The Military Technical Institute offers a wide range of courses in the following fields:

- Artillery systems design;
- Energetic materials;
- Metallic materials;
- Organic technical materials and corrosion protection;
- Wind tunnel testing;
- Aerodynamics;
- Design of unmanned air vehicles;
- Tracking mobile targets in the air;
- Avionics;
- Mechanical and physical testing of materials;
- Strength calculation of aircraft;
- Rockets aerodynamics;
- Protection;
- Vibration;
- Rockets guidance.

The courses are carried out for participants coming from:
state institutions, Armed Forces and Ministry of Defence,
Defence industry, public and private companies.

The aim of the courses is to provide the understanding of the principles of design and testings of armament systems.
ARTILLERY SYSTEMS DESIGN

Artillery weapons muzzle brake design

Content

Theoretical part
- Overview of muzzle brake efficiency calculation methods,
- Calculation of the blast overpressure level,
- Methods for experimental defining of muzzle brake efficiency.

Practice
- Measurement of the blast overpressure around artillery weapon while firing.

Languages: Serbian, English.

Duration: 2 weeks.

Min. number of participants: 4.

Price: to be determined later, upon agreement on user's requirements.

Aim

The aim of the course is to provide the participants with an understanding of design of the artillery weapons muzzle brake.
Design and implementation of the subbore barrel gun crew training

Content
Theoretical part
- Overview of subbore barrel training system design methods and implementation to various guns.

Practice
- Firing demonstration.

Languages: Serbian, English.

Duration: 1 week.

Min. number of participants: 4.

Price: to be determined later, upon agreement on user's requirements

Aim
The aim of this course is to give participants an overview of subbore barrel training system design methods and implementation to various guns.

Artillery weapon's ordnance design

Content
Theoretical part
- Overview of ballistic and constructional calculation methods for monobloc barrel,
- Breach ring calculation methods,
- Breach and associated mechanisms calculation methods.

Practice
- Barrel assembly stress measurement while firing,
- Calculation examples in MathCAD.

Languages: Serbian, English.

Duration: 4 weeks.

Min. number of participants: 4.

Price: to be determined later, upon agreement on user's requirements

Aim
The aim of this course is to give participants a basic ground necessary for artillery weapon's ordnance design.

Measurement in ballistics and weapons

Content
Theoretical part
- Overview of basic methods for measurements in ballistics and during development of weapon systems.

Practice
- Practical presentation of basic methods for measurements in ballistics and during development of weapon systems.

Languages: Serbian, English.

Duration: 2 weeks.

Min. number of participants: 4.

Price: to be determined later, upon agreement on user's requirements

Aim
The aim of this course is to give participants an overview of basic methods for measurements in ballistics and during development of weapon systems.
ENERGETIC MATERIALS

Cast plastic bonded explosives (PBX) manufacture and quality control

**Content**

- **Theoretical part**
  - Cast explosives classification,
  - Cast explosives components,
  - Explosive component (Hexogen, Octogene, Pentrite),
  - Fuel and oxidizers,
  - Bonding agents for PBX-binders (different types of used polymers, curing agents and reactions, catalyzators of curing reactions, general conditions of polymers use),
  - Additives (plastifiers, unoxidators, bonding agents),
  - Description of manufacture.

- **Practice**
  - Explosive component, oxidator and fuel preparation,
  - Calculation of PBX composition,
  - Homogenisation of PBX in vertical mixer,
  - PBX curing,
  - PBX quality control,
  - Measuring of viscosity change with time,
  - Examination of one-axe mechanical characteristics,
  - Density determination,
  - Detonation velocity measuring,
  - Particle velocity of PBX determination,
  - Determination of PBX sensitivity on shock initiation,
  - Determination of PBX sensitivity on mechanical impulses.

**Languages:** Serbian, English.

**Duration:** minimum 3 weeks.

**Min. number of participants:** 3.

**Price:** to be determined later, upon agreement on user's requirements

**Aim**

The aim of this course is to give participants an introductory level working knowledge of the cast plastic bonded explosives (PBX) manufacture and quality control.
Methods of explosive and detonation characteristics of explosives determination

Content

Theoretical part
- Detonation wave physics,
- Explosive sensitivity,
- Parameters of explosive charges detonation,
- Methods of detonation velocity and detonation wave front shape determination,
- Methods of detonation pressure determination,
- Brisance of explosives determination.

Practice
- Determination of explosive sensitivity on impact,
- Determination of explosive sensitivity on friction,
- Determination of explosive sensitivity on shock initiation – GAP test,
- Detonation velocity determination,
- Determination of shape of detonation wave front by optical method,
- Particle velocity determination,
- Brisance of explosives determination.

Languages: Serbian, English.

Duration: minimum 3 weeks.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements.

Aim

The aim of this course is to give participants a survey of methods of explosive and detonation characteristics of explosives determination.

Production and doublebase rocket propellants (dbrp) quality control

Content

Theoretical part
- Solid rocket propellants classification,
- Components of the doublebase rocket propellants,
- Oxidants (nitroglycerine, nitrocellulose),
- Chemical stabilizers,
- The burning rate modifiers,
- Description of the productive process,
- Calculation of the Propellant Composition,
- Definition of the DBRP composition,
- Determination of the theoretical heat of combustion,
- Quality verification of the wet paste and modifiers.

Practice
- Weighing of the raw materials,
- Kneading machine homogenization,
- Gelatinization of the DBRP,
- Pressing the propellants,
- Machine workshop of the pressed product,
- Quality verification of the DBRP,
- Compress strength determination,
- Determination of the density,
- Determination of the heat of combustion,
- Determination of the burning rate law.

Languages: Serbian, English.

Duration: minimum 3 weeks.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements.

Aim

The aim of the course is to provide the participants with an understanding of production and double-base rocket propellants (dbrp) quality control.
**Chemical stability estimation and prolongation of storage time for propellants**

**Content**

**Theoretical part**
- Chemical Stability of Propellants,
- Methods and Criteria for Estimation and Prolongation of Storage Time for Propellants,
- Artificial Aging,
- Chemicals Transformations of the Stabilizers during Artificial Aging,
- Instrumental Methods for Estimation of Chemical Stability of Propellants,
- Gas Chromatography (GC),
- The work with Gas Chromatograph,
- High-Performance Liquid Chromatography (HPLC),
- The work with Liquid Chromatograph,
- Traditional Stability Test Methods,
- Estimation of Storage Time by determination of Stabilizer Consumption,
- Kinetics Modelling of Consumption of Stabilizer in Propellants during Aging.

**Practice**
- Calibration of Gas Chromatograph,
- Artificial Aging,
- Determination of the Contents of Ethyl Centralite (C I) in Artificial Aged Propellants by Gas Chromatography Method,
- Determination of the Contents of Methyl Centralite (C II) in Artificial Aged Propellants by Gas Chromatography Method,
- Determination of the Contents of 2-NO₂-Diphenylamine in Artificial Aged Propellants by Gas Chromatography Method,
- Determination of the Contents of Diphenylamine and its Mono-Derivates in Artificial Aged Propellants by Liquid Chromatography Method,
- Determination of the Contents of Ethyl Centralite (C I) in Artificial Aged Propellants by Liquid Chromatography Method,
- Heat Storage Test at 100 °C,
- Methyl-Violet-Test at 120 °C and 134.5 °C,
- Bergmann-Junk Test at 120 °C and 132 °C,
- Hansen Method at 110 °C (measuring pH).

**Languages:** Serbian, English.

**Duration:** minimum 3 weeks.

**Min. number of participants:** 3.

**Price:** to be determined later, upon agreement on user's requirements.

**Aim**

The aim of the course is to highlight the chemical stability estimation and prolongation of storage time for propellants.
METALLIC MATERIALS

Materials selection, technology development of armament pieces and failure analysis

Content

Theoretical part
- Basic principles of materials selection,
- Mechanisms of damages in metallic materials for armament,
- Influence of chemical compositions, production technologies and structure on the properties of metallic materials,
- Principles for analysis of damaged pieces and construction,
- Fractography of ductile, brittle, fatigue, corrosion-mechanical and thermal fatigue fracture,
- Flaws influences in material on fracture of metallic pieces and constructions,
- Materials selection and damage analysis at munitions, artillery, combat vehicles (armour protections, engines and transmission, propulsion), aircrafts and helicopters,

Practical basis
- Materials selections on the basis of properties and different materials sources maps,
- Determination the influence of chemical compositions, technology development and structure on the properties of selected materials,
- Materials selection of metallic materials for specific usage,
- Materials selection in practice and failure analysis of metallic pieces of: cumulative and subcaliber projectile, rifle ammunition, artillery, combat vehicles, missile components (engine chambers, nozzles, etc), aircrafts and helicopters,
- Failure analysis using different methods (chemical analysis, microstructures, quantitative fractography).

Languages: Serbian, English.

Duration: 3 months.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of this course is to provide the participants with an understanding of materials selection, technology development of armament pieces and failure analysis.
ORGANIC TECHNICAL MATERIALS AND CORROSION PROTECTION

Production and inhibitors quality control for composites rocket propellant with polyurethanes based polymer

Content

Theoretical part
- Materials for thermal protection of missile motor,
- Elastomer based inhibitors,
- Polymer blend,
- Compatibility theory,
- Criterions for estimation of inhibitor quality, depend on type of charging (free or bonded),
- Compounding principle,
- Production of thermal shield,
- Quality control methods.

Practice
- Procedure of production inhibitors materials,
- Quality control methods-practical.

Languages: Serbian, English.

Duration: minimum 3 weeks.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of this course is to provide the participants with an understanding of production and inhibitors quality control for composites rocket propellant with polyurethanes based polymer.
WIND TUNNEL TESTING

Design of six component internal balances for wind tunnel testing

Content
Theoretical part
- Wind tunnel internal balance types,
- Wind tunnel internal balance purpose,
- Wind tunnel internal balance measuring range selection,
- Internal balance supporting device selection,
- Measuring element type selection,
- Aerodynamic vector decomposition,
- Stress analysis of measuring element for normal force and pitching moment,
- Stress analysis of measuring element for axial force,
- Stress analysis of measuring element for rolling moment,
- Selection of strain gages,
- Selection of strain gages sensitivity,
- Temperature compensation and balance calibration.

Practice
- Stress analysis of wind tunnel internal balance,
- Basic element of bending theory,
- Finite element method using CAD program package Simens NX-6.

Languages: Serbian, English.

Duration: 2 weeks.
Min. number of participants: 3.
Price: to be determined later, upon agreement on user's requirements

Aim
The aim of the course is to provide the participants with an understanding of design of the six component internal balances for wind tunnel testing.
Wind tunnel models design

Aim
The aim of the course is to provide the participants with an understanding of design of the wind tunnel models.

Content

Theoretical part
- Wind tunnel model types 3D, 2D, half models,
- Wind tunnel model purpose,
- Wind tunnel model scale selection,
- Wind tunnel model aerodynamic load,
- Selection of supporting device,
- Wind tunnel model mechanization,
- Wind tunnel model motorization,
- Wind tunnel model pressurization.

Practice
- Wind tunnel model design,
- Wind tunnel model manufacture.

Languages: Serbian, English.
Duration: 2 weeks.
Min. number of participants: 3.
Price: to be determined later, upon agreement on user’s requirements.
AERODYNAMICS

Aerodynamic design and calculation of airplanes

Content

Theoretical part and Practice
- Aerodynamic design of the airplane,
- Calculation of the airplane aerodynamic characteristics,
- Airplane preliminary design,

Languages: Serbian, English.

Duration: 1 month.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of this course is to give participants a basic ground necessary for aerodynamic design and calculation of airplanes.

Design of airplane flight dynamics

Content

Theoretical part and Practice
- Airplane's parasite drag and aerodynamic cleanness,
- Interior (duct) aerodynamics and propulsion integration,
- General performance calculation in standard and non-standard conditions,
- Special performance calculation in standard and non-standard conditions,
- Determination of maneuvering capabilities.

Languages: Serbian, English.

Duration: 1 month.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of the course is to develop an understanding of the principles of design of the airplane flight dynamics.
DESIGN OF UNMANNED AIR VEHICLES

Unmanned air vehicles (UAV) stability and control

Content
- Theoretical part and Practice
  - Concepts of UAV’s flight dynamics design,
  - Modeling of UAV’s dynamics,
  - Design criteria of UAV’s control systems,
  - UAV’s integration and ground testing,
  - UAV’s flight testing procedures,
  - Effects of UAV’s structure vibration and aero elasticity.

Languages: Serbian, English.

Duration: 1 month.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user’s requirements

Aim
The aim of the course is to develop an understanding of the principles of unmanned air vehicles (UAV) stability and control.
TRACING MOBILE TARGETS IN THE AIR

Introduction in methods of tracking mobile targets in the air

<table>
<thead>
<tr>
<th>Content</th>
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<tbody>
<tr>
<td><strong>Theoretical part</strong></td>
</tr>
<tr>
<td>- Accidental vector,</td>
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<tr>
<td>- Distribution of accidental vector,</td>
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<td>- Election accidental vector,</td>
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<tr>
<td>- Kalman filter (mathematical model, definition of parameters and matrix),</td>
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<td>- Determination of parameter maneuver motion,</td>
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<tr>
<td>- Joining data.</td>
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<tr>
<td><strong>Practice</strong></td>
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<tr>
<td>- Simulation in software package MATLAB,</td>
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<tr>
<td>- Determination integral of complex functions,</td>
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<tr>
<td>- Extraction of a differential equation,</td>
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<tr>
<td>- Work with files,</td>
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<tr>
<td>- Generation of a path tracking,</td>
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<tr>
<td>- Simulation of a path tracking and estimation of a tracking error,</td>
</tr>
<tr>
<td>- Production of a simulation algorithm for video tracking of objects by Kalman filter.</td>
</tr>
</tbody>
</table>

**Languages:** Serbian, English.

**Duration:** 4 weeks.

**Min. number of participants:** 3.

**Price:** to be determined later, upon agreement on user's requirements

**Aim**

The aim of this course is to provide the participants with an understanding of methods of tracking mobile targets in the air.
AVIONICS

Avionics and aircraft trainer equipment

Content

Theoretical part
- Avionics principle of operation,
- GPS system,
- WAAS system,
- Radio navigation and GPS systems,
- VHF COM, UHF COM, audio and signal annunciation and warning,
- Additional navigation equipment (KCS305 gyro compass, ADF),
- Identification system transponder,
- Instrument panels of Front and Rear Cockpits (Meters),
- Avionics installation and maintenance,
- Radio navigation and GPS systems,
- VHF COM, UHF COM, audio and signal annunciation and warning,
- Additional navigation equipment (KCS305 gyro compass, ADF),
- Identification system transponder,
- Instrument panels of Front and Rear Cockpits (Meters),
- Fuel Installation,
- System for Cockpit Space Heating and Ventilation, Windshield Defogging and De/Icing,
- Pitot Installation.

Practice
- Test and calibrating equipment,
- IFR 6000: DME,
- Transponder,
- IFR 4000: ILS/VOR,
- GPS 101.

Languages: Serbian, English.

Duration: 3 weeks.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements.

Aim

The aim of the course is to highlight the avionics and aircraft trainer equipment.
**Static test of constructions**

### Content
- **Preparation of testing**
  - Experiment sample,
  - Requirements strength,
  - Applicable load cases,
  - Outline conditions,
  - Calculated and imposed load.
- **Supplies and equipment for testing**
- **Instrumentation and measurement**
  - Measuring bridges,
  - Testing procedure,
  - Processing and analysis of results of measurements.
- **Construction inspection**
- **Preparation of report**
- **Examples from practice**

### Aim
The aim of this course is to give participants a basic ground necessary for static testing of constructions.

### Mechanical and experimental testing of composite materials

#### Content
- **Theoretical part**
  - The basic concepts related to composite materials,
  - Composite classification,
  - Techniques of composites,
  - Application of composites,
  - Structure of composites.
- **Practice**
  - Testing by tightening of plastic glass composite materials and carbon fibers – epoxy resign,
  - Testing by pressure of glass plastic and carbon fiber epoxy resign,
  - Testing by bending of glass plastic and carbon fiber epoxy resign,
  - Testing of interlaminar strength by compressive of glass plastics and carbon fiber epoxy resign,
  - Testing by the shear of plastic glass and carbon fiber epoxy resign.

#### Aim
The aim of the course is to provide the participants with an understanding of mechanical and experimental testing of composite materials.
### Fracture mechanics of construction materials

**Content**

**Theoretical part**
- Introduction to Fracture Mechanics,
- General definitions of LEML,
- Stress intensity factor,
- Fracture toughness in plane deformation Kic,
- General definitions EPML,
- J – Integral,
- Opening the top of the crack (COD),
- The behavior of materials in the presence of crack,
- Quantitative description of crack growth,
- Rules of crack growth.

**Practice**
- Experimental determination of fracture mechanics parameters, Kic,
- Experimental determination of fracture mechanics parameters in elastoplastic behaviour,
- Determination of the J-a curve, and the critical J-integral,
- Determine the critical COD,
- Experimental determination of parameters of crack growth.

**Languages:** Serbian, English.

**Duration:** 4 weeks.

**Min. number of participants:** 2.

**Price:** to be determined later, upon agreement on user's requirements.

### Electrically measurement of strain in the material

**Content**

**Theoretical part**
- Introduction to working with measuring tapes,
- Types of measuring tape and principles of work with them,
- The terms and units that are used in dealing with measuring tapes,
- Criteria for the selection of measuring tape,
- Set the measuring tape,
- Selection of adhesives to set up measuring tape,
- Protection of measuring points,
  The principle of measurement with measuring tapes,
- Viston bridge,
- Method of measuring tape to connect Viston bridge,
  Instrumentation used for measuring with measuring tapes,
- Data processing of measurement in MS Excel.

**Practice**
- Determination of material characteristics.
  - Selection of specimen for testing,
  - Paste the measuring tape on the specimen,
  - Connect the measuring tape on measuring amplifier,
  - Testing and data acquisition,
  - Processing of measurement data,

**Languages:** Serbian, English.

**Duration:** 3 weeks.

**Min. number of participants:** 2.

**Price:** to be determined later, upon agreement on user's requirements.

### Aim

**Fracture mechanics of construction materials**

The aim of the course is to provide the participants with an understanding of fracture mechanics of construction materials.

**Electrically measurement of strain in the material**

The aim of this course is to give participants a basic ground necessary for electrically measurement of strain in the material of construction materials.
STRENGTH CALCULATION OF AIRCRAFT

Structural analysis using finite element method

Content

Theoretical part and Practice
- Theoretical considerations of structural analysis using the Finite Element Method (FEM) including: elastic and elastoplastic behaviour of materials
- Application of finite element methods for the analysis of thin-walled structures using commercial software MSC/queue (3-D finite elements used in plates and shells)
- "Free-Mesh Finite Element Modeling" three-dimensional structural elements of construction
- Application of finite element analysis of reinforced structures for thin-walled structures using finite element method in elastic domain
- Analysis of stability loss of thin-walled structures ("buckling behaviour") modeling plates and shells by finite elements
- Verifying the accuracy of the results using the FEM: comparison of FEM results with analytical solutions, including sample tests ("patch-tests")
- Modeling of the structural elements of aircraft and stress analysis using Finite Element Method (FEM)
- Introduction to experimental testing of static strength of the school light aircraft
- Compare the results of structural analysis using FEM with the experimental results of the assembly of school light aircraft

Languages: Serbian, English

Duration: 4 weeks

Min. number of participants: 3

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of the course is to highlight the structural analysis using finite element method.
ROCKETS AERODYNAMICS

WAG-Wing Aerodynamic Coefficient

**Content**

**Theoretical part and Practice**

The programme calculates non-linear static coefficients, their derivatives and linear dynamic coefficients of an isolated wing. It is based on available data from Russian and western literature and also experimental data obtained from wind-tunnel. Calculation can be done either in function of Mach number or in function of angles of attack for various types of the wing shapes: rectangular, delta or clipped delta wings. The results from the WAC programme can be used as input data for programme NLMAC.

**Languages:** Serbian, English

**Duration:** 1 week

**Min. number of participants:** 3

**Price:** to be determined later, upon agreement on user's requirements

**Aim**

The aim of this course is to introduce the participants into computer programme for calculation non-linear static coefficients, their derivatives and linear dynamic coefficients of an isolated wing.

FITALPHA – fitting obtained data from wind-tunnel in function of angle of attack

**Content**

**Theoretical part and Practice**

The programme enables determination of missile aerodynamic derivatives based on the measured aerodynamic coefficients in wind-tunnel or obtained by calculation of the NLMAC programme. Based on predefined polynomial structure of aerodynamic coefficients in aerodynamic co-ordinate system, aerodynamic derivatives are obtained up to the third order of angle of attack, and up to the first order canard control angle. Fitting procedure is done in two phases.

In first phase aerodynamic coefficients are fitted in function of angle of attack. Coefficients obtained by fitting in the first phase are fitted in function of canard control angle.

**Languages:** Serbian, English

**Duration:** 2 weeks

**Min. number of participants:** 3

**Price:** to be determined later, upon agreement on user's requirements

**Aim**

The aim of this course is to introduce the participants to computer programme for determination of missile aerodynamic derivatives based on the measured aerodynamic coefficients in wind-tunnel or obtained by calculation of the NLMAC programme.
PROTECTION

Camouflage protection

Content
Theoretical part and Practice
Essential notions about camouflage protection:
- Essential notions about camouflage protection,
- Main principles and procedures for camouflage protection,
- Equipment for camouflage protection,
- Detection and identification sensors/devices and,
- Testing methods for camouflage equipment.
Laboratory and field testing:
- Laboratory testing for camouflage materials and equipment,
- Field testing for camouflage materials and equipment,

Languages: Serbian, English.

Duration: 2 weeks.

Min. number of participants: 2.

Price: to be determined later, upon agreement on user's requirements

Aim
The aim of this course is to give participants an introductory level knowledge necessary for camouflage protection, as well as, laboratory testing of camouflage materials.
Respiratory protection devices

Content

Theoretical part and Practice
- Fundamentals of respiratory protections,
- Aerosol filtration of toxic and hazardous chemicals, radioactive particles and other hazard substances,
- Adsorption principals of toxic and hazardous chemicals,
- Gas mask: basic and principals,
- Self-contained Breathing Apparatus (SCBA) and Compressed Air Breathing Apparatus (CABA),
- Laboratory testing of gas mask filtration,
- Exhalation valve and combined filter aerodynamic resistance testing,
- Testing of dynamic and static exhalation valve leakage,
- Inhalation resistance test of the full-face mask,
- Method for respiratory quantitative fit testing with sodium chloride aerosol (protection factor test),
- Determination of heat characteristics (heat transfer, resistance to burning, oxygen index), thickness, mass, air and water vapor permeability, viscosity, resistance to oil, effective tensile strength, tearing, adhesion and abrasion, high and low temperature effects, etc.

Languages: Serbian, English.

Duration: 8 weeks.

Min. number of participants: 2.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of this course is to provide the participants with an understanding of respiratory protection devices.

Body protection devices

Content

Theoretical part and Practice
- Body protection fundamentals: Materials, Devices.
- Laboratory testing of materials for body protection: Testing methods, Technical support of body protection devices.

Languages: Serbian, English.

Duration: 4 weeks.

Min. number of participants: 3.

Price: to be determined later, upon agreement on user's requirements

Aim

The aim of this course is to provide the participants with an understanding of body protection fundamentals and laboratory testing of materials for body protection.
Decontamination of chemical warfare agents (CWA)

**Content**

**Theoretical part**
- General concepts about CWA (definitions, types, division, general toxicological data...),
- Personal protective equipment (types, description, management usage and practice),
- Laboratory procedure for dealing with CWA (safety measures, action in the case of contamination, evacuation...),
- Decontamination (definition, norm, division, types, general mechanisms...),
- Accessories and substances for decontamination,
- Descriptive exercise: decontamination procedure in laboratory conditions.

**Practice**
- Decontamination efficiency theoretical and practical training for exercise,
- Evaluation of decontamination efficiency laboratory exercise (with sulfur mustard),
- Decontaminating station representation and description of components and practice.

**Languages:** Serbian, English.

**Duration:** 2 weeks.

**Min. number of participants:** 5.

**Price:** to be determined later, upon agreement on user's requirements

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VIBRATION

**Structural analysis using finite element method**

**Content**

**Theoretical part and Practice**
- The basic theory of vibration,
- Vibration resources on motors and machines,
- Sensors and devices for vibration tests,
- Measurement systems calibration,
- Vibration test machines,
- Vibration tests procedures and standards,
- The basis of random vibration,
- Torsion vibration and balancing machine,
- Design tool holders for vibration tests,
- Resonant behaviour and the purpose of tool holders,
- The main data of vibration systems and equipment,
- Tool holders design,
- Tool holders function,
- Requested information about measurement devices and procedures,
- Tool holders basic types,
- Methods of tool holders,
- Tool holders special consideration and verification.

Testing of device and equipment to transportation vibration:
- Device and equipment vibration to ground vehicle,
- Transportation vibration examples and graphics,
- Testing equipment carried as cargo,
- Development of software for testing in the laboratory,
- Testing equipment installed in helicopters,
- Testing fuses and components embedded in launcher,
- Testing equipment installed in ships,

Special considerations testing technique to vibration.

**Languages:** Serbian, English.

**Duration:** 3 weeks.

**Min. number of participants:** 2.

**Price:** to be determined later, upon agreement on user's requirements

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**Aim**

The aim of the course is to highlight the decontamination of chemical warfare agents (CWA).
ROCKETS GUIDANCE

APD - Autopilot Design

**Content**

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**Theoretical part and Practice**

Purpose of the APD (Autopilot Design) software is determination of the gains and compensator parameters of the autopilot in order to obtain stability of the autopilot closed loop. This software package enables design of the following types of the autopilots:

- Normal acceleration autopilot with accelerometers and rate gyros for both statically stable and statically unstable missiles,
- Roll autopilot with free and roll rate gyro.

**Languages:** Serbian, English.

**Duration:** 2 weeks.

**Min. number of participants:** 2.

**Price:** to be determined later, upon agreement on user's requirements.

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**Aim**

The aim of this course is to introduce the participants to computer programme for determination of the gains and compensator parameters of the autopilot in order to obtain stability of the autopilot closed loop.
INTRODUCTORY NOTE

With its great experience in the field of design and testing of armament and the personnel with the highest scientific and teaching titles, the Military Technical Institute participates in master academic and PhD studies at the University of Defence.

MASTER ACADEMIC STUDY PROGRAMS INCLUDE:
- MILITARY MECHANICAL ENGINEERING
- MILITARY ELECTRONIC ENGINEERING
- MILITARY CHEMICAL ENGINEERING

PhD STUDY PROGRAMS INCLUDE:
- MILITARY MECHANICAL ENGINEERING
ABOUT US

The Military Technical Institute (MTI) is the greatest military research and development institution and it is an integral part of the Ministry of Defence of the Republic of Serbia. It is accredited at the Board for Accreditation of Scientific Research Institutions as the Research and Development Institute of the Republic of Serbia.

The activities of Military Technical Institute are primarily focused on development of weaponry and military equipment as high technology products. This objective is successfully accomplished so far, since over 1300 weaponry and military equipment products, developed in the MTI, entered the operational use in the Army of the Republic of Serbia. Numerous new technologies, state-of-the-art materials and modern testing methods have also been conquered with time. MTI employs few tenth persons with the highest scientific and teaching titles. 80% of employees are research stuff. The Laboratory potentials of the MTI have been created for 60 years. Today, the MTI has at its disposal 22 modern laboratories. Some of them are of international importance, some are unique in Balkan region and most of them exceed military importance and can be regarded as a national resource of the Republic of Serbia. In following period, the MTI will continue with its basic activity research and development in the field of defence technologies.
MTI LOCATION
- 170,000 m² under roof
- 12 km from Belgrade city centre
- Public transport, Bus line No 51

To download Belgrade map of public transportation follow the link:

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Military Technical Institute offers a wide range of teaching facilities, classrooms, amphitheaters and laboratories for practical studies. MTI also provides space for recreation and sports.
Accommodation Facilities

Acocmodation facilities include 35 apartments equipped with kitchenette, TV, internet and air conditioning. The facility also provides space for the living room and dining.