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| **YILDIZ TECHNICAL UNIVERSITY, FACULTY OF CHEMICAL AND METALLURGICAL ENGINEERING, DEPARTMENT OF BIOENGINEERING LABORATORY SAFETY AND WORKING RULES** | | | | |
| **GENERAL RULES TO FOLLOW IN LABORATORIES**  1. It should never be forgotten that laboratories are a serious working environment and they should not act in a way that may disrupt order or cause danger.  2. All verbal or written rules should be followed carefully, and the parts that are not understood should be asked to the laboratory responsible.  3. Never work alone, without permission and responsible person in laboratories.  4. No experimental setup, chemicals, or other materials should be touched unless the responsible person in the laboratory has given permission.  5. It is forbidden to eat, drink and use laboratory materials for this purpose in the laboratory.  6. Experimental studies are carried out only as the responsible tells and shows you. It is never followed by a different method than the experiment method described and shown.  7. Before coming to the laboratory, information should be obtained about the dangers of the experiment to be carried out by conducting a preliminary study (examination of relevant MSDS and technical data).  8. **It is mandatory to use lab coat in the laboratory and to bring gloves with laboratory glasses. Coats, jackets, bags, etc. it is forbidden to bring personal belongings to the laboratory.**  9. It is forbidden to enter and leave the laboratory without permission.  10. As long as they are working in the laboratory, depending on the feature of the study, face mask, gloves and so on. eye and skin protective equipment should be used.  11. Closed shoes should always be worn as a precaution against chemical spills and glass breaks.  12. Contact lenses should not be used in the laboratory unless the responsible gives consent.  13. Long hair, dangling jewelery and loose dresses will cause danger in the laboratory environment; long hair should be gathered at the back, jerky jewelry should be removed, loose clothes should not be worn.  14. Lab coat should always be closed. Working with an open lab coat is dangerous and prohibited.  15. Hands should be washed with soap and water before touching the face in the laboratory.  16. After the experimental work is finished, the materials used, the test setup and the test bench must be cleaned with due care. Hands should be washed with soap and water, and leave the laboratory with the permission of the responsible person.  17. Students are forbidden to work in laboratories outside weekdays and on weekends without a consultant. Experiments that should continue during these periods should be done within the knowledge of the responsible person and after taking the necessary measures..  **RULES TO FOLLOW WHEN WORKING WITH CHEMICAL SUBSTANCE**  18. All chemicals in the laboratory are dangerous. For this reason, chemicals should never be touched, tasted and smelled.  19. No container with a chemical substance should be unlabeled in the laboratories. The label should be read carefully before use. When chemicals are transferred from one container to another, the labeling of the new container should not be forgotten.  20. Even if chemicals from the bottle are not used, | | they should never be put back in the original bottle. Pipette should not be immersed in the original bottle.  21. The pipette used to take a solution should not be immersed in a different solution bottle.  22. Acids should be added little by little to the water. Absolutely no water should be added to the acid.  23. The mouth should never be used when liquid is drawn with a pipette. Instead, the pipette should be used with the pipette filler, or an automatic pipette should be used.  24 Automatic pipettes should only be used for aqueous solutions. Glass pipettes and pads should be used for organic solvents, strong acids and strong bases.  24. Flammable liquids should be taken in a closed container as much as to be used and placed on the bench and kept away from heat sources (flame, electric heater, etc.)  25. Chemical wastes must be treated in accordance with the directives of the laboratory manager.  26. Inhaling toxic vapors and gases should be avoided. Fume hoods should be used when working with concentrated acid, base and volatile solvents with such substances  27. The location of chemicals should not be changed without the knowledge of the responsible persons, and should never be taken out of the laboratory. If it needs to be removed, it must be moved using a second transport container. When carrying chemicals in the laboratory, bottles should never be held from the lid and support should be given from the bottom.  28. The injectors and needles used in the scope of the experiment should be thrown into the “injector waste bin”with the caps of the needles closed.  29. When fire should be used in the experiments, a fume hood should be used and necessary precautions should be taken.  **RULES TO FOLLOW WHEN WORKING WITH BIOLOGICAL AGENT**  30. If cultures are spilled on the floor or on the table or culture containers are broken, the situation should be immediately reported to the laboratory manager and the spilled culture should be immediately covered with a suitable disinfectant solution (e.g. 10% solution of hypochlorite) and then cleaned for 15 - 30 minutes.  31. The ends of the loop should be sterilized by Bunsen flame before and after each use.  32. Cotton should be placed on the tips of the pipettes to be used and sterilized and used in this way.  33 All precautions should be taken to avoid swallowing the culture. If the culture is swallowed, the laboratory manager should be informed immediately.  34. Materials suspected to be sterile should not be used in microbiological studies.  35. Flammable, combustible substances such as ethyl alcohol should be kept away from the flame of Bunzen burner.  36. If there are cuts, wounds and similar conditions on the hands, they should only be worked after they are covered with a waterproof tape, otherwise they should not be | | worked out and the final situation should be reported to the responsible.  37. The lens and ocular part of the microscope should be cleaned before and after each use without damaging the lens with thin lens paper or with the help of a cheesecloth.  38. Contaminated/non-contaminated plastic straws and pipette tips should be disposed of in waste collection container.  39. Culture plates are discarded after sterilization by autoclave.  40. Microbiological studies should be carried out in the biosafety cabinet under the supervision of the experimenter.  **RULES TO FOLLOW WHEN WORKING WITH GLASS MATERIAL**  41. Broken and cracked glassware should never be used, and should be thrown into the "glassware recycling bin" in the laboratory..  42. Glassware (thermometer, pipette etc.) and chemical bottles that can roll over should be placed on the laboratory bench in a way to prevent them from falling to the ground.  43. Glass pipe, thermometer etc. lubricant should be used before placing the materials into the cork. It should be very careful against sudden breaks, should not be applied excessively and gloves should definitely be worn.  44. Hot glass material should not be placed in a cold environment or on bench. It may cause glass material to crack or break. It should be kept with wooden tongs until it cools.  45. Heated glassware should not be placed in a random place. because hot and cold glass are indistinguishable. Another can take this glassware.  **RULES TO FOLLOW IN THE USE OF THE DEVICE**  46. The burner or electric heaters should always be kept off unless they are used.  47. It should be noted that the container is not completely closed during the heating or boiling process. Because it can cause an explosion due to pressure.  48. When heating liquids inside the tube, the tube is not constantly shaking to prevent splashing with overheating. The mouth of the tube should not be directed to the person doing the experiment or anyone else.  49. The temperature of the heat devices should not be controlled manually.  50. While using a drying oven or a furnace the temperature setting should not be changed. If necessary, the responsible person should be notified.  51. Ovens or furnaces should not be used with plastic gloves. When working at high temperatures, tongs should be used.  52. Care should be taken to ensure that specimen containers and tongs do not touch the oven wall.  53. The analytical balances must be closed and unloaded when not in use.  54 The balance of the analytical balances should be checked. The air bubble in the spirit level should be centered. Otherwise, contact the laboratory supervisor.  55. Care should be taken not to spill chemicals on or around the sensitive scale. The spilled chemical should be cleaned with a brush.  56. Before using fume hoods (or biosafety cabinets), the ventilation system must be |
| operated. When working with a fume hood, chemicals should be placed at least 15 cm from the front of the fume hood and the glass of the fume hood should be kept as closed as possible. 57. When working with explosive or combustible chemicals at fume hood, electrical connection of all devices must be made in advance.  58. It should be paid attention that the hands should be completely dry while electrically connecting the electrical appliances. Care should be taken to ensure that the cables are away from wet floors and unused devices must be unplugged.  59. The devices whose usage is not fully known should never be used.  **RULES TO FOLLOW IN ACCIDENTS**  60. After the acid spilled area is neutralized with base and the base spilled area is neutralized with acid, it should be wiped with water immediately.  61. In the case of chemical splashes on the skin or in the eyes, it should be washed with plenty of water and act within the framework of first aid rules.  62. Should never run if clothing is fired; It is necessary to try to extinguish the flame by rolling on the ground and seek help.  63. Chemical burns that may occur in the laboratory should be washed with plenty of water first. Fresh cold water or indirect ice should be applied until the pain subsides, and action should be taken in accordance with the condition of the event.  64. The first thing to do when a fire occurs is to notify the fire. To prevent the fire from spreading, the door should be closed and help should be sought. When the helpers arrive, they are intervened with fire extinguishers. If a person is on fire, a fire blanket should be used to cut off contact with air.  **FIRST AID**  65 In cuts or bleedings; the wound and its surroundings are cleaned and covered with gauze.  Depending on the severity of the bleeding, pressure is applied with a loose or tight tampon. | | 66. In case of burns, It is prevented that the casualty gets into shock and gets infected. The first thing to do in combustion which is in flames is to prevent contact of the burning part with air. In combustion of chemicals such as acids, washing should be carried out with plenty of water. If the burn is under the dress, the clothes should never be removed. The burn should never be touched by hand.  67. In cases of fractures; If the fracture is under the dress, the clothes should be removed by cutting. The person should not be moved, if there is bleeding, it should be stopped and then tampons should be made.  68. Drowning occurs because of the chemicals used or the result of an electric shock that the mouth is closed and not enough oxygen is provided First of all, the factor that causes drowning should be eliminated, and if necessary, the person should be removed from the environment. The tongue of the unconscious victim should be prevented from escaping into the throat, if necessary, this should be done with a pair of forceps. Artificial respiration should be started immediately. One of the methods of “Oral Respiration Application The patient is lying on his side, chewing gum and so on. Substances, if any, are removed. The mouth is cleaned. The feet are raised slightly and the head is held bent backwards. The lower jaw is pulled down. . The mouth is worn with a tissue or a thin cloth. The mouth may be locked in case of electric shock. In this case, the nose is treated instead of the mouth. Nostrils are closed with two fingers (mouth in electric shocks). This prevents air from escaping through the nostrils.  **CHEMICAL BURNS**  First aid person should take protective measures (glasses, gloves, mask, protective clothing, etc.) first.  **SKIN BURNS**  69. Dress buttons should be unfastened, clothes and shoes contaminated with | | chemicals.  70. Ointment / spray etc. application to the wound should not be made.  71. A sterile bandage (if not, a clean cloth) should be covered without overpressing the burn.  72. If the size of the burn is large, emergency assistance should be called.  **IRRITATION IN EYES**  73. Non-irritated eye should be protected immediately; the other eyelid should be opened by force and wash with water or eye cleansing liquid for at least 15 minutes.  74.It should be ensured that the washing process is carried out from the upper level of the nose in the direction of the ears, so that the other eye is not affected and the chemical does not come back into the eye.  75. If there are contact lenses, for the effectiveness of washing, they should be removed immediately.  76. Both eyes should be closed with a sterile or clean dressing.  77. Health institutions should be contacted.  **CHEMICAL INGESTION**  78. If the person is conscious and able to swallow, water or milk should be drunk (if fluid tends to vomit, fluid should not be continued).  79. If the consciousness is not in place, the head and body of the injured person must be turned to the left.  80. The person exposed to the accident should be delivered to the nearest health institution immediately.  **TAKING CHEMICALS BY RESPIRATORY**  81. It should be ensured that the victim gets fresh air by removing it from the area where it is affected.  82. The health institution should be contacted.  83. In the time breathing is stopped (no breathing sounds, no movement in the chest and changing skin color), artificial respiration should be made from mouth to mouth or mouth to nose during the time until receiving medical assistance. |
| **EMERGENCY ACTION PLAN** | | | | |
| **EVENT** | **LABORATORY EMPLOYEE** | | **LABORATORY RESPONSIBLE** | |
| **EMERGENCY HEALTH PROBLEMS** | - İnform the responsible and other laboratory staff  - If there is a factor causing the injury, take the necessary protective measures to eliminate the factor. | | - Notify the medico unit,  - İf necessary, call an ambulance (112). | |
| **FIRE** | - İnform the responsible and other laboratory staff,  - Do not intervene on your own,  - Remove flammable, combustible materials,  - If someone catches fire, intervene (extinguisher etc.) | | - If necessary, use a fire extinguisher, cut off electricity or evacuate the laboratory,  - Call 110,  - Inform the Faculty Administration. | |
| **CHEMICAL MATTER/SPILLING BIOLOGICAL FACTOR** | - Inform the responsible and other laboratory staff,  - Make other employees away from the environment,  - Do not touch the spilled substance, do not inhale the substance. | | - Learn the properties of the spilled chemical,  - Wash with plenty of water or clean with vacuum cleaner.  - Wear protective gloves and goggles during cleaning. | |
| **GAS ODOR ELECTRICAL LEAKAGE** | - Inform the responsible and other laboratory staff, | | - Identify the source of the gas / electricity leak,  - Inform the faculty administration immediately,  - Turn off the electrical switch of the area with electrical leakage,  - If the gas leakage comes from the cylinder, close it immediately and call the relevant organization. | |
| **EARTHQUAKE** | - If you are near corrosive chemicals, move away immediately,  -Look near items close to the center of gravity, such as benches, tables, etc., put your arms on your head, tilt your head between your legs and wait. | | Except what to do next, after the concussion ends;  - Evacuate employees in the laboratory,  - Inform faculty management. | |
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**Student's Risk, Waiver and Permission Acceptance Form**

**1**. I accept the activity voluntarily and with my own consent.

**2**. I am physically involved in the activity. I declare that I do not have any incapacity and disability that would prevent me from participating in the activity or injure me or anyone else.

**3**. I accept the personal responsibility of all results, including injury, permanent disability, which may result from negligence of the acquitted items.

**4**. Knowingly and with my free will; and I take full responsibility for my own participation.

**5**. I hereby declare that I will record and reimburse all relevant losses, damages, debts or costs that may result from the negligence of any or all of the items released from my participation in the Activity.

By signing this waiver, I agree that I have read and fully understood all the articles written in the waiver; I accept and declare that I will apply all the rules stated in the waiver and sign voluntarily with my own free will. I declare that no verbal representation, expression or incentive is made other than the articles of the agreement written above. I am over the age of eighteen (18) and legally legal; I declare that I will fully consider the acquitted items fully, adequately and completely, and that I will continue my intentions in this direction.

I fully understand and accept that I can engage in activities where I may be exposed to risky and dangerous substances by working in a research laboratory.

I agree to adhere to all the security principles and procedures of the department.

I am over the age of eighteen (18) and legally legal; I hereby declare and certify that I fully understand all the items, related risks and responsibilities specified in this risk, waiver and acceptance.

“I have read the "Handbook" and "Laboratory Safety and Working Rules Information Form".

Student’s name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Responsible / Süperviser Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Working dates: Between\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Person(s) to be notified in case of an emergency:**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Sign\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Doküman No: MDK-FR-014; Revizyon Tarihi: 13.02.2020; Revizyon No:00