ROYAL MILITARY ACADEMY

Department Weapons Systems and Ballistics

# Design principles and evaluation of armament and ammunition

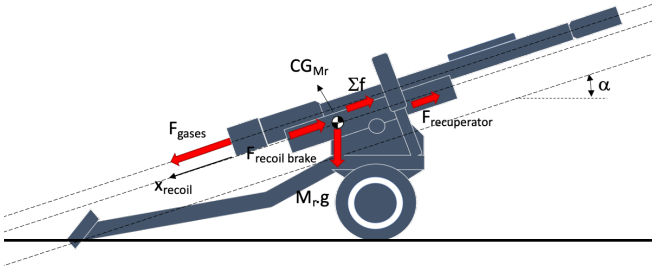


The Department of Weapon Systems and Ballistics of the Royal Military Academy has always been trying to respond to the wishes of the national, European and NATO industry and several high institutions by organizing tailored training courses in ballistics. The applications are numerous: protection, expertise, armament, ammunition... The diversity of the subjects emphasizes the complexity of a specialized branch of applied sciences which is not usually the topic of a training.

This new course proposed here is an addition to the already existing general short course on ballistics and will focus on the basics for the design of conventional weapon systems. It hence can be of interest to scientists, technicians, managers and end users dealing with weapon systems. The course will cover typical military ordnance and gun systems, both for direct and indirect fire applications. Although the course was mainly conceived for and illustrated with land systems in mind, the concepts introduced during the course can nevertheless be easily applied to air and naval platforms.

The teaching provided is at university level. Participation in the course therefore implies sufficient scientific knowledge, mainly in mathematics, mechanics, physics and chemistry. Although the course can be followed without advanced mathematical knowledge (and has been organized as such), it will also cover several analytical design approaches based on engineering mathematics.

As the duration of the short course is voluntarily limited to a single mid-week module of three days, it is unfortunately impossible for us to cover everything. Nevertheless, we try to cover all the essential technical and theoretical aspects and to illustrate them as much as possible by first-hand experience and examples. The pace of the lessons is therefore quite intense, something to consider when applying for this course.




# COURSE CONTENT

**The short course on the design of conventional weapon systems will cover the following topics:**

- General introduction
  - Generic gun system
  - Calibre designation

- Part 1 – Ammunition
  - Introduction
  - Propellant charge
  - Cartridge case
  - Primers
  - Conventional projectile
  - Driving band
  - Subcalibre projectile
  - Fuzes
  - Special cases
  - Recent and future developments

- Part 2 – Gun
  - Introduction
  - Barrel
  - Breech
  - Barrel wear and erosion
  - Barrel ancillary equipment
  - Special cases

- Part 3 – Gun integration and automatic functioning
  - Introduction
  - Recoil and stability
  - Recoil mechanism
  - Recoilless solutions
  - Balancing gears
  - Automatic functioning

# COURSE LECTURER

The lecturer for this course will be LtCol IMM Frederik Coghe.
He is currently employed as a military professor at the Department of Weapon Systems & Ballistics of the Royal Military Academy. He lectures courses in the field of weapon systems, terminal ballistics and dynamic material behaviour. His research focuses on ballistic and blast protection for personnel and vehicle applications.

Next to his academic activities, he also acts as a senior advisor for the Belgian Defence department on survivability and letality issues. As such, he was responsible for the design and implementation of cage armour systems for all the Belgian Defence armoured vehicle systems, and is a member of the Mine Safety Board, responsible for ensuring the mine safety of all armoured vehicles. He is also the Belgian representative for STANAG 2920 and AEP-2920 and delivers technical expertise to the Belgian activities in the framework of the STANAG 4569 and AEP-55 working group.

He is also an active member of the DYMAT society and is a former president of the Light-Weight Armour Group (LWAG), grouping European industry, academia and research institutes working in the field of armour systems. He is also a member of the International Personal Armour Committee (IPAC), and of the International Ballistics Society.

# PRACTICAL INFORMATION

⇒ **Schedule 2027**

23 – 25 Mar 2027.

⇒ **Registration Fees**

€1800 excluding VAT
Fees include course materials, lunches, refreshments during breaks, and a course dinner on Thursday evening at a restaurant in Brussels.

The course is free of charge for Belgian military personnel and offered at half price for Belgian law enforcement personnel.

⇒ **Course language**

The course is taught in English.

⇒ **How to register?**

Registration is open to participants from EU and/or NATO member states. Registration, including participant details and purchase order, must be submitted by Monday, December 07, 2026. **Payment is due at least two weeks before each module begins.** Cancellations are accepted up to two weeks before the course start date, and replacement participants are welcome.

**Point of Contact**

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