European School Laboratory Guidelines and Regulations

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Sophio Bazadze
Director

GEORGIA "EUROPEAN SCHOOL" Ltd 205172917

2 I. Skhirtladze Str. Tbilisi, 0177, Georgia
Tel: (032) 239 59 64,
info@europeanschool.ge
www.europeanschool.ge
ს/კ: 205172917

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1. Introduction to the labs

The purpose of this document is to establish clear guidelines and procedures for all users of the European School (ES) laboratories. These regulations ensure consistency, safety, and efficiency across all lab activities. The laboratories at ES are shared by diverse users, including students, teachers, and guests, often for varying durations and purposes. To maintain a structured and safe environment, it is essential that everyone adheres to the outlined routines and protocols.

This document provides comprehensive information about the routines, safety measures, and regulations for the Chemistry, Physics, Biology, and Science labs. It also includes guidelines for handling chemicals, operating equipment, and ensuring personal and environmental safety. For any inquiries or clarification, users should contact the designated Lab Leader.

At the European School, laboratory work is an integral part of the educational experience, complementing classroom instruction to ensure students thoroughly grasp theoretical concepts through practical application. Our state-of-the-art facilities include well-equipped laboratories for Physics, Chemistry, Biology, and general Science, along with specialized spaces like FabLab, Computer Labs, Lego Laboratory, and Robotics Laboratory. These labs serve as dynamic platforms for observation, experimentation, and innovation.

Students are encouraged to engage in independent and collaborative learning, fostering skills in critical thinking, problem-solving, and creativity. By conducting experiments and working on hands-on projects, students gain insights into scientific principles and processes, nurturing their ability to draw their own conclusions, develop hypotheses, and form theories. Additionally, our labs are designed to promote global and digital citizenship, aligning with the school's vision of preparing students for the challenges of a rapidly evolving world.

This document aims to create a safe, inclusive, and inspiring environment for all lab users, empowering them to explore, discover, and grow through experiential learning.

Computer Labs

The European School boasts six state-of-the-art computer labs distributed across its campus, designed to support a wide range of educational activities and enhance digital learning experiences:

Building A: Three computer labs fully equipped with laptops.

Building B: Two computer labs - one equipped with laptops and the other with both Windows and Mac desktop computers.

Building C: One computer lab fully equipped with laptops.

Each device in the computer labs is connected to the internet via cable or wireless connections to ensure reliable and uninterrupted access. The labs are further equipped with modern tools such as Interactive Whiteboards (IWBs), printers, scanners, web cameras, headphones, and other cutting-edge technologies that support high-quality teaching and learning experiences.

To meet the dynamic requirements of the curriculum, all devices in the computer labs are updated annually with the latest software. This ensures that learners can compile, run, and debug programs seamlessly while working on projects or learning advanced concepts. Software installations are

carefully aligned with curriculum standards and tailored to meet the specific needs of various courses, from basic computing to advanced programming and multimedia design.

The computer labs are designed to promote collaborative and independent learning, providing students with opportunities to develop essential 21st-century skills, such as digital literacy, coding, problem-solving, and creative thinking. Teachers also leverage these labs to integrate technology into lessons effectively, ensuring that students are prepared for future academic and professional challenges.

Additionally, lab maintenance and troubleshooting are overseen by the IT Department, ensuring that all systems remain functional and secure. Any issues or special requests related to the computer labs can be directed to the Lab Leader or IT support team.

By fostering a technologically enriched learning environment, the computer labs at the European School serve as vital hubs for exploration, innovation, and the development of global and digital citizenship skills.

Picture 1. ICT Lab Building C

Picture 2. ICT Lab Building B

Lego Lab

The Lego Lab at the European School provides primary school students with engaging, hands-on experiences that bring STEAM (Science, Technology, Engineering, Art and Mathematics) concepts to life. Through the use of LEGO Education Solutions, students are encouraged to explore, experiment, and innovate while linking their learning to real-world phenomena.

LEGO bricks, intuitive programming tools, and well-designed lesson plans empower teachers to ignite students' natural curiosity. These tools foster the development of essential skills such as communication, creativity, collaboration, and critical thinking, all within a fun and exciting learning environment. The lab’s tactile and flexible resources adapt to the needs of students as they advance, offering a scalable approach to problem-solving and discovery.

In the Lego Lab, students have access to a variety of innovative resources that extend their learning beyond Lego kits, including:

- 3Doodler Create 3D Pen: Encouraging creativity through 3D drawing and design projects.
- MakeyMakey: Introducing students to the basics of electronics and coding by transforming everyday objects into touchpads.

- Elenco kits: Offering hands-on experience with circuits and electronics.
- Microcontroller tools: Providing a foundation in programming and hardware integration.
- Botley Robot: Teaching foundational coding concepts without the need for screens.

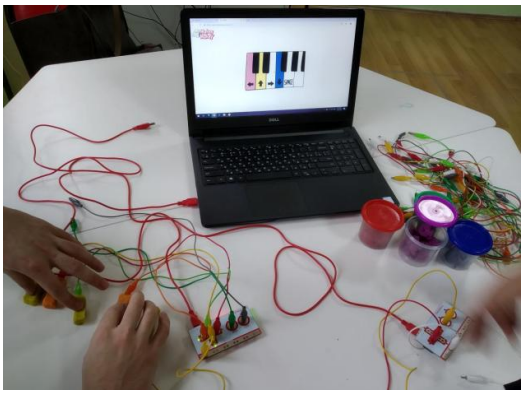
These resources enable students to explore advanced topics in STEAM, such as robotics, engineering design, and computational thinking, in an interactive and supportive environment. Activities in the Lego Lab are carefully designed to align with educational standards and to encourage students to think critically about how science and technology influence their daily lives.

By integrating play with purposeful learning, the Lego Lab fosters an atmosphere of discovery where students can actively build their understanding of complex concepts. The lab is not only a space for innovation but also a platform for cultivating a lifelong passion for STEAM subjects and developing future-ready skills.

For any assistance or inquiries regarding resources or lesson planning, teachers and students are encouraged to contact the Lego Lab Coordinator.

Picture 3. Lego Lab

Picture 4. Botley Robot



Picture 5. Makey Makey

FabLAb

The FabLab at the European School is a pioneering facility, marking the first Industrial Innovations Laboratory established within a school in Eastern Europe. Designed to equip students with 21st-century skills, FabLab offers access to advanced technologies and fosters innovation, creativity, and problem-solving capabilities.

The FabLab is equipped with cutting-edge tools and machinery, including:

- Laser Cutter: Precision cutting and engraving for a variety of materials.
- 3D Printers: Turning digital designs into physical prototypes, encouraging iterative design and experimentation.
- Industrial Robot Arms: Introducing students to robotics and automation processes.
- CNC Milling Machines: Supporting advanced fabrication techniques for complex projects.
- Vinyl Cutter: Creating custom decals, signage, and graphics.
- UV Printer: Printing high-quality, durable designs on various surfaces.
- Vacuum Former: Enabling the production of molds and forms for prototyping.
- Thermo Presses: Customizing textiles and other materials.
- Electronics Workbench: Providing tools and components for developing and testing electronic circuits.
- Additional tools for inventions and innovative projects.

FabLab is a hub for STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, emphasizing critical thinking, creativity, and practical application over rote memorization and procedure. It prepares students for future careers in industries where innovation is key.

The European School is among the few institutions in Georgia to adopt Project-Based Learning (PBL) and establish a dedicated 3D Printing Lab. PBL encourages sustained engagement with real-world challenges, helping students develop resilience, collaborative skills, and a deeper understanding of complex concepts. In the FabLab, students can transform their ideas into tangible prototypes, allowing them to:

- Explore diverse ideas and approaches.
- Analyze problems in depth and identify innovative solutions.
- Iterate and refine designs, learning persistence and adaptability.

The 3D printing solutions available in FabLab bring students' designs to life, creating excitement and momentum behind their projects. Whether they are designing models, engineering prototypes, or creating art, FabLab provides an inspiring environment where ideas can evolve into impactful creations.

By integrating hands-on experiences with cutting-edge technology, FabLab cultivates the skills necessary for success in a rapidly advancing technological landscape. For inquiries or guidance on using the FabLab resources, students and teachers can reach out to the FabLab Manager.

Picture 6. FabLab Building A

Science Laboratories

European School has well-equipped Physics, Chemistry, Biology and Science laboratories designed to provide a safe and effective environment for hands-on learning and experimentation. Every lab is equipped with dedicated demonstration spaces where teachers can conduct interactive sessions, ensuring students grasp complex scientific concepts effectively. Staff cubicles attached to labs provide a convenient workspace for preparation and supervision, ensuring seamless guidance during lab activities. The laboratories feature a wide range of tools and resources, including:

- **Models and Charts:** For effective visualization of scientific concepts.
- **Audio-Visual Aids:** (https://gizmos.explorelearning.com/, https://www.labster.com/, etc.To facilitate interactive and engaging learning sessions.
- **Vernier Go Direct®** sensors empower students to investigate scientific concepts with hands-on real-time data collection, for precise data acquisition and analysis.
- **PASCO Laboratories** provide hands-on science tools and data-logging solutions, enabling students to engage directly with science and STEM concepts through cutting-edge classroom technology.

Picture 7. Chemistry Lab

Picture 8. Physics Lab

Picture 9. Biology Lab

2. General Information

Access

You are required to read and sign the Safety Instructions for Laboratory Use at ES

https://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/acs-secondary-safety-guidelines.pdf

and meet with the lab leader in order to gain access to the ES labs. The chemistry and physics labs are located on 4th floor, science and biology on the 3rd floor. This document is for you to keep and refer to throughout your lab work. A checklist accompanies your HSE documentation and is used when you begin and end your work in the UNIS labs. This checklist needs to be completed with lab personnel both before and after your lab work begins and ends.

Manuals

Manuals should always be in a binder in the same room as the equipment is located. Do not remove it. If you need certain information from the manual, make a copy. If you are unable to find the manuals, ask. There is often a copy in the Lab leaders' office.

Material Safety Data Sheets

These are found in the binder located on the bench in the chemistry lab, for all chemicals that are found in this lab. It is very important that you read these before you begin working with any chemical. Make sure to read what protective equipment you should be using when handling the substance, and how to clean up any spills. You should know how to clean up a spill before it happens. There is a small common fridge and freezer in the chemistry lab. These are for small items and short-term storage only. There is a fridge and freezer in the instrument lab that is used only for standards. Anything being stored in the fridges and freezers need to be labeled with your name. If you do not label your samples adequately, they may be thrown away without notice.

Common equipment and supplies

In the laboratory storage room and in the teaching lab you will find common lab equipment for everyone to use, such as gloves, glassware, tubing, small instruments, etc. Be sure to always return things clean and in working condition. Ask the Lab leader if you're looking for any equipment.

3. Laboratory Safety

General safety in Science Labs

To ensure a safe and effective working environment, the following safety rules must be adhered to in all laboratories. These guidelines cover behavior, emergency preparedness, chemical handling, equipment usage, and personal hygiene.

Emergency Preparedness

1. **Locate Safety Equipment**: Know the locations of safety showers, eyewash stations, and fire extinguishers, which is in the laboratory or near it.
2. **Emergency Exits**: Familiarize yourself with emergency exit routes.
3. **Emergency Procedures**: Be prepared to act quickly in case of accidents or exposure.

General Behavior

4. **No Horseplay**: Playful or distracting behavior is strictly prohibited.
5. **Restricted Access**: Only authorized personnel are allowed in laboratories specialized areas.
6. **No Food or Drink**: Avoid storing or consuming food, beverages, or cosmetics in the lab.
7. **Designated Use**: Use equipment only for its intended purpose.
8. **Proper Disposal**: Do not pour chemicals down drains or dispose of volatile solvents in fume hoods.

Chemical Handling and Exposure

7. **Labeling**: Ensure all containers are labeled properly. Never use unlabeled chemicals.
8. **Do Not Taste or Sniff Chemicals**: Intentional inhalation or ingestion of chemicals is prohibited.

Personal Protective Equipment (PPE)

13. **Eye Protection**: Always wear lab coats and safety glasses or goggles when working with or near chemicals.
14. **Appropriate Clothing**:
    - Wear closed-toe shoes; sandals and perforated shoes are prohibited.
    - Tie back long hair and secure loose clothing.

Hygiene and Cleanliness

17. **Wash Hands:** Wash exposed areas thoroughly before leaving the lab.
18. **Keep Workspaces Clean**: Maintain cleanliness to reduce the risk of contamination.

By following these comprehensive safety rules, laboratories can maintain a secure environment, minimizing risks and promoting a culture of safety and responsibility.

FabLab Safety Guide

I. General Safety Principles

1.1 Basic Rules

Laboratory work is permitted only under instructor supervision

All equipment operation requires prior instruction

Equipment must never be left unattended

Use of safety equipment is mandatory

1.2 Personal Protective Equipment

Mandatory equipment before entering the laboratory:

Protective eyewear

Special work coat

Tied-back hair

Removal of accessories and loose clothing

II. Specific Safety Protocols

2.1 Noise Safety

Risk Indicators:

Need to raise voice when speaking to colleagues less than 2 meters away

Ringing sensation in ears

Temporary hearing loss

Preventive Measures:

Use of earmuffs or earplugs

Noise isolation

Limited working time in noisy areas

2.2 Eye Protection

Mandatory use of protective eyewear when:

Operating machining equipment

Working with chemicals

Soldering

Operating laser cutter

2.3 Respiratory Protection

Hazards and Prevention:

Protection from harmful particles using respirators

Proper ventilation system operation

Air quality monitoring

2.4 Skin Protection

Special gloves for wood and metal processing

Protective measures when working with hot surfaces

III. Equipment-Specific Safety Protocols

3.1 Laser Cutter

Operation only under instructor supervision

Keep lid closed during operation

Use only approved materials

Check fire extinguisher condition

Never leave unattended

3.2 3D Printer

Clean working surface before and after use

No contact with moving parts

Avoid contact with hot components

3.3 CNC Machine

Required Equipment:

Protective eyewear

Earmuffs

Work coat

Work gloves

Safety Measures:

Proper material securing

Clean workspace

No contact with moving parts

3.4 Eco-solvent Printer and Vinyl Cutter

Proper material securing at corners

No material contact during printing/cutting

No unnecessary movement during operation

3.5 Other Equipment

UV Printer:

Use protective glass

Avoid direct eye exposure

Vacuum Forming Machine:

Constant supervision

Protection from thermal burns

Heat Press:

Protection from thermal burns

Constant supervision

3.6 Soldering Equipment

Mandatory shutdown when leaving laboratory

Prevent tip oxidation by maintaining solder coating

Fire hazard prevention

IV. Emergency Response Protocol

4.1 In Case of Fire

Immediately notify instructor

Use appropriate fire extinguisher

Evacuate building according to evacuation plan if necessary

4.2 In Case of Injury

Immediately notify instructor

Use first aid kit

Call emergency services if necessary

V. Final Provisions

5.1 Responsibilities

All users must read and follow safety rules

Instructors are responsible for monitoring rule compliance

Rule violations may result in restricted laboratory access

5.2 Rules Update

Safety rules are subject to periodic updates

Users will be notified of changes

Suggestions for rule improvements are welcome

Safety rules for working in ICT Labs

To ensure a safe, respectful, and productive environment, all users of the European School's ICT Labs must adhere to the following safety and usage guidelines. Violation of these rules may result in the loss of lab privileges and access to computing resources.

1. **Respect for Equipment and Others**
    - The use of the computer lab is a privilege. Always treat the equipment and your peers with respect.
    - Maintain a quiet atmosphere in the lab to avoid disrupting others who are working.
2. **Access and Entry**
    - Students may only enter the lab with a teacher present.
    - Upon entering, walk quietly and go directly to your assigned seat.
3. **Prohibited Items and Actions**
    - No food or drinks are allowed near the computers or in the lab.
    - Do not touch the screens, and handle mice, keyboards, and headphones gently.
    - Do not touch wires or unplug equipment, as this can cause damage to computers or networks and result in lost work.
4. **Proper Use of Equipment**
    - Use the equipment for educational purposes only. No downloading of music, games, pictures, or non-educational materials.
    - Do not engage in chatting or using non-educational software.
    - Do not tamper with or damage any computer components. Students responsible for damage will be held accountable for repairs or replacements.
5. **Behavioral Expectations**
    - Stay focused on your task. Bring only the materials needed for your work in the lab.
    - Do not interfere with or use another person's equipment without permission.
6. **Saving and Exiting Procedures**
    - Save your work frequently to the correct media, such as your personal folder or designated storage.
    - Before leaving the lab, ensure you:
        - Save all work to the correct location.
        - Close all open programs.
        - Turn off the computer if instructed to do so.
7. **Maintaining a Clean Workspace**
    - Leave your workstation neat and ready for the next user:
        - Push in your chair.
        - Leave the computer station in proper order.

- Take all personal items with you.

8. **Technical Issues**
    - Report any technical issues to your teacher immediately. Do not attempt to fix problems yourself.

Consequences for Rule Violations

Failure to follow these rules may result in the loss of access to the computer lab and its resources.

For more information on the safe and responsible use of ICT, please refer to the **European School e-Safety Policy**.

4. Laboratory Routines

Protocol writing

It is important for ES to gain knowledge from the work you do while at ES. It is therefore asked that a copy of your Standard Operating Procedure (protocol/method) be written and given to the Lab leader along with a risk analysis. These will need to be read through with the Lab leader before you begin your work. Templates for these can be found on the UNIS webpage under the Lab services section, or ask the AT Staff Engineer or the Lab leader for a copy.

Standards

When using the standards, weigh the bottle before and after and record the weight (as well as the amount taken) on the standard weigh sheet. Make a note if emptied and always return the standards to their place in the fridge after using. Be sure to use the label maker if you are making a new vial; include: name of standard, concentration, date made, and made by. These are very expensive and should not be used without permission.

Lab equipment

Do not use any laboratory equipment without having been given prior instruction or training from an experienced user – always ask for help if you are unsure. This is for your own safety as well as for the maintenance of the instrument. Always leave the equipment in a condition that you would like to find it yourself. If equipment is broken or not functioning well, please notify the lab personnel.

General cleaning

While the cleaning staff cleans the floors and empty the trash bins, everything else in the laboratory is our responsibility. The lab is shared by many, and it is important to keep things tidy and clean. Always make sure that you have cleaned up after yourself and put common equipment back where they belong. Everyone is responsible for cleaning dishes. They are rinsed, then labels are removed and they are placed in the dish washer. When it is full, turn it on. The washing machine uses detergent for the wash cycle and a quick drying agent in the disinfection rinse. Dishes are then hung on the drying racks to dry. Glassware is burned at 450˚C for 6 hours in the muffle furnace - Cover the glassware openings with foil.

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