INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**BACHELOR OF SCIENCE (CHEMISTRY)**
SEMESTER	**1**
COURSE TITLE	**LABORATORY - I**
COURSE CODE	**02CY0105**
COURSE CREDITS	**3**

Objective:

1 To enable students with practical skills of Chemistry and allied subject like Microbiology or Physics

2 To enable students with practical skills of Chemistry and allied subject like Microbiology or Physics.

Course Outcomes: After completion of this course, student will be able to:

1 Student will have knowledge and skills about Handling of glassware and chemicals in the laboratory.

2 Student will have knowledge and skills about Safety and precautionary measures in the laboratory.

3 Students will be able to learn different practical techniques in Chemistry, Biology and Physics.

4 Students will be able to analyse, interpret and record the experimental results.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	6	0	0	0	50	50

Contents : Unit	Topics	Contact Hours
Total Hours		

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Chemistry Experiments** Demonstrations for laboratory glassware and instruments. , To prepare solutions of acid and base with definite concentration., To determine normality, molarity and gm/lit of given strong acid with the help of known concentration of strong base., To determine normality, molarity and gm/lit of given weak acid with the help of known concentration of strong base., To determine normality, molarity and gm/lit of given weak base (Na2CO3/NaHCO3) with the help of known concentration of strong acid., To determine normality, molarity and gm/lit of given FeSO4.7H2O with the help of known concentration of KMnO4., To determine normality, molarity and gm/lit of given FeSO4(NH4)2SO4.6H2O with the help of known concentration of K2Cr2O7., To determine normality, molarity and gm/lit of each component in the given mixture of Na2CO3 and NaHCO3 with the help of known concentration of HCl., To determine the amount of chloride in the given sample of water using 'X' N AgNO3solution., To calibrate and determine the boiling point of an organic compound., To calibrate and determine the melting point of organic compounds. , Preparation of liquid soap	20
2	**Fundamental Biology Experiments** Structure, life cycle and systematic position of (a) Cyanobacteria – Nostoc (b) Algae –Spirogyra., Structure, life cycle and systematic position (a) Bryophytes -Riccia, (b) Pteridophyta., Structure, life cycle and systematic position of Gymnosperm – Cycas -T.S of leaflet, megasporophyll, microsporophyll., Structure, life cycle and systematic position of Angiosperm – Root (Dicot/Monocot), Stem (Dicot/Monocot), Leaves (Dicot/Monocot)., To study the classification of non-chordates with reasons of the following (a) Protozoa- Amoeba (b) Porifera- Sycon(c) Coelenterata- Hydra/anyone coral (d) Platyhelminthes- Tapeworm/Planeria/Liverfluke(e)Nematoda (Aschelminthes)- Ascaris, To study the classification of non-chordates with reasons of the following (f) Annelida- Tubifex, Leech and Neries (g) Arthopoda – Spider, Bees, Crab, Lobster (h) Mollusca – Snail, Slug, Octopus (i) Echinodermata –Starfish, To observe the T.S. of (a) Epithelial, (b) Connective, (c) Muscle and (d) Nerve tissues using permanent slides., To observe pollen tube germination under microscope., L.S. of germination seed of to observe (a) embryo (b) endosperm (c) seed coat of Vigna/Zea may/Pisium, To observe the response of light on seedling germination and demonstrate phototropism, To observe the plasmodium signet ring in RBC cells using permanent slides.	30

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
3	**Fundamental of Physics Experiments** To measure the length, width and height of the given rectangular block using vernier calipers., To determine the diameter of a given wire using micrometer screw gauge, To find the weight of a given body using the Parallelogram law of vectors., To determine co efficient of statics friction of the surface., To determine the restoring force per unit extension of a spiral spring. (Spring Constant) , To determine the value of acceleration due to gravity 'g' by using a simple pendulum., To determine moment of inertia of a disc about the wire as axis and rigidity of the material of wire Torsional pendulum., To find the refractive index (μ) of material of prism using spectrometer., To study variation in thermoelectric potential using Thermocouple., To determine the radius of curvature of a convex mirror using a Spherometer.	20
Total Hours		**70**

Textbook :

1 A Laboratory Text Book of Practical Chemistry, Wm G Valentin , Outlook Verlag, 2022

2 A Textbook Of Practical Physics, Indu Prakash , Kitab Mahal, 2012

3 A Textbook of Practical Biology, Mandip Singh, H. Sahiu , Daya Publishing House, 2005

References:

1 Practical Chemistry , Practical Chemistry , Pandey O.P./ Bajpai D.N. & Giri S. , S.Chand, 2010

2 General Chemistry I: Lab Manual, General Chemistry I: Lab Manual, Steven Rowley , Kendall Hunt Publishing, 2022

3 Fundamentals of Biology Lab Manual, Fundamentals of Biology Lab Manual, Robert Keeton, Kendall/Hunt Publishing Co ,U.S., 2021

4 Fundamentals of Biology - Lab Manual, Fundamentals of Biology - Lab Manual, Bates , star, 2000

5 Fundamentals of Physics: Fundamentals of Physics 6e Laboratory Manual, Fundamentals of Physics: Fundamentals of Physics 6e Laboratory Manual, David Halliday, Robert Resnick, Jearl Walker, John Wiley & Sons, 2002

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	25.00	15.00	10.00	0.00

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Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.
5. Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.
6. All students in the laboratory must wear lab coats during lab session.
7. During practical and experimental section student must wear shoes to avoid accidents cause by spilling or rush handling of acidic chemicals (Especially during inorganic estimation experiments).

Supplementary Resources:

1. http://ocw.mit.edu/courses/chemistry/
2. https://www.youtube.com/watch?v=OH-aSu-rWgk
3. https://www.youtube.com/watch?v=NyOYW07-L5g
4. https://www.youtube.com/watch?v=5BSQG2sbrQw
5. http://vlab.amrita.edu/index.php?sub=2
6. https://www.youtube.com/watch?v=gyxgVsXMYq0&list=PL7jfMV2bTYmqnYac3pdt9uaDNCXvffayK
7. https://www.youtube.com/watch?v=2iqUB_N-uzw

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