US and Europe

Test: written examination. Multiple choice questions + short answers

MODULE 7

CBRNe MEDICAL MANAGMENT

Rome (Italy) **24-28 October 2016**

Area responsible: Prof. Leonardo Palombi

The aim of the module is to Increase the understanding of the medical management in case of CBRNe events and build confidence. This aspect is crucial to smoothen cooperation between first responders working in the potentially contaminated areas and it is also a key element of the general management of a CBRNe event. Frontal lessons as well as practical activities will be held during this module.

Subjects

- Medical management of Hazmat victims
- Hospital CBRNe preparedness
- Competences in Hazmat/CBRNe events and the National Antidotes Stockpile (SNA)
- Hazardous material epidemiology
- Establishing and organizing a Hazmat/CBRNe response team
- Medical management of chemical warfare agent event victims
- Medical management of radiological event victims
- Medical management of biological event victims
- CBRNe awareness/preparedness and crisis communication
- Oncohematological aspects in CBRNe victims
- CBRNe risks on reproduction and re-population of contaminated areas
- Training activities and frontal lectures on medical management
- Organizing a CBRNe Response: the Greek experience (2004 Athens Olympic Games)

Test: oral examination (time: 10 minutes)

MODULE 8

CBRNe PROTECTION AND DECONTAMINATION

Rome (Italy) **21-25 November 2016**

Area responsible: CDR. Gaetano Carminati

The aim of the module is to provide students with an overview about principles of protection and decontamination necessary in planning activities and during the management of CBRNe incidents. The Students will learn how to advice and support Decision Makers for a prompt and effective response.

Subjects

- Collective and personal protection
- Types of Personal Protection Equipments (PPE)
- Levels of protection
- Technical/operative use of PPE
- Procedure to reduce the exposure during C/R events
- PPE and the future of protection
- Medical countermeasure for accidental exposure or contamination
- Decontamination: principles and technical/operational procedures
- Decontamination instruments: limits and criticalities
- Training activities using PPE
- Training activities: decontamination procedures
- Consequence management
- Protection and Decontamination during a CBRNe incident
- CBRNe forensic

Test: oral examination (time: 10 minutes)

MODULE 9

INVESTIGATION, COMMUNICATION AND PSYCHOLOGY

Rome (Italy) **23-27 January 2017**

Area responsible: Dr. Federico Sesler

Communication and psychology are a key issues to help, prevent, face and manage CBRNe events and their consequences on population as well as operators on the field. This module will address the peculiarities of a CBRNe scenario from an investigative point of view.

Subjects

- CBRNe terrorism
- Contrasting illicit trafficking of CBRNe materials
- Analysis and evaluation of CBRNe threats
- Cognitive Psychology
- CBRNe defense procedures on board of Naval Unit;
- CBRN/WMD Intelligence Indicators and Warning and Information Sharing
- Communication and psychology of CBRNe events
- Investigation and information in CBRNe events
- Info sharing

Test: oral examination (time: 10 minutes)

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MODULE 10

MARITIME SECURITY COURSE
IN COLLABORATION WITH ITALIAN COAST GUARD

Rome (Italy) **20-24 February 2017**

Area responsible: CDR. Attilio Montalto

Subjects

- Security in general and Maritime Security. Short presentation of international organizations involved in Maritime Security. Analysis of international, European and national legislation. Main international Convention and specific legislation (SOLAS, ISPS Code, Reg. 725/20004, Dir. 65/2005).
- ISPS Code (self-evaluation tests). Port security and port security plan. Security methodologies applied to ports and infrastructure.
- Risk analysis methodologies. Application of risk analysis and management to Maritime Security. Ship Security Assessment, development methodology, risk analysis techniques.
- Ship and port security, from the beginning (e total absence of any system and regulation) to the present security system. Port technical operations and ship security plan.
- Maritime security emergencies. Emergency management.
- Security measures. Security equipment and port control methodologies. Drills and drills registration.
- Environment in maritime security. Elements of different types of ships , passive protection, analysis of the main security systems. Ship Security Assessment, characteristics and approval.
- 8. Practical exercise on a port security plan and port facility plan, exercise on a ship security plan.

Test: written examination. Multiple choice questions + short answers

MODULE 11

FINAL TABLE TOP EXERCISE (TTX)

Rome (Italy) **20-22 March 2017**

Area responsible: Dr. Giovanni Ferrari / Dr. Luciano Cadoni / Dr. Ferruccio Di Paolo

Test: TTX exercitation

FINAL THESIS DEFENCE

Rome (Italy) **June 2017**

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STRUCTURE OF THE II LEVEL MASTER COURSE

This Master Course has a total duration of one academic year, and consists of different Modules.
The overall educational and training activities will account for 60 ECTS points, that is, a total of 1,500 hours, 390 of which shall consist of classes and lectures.
Moreover, each student shall devote at least:
- 50 hours to operational laboratory activities, supported by teachers of University of Rome Tor Vergata and external experts and tutors;
- 50 hours workshops, held by University of Rome Tor Vergata and external subject-matter experts.
Furthermore, each student shall carry out a 200 hours internship at one of the supporting organisations and companies, under the supervision of a personal tutor. Besides, all students shall write and defend a Master Thesis.

Module	**ECTS**
The CBRNe agents and their risks	4
The effects of the CBRNe agents	5
Equipment and instrumentation	4
DSS software	5
Decontamination and remediation	4
International response in case of CBRNe events	5
Investigation and communication in case of CBRNe events	4
Training at COE NATO Vyskov	5
Course at NATO School Oberammergau	5
Internship	13
Final Thesis	16
Total	**60**

ADMISSION CRITERIA

This Master Course targets people with a MSc Degree or a Bachelor's Degree in technical-scientific disciplines + 2 years 120 ECTS relevant Master course, or any title considered as equivalent for admission purposes by the Board of Industrial Engineering Department. It also targets people with a 3+2 University education in other disciplines, to be authorised by the Master's Steering Committee. The Master's Steering Committee might also recognise other vocational certified training and practical activities carried out by applicants after obtaining the Degree(s) allowing them to participate in the Master Course (including individual courses attended in the framework of wider educational programmes), if they are consistent with the subject matters of the Master Course. Such activities might be attributed a number of ECTS points – up to a maximum of 20 – which the relevant student could use to obtain the final Degree of the Master course.
The CBRNe Master Course shall have a maximum of 40 and a minimum of 16 participants. Applicants that wish to register for this Master Course cannot be simultaneously attending any other university course. An excellent level of English is requested.

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APPLICATIONS

Candidates shall be admitted based on the assessment of their CVs by the Master's Steering Committee. A maximum of 40 and a minimum of 16 people can participate in each Master Course. Applicants are requested to pre-register online by March 4th 2016 , by filling in the attached application file and sending it to the mail address: info@mastercbrn.com together with the following records:

- CV;
- Bachelor's Degree self certification, showing the marks obtained for each exam and the final grade;

The list of admitted applicants shall be published on March 14th 2016, on the http://www.uniroma2.it and www.mastercbrn.com web sites together with the instructions for the tuition fee payment.

FEES AND CHARGES

The overall tuition fee and charges amount to € 7,146.00, which shall be paid as follows:

- € 3,646.00 upon registration, by March 25th 2016 (this amount also includes € 16.00 tax and € 130.00 charge).
- € 3,500.00 by June 27th, 2016

Students admitted have to register by 25/03/2016.

Should a student's personal plan last longer than one academic year, the student under consideration shall pay an additional € 1.016,00 fee (including all charges) for each additional year after the first one.

Students can attend single modules of the course. The tuition fees for the application to the single module are the following:

Module	Tuition Fee
The CBRNe agents and their risks	1.000 euro
The effects of the CBRNe agents	1.000 euro
Equipment and instrumentation	1.000 euro
DSS software	1.000 euro
Decontamination and remediation	1.000 euro
International response in case of CBRNe events	1.000 euro
Investigation and communication in case of CBRNe events	1.000 euro
Training at COE NATO Vyskov	1.400 euro
Course at NATO School Oberammergau	1.600 euro

For the application to a single module the deadline is 25/03/2016.

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SPECIAL TERMS

Students with at least 66% certified and documented disability shall only pay € 466, that is, 5% of the overall fees and charges. People who meet the aforesaid requirements, shall include the relevant information in their Applications. After being communicated their admission, they shall then hand in the records attesting their disability to the Master Course Secretariat. The Faculty Board may – in compliance with the provisions of the Internal Rules – grant special financial terms to individual students.

START

Classes of the Master Course in Protection against CBRNe Events shall start on **March 21st 2016**.

ATTENDANCE AND FINAL DEGREE

Students shall attend at least 80% of all classes, lectures and activities.
The final Degree shall only be obtained by students who have attended at eat 80% of all classes, lectures and activities and passed the Module-related and final exams. At the end of the Master Course, all 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 and dissertation), and have duly paid all fees and charges, shall obtain the educational qualification **"2nd level University Master Course in Protection against CBRNe Events (60 ECTS)"** (*Master Universitario di II livello* in Protezione da Eventi CBRNe under the Italian Law)**".**
All students shall defence the Thesis within the last session of the first Academic Year following the latest registration year. After that, it will not be possible to obtain the Degree.

INFORMATION

For information, please contact:

- Teaching Activity Coordinator: **Dr. Andrea Malizia** (malizia@ing.uniroma2.it).
- Master Course Secretariat: **Ms. Colomba Russo, Ms. Valentina Gabbarini** (info@masterCBRN.it; info@mastermastercbrn.com). Telephone: +39 0672597201 (Monday through Friday from 9.00 a.m. to 1:00 p.m.).