

SCHEME OF COURSE WORK

Course Details:

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|--|---|----------|----------|----------------------|
| Course Title | :CHEMISTRY LAB | | | |
| Course Code | : 20BC1104 | L | T | P C 0 0 3 1.5 |
| Program: | : B.Tech. | | | |
| Specialization: | : CIVIL ENGINEERING | | | |
| Semester | : I | | | |
| Prerequisites | :Fundamentals of chemistry | | | |
| Courses to which it is a prerequisite | For Civil & Mechanical Engineering | | | |

Course Outcomes (COs): After the completion of the Course the student shall be able to:

| CO No. | Course outcomes |
|---------------|---|
| CO1 | Determine the quality of the ground water sample (L3). |
| CO2 | Determine the metal content in different ores and cement (L3). |
| CO3 | Explain the functioning of the instruments like pH metry, Conductometry and Potentiometry (L2). |
| CO4 | Determine the physical properties like surface tension and viscosity (L3). |
| CO5 | Use spectrophotometry to determine the metal ions (L3). |

Program Outcomes (POs):

A graduate of Civil engineering will be able to

1. Graduates will be able to apply the knowledge of mathematics, science, engineering fundamentals to solve complex civil engineering problems.
2. Graduates will attain the capability to identify, formulate and analyse problems related to civil engineering and substantiate the conclusions
3. Graduates will be in a position to design solutions for civil engineering problems and design system components and processes that meet the specified needs with appropriate consideration to public health and safety.
4. Graduates will be able to perform analysis and interpretation of data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions.
5. Graduates will be able to select and apply appropriate techniques from the available resources and modern civil engineering and software tools, and will be able to predict and model complex engineering activities with an understanding of the practical limitations.

6. Graduates will be able to carry out their professional practice in civil engineering by appropriately considering and weighing the issues related to society and culture and the consequent responsibilities.
7. Graduates will be able to understand the impact of the professional engineering solutions on environmental safety and legal issues.
8. Graduates will transform into responsible citizens by resorting to professional ethics and norms of the engineering practice.
9. Graduates will be able to function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams.
10. Graduates will be able to communicate fluently on complex engineering activities with the engineering community and society, and will be able to prepare reports and make presentations effectively.
11. Graduates will be able to demonstrate knowledge and understanding of the engineering and management principles and apply the same while managing projects in multidisciplinary environments.
12. Graduates will engage themselves in independent and life-long learning in the broadest context of technological change while continuing professional practice in their specialized areas of civil engineering.

PROGRAMME SPECIFIC OUTCOMES(PSOs):

1. Collect, process and analyse the data from topographic surveys, remote sensing, hydrogeological investigations, geotechnical explorations, and integrate the data for planning of civil engineering infrastructure.
2. Analyse and design of substructures and superstructure for buildings, bridges, irrigation structures and pavements.
3. Estimate, cost evaluation, execution and management of civil engineering projects.

Course Outcome versus Program Outcomes:

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO-1 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO-2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO-3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO-4 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO-5 | 3 | 2 | - | - | - | - | - | - | - | - | - | - |

Mapping Levels:

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put -: No Correlation

Course outcomes vs Program Specific Outcomes

| COs | PSO1 | PSO2 | PSO3 |
|------|------|------|------|
| CO-1 | - | - | - |
| CO-2 | - | - | - |
| CO-3 | - | - | - |
| CO-4 | - | - | - |
| CO-5 | - | - | - |

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| Assessment Methods: | Day to Day assessment / Mid-Test / End Exam |
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Course Outcome-Assessment

| Week | TOPIC / CONTENTS | Course Outcomes | Sample questions | TEACHING-LEARNING STRATEGY | Assessment Method & Schedule |
|-------------|--|------------------------|---|-----------------------------------|---|
| 1 | Determination of total hardness of a ground water sample | CO 1 | Q)Determine the total hardness of given 100 ml water sample | Experiment | Evaluation by checking observation and record <u>Day to Day Evaluation(10M)</u> Experment-4M Record-2M Result-2M Viva-2M |
| 2 | Determination of copper in copper ore | CO 2 | Q) Determine the amount of copper present in given copper ore | Experiment | |
| 3 | Determination of active chlorine content in bleaching powder | CO 1 | Q) Determine the active chlorine present in given bleaching powder solution | Experiment | |
| 4 | Determination of chromium (VI) by hypo | CO 2 | Q) Determine the amount of Cr present in given dichromate sample solution | Experiment | |
| 5 | Determination of iron(II) in an iron ore sample | CO 2 | Q) Determine the amount iron present in given iron ore sample | Experiment | |
| 6 | Determination of sulphuric acid in lead-acid storage cell | CO 2 | Q) Determine the strength of sulphuric acid in lead-acid storage cell | Experiment | |
| 7 | MID TEST-I | | | | <u>MID TEST (20M)</u> Procedure-5M Experiment-5M Result-5M Viva-5M |

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|----|---|------|--|------------|--|
| 8 | Determination of strength of an acid by pH metric method | CO 3 | Q) Determine the strength of an acid by pH metric method | Experiment | Evaluation by checking observation and record <u>Day to Day Evaluation(10M)</u> Experment-4M Record-2M Result-2M Viva-2M |
| 9 | Determination of citric acid in a citrus fruit by conductometric method | CO 3 | Q) Determine the strength of citric acid by pH metric method | Experiment | |
| 10 | Determination of surface tension of a liquid | CO 4 | Q) Determine the surface tension of given liquid | Experiment | |
| 11 | Determination of viscosity of a liquid | CO 4 | Q) Determine the viscosity of given liquid | Experiment | |
| 12 | Determination of Fe(III) by spectrophotometry | CO 5 | Q) Determine the amount of Fe(III) present in given cement sample by spectrophotometric method | Experiment | |
| 13 | Determination of Flash and Fire points of a lubricant | CO 4 | Q) Determine the Flash point and Fire point of given lubricating oil | Experiment | |
| 14 | Mid Test - II | | | | <u>MID TEST (20M)</u> Procedure-5M Experiment-5M Result-5M Viva-5M |
| | END Exams | | | | |