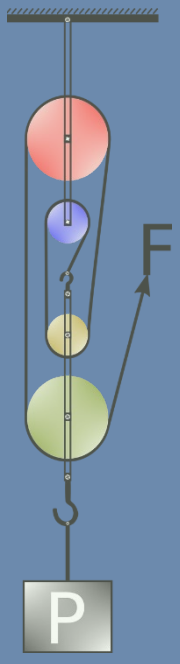
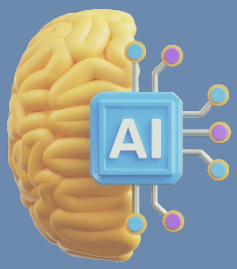
# ICSE

## Indian Certificate of Secondary Education Examination

# LABORATORY REQUIREMENT

## CLASSES IX & X




COUNCIL FOR THE INDIAN SCHOOL CERTIFICATE EXAMINATIONS, NEW DELHI

**May 2023**

**Published by:**
Council for the Indian School Certificate Examinations
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47-48, Nehru Place
New Delhi-110019

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# Council for the Indian School Certificate Examinations (CISCE)

## MISSION STATEMENT

***The Council for the Indian School Certificate Examinations is committed to serving the nation's children, through high quality educational endeavours, empowering them to contribute towards a humane, just and pluralistic society, promoting introspective living, by creating exciting learning opportunities, with a commitment to excellence.***

## ETHOS OF CISCE

- Trust and fair play.
- Minimum monitoring.
- Allowing schools to evolve their own niche.
- Catering to the needs of the children.
- Giving freedom to experiment with new ideas and practices.
- Diversity and plurality - the basic strength for evolution of ideas.
- Schools to motivate pupils towards the cultivation of:
  **Excellence** - The Indian and Global experience.
  **Values** - Spiritual and cultural - to be the bedrock of the educational experience.
- Schools to have an 'Indian Ethos', strong roots in the national psyche and be sensitive to national aspirations.

# FOREWORD

*"Laboratory and discovery are related terms. Do away with laboratories and the physical sciences will be stricken with barrenness and death."*

***Louis Pasteur***

According to the National Education Policy (NEP) 2020, curriculum, pedagogy, continuous assessment and learner support are the cornerstones of high-quality learning. To enhance the capacities of teachers in the teaching of practical-based subjects and to provide learners with an outcome-based environment, teaching and learning practices must be supplemented with engaging and supportive laboratory experiences.

A well-equipped laboratory helps in enhancing the learner's comprehension of theoretical concepts and acquisition of basic experimental skills through enquiry-based approach and hands-on experience.

The document entitled **"Laboratory Requirements" (at the ICSE level)"** was last brought out in the year 2014, wherein, details regarding the materials and equipment required for the conduct of practicals were provided for the three Science subjects, i.e., Physics, Chemistry and Biology. Since then, there have been several modifications in the syllabi of these subjects. Furthermore, with the addition of a number of new Practical-based subjects at the ICSE level, over the past few years, it has become imperative that this document be revised and updated.

The revised document entitled "**Laboratory Requirement**" has been reviewed with respect to the latest ICSE syllabus for science and other practical based subjects (including Vocational subjects). This revised document will provide broad guidelines to CISCE affiliated schools regarding the basic materials/equipment for the conduct of practicals in school laboratories.

I would like to thank all the resource persons who have contributed towards the preparation of this document. We warmly welcome comments and suggestions from the subject experts for further improvement of this document.

May 2023

Gerry Arathoon
Chief Executive & Secretary

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# CLASSES IX – X

## LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| 1. | Physical balance with weight box | 03 |
| 2. | Digital balance with least count (l.c.) = 0.1 g and maximum weight 500 g | 02 |
| 3. | Spring balance up to 200 gf | 30 |
| 4. | Single pulley | 60 |
| 5. | Block of 2 pulley (for demonstration) | 02 |
| 6. | Block of 3 pulley (for demonstration) | 03 |
| 7. | Loose weight 100 gf, 50 gf, 20 gf, 1 gf | 30 each |
| 8. | Loose weight 2 gf, 5 gf | 60 each |
| 9. | Slotted weight set of 50 g | 30 |
| 10. | Metre rule 50 cm | 30 |
| 11. | Metre rule 100 cm | 30 |
| 12. | Measuring cylinder 50 ml | 15 |
| 13. | Measuring cylinder 100 ml | 10 |
| 14. | Measuring cylinder 200 ml | 10 |
| 15. | Measuring cylinder 500 ml | 10 |
| 16. | Long jars (glass) | 10 |
| 17. | Beaker (200 ml) | 60 |
| 18. | Test tube (glass) | 30 |
| 19. | Utube | 30 |
| 20. | Solid glass cylinder (length = 5 cm, diameter = 0.5 cm approx.) | 10 |
| 21. | Solid cube (side = 2.5 cm approx.) (metallic) | 30 |
| 22. | Small solid cone (glass or metallic) | 10 |
| 23. | Relative density bottle (25 cc) | 30 |
| 24. | Eureka can (for demonstration) | 01 |
| 25. | Fortin's barometer (for demonstration) | 01 |
| 26. | Aneroid barometer (for demonstration) | 01 |
| 27. | Vernier calliper (big, wooden) (for demonstration) | 01 |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 28. | Vernier calliper (l.c. = 0.1 mm) | 30 |
| 29. | Micrometre screw gauge (big) (for demonstration) | 01 |
| 30. | Micrometre screw gauge | 30 |
| 31. | Cork piece (various sizes) | 15 |
| 32. | Split cork | 30 |
| 33. | Cork borer | 01 |
| 34. | Glass tube (of various diameters including capillary tubes) | 50 |
| 35. | Brass bob (2 cm diameter) | 30 |
| 36. | Retort stand | 30 |
| 37. | Stopwatch (for demonstration) | 02 |
| 38. | Electronic stopwatch | 30 |
| 39. | Stopclock (for demonstration) | 02 |
| 40. | Drawing board (to fix A3 size paper easily) | 30 |
| 41. | Knife-edge to act as fulcrum | 30 |
| 42. | Rectangular wooden block | 10 |
| 43. | Tripod stands | 05 |
| 44. | Wire gauge | 05 |
| 45. | Syringe | 05 |
| | ***Light*** | |
| 46. | Pinhole camera (for demonstration) | 01 |
| 47. | Plane mirror with stand (4cm x 4cm or 4 cm x 2cm approx.) | 30 |
| 48. | Plane mirror strip with stand (10 cm x 3 cm) | 30 |
| 49. | Lens or mirror holder | 30 |
| 50. | Object pin with holder | 30 |
| 51. | Concave mirror (small) (focal length = 15 cm approx.) | 30 |
| 52. | Convex mirror (big) (for demonstration) | 05 |
| 53. | Convex lens (focal length = 10 to 15 cm approx.) | 30 |
| 54. | Convex lens (focal length = 20 cm approx.) | 30 |
| 55. | Concave lens (for demonstration) | 05 |
| 56. | Mercury vapour lamp | 05 |
| 57. | Spectrometer (for demonstration) | 02 |
| 58. | Binocular (short range) (for demonstration) | 01 |
| 59. | Telescope (short range) (for demonstration) | 01 |
| 60. | Magnifying glass (big) (for demonstration) | 02 |
| 61. | Equilateral triangular glass prism (big) | 30 |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 62. | Right angle glass prism (big) | 05 |
| 63. | Rectangular glass slab (10 cm x 4 cm x 1 cm) | 30 |
| 64. | Semi-circular glass slab (6 cm diameter) | 05 |
| 65. | Laser jet (3 to 4 laser beams coming out parallel together) | 01 |
| 66. | Newton's colour disc (for demonstration) | 01 |
| | ***Magnetism*** | |
| 67. | Alnico bar magnet (5 cm x 1 cm x 1 cm) | 30 |
| 68. | Magnetic compass (small) | 30 |
| 69. | Horseshoe magnet (strong) | 01 |
| 70. | Magnetic compass (big) (for demonstration) | 05 |
| 71. | Iron filings or iron powder | 250 g |
| 72. | Soft iron bar | 05 |
| 73. | Copper coil (co-axial) | 04 |
| 74. | Copper wire (2 mm diameter) | 25 m |
| | ***Heat*** | |
| 75. | Gas burner or spirit lamp | 05 |
| 76. | Ring and ball experiment equipment | 02 |
| 77. | Bimetallic strip | 02 |
| 78. | Celsius thermometer (l.c. = half or one degree) | 30 |
| 79. | Fahrenheit thermometer (l.c. = one degree) | 30 |
| 80. | Clinical thermometer $^{\circ}$f and $^{\circ}$c | 02 |
| 81. | Calorimeter with stirrer in wooden box | 30 |
| 82. | Steam trap | 05 |
| 83. | Copper boiler with outlet | 05 |
| 84. | Convection current apparatus (wooden box with glass window for demonstration) | 01 |
| | ***Electricity*** | |
| 85. | Pith-ball electroscope (for demonstration) | 02 |
| 86. | Gold-leaf electroscope (for demonstration) | 02 |
| 87. | Ebonite rod | 02 |
| 88. | Glass rod | 02 |
| 89. | Fur, wool, silk cloth piece | 02 each |
| 90. | Voltmeter (0 to 3 v) l.c.= 0.05 v | 30 |
| 91. | Ammeter (0 to 3 a) l.c.= 0.05 a | 30 |
| 92. | Galvanometer (for demonstration) | 05 |
| 93. | Rheostat 20 Ω | 30 |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 94. | Plug key | 30 |
| 95. | Nichrome wire (resistance 4 Ω $m^{-1}$) | 50 m |
| 96. | Jockey | 30 |
| 97. | Battery eliminator/bridge rectifier (up to 20 v supply) | 30 |
| 98. | Dry cell 1.5 v | 10 |
| 99. | Connecting wires 40 cm pieces | 150 |
| 100. | Torch bulb and holder | 02 |
| 101. | Tap key | 30 |
| 102. | Meter bridge (1 m wooden board with 1 m nichrome wire fitted on it) | 30 |
| 103. | Crocodile clip pairs | 30 |
| 104. | Multimeter (for demonstration) | 02 |
| 105. | Electric bell (for demonstration) | 02 |
| | ***Sound*** | |
| 106. | Set of tuning forks of various frequencies (for demonstration) | 02 |
| 107. | Bell jar (for demonstration) | 02 |
| 108. | Tall cylindrical jar (for demonstration) | 02 |
| 109. | Metal pipe (diameter 3.5 cm approx.) (open at both ends) (for demonstration) | 02 |
| 110. | Wave apparatus to show primary and secondary waves (for demonstration) | 02 |
| 111. | Sonometer (for demonstration) | 02 |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*


# CLASSES IX – X

## LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| | ***Common apparatus*** | |
| *1.* | Rough balance | 01 |
| *2.* | Burner | 30 +5 (in reserve) |
| *3.* | Test tube rack | 30 +5 (in reserve) |
| *4.* | Test tube holder | 30 +5 (in reserve) |
| *5.* | Reagent bottle (transparent) | 120 +10 (in reserve) |
| *6.* | Reagent bottle (amber colored) | 30 +5 (in reserve) |
| *7.* | Dropper | 30 +5 (in reserve) |
| *8.* | Glass rod | 30 +5 (in reserve) |
| *9.* | Glass test tube (small) | 100 +5 (in reserve) |
| *10.* | Glass test tube (large) | 30 +5 (in reserve) |
| *11.* | Funnel | 30 +5 (in reserve) |
| *12.* | Delivery tube | 30 +5 (in reserve) |
| *13.* | Measuring cylinder (1000 ml) | 2 +1 (in reserve) |
| *14.* | Platinum wire/nichrome wire | 30 pieces |
| *15.* | Watch glass | 30 +5 (in reserve) |
| *16.* | Litmus paper | 10 packets |
| *17.* | Starch iodide paper | 5 packets |
| *18.* | Filter paper | 10 packets |
| *19.* | Spatula | 30+5 (in reserve) |
| *20.* | Cobalt chloride paper | 5 packets |
| | ***Additional Apparatus*** | |
| *21.* | Measuring cylinder – 500 ml | 5+1 (in reserve) |
| *22.* | Measuring cylinder – 250 ml | 2+1 (in reserve) |
| *23.* | Round-bottom flask – 1000 ml | 2+1 (in reserve) |
| *24.* | Separating funnel – 1000 ml | 1+1 (in reserve) |
| *25.* | One-holed rubber stopper for large test tubes | 30 |
| *26.* | Tripod stand | 30+5 (in reserve) |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 27. | Wire gauge | 30+5 (in reserve) |
| 28. | Evaporating dish | 30+5 (in reserve) |
| 29. | Beaker – 250 ml | 30+5 (in reserve) |
| 30. | Beaker – 150 ml | 30+5 (in reserve) |
| 31. | Beaker | 2+1 (in reserve) |
| 32. | Thistle funnel | 01 |
| 33. | Conical flask | 30+5 (in reserve) |
| 34. | Pipette (10 ml, 25 ml) | 1+1 (in reserve) |
| 35. | Burette | 1+1(in reserve) |
| 36. | Clamp stand | 05 |
| 37. | Gas lighter | 05 |
| 38. | Crucible | 1+1 (in reserve) |
| 39. | Graphite electrode | 2+2 (in reserve) |
| 40. | Copper plate | 2+2 (in reserve) |
| 41. | Voltmeter (0 to 3 v) (for demonstration) | 01 |
| 42. | Splinter | As required |
| 43. | Gas jar | 1+1 (in reserve) |
| 44. | Clay pipe triangle | 05 |
| | ***Chemicals*** | |
| 45. | Distilled water | As required |
| 46. | Calcium hydroxide | 500 g |
| 47. | Concentrated hydrochloric acid | 2.5 l |
| 48. | Concentrated sulphuric acid | 2.5 l |
| 49. | Concentrated nitric acid | 2.5 l |
| 50. | Sodium hydroxide | 500 g |
| 51. | Ammonium hydroxide | 2.5 l |
| 52. | Potassium iodide | 100 g |
| 53. | Potassium chromate | 250 g |
| 54. | Potassium dichromate | 250 g |
| 55. | Potassium permanganate | 250 g |
| 56. | Lead acetate | 250 g |
| 57. | Mercuric oxide | 100 g |
| 58. | Lead dioxide | 250 g |
| 59. | Trilead tetraoxide (red lead) | 100 g |
| 60. | Lead nitrate | 250 g |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 61. | Zinc nitrate | 250 g |
| 62. | Calcium nitrate | 250 g |
| 63. | Copper nitrate | 250 g |
| 64. | Copper sulphate | 250 g |
| 65. | Sodium carbonate | 250 g |
| 66. | Sodium bicarbonate | 250 g |
| 67. | Ammonium dichromate | 250 g |
| 68. | Ferrous sulphate | 250 g |
| 69. | Ferric chloride | 250 g |
| 70. | Copper oxide | 100 g |
| 71. | Manganese dioxide | 500 g |
| 72. | Sodium nitrate | 250 g |
| 73. | Ammonium chloride | 250 g |
| 74. | Phenolphthalein | 50 ml |
| 75. | Magnesium wire | As required |
| 76. | Zinc granules | As required |
| 77. | Copper turnings | As required |
| 78. | Methyl orange | 50 ml |
| | ***Additional Chemicals*** | |
| 79. | Potassium chloride | 250 g |
| 80. | Barium chloride | 250 g |
| 81. | Copper chloride | 250 g |
| 82. | Sodium chloride | 250 g |
| 83. | Zinc carbonate | 250 g |
| 84. | Calcium carbonate | 250 g |
| 85. | Copper carbonate | 250 g |
| 86. | Zinc sulphide | 250 g |
| 87. | Sodium sulphite | 250 g |
| 88. | Zinc sulphate | 250 g |
| 89. | Silver nitrate | 25 g |
| 90. | Potassium ferrocyanide | 250 g |
| 91. | Potassium ferricyanide | 250 g |
| 92. | Sulphur powder | 250 g |
| 93. | Iron filings | 1 packet |
| 94. | Ferrous sulphide | 250 g |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*

# BIOLOGY

## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| 1. | Dissecting microscope | 04 |
| 2. | Compound microscope | 04 |
| 3. | Hand lens | 30 |
| 4. | Forceps | 30 |
| 5. | Needle | 30 |
| 6. | Test tube | 100 |
| 7. | Beaker | 05 |
| 8. | Funnel | 05 |
| 9. | Thistle funnel | 03 |
| 10. | Dropper | 04 |
| 11. | Conical flask | 04 |
| 12. | Glass slide | 01 box |
| 13. | Cover slip | 05 pkts |
| 14. | Filter paper | 03 pkts |
| 15. | Vaseline | 01 bottle |
| 16. | Desiccator | 01 |
| 17. | Semipermeable membrane (parchment paper) | As required |
| 18. | Petri dish (small) | 05 sets |
| 19. | Watch glass | 20 |
| 20. | Y-shaped glass tube | 02 |
| 21. | Bell jar | 02 |
| 22. | Ganong's potometer | 01 |
| | ***Reagents*** | |
| 23. | Iodine solution | 250 ml |
| 24. | Fehling's A & B solution | 500 ml each |
| 25. | Benedict's solution | 500 ml |
| 26. | Sodium hydroxide | 250 ml |
| 27. | Millon's reagent | 01 bottle |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 28. | Copper sulphate solution | 250 ml |
| 29. | Nitric acid | 250 ml |
| 30. | Sudan III | 100 g |
| 31. | Eosin | 01 bottle |
| 32. | Cobalt chloride | 100 g |
| 33. | Potassium hydroxide | 100 g |
| 34. | Sucrose | 500 g |
| 35. | Potassium permanganate | 100 g |
| 36. | Methylene blue | 01 bottle |
| 37. | Methyl alcohol | 01 bottle |
| | ***Charts & Models*** | |
| 38. | Sycon | |
| 39. | Metridium (sea anemone)/physalia, corals | |
| 40. | Tapeworm, liver fluke | |
| 41. | Ascaris (roundworm) | |
| 42. | Pheretima (earthworm), leech | |
| 43. | Julus (millipede), centipede | |
| 44. | Palaemon (prawn), crab | |
| 45. | Butterfly, cockroach, moth | |
| 46. | Scorpion, spider | |
| 47. | Apple snail (pila)/octopus/sepia/mussel | |
| 48. | Starfish/sea urchin | |
| 49. | Scoliodon (shark) | |
| 50. | Labeo (rohu fish) | |
| 51. | Common toad, frog | |
| 52. | Garden lizard, turtle/tortoise, snake | |
| 53. | Pigeon | |
| 54. | Rabbit | |
| 55. | Bat | |
| 56. | Human digestive system | |
| 57. | Human respiratory system | |
| 58. | Human skeletal system | |
| 59. | Types of joints in humans | |
| 60. | Male reproductive system in humans, female reproductive system in humans | |
| 61. | Human endocrine system | |

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| 62. | Parts of a flower – hibiscus | |
| 63. | Parts of a plant cell | |
| 64. | Parts of an animal cell | |
| 65. | Plant tissues | |
| 66. | Animal tissues | |
| 67. | Longitudinal section of ovule during fertilization | |
| 68. | Structure of a tooth | |
| 69. | Structure of a villus | |
| 70. | Working model of human lungs/model of respiratory system | |
| 71. | Internal structure of bean seed | |
| 72. | Internal structure of maize grain | |
| 73. | Stages of mitosis | |
| 74. | Human excretory system | |
| 75. | Longitudinal section of human kidney | |
| 76. | Structure of kidney tubule, malpighian capsule | |
| 77. | Parts of human eye – internal | |
| 78. | Parts of human ear – internal | |
| 79. | Model of heart – external & internal view | |
| 80. | Model of Human Brain, chart showing internal structure of human brain and structure of neuron. | |
| 81. | Model of human skin & chart | |
| 82. | Types of blood cells | |
| 83. | Clinostat | |
| 84. | Chart showing various stages in the evolution of man with reference to Australopithecus, homo erectus, neanderthal, Cro-Magnon & modern man | |
| 85. | Industrial melanism with reference to biston betularia | |
| 86. | Lamarck's theory with reference to use and disuse of organs | |
| 87. | Vestigial organs | |
| 88. | Charts showing air, water, land, and noise pollution | |
| | ***Permanent Slides*** | |
| 89. | Plant cell and animal cell (as per middle school syllabus) | |
| | ***Specific Requirements for Classes IX & X As Per ICSE Syllabus*** | |
| 90. | Human blood | |
| 91. | Amoeba/paramecium | |
| 92. | Hydra | |
| 93. | Mitosis stages | |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*

# COMPUTER APPLICATIONS

## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| | ***Hardware*** | |
| *1.* | Personal computer (PC) with a minimum of 2GB RAM with dual core processor | 30 |
| *2.* | Local area network (LAN) with high-speed internet facility | |
| *3.* | Smartboard with a multimedia projector/ interactive T.V./LCD/OHP attached to the computer | 01 |
| *4.* | High speed, good quality printer on LAN (shared) | 01 |
| *5.* | White/green board | 01 |
| | ***Software*** | |
| *6.* | Any suitable operating system can be used | |
| *7.* | JDK 6 or later version | |
| *8.* | Documentation for the JDK version being used | |
| *9.* | A suitable text editor, a development environment (IDE) with a debugger is preferred (e.g.,. BlueJ, Eclipse, NetBeans) BlueJ (version 3.2 or higher) is recommended for its ease of use and simplicity | |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*

# HOME SCIENCE

## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Utensils & Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| | ***For Cooking*** | |
| 1. | Chef's knife | 30 |
| 2. | Paring knife | 10 |
| 3. | Knife sharpening/honing rod | 10 |
| 4. | Bread knife | 10 |
| 5. | Chopping/cutting board(s) | 30 |
| 6. | Kitchen shears/scissors | 05 |
| 7. | Vegetable peeler | 30 |
| 8. | Garlic press | 05 |
| 9. | Grater | 10 |
| 10. | Kitchen scales | 03 |
| 11. | Measuring jug | 10 |
| 12. | Measuring spoons | 10 |
| 13. | Measuring cups | 10 |
| 14. | Mixing bowl | 30 |
| 15. | Colander/pasta strainer | 10 |
| 16. | Sieve | 10 |
| 17. | Rolling pin | 10 |
| 18. | Can opener | 05 |
| 19. | Blender | 03 |
| 20. | Frying pan/skillet | 15 |
| 21. | Saucepans | 15 |
| 22. | Ovenproof dish | 10 |
| 23. | Pressure cooker | 10 |
| 24. | Wok (deep and shallow both) | 30 |
| 25. | Roasting pan | 10 |
| 26. | Baking sheet | 2 rolls |

| S. No. | Utensils & Equipment | Quantity |
|---|---|---|
| 27. | Stirring spoon | 30 |
| 28. | Slotted spoon | 30 |
| 29. | Spatula | 30 |
| 30. | Tongs | 30 |
| 31. | Masher | 10 |
| 32. | Balloon whisk | 10 |
| 33. | Oven gloves | 15 |
| 34. | Pot holders | 15 |
| 35. | Food/meat thermometer | Optional |
| | ***For Serving*** | |
| 36. | Ladle | 30 |
| 37. | Pasta fork | 10 |
| 38. | Pizza cutter | 05 |
| | ***For Storage*** | |
| 39. | Eco-friendly storage containers | 10 |
| 40. | Bread bin | 05 |
| | ***Miscellaneous*** | |
| 41. | Butter Paper | |
| 42. | Eco-friendly parchment paper | |
| 43. | Tea towels | |
| 44. | Kitchen tool organizer | |
| 45. | Needlework kit | |
| 46. | First-aid box | |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*


# MASS MEDIA & COMMUNICATION

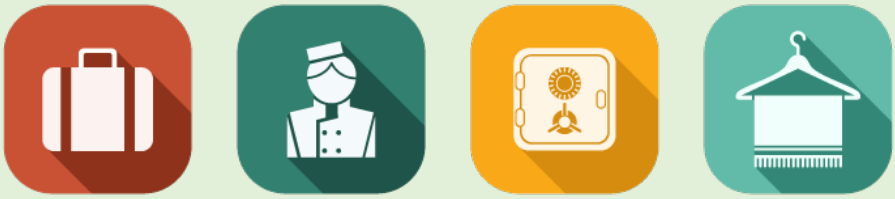
## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus/Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| *1.* | Smartboard/projector set-up | 01 |
| *2.* | If smartboard/projector set-up is not available, *one* computer per *five* students | 06 |
| *3.* | Sound mixer | 01 |
| *4.* | Microphones | 02 |
| *5.* | Headphones | 02 |
| *6.* | Leads for mixer to other devices | 04 |
| *7.* | 10 feet x 10 feet open area/stage area | |
| *8.* | Speakers | 02 |
| *9.* | Teacher's computer | 01 |
| *10. ** | Sound-proofing for walls and ceiling | |
| *11. ** | Video camera setup | 01 |
| *12. ** | Lecterns | 02 |
| *13. ** | Internet access | As required |
| *14. ** | Display boards for charts and explanation | 02 |
| *15. ** | Backup power for equipment | As required |

** Equipment mentioned from S. No. 10 to 15 are optional*

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*



# HOSPITALITY MANAGEMENT

## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Utensils & Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| | ***For Cooking*** | |
| *1.* | Dinner plate/full plate | 12 |
| *2.* | Side plate/bread & butter plate | 12 |
| *3.* | Bread & butter knife | 12 |
| *4.* | Dinner spoons | 12 |
| *5.* | Dinner forks | 12 |
| *6.* | Dinner knife | 12 |
| *7.* | Dessert spoon and fork | 12 each |
| *8.* | Soup bowl | 12 |
| *9.* | Soup spoon | 12 |
| *10.* | Water goblet (glass) | 12 |
| *11.* | Salver | 05 |
| *12.* | Cruet set | 01 |
| *13.* | Food & beverage napkin for table set-up & napkin fold | 10 |

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*

# ROBOTICS AND ARTIFICIAL INTELLIGENCE

## CLASSES IX – X

### LIST OF REQUIREMENT – FOR A CLASS OF 30 STUDENTS

| S. No. | Apparatus & Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| | ***Class IX*** | |
| *1.* | Computer laboratory Desktop PCs with Python installed | 15 |
| *2.* | Registration IDs on Tinkercad for students | 30 |
| *3.* | Miscellaneous:<br>Screwdrivers, Allen wrench, Soldering Station | As required |
| | ***For Laboratory Experiments*** | |
| *4.* | Single-Board Computer (e.g. Arduino Uno/Nano BLE Sense, Raspberry Pi) | 10 sets |
| *5.* | Robotics components: Servo motors, sensors (Ultrasonic,, infrared IR), wires, batteries, crimper, LED | 10 sets |

**Robotics Game**

- *An introductory DIY set-up analogous to a Robotics Systems with vibration motor, and coin battery.*
- *A Bristlebot race can be conducted as an activity. Bristlebot is available as a kit and can also be easily built using the following parts: vibration motor, coin cell battery, toothbrush head with the handle cut off, double-sided tape.*

**Intelligent Robotic Waste Bin**

*Intelligent Robotic Waste Bin works a supervision device for waste. This device integrates select sensors to supervise the state of waste. It includes:*

- *an ultrasonic sensor to check the level of the waste, used to prevent overflows by alerting the garbage collection team.*
- *a temperature and humidity sensor to monitor the waste environment*
- *a flame sensor to check for incandescent waste and reduce the risk of fire*
- *a servo motor to open the lid whenever someone comes in the vicinity of the waste bin demonstration by teacher.*

| S. No. | Apparatus & Equipment | Quantity |
|---|---|---|
| | ***Common Apparatus*** | |
| | ***Class X*** | |
| *1.* | Computer laboratory Desktop PCs with Python and Tinkercad installed | 15 |
| *2.* | Registration IDs on Tinkercad for student user | 30 |
| *3.* | Miscellaneous:<br>Screwdrivers, Allen wrench, Soldering Station | As required |
| | ***For Laboratory Experiments*** | |
| *4.* | Single-board Computer (e.g. Arduino Uno/Nano BLE Sense, raspberry pi) | 10 sets |
| *5.* | Robotics components: Servo motors, sensors, wires, batteries, crimper, LED | 10 sets |

Programmable mobile robots: Line follower, obstacle avoidance and edge detection mobile robot.

*The aforementioned programmable mobile robots are available as a DIY kit and can also be easily built using the robotic components.*

***NOTE:*** *LABORATORY REQUIREMENT ARE SUBJECT TO CHANGE BASED ON CHANGES IN THE SYLLABUS*