7. Determine the concentration of pollutant in natural sample after using external standards methods.
8. Compare the inter laboratory error of a spectroscopic results.
9. Evaluate the limit of detection for colorimetric analysis of dyes and coloured metals in wastes water samples.
10. Demonstrate the control of interference by masking by complexation.
11. Report the ten analytic results in significant numbers along with standard deviation.
12. Determine the confidence limit and interval for a laboratory instrument like breath alcohol analyser
13. Demonstrate the internal standard method for calibration of metal estimation.
14. Estimate the comparative effectiveness of different types of graphs like line, pi chart and bar graph.
15. Demonstrate the working of lab on chip like glucose sensor.

References:

1. Dey, R. A. and Underwood, A. L., **Quantitative Analysis**, 6th Edition, Pearson.
2. Skoog, D. A., West, D. M., Holler, F. J., Crouch, S. R., **Fundamental an alytical chemistry**, Thomson Asia Ltd.
3. Encyclopaedia of analytical chemistry: Applications, Theory, and Instrumentation, R A Meyor (Eds) Wiley and Sons (2000).

GE 13: Chemistry: Medicines in Daily Life

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Medicines in Daily Life (GE-13)	4	2		2		

Learning Objectives

The Learning Objectives of this course are as follows:

- To make students study the basic details about various medicines of general uses, which are crucial for the various diseases.
- To make students learn about the active pharmaceutical ingredient in some medicines, their synthesis; therapeutic effect and side effects on human physiology.

- To make students aware about the positive and negative effects of medicines those are essential for a healthy day-to-day life.

Learning Outcomes

By the end of the course, the students will be able to:

- Understand the role of different medicines on human physiology.
- Gain the knowledge of active pharmaceutical ingredient and their roles in different disease.
- Learn the proper use of different medicines and their effect and side effects.
- Learn the techniques of administering blood group, pulse rate, blood pressure and may other general diagnostic applications.

SYLLABUS OF GE-13

Theory:

Unit 1: General Introduction (8 Hours)

Introduction-Health, disease, drugs, chemotherapy, approaches in drug designing, classification of drugs and their origin.

Unit 2: Different class of medicines (22 Hours)

Structure of active ingredients, uses, dosage, side effects and their natural remedies:
Analgesics and antipyretics- Aspirin, paracetamol, ibuprofen, morphine, codeine
Antibiotics- Amoxicillin, norfloxacin, ciprofloxacin
Antihistamines or antiallergics- Cetrizine and Levocetrizine (role of stereoisomers)
Antiparasitic- Albendazole
Antidiabetics- Insulin, Glipizide and metformin
Antihypertensive – Amlodipine and its natural remedies- Rauwolfia.
Diuretic- Lasix
Antidepressant-Zoloft and its natural treatment
Antifungal – fluconazole, Itraconazole
Antacids- Ideal properties of antacids, combinations of antacids, Sodium 40 Bicarbonate, rantidine, milk of magnesia, aluminium hydroxide gel
Anticoagulants/antiplatelet drugs- Warfarin, heparin and Ecosprin
Anaesthetics- Atracurium, Desflurane
Poison and Antidote: Sodium thiosulphate, Activated charcoal, Sodium nitrite
Astringents: Zinc Sulphate, Potash Alum
Supplements- zinc and calcium, vitamins
Synthesis of small molecule drugs like aspirin and paracetamol

Practicals: (60 Hours)

(Laboratory periods: 60)

1. Determination of heart rate and pulse rate, blood pressure and discussion on medicines affecting them.
2. Identification test- Magnesium hydroxide, Sodium bicarbonate, Calcium gluconate.

3. Preparation of inorganic pharmaceuticals- Boric acid Potash alum
4. Determination of sugar content in the given solution.
5. Estimation of zinc and calcium in a given solution.
6. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose).
7. Qualitative tests for Proteins
8. Qualitative analysis of vitamin C.
9. Isolation of paracetamol (API) from a commercial tablet
10. Isolation of aspirin (API) from tablet and recording of melting point (synthesis needs discussion)

References:

Theory:

1. Patrick, G. L. (2001) **Introduction t o Med icinal C hemistry**, Oxford University Press.
2. Lemke, T. L. & William, D. A. (2002), **Foye's Principles of Medicinal Chemistry**, 5th Ed., USA,
3. Singh H.; Kapoor V.K. (1996), **Medicinal and Pharmaceutical Chemistry**, Vallabh Prakashan.
4. Chatwal, G.R. (2010), **Pharmaceutical ch emistry**, inorganic (vol. 1), Himalayan publishing house
5. https://go.drugbank.com./

Practicals:

1. Jeffery, G.H., Bassett, J., Mendham, J., Denney, R.C. (1989), **Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.
2. Ahluwalia, V.K., Dhingra, S. (2004), **Comprehensive Practical Organic Chemistry: Qualitative Analysis**, University Press.
3. Munwar, S., Ammaji, S.(2019), **Comprehensive Practical Manual of Pharmaceutical Chemistry,** Educreation Publishing.
4. Mondal, P., Mondal, S.(2019), **Handbook of Practical Pharmaceutical Organic, Inorganic and Medicinal chemistry**, Educreation Publishing.

GE 15: Chemistry and Society

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Chemistry and Society (GE-15)	4	2		2		