

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

Dr Jean Pascal Zanders
The Trench

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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



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www.the-trench.org

E-mail: jpzanders@the-trench.org

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