

## 1. Certificate Programme in Laboratory Technique [CPLT]

Course Code	Course Name	Credits
CP LT-01	Good Laboratory Practices	6
CPLT-02	Laboratory Techniques in Biology	4
CPLT-03	Laboratory Techniques in Chemistry	4
CPLT-04	Laboratory Techniques in Physics	4

### **CPLT – 01 Good Laboratory Practices**

There are no specific requirements for this laboratory course. It can be clubbed with any of the other laboratory courses of the programme

#### **List of Experiments**

- Exercise 1:** Study of Design and Features of a Laboratory
- Exercise 2:** Study of Design and Infrastructure of a Preparation Room of a Laboratory
- Exercise 3:** Study of Design and Organisation of Laboratory Store
- Exercise 4:** Study of Regular Duties of Laboratory Staff
- Exercise 5:** Study of Procedure regarding Purchase of Laboratory related Items
- Exercise 6:** Study of Procedure for Purchase of Alcohol and its Stock Maintenance
- Exercise 7:** Study of Procedure for Stock Verification and Maintenance of Apparatus
- Exercise 8:** Study of Basic Aspects of Electrical Maintenance
- Exercise 9:** Study of Supply of Gas, Electricity and Water in a Laboratory
- Exercise 10:** Identification of Compressed Gases and Study of their Handling and Storage
- Exercise 11:** Study of Fire Safety Measures in a Laboratory
- Exercise 12:** Classifying and Handling of Hazardous Chemicals
- Exercise 13:** Study of Sterilization and Safe Disposal Methods of Biological Materials
- Exercise 14:** Disposal of Unserviceable and Obsolete Items
- Exercise 15:** Disposal of Chemical Wastes
- Exercise 16:** Attending to Emergency Situations
- Exercise 17:** Group Interaction – Laws, Regulations and Related Issues

## CPLT- 02

### Laboratory Techniques in Biology

#### Lab Requirements for CPLT– 02

1. Autoclave
2. Pressure cooker
3. Microtome knives
4. Dissecting kit
5. Hot air oven
6. Incubator, Water bath, Centrifuge
7. Scissors
8. Coplin jars or wide mouth bottles
9. 100 ml beakers
10. Scalpel
11. Nylon nets
12. Large clean jars or buckets
13. Shallow white pans or papers
14. Trowel
15. A bucket
16. Flashlight torch (for night collection)
17. Blunt-end forceps
18. Insect-collecting net
19. Killing jar
20. Light sources such as an electric bulb (~200 W) or a lantern lamp.
21. A transparent vial made of glass or plastic
22. Rubber stopper with two holes
23. Two glass tubes each with a bend
24. Rubber tube
25. Small piece of muslin cloth
26. An empty glass bottle with an airtight lid
27. Potometer
28. Stop watch
29. 500 ml conical flask
30. 25 ml test tube
31. T – tube
32. Pinch clip
33. 1 mm diameter graduated pipette
34. Wire gauze
35. Thermometer
36. 250 – 500 ml beaker
37. 15- 25 ml test tube
38. Cork borer
39. Kymograph Recording System  
Consisting of:
  40. Injection syringe and needle
  41. Board made of soft wood
  42. Pins
  43. String
  44. Compound Microscope and Dissection Microscope
  45. Illuminator or lamp
  46. Slide micrometer graduate in 0.1 mm or 0.01 mm units
  47. Microscope fitted with Abbe condenser and usual objectives
  48. Oil immersion objective lens
  49. Analytical balance
  50. 100 ml Graduated cylinder Round flask
  51. Graduated measuring cylinders of 50 ml, 100 ml
  52. Round flask of 150 ml capacity
  53. Burner
  54. Cover slips, slides, slide labels
  55. Disposable spatula or tooth pick
  56. Pipette, glass dropper
  57. Methyl green Acetocarmine
  58. Petridishes, Beakers, Slides, Coverslips, Slide labels
  59. Dissection trays
  60. Petridishes
  61. Dissection kit
  62. 500 ml Beaker
  63. 500 ml Erlenmyer flask
  64. Petriplates
  65. Test tubes
  66. Metal loop
  67. pH meter/pH paper
  68. Electronic Balance

## CPLT – 02: List of Experiments

**Experiment 1:** Handling Common Laboratory Equipment

**Experiment 2:** Laboratory Organisation

**Experiment 3:** Procuring Plant Material

**Experiment 4:** Procuring Zoological Material for Lab Exercises

**Experiment 5:** Setting of Demonstrations of Physiological Processes in Plants

**Experiment 6:** Setting Up Apparatus for Demonstrating Physiological Activity in Animals

**Experiment 7:** Microscope Handling and Maintenance

**Experiment 8:** Preparation of Reagents and Stains

**Experiment 9:** Preparation of Temporary Slide

**Experiment 10:** Preparation Required for Dissections

**Experiment 11:** Techniques for Microbial Culture and Gram's Staining

## CPLT- 03

### Laboratory Techniques in Chemistry

#### Lab Requirements for CPLT - 03

1. Stove Pin or a piece of wire
2. Emery Cloth or sand paper
3. Cork
4. Set of cork borers
5. Glass tube
6. Kipp's apparatus
7. Funnel
8. Analytical balance
9. Beaker
10. Burette
11. Thermometer
12. Water still
13. Deioniser
14. Boiling tube
15. Test-tubes
16. Bench centrifuge with tubes
17. Measuring cylinder
18. Glass rods
19. Analytical balance
20. Beaker 400cm<sup>3</sup> , 100cm<sup>3</sup>
21. Burette 50 cm<sup>3</sup>
22. Burette stand
23. Conical flask 250 cm<sup>3</sup>, 100cm<sup>3</sup>
24. Funnel small
25. Pipette 20 cm<sup>3</sup>
26. Volumetric flask 250 cm<sup>3</sup>
27. Wash bottle
28. Weighing bottle
29. pH meter
30. Glass electrode
31. Conductivity meter
32. Conductivity cell
33. Bunsen burner
34. Evaporating dish
35. Funnel glass
36. Funnel stand
37. Glass rod
38. Porcelain plate
39. Tripod stand
40. watch glass
41. Wire gauze
42. Measuring cylinder (10cm<sup>3</sup>)
43. Cooling bath
44. Filtration assembly
45. Melting point apparatus
46. Boiling tube
47. Cork
48. Dropper
49. Metal Paper clips
50. Spotting capillaries
51. Glass rod or tubing of various

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| diameters and length              | 55. Lighter                         |
| 52. V-stand                       | 56. 10 or 12 mm o.d. glass tubing   |
| 53. A glass cutting knife or file | 57. Gas and compressed air supplies |
| 54. Carbon block                  |                                     |

### **List of Experiments**

- Experiment 1:** Servicing Bunsen burners  
**Experiment:** Cork boring  
**Experiment 3:** Preparation of H<sub>2</sub>S gas by using Kipp's apparatus  
**Experiment 4:** Calibration of Volumetric Glassware  
**Experiment 5:** Preparation of Distilled and Deionised Water  
**Experiment 6:** Centrifugation of a Colloidal Suspension  
**Experiment 7:** A Simple Titration  
**Experiment 8:** Preparation of Bench Reagents  
**Experiment 9:** Use of pH meter and Conductometer  
**Experiment 10:** Preparation of Potash Alum  
**Experiment 11:** Preparation of *p*-Nitroacetanilide  
**Experiment 12:** Experiments based on Chromatography  
**Experiment 13:** Glassworking Operations using Bunsen/Batwing Burner  
**Experiment 14:** Glassworking Operations using a Premixing Burner

## **CPLT- 04**

### **Laboratory Techniques in Physics**

#### **Lab Requirements for CPLT - 04**

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|-------------------------------------|---|
| 1. Vernier callipers                | 18. Voltmeter (0-5V)                          |
| 2. Screw gauge                      | 19. Rheostat                                  |
| 3. Bob of pendulum or wooden block  | 20. Capacitor                                 |
| 4. Metallic wire/needle             | 21. Coefficient of linear expansion apparatus |
| 5. Sonometer                        | 22. Metre scale                               |
| 6. ½ kg hanger                      | 23. Steam boiler                              |
| 7. ½ kg slotted weights             | 24. Tripod stand                              |
| 8. Tuning fork of unknown frequency | 25. Rubber tubing for steam delivery          |
| 9. Rubber pad                       | 26. Burner                                    |
| 10. Physical balance                | 27. Beaker                                    |
| 11. Weight box                      | 28. A metallic rod                            |
| 12. Calorimeter with heating coil   | 29. Telescope                                 |
| 13. A sensitive thermometer         | 30. Optical lever                             |
| 14. Stirring rod                    | 31. Lamp and scale arrangement                |
| 15. DC power supply                 | 32. Optical bench                             |
| 16. Stop watch                      | 33. Concave mirror (f = 15-20 cm)             |
| 17. Ammeter (0-5A)                  |   |

34. Convex lens ( $f = 15\text{-}20\text{ cm}$ )
35. Pins
36. Index needle
37. Spectrometer
38. Prism
39. Light source such as sodium or mercury lamp
40. Spirit level
41. Reading lens
42. Reading lamp
43. Multimeter
44. Resistors
45. Electrolytic capacitors
46. *pn* junction diode
47. *pnp* and *nnp* transistors
48. Signal generator
49. Wooden or plastic box  
(30 cm  $\square$   $\square$  15 cm  $\square$   $\square$  4 cm)
50. Good quality 5m three-core electric wire of 20 gauge
51. 2 two-in-one (5 A and 15 A) sockets
52. 1 three-pin plug (15 A)
53. 2 switches (15 A)
54. Ammeters and voltmeters of different ranges
55. Resistance boxes
56. One way key
57. Oscilloscope
58. Tracing paper

## **List of Experiments**

- Experiment 1:** Measurements in Physics
- Experiment 2:** Stationary Waves in Stretched Strings
- Experiment 3:** Measurement of Thermal Properties
- Experiment 4:** Investigations with Mirrors and Lenses
- Experiment 5:** Working with a Spectrometer
- Experiment 6:** Handling and Maintaining a Multimeter
- Experiment 7:** Fabrication of an Extension Board
- Experiment 8:** Simple Current and Voltage Measurements
- Experiment 9:** Using an Oscilloscope