SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMKUR-3.
(Autonomous Institution affiliated to VTU, Belgaum)
I/II Semester B.E. (Common for all branches)
Syllabus from the academic year 2018-19 onwards
Subject: ENGINEERING CHEMISTRY LABORATORY

Subject code: **1 RCHEL**

Lab Hours/Week   : 3   Sessional Marks   : 50

End Semester exam. marks : 50

Credits   : 1.5

For examination one experiment from Part-A and one experiment from Part-B shall be set. Under Part-B, a common experiment shall be set for all the candidates while under Part-A, different experiments may be set.

PART-A

Instrumental Methods of Analysis:

1. Determination of pK_a of a weak acid using pH meter and its application in the determination of pKa of soft drinks.

2. Potentiometric titration - Estimation of iron in stainless steel using standard $K_2Cr_2O_7$ solution.

3. Colorimetric determination of copper from the sample prepared from printed circuit board.

4. Determination iron in the given sample of industrial rods by colorimetric method using potassium thiocyanate.

5. Estimation of HCl using standard NaOH conductometrically (Using direct reading conductivity bridge).

6. Identification of of λ_{max} of a dye solution using a spectrophotometer.

PART-B

Titrimetric Estimations:

1. **Analysis of industrial waste water sample** - **Redox-Titration** - Determination of Chemical Oxygen Demand (COD) of the given industrial waste water sample.

2. **Complexometry**- Determination of total hardness of a sample of drinking water using standard EDTA solution.

3. **Redox titration -** Determination of iron in the given TMT (Thermo mechanically

treated) bars (External indicator method) using standard potassium dichromate
solution.

4. **Redox titration** Determination of amount of manganese dioxide present in austenitic
manganese steel using standard potassium permanganate solution.

5. **Complexometry:** Determination of CaO in cement by rapid EDTA method**.**

6. **Acid base titration**: Determination of alkalinity of given water sample.

Reference:

1. Arthur I. Vogel, Quantitative Inorganic Analysis and Elementary Instrumental
Analysis, ELBS, Longmann Group, 5th Edition, 1989.

Course Learning Objectives (CLO): (Based on Bloom's Taxonomy)

CO1: To guide the students to use pH meter/Potentiometer for determination of pH /
pK_a of solutions and interpret it for the health effects of drinking soft-drinks.

CO2: To educate and guide the students to use of Colorimeter for the estimation
of metals in alloys.

CO3: To teach the students the to use of conductivity meter for the determination of
conductance in solutions/electrolytes.

CO4: To explain the use of Spectrophotometer for the determination of absorption
maxima in dye solutions.

CO5: To train the students in volumetric analysis and to use these techniques for
estimation on metals, water quality, extent of pollution.

Mapping of Course Outcomes with Program outcomes

1. Ability to apply knowledge of science to the engineering problems.

2. Ability to analyze the problems using the principles of science.

Program Articulation Matrix:

	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	√											
CO2		√										
CO3		√										
CO4	√											
CO5	√											

Course Articulation Matrix:

	Pos											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1											
CO2	2											
CO3	2											
CO4	1											
CO5	2											

[1]High association, [2]Moderate association, [3]Low association

Course Outcomes (COs):

On successful completion of this course, the student will be able to:

1. Determine the electrode potential of newly constructed electrodes, calculate the voltage of galvanic cell and batteries and determination of pH of water and other liquid samples. Also, estimate the amount of metal(s) in effluents.

2. Determine the metals/ pollutants in water and alloys using colorimeter.

3. Measure the conductance of solutions / electrolytes which in turn can be used determination its characterstics.

4. Identify the λ_{max} of dye solution and predict the complimentary colours.

5. With the knowledge the use the knowledge of volumetric analysis for estimation of metals, materials and pollutants in water and industrial effluents samples.