

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ENVIRONMENTAL ENGINEERING (17) ADVANCES IN ENVIRONMENTAL LABORATORIES SUBJECT CODE: 2711705 SEMESTER: I

**Type of course:** Engineering and Technology

**Prerequisite:** Student shall have studied basics of environmental engineering

**Rationale:** To introduce the concept and principles of various advanced environmental engineering instruments and its applications in water, wastewater, soil engg

**Teaching and Examination Scheme:**

| Teaching Scheme |   |   | Credits<br>C | Examination Marks |        |                 |        |    |   | Total<br>Marks |
|-----------------|---|---|--------------|-------------------|--------|-----------------|--------|----|---|----------------|
| L               | T | P |              | Theory Marks      |        | Practical Marks |        |    |   |                |
|                 |   |   | ESE<br>(E)   | PA (M)            | PA (V) |                 | PA (I) |    |   |                |
|                 |   |   |              |                   | ESE    | OEP             | PA     | RP |   |                |
| 3               | 2 | 2 | 5            | 70                | 30     | 20              | 10     | 20 | 0 | 150            |

**Content:**

| Sr. No. | Content   | Total Hrs | % Weightage |
|---------|---|-----------|-------------|
| 1       | Introduction to instrumental methods of environmental analysis. | 4         | 10          |
| 2       | Application of optical spectroscopy to environmental analysis.  | 8         | 19          |
| 3       | Electrochemical methods of environmental analysis.              | 8         | 19          |
| 4       | Chromatographic environmental analysis.                         | 8         | 19          |
| 5       | Mass spectroscopy in environmental analysis.                    | 8         | 19          |
| 6       | Advances in mass spectrometry environmental analysis.           | 6         | 14          |

**Reference Books:**

1. Instrumental Methods of Environmental Analysis by /Karan Sareen. Vedams e-Books Pvt Ltd. New Delhi
2. Instrumental Methods Of Analysis, 7e(Hardcover - 2006) by M H Willard Publisher: C B S Publishers & Distributors
3. Standard Methods of Testing Water and Waste water Latest Edition Published jointly APHA, AWWWA,WPCF
4. Use of Manual of a software included for study

**Course Outcome:**

- A sound understanding of the instrumental methods of environmental analysis and underlying theories & applications of environmental engineering

- Hands on” skills and knowledge of safe practices in the experimental and instrumental aspects of environmental engg. through advanced laboratory course experiences and independent research projects

**List of Experiments:** This is basically laboratory based syllabus only so list is same

1. Introduction to instrumental methods of environmental analysis.
2. Application of optical spectroscopy to environmental analysis.
3. Electrochemical methods of environmental analysis.
4. Chromatographic environmental analysis.
5. Mass spectroscopy in environmental analysis.
6. Advances in mass spectrometry environmental analysis.

**Design based Problems (DP)/Open Ended Problem: ---**

**Major Equipments:**

- UV Visible Spectrophotometer
- Gas Chromatography

**List of Open Source Software/learning website:**

- <http://nptel.ac.in/>
- Videos from you tube