



Univerzita Karlova v Praze
Lékařská fakulta v Hradci Králové

INITIAL TRAINING FOR STUDENTS

SAFETY AND OCCUPATIONAL HYGIENE
FIRE PREVENTION

This text is based on valid regulations and other laws of safety and occupational hygiene, fire prevention and internal regulations of the Medical Faculty, Charles University in Hradec Králové. It is mandatory for all the students of the Medical Faculty, Charles University in Hradec Králové.

Safety in the workplace

The basic requirements for occupational safety are stipulated by the Labor Code. In compliance with this code it is necessary to care for one's own safety, health or life and the health of other people. Above all, it is necessary to follow the legal requirements related to occupational safety, follow other regulations related to the performed work, namely on technical equipment, laboratory equipment related to both physics and chemistry. It is also necessary to follow guidelines for safe and proper conduct in the workplace, to use required protective clothing and equipment, not to use alcoholic drinks and other addictive substances and not to teach or perform other tasks when under the influence of such substances, to adhere to the ban on smoking in all parts of the Medical faculty and announce to your superordinate all defects or faults that may threaten occupational safety (OS).

Safety when working with machines, technical equipment, instruments and tools

- Equipment may be used only for the purposes and under the conditions for which it is intended, in compliance with the operational documentation.
- Maintenance and repairs of equipment must be carried out in compliance with the instructions provided by the manufacturer and, if special professional qualification is required for certain activities, such activities may be carried out only by a person with the relevant special professional qualification.
- Equipment may be turned on only by an intentional act of the operator by means of a device intended for this purpose.
- Equipment must be provided with warning or information signs, notices, markings or signaling in accordance with the instructions for use provided by the manufacturer.
- Repairs, setting, adjustment, maintenance and cleaning of equipment may be carried out only if the equipment is disconnected from the power lines; if this is not technically feasible, suitable safety measures must be implemented.
- Checking the operation safety of equipment prior to bringing the equipment into operation shall be carried out in accordance with the accompanying documents provided by the manufacturer.
- Equipment must be provided with operational documentation. Such documentation must be kept during the entire time of operation of the equipment.

Principles of safety in the workplace with regards to electrical appliances

- Become acquainted with the safety instructions, particularly with the operating instructions.
- Regularly check electrical appliances in the workplace as to whether or not they are visibly damaged; this must be done particularly in relation to the power cord, extension cord, plug and socket.
- Before every usage, carefully check whether or not the covers or other parts of the appliance are damaged.
- Report all defects and suspected defects to the superior employee.
- Make sure that the switch is in the off position before plugging in the appliance.
- Protect electrical appliances against water; they must not be exposed to rain, used in a damp, wet or explosive environment.
- Do not move appliances and do not lift them by the power cords.
- Repairs to electrical appliances may be carried out only by persons with appropriate qualification.
- Do not use damaged electrical appliances.

Principles of safe handling of materials

- Do not underestimate handling and do not overestimate your abilities.
- Keep passageways clear – do not place materials not in use in passageways and manipulation routes.
- Avoid unnecessary operations – render the remaining operations easier.
- When lifting and moving loads, try to have the center of gravity of the load as close to the body as possible.
- When moving loads horizontally between workplaces, try to keep the load at a constant height.

The weight of loads that are moved manually by men must not exceed 50 kilograms with a good grip for occasional lifting and moving and 30 kilograms for frequent lifting and moving. Occasional lifting and moving relates to a period of less than 30 minutes per shift.

Permissible weight and distance for moving loads by women:

Women

Weight (kilograms)	15	10	5
Maximum distance (meters)	10	15	20

Pregnant women, mothers up to nine months after childbirth

Weight (kilograms)	7.5	5	2.5
Maximum distance (meters)	10	15	20

Requirements for working with computers

The monitor must be placed so that lights or other light sources, such as windows etc., are not reflected in the monitor.

- The screen must not contain any defects, such as oscillations, floating or flickering of individual characters, lines, variations in brightness etc.
- The brightness and contrast of monitors must be individually adjustable.
- The distance between the eyes and the screen must not be less than 40 cm.
- The top of the monitor should be at the same height as the eyes, not higher.
- After every two hours of continuous work, a safety break lasting five to ten minutes must be taken.

Principles of safety in laboratory work

- Necessary precautions have to be taken during the lab work to lower certain risks which can be predicted on the basis of the dangerous nature of the chemicals.
- Technical and organizing precautions for health safety and decontaminants have to be carefully checked before each task.
- Employ only safe and approved methods.
- Never leave the lab for even a minute without supervision.
- Labs have to be equipped by personal protective equipment, fire extinguishers, first-aid kits, drinking water supply, proper portable torch (at the places where backup lighting is missing), decontaminants and neutralizing equipment.
- The entrance to the lab has to be labelled by warning signs according to the character of the work inside.
- Lab machines, equipment and tools have to be kept in a safe state. They have to serve only for doing lab work and they have to be in accordance with the rules and regulations.
- Lab glass is used only for lab work and is not allowed to be used for food preparation, drinking or food storage. Food and drinks are not allowed to be stored in freezers which are used for chemicals and biochemicals.
- Eating, drinking and smoking are prohibited in a lab.
- All chemicals have to be labeled.
- Usage of unsuitable, damaged machines, tools and lab dishes is prohibited. The state of the machines has to be checked according to the instructions list before beginning work.
- Switching off the machines has to be done at a safe and reachable place. It must not be spontaneously switched on or even switched on accidentally.
- It is necessary to use in the lab only an apparatus which is carefully set together.

Principles of safety when working with chemicals

- All work with dangerous chemicals has to be technically insured (e.g. work in digester, ventilation etc.) so that the highest permitted concentration in the air is not exceeded.
- Contact of the workers with the chemicals during their work has to be avoided by using e.g. lab forceps, spoons etc.
- Safety in work, hygienic and protective tools have to be used during when working with chemicals according to the nature of the work.
- All chemicals have to be labeled; dangerous chemicals have to include a safety list attached by a supplier. The students have to be demonstrably informed about the safety lists of dangerous chemicals.
- The amount of time spent working with poisonous material, chemical carcinogens and other dangerous material has to be limited to the minimal.

- Poisonous materials or alkali must not be moved while open.
- During casting or overflowing of the poison or alkali, the dishes have to be placed in a way in which there is no possibility of tipping or spilling. Alkali from larger containers is allowed to be poured only by using special tipping baskets or by other suitable ways.
- It is prohibited to inhale poisonous material, alkali and other dangerous chemicals. The safety pipettes have to be used or the inhalation has to be performed by vacuum.
- It is necessary to use safety principles during the work.

Principles of safety when working with technical gas

- Only the gas bottles which are necessary for the work can be placed in a lab. The bottles have to be placed on stands and attached by bands or chains in their upper parts.

When working with technical gas the following is prohibited:

- usage of damaged bottles with an expired date from the last periodical examination;
- usage of unsuitable or damaged valves;
- usage of the bottles for other purposes or for a different gas than which they were indicated for;
- performing unauthorized repairs, using force to open the valves;
- free gas discharge in a closed space except in case it is a part of working procedure.

Injuries to students

- a student is obligated to report every injury
- each injury is written into the Book of Injuries, which is stored at the Study Department

Safety marking

PROHIBITION - red color, circular shape, black pictogram

WARNING - yellow color, triangular shape, black pictogram

COMMAND - blue color, circular shape, white pictogram

SAFETY - green color, rectangular or square shape, white pictogram

Caution! Red markings of rectangular or square shape are informative markings indicating the material means of fire prevention. Red markings with white arrows indicate the way to those means, rather than the direction of escape from the building.

Fire prevention

Everyone is obligated to behave in a proper way not to cause fire, damage property or endanger the life and health of people or animals. Everyone is also obligated to help, according to one's ability, with extinguishing any fire in natural disasters and in other emergency situations.

The most frequent causes of fire

- Defect of the wiring system or an electrical appliance;
- Starting a fire due to negligence or omission when using gas and electrical appliances;
- Negligent storage of flammable materials (failure to maintain a sufficient distance from heaters or lights);
- Performance of work with elevated fire hazard (e.g. welding) without sufficient organizational and technical arrangements;
- Intentional starting of a fire;
- Smoking (cigarette butts in a waste bin), etc.

Principles of extinguishing fire using fire extinguishers

- It is necessary to estimate the extent of the fire and the kind of burning materials as accurately as possible;
- Choose a suitable type of fire extinguisher;
- Attempt to extinguish the fire or at least localize it using fire extinguishers;
- Use a fire hydrant if fire extinguishers are not sufficient;
- For reasons of prevention, other persons should commence preparations for using a fire hydrant even if it is anticipated that the fire will be extinguished by fire extinguishers;
- Fire extinguishing operations, particularly with the use of a fire hydrant, should always be carried out in two-man groups;

- Burning materials shall be extinguished from the top to the bottom;
- Protect yourselves from radiant heat, flames and explosions, if appropriate, by moving close to the ground;
- If there is a suspected fire inside a room, never open the door to the room while standing in front of the door; use shelters;
- If possible, continuously approach the burning materials when extinguishing the fire, up to the maximum effective distance;
- When water is used in enclosed premises, the persons fighting the fire are threatened by scalding (move close to ground, protect parts of the body, if appropriate, especially the neck and ears);
- If it is not possible to extinguish the fire by the available means, attempt to close the door to the room or the nearest fire door, as appropriate.

Fire extinguishers (FE)

Fire extinguishers are devices that can be used to extinguish a fire in the initial stages.

Water FE

- Suitable for extinguishing solid flammable materials;
- Not suitable for extinguishing flammable liquids, except for water-based liquids;
- Use for extinguishing devices under electrical power is prohibited;
- The effective extinguishing distance is up to approximately 4 metres.

Powder FE

- Universal use including extinguishing of devices under electrical power;
- The effective extinguishing distance is up to approximately 2 metres;
- When using older fire extinguishers (with a capping inlet) there is a danger of streamline blockage during interrupted extinguishing.

Foam FE

- Filled with inert CO₂ gas;
- Highly universal use in extinguishing burning flammable gases and liquids as well as solid materials;
- However, the main use of this extinguisher consists in extinguishing of devices under electrical power;
- The effective extinguishing distance is up to approximately 1,5 metres;
- When extinguishing in confined spaces, it is necessary to ensure sufficient ventilation (inert gas expels oxygen and there is a risk of the person losing consciousness).

Fire hydrant

A device intended to supply fire-fighting water directly to the site of fire, or for refilling fire engines with water. Fire hydrants are classified as underground, ground-level (outdoor) and wall (indoor) types.

- The most effective means for primary fire-fighting;
- Safe distance while extinguishing the fire;
- Sufficient quantity of fire-fighting agent;
- Effective fire-fighting distance of 15 metres or more;
- Water is used as the fire-fighting agent;
- Fire hoses may be extended when using older types of hydrants;
- New types of hydrants contain full continuous hoses enabling use by a single person.

Evacuation principles

- When leaving evacuated premises, close (but do not lock!) the doors and windows;
- Leave the evacuated space using the shortest escape route;
- During evacuation, remain calm, do not run or panic; walk quickly from the premises;
- Do not use any lifts other than evacuation lifts during evacuation;
- Assist children, disabled or injured persons;
- Before opening a door during escape, touch the door to make sure that it is not hot; if this is the case, look for some other escape route and warn others;
- Come to the designated meeting place after leaving the evacuated building in order to check the number of evacuated persons;
- Provide all information on the course of evacuation and other facts that might assist fire-fighting units.

If the building cannot be left through the escape routes:

- remain calm;

- crouch if the space is filled with smoke;
- draw attention to yourself through a window – using a towel, piece of clothing, etc., switch the light in the room on and off if it is dark outside.

FIRST AID

The most important is to help to the injured person immediately or at least as soon as possible to minimize health damage. Each working place is equipped with a first aid kit which must be freely accessible.

Principles for providing first aid after an electrical injury:

- **To free the person** from the electric circuit under voltage in the following way:
 - by turning off the electricity;
 - by moving away or aside the electric wires using a suitable non-conductive thing;
 - by pulling the person away;
 - by interrupting the wire.

!!!! ATTENTION, YOU MUST NOT GET UNDER THE VOLTAGE YOURSELF!!!!
- **Treatment** of electric shock:
 - do not transport such a person;
 - do not leave him alone;
 - find out if the person is:
 - conscious
 - breathing
 - has a palpable pulse
 - is injured (bleeding or fracture).

Principles for providing first aid in BURNS:

- do not touch wounds, keep everything as clean as possible;
- do not remove from the wound any remaining clothing or any other things;
- 1st and 2nd degree burns of a smaller extent can be cooled by clean water, for example under running water (15-20 minutes);
- cover the wound with a sterile cloth or ironed cloth;
- start preventive anti-shock measures: QUIET, CALM, DRINKS, PAINKILLERS, TRANSPORTATION;
- always accompany a person on his way to a doctor.

Principles for providing first aid in BLEEDING:

- IMMEDIATELY
 - Press the artery/vein directly in the wound or in a pressure point;
- AFTERWARDS
 - Apply a pressure bandage or a tourniquet – after approx. 10-15 minutes release for a while so as not to cause necrosis of the tissue or the whole extremity because of the lack of blood supply;
 - If possible, keep the wound stabilized;
 - Start preventive anti-shock measures: QUIET, CALM, DRINKS, PAINKILLERS, TRANSPORTATION;
 - Check the wound and overall condition of the injured continuously;
 - Always accompany a person on his way to a doctor.

Important telephone numbers:

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| ▪ Ambulance | 155 |
| ▪ State Police | 158 |
| ▪ Municipal Police | 156 |
| ▪ Firefighters | 150 |
| ▪ Integrated Rescue system | 112 |

Emergency services:

Electricity	840 850 860
Water	495 406 102
Gas	1 239