

# Overview of experiences with the master's course on CBRN-relevant dual-use technology transfers in Ukraine and Moldova

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Part 1

# OVERVIEW OF THE MASTER'S COURSE

# Outline of modules

- **Introductory modules (IM)**
  - IM 1: CBRN basic knowledge and concepts
  - IM 2: Frameworks, instruments and responsibilities
- **Substantive modules (SM)**
  - SM 1: Threats, risks and their mitigation
  - SM 2: Transfer controls (general)
  - SM 3: Transfer controls (national context)
  - SM 4: Promoting responsible behaviour
- **Seminar modules (SE)**
  - SE 1 (follows SM2)
  - SE 2 (follows SM3)
  - SE 3 (follows SM4)

# Summary of module content - IM

- **IM 1: CBRN basic knowledge and concepts**
  - Basic concepts relating to CBRN weapons and their control;
  - The concept of dual-use technologies and the challenges they pose from a policy perspective; and
  - The formal, multilateral treaties and other arrangements set up to prevent their misuses
- **IM 2: Frameworks, instruments and responsibilities**
  - A holistic overview of frameworks and instruments relevant to CBRN export controls, their respective objectives and areas of operation
  - Responsibilities for different categories of actors
  - Linkage of those responsibilities to broader societal and policy contexts

# Summary of module content - SM

- **SM 1: Threats, risks and their mitigation**
  - In-depth analysis of the various ways in which threats and risks related to CBRN materials and technologies may present themselves
  - Discussion the various technology transfer processes
  - Linkage of threats and risks with the various frameworks and instruments to counter them
  - Introduction to roles played by various national implementors, and national and international actor categories
- **SM 2: Transfer controls (general)**
  - Focus to the national regulatory level, but remains general
  - Historical analysis
    - Origins of export control regulations
    - Evolution of export control regulations in the context of international developments
  - Discussion of the various instruments available to prevent and penalise proliferation activities.
  - Key stakeholder communities and their specific contributions or responsibilities regarding the prevention of CBRN proliferation

# Summary of module content - SM

- **SM 3: Transfer controls (national context)**
  - Focus on the national regulatory level
  - Types of technologies developed, produced or consumed that
    - may be of CBRN proliferation concern, or
    - may pose security and safety issues
  - Study of those technologies in the context of a country's economic relations (regional and international) and specific security challenges
  - Transposition of international obligations into national legislative and regulatory frameworks
  - Offers the possibility to study the country in which the module is being taught
- **SM 4: Promoting responsible behaviour**
  - Academic, scientific and professional legal responsibilities and obligations
  - Academic, scientific and professional norms and ethics
  - Understanding of the evolution of responsibilities and obligations in view of scientific and technological advances
  - How can academics, scientists, and professionals contribute to raising awareness, education and outreach?

# Summary of module content - SE

- SE 1
  - Supports the two IMs
- SE 2 and SE3
  - Support the SMs
- Practical and highly interactive lectures of 10 up to 15 hours over a one-week period
  - Preparatory work by students is an important part of seminar work

# Why a modular approach?

- Option to adopt the master's in its entirety as standalone course
- Option to integrate certain elements in existing courses
  - Choice to offer course in a single academic year
  - Option to spread module contents of 2 or 3 academic years
    - E.g. IM in final bachelor's year; spread over SM and SE in master's years
  - Selection of certain topics only
    - E.g. elective courses for students from different disciplines
- Flexibility to use the modules in a variety of educational settings
  - Executive courses (intensive 2-week immersion for professionals)
    - One undertaken in Nur-Sultan, June 2019
    - Helped to lay foundation of current initiative in Kazakhstan
  - Short courses (intensive 1-week course of introductory or advanced levels)

Part 2

## IMPLEMENTING THE MASTER'S COURSE IN KYIV

# Preparations

- Host: Taras Schevchenko National University, Kyiv, Ukraine
- Most preparatory work done by host
  - Administrative preparations
    - Within the university
    - With the Science and Technology Centre in Ukraine (STCU)
      - EU Targeted Initiative support via STCU
  - Introductory meetings; discussions concerning course contents
  - Promotional events
    - Guest lectures
      - Special lectures for students
      - Promotional lectures for university and faculty leadership
      - Lectures in support of recruitment
    - Participation in official university events and conferences
      - Keynote speaker
      - Invited speaker
- Promotion campaigns
  - Need to recruit a minimum number of students

# Course integration

- **Selection of 6 modules**
  - 2 introductory modules + 4 substantive modules (no seminar modules)
- **Local capacity development**
  - Local professors participated in international courses and seminars
  - Writing of topic-relevant papers
  - Discussion of precise module contents
- **Selection and recruitment of visiting professors**
  - Development of individual module content by each selected Visiting Professor (Syllabi)
  - Development of literature lists (plus transfer of article copies)
  - 1-week intensive lecture sessions for each module (in English)
- **Integration of modules into broader master's course**
  - 2-year course on Security and Entrepreneurship
  - All modules taught in first year
  - Local professors who would take over teaching to attend the Visiting Professor courses
    - Visiting Professors to have detailed private discussions on topics and teaching methodologies
    - In second year, Visiting Professors to attend as observers and advisers

# Course execution

- **Went relatively well**

- Adjustments had to be made
  - Language issues
  - Classroom setup
  - Different teaching expectations by students and lecturers (soon resolved)
- Some cultural differences had to be overcome
  - Student participation in class
  - Lecture preparations by students (reading indicated materials)
  - In-class exercises
- Module scheduling was uncertain at times because of administrative issues related to the overall master's course
  - Fortunately, Visiting Professors all had sufficient flexibility

- **Follow up**

- Second year taught by local professors
- Adjustment of course organisation:
  - Master's became extra mural, with participation of students from other universities and institutes
  - Course content adjusted to new format

# Preparation of local professors

- **Impact of COVID-19**
  - Final module by Visiting Professor already had to be taught virtually
- **Intensive training of local professors**
  - Originally foreseen for one week in workshop format
  - Had to be reorganised virtually
  - Differentiated training given in function of background and expertise of local professors
- **Follow-up and evaluation by Visiting Professors**
  - Virtual teaching
  - Evaluation immediately after course
  - Went well

Part 3

## SHORT COURSES – THE MOLDOVAN EXPERIENCE

# Preparations

- **Host: Technical University of Moldova, Chişinău, Moldova**
  - Project: *Technical University of Moldova Teaching Module: Engineering and CBRN Non-Proliferation Culture*
  - Financed by the EU through STCU
- **Short preparatory phase**
  - Option for an intensive short course
    - Introductory level
    - Students to be invited from different faculties and institutes
  - Goal: to add the subject matter to regular courses taught at the university
- **Professor training**
  - Local professors were professionally involved, and therefore familiar with export control policies
  - Background in nuclear physics and engineering
  - Two intensive training sessions focussing CBW (January 2021)
    - Issues with weapons, including nature of the technology
    - International legal regimes
    - Sources of regulations concerning technology transfers in the CBW field

# Course execution

- One guest lecturer
- Four evening sessions of two hours each
  - English language
- Students came from:
  - Technical University of Moldova
    - Schools of Micro-nanoelectronics and Biomedical Engineering (master's)
    - School of Biomedical Engineering (fourth-year undergraduate)
  - State University of Moldova (Law and Physics)
  - University of Medicine and Pharmacy (General medicine)

Part 3

IN CONCLUSION

# The modular approach

- Flexible format
  - Introductory level
  - Advanced level
  - Academic or training formats
- Contents can be presented in different teaching contexts
  - Full master's course option
    - Good content framework
    - Easily adaptable to local situation and educational context
  - Executive course (Content determined by host)
  - Short course (Content determined by host)
- If necessary, we can draw on pool of EU expert visiting professors
- Flexibility in time for organising events



# THE TRENCH

**Recalling** where science, industry and military art converged  
**Challenging** entrenched positions

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