

PAPER CODE:1SC2030311	TITLE OF PAPER: ANALYTICAL CHEMISTRY -I
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Course Objective: To provide the basic knowledge & concepts of the Analytical chemistry. To provide overview of the application of analytical chemistry in applied field to the students.

Teaching scheme (hours) per week		Credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	-	4	-	60	40	-	-	100

UNIT	DISCRIPTION IN DETAIL	WEIGHTAGE
I	Introduction of Nanomaterials What is nanotechnology? Classification of Nano-structured materials. Nano-scale Architecture. Synthesis of Nanomaterials: Top down – ball milling; Bottom up co-precipitation, sol-gel, electro deposition, using natural nano-particles chemical vapor deposition. Introduction of fullerene chemistry. The Carbon Nanotube New Forms of Carbon – Types of Nanotubes Formation of Nanotubes – Uses for nanotubes. Applications of nano-materials in various fields. Introduction of TEM, SEM, DLS, AFM,	25%
II	Pharmaceutical Analysis Instrumental and titrimetric assays for anti-diabetic, anti-cancer, anti-tuberculosis, anti- malarial, anti-hypertensive and anti-HIV drugs based on USP/BP/IP. Heavy metal ion, Dissolution, Loss on drying and Karl fisher analysis in pharmaceuticals. Importance of UV-Visible spectroscopy, IR spectroscopy and HPLC with UV, fluorescence and photodiode array detection in pharmaceutical industry	25%

III	Food Analysis: Introduction to food analysis, regulations and international standards related to food analysis, nutritional labeling, sample and sample preparation. Compositional analysis of foods for moisture, proteins, fat, fiber, ash, vitamins and minerals. What is Adulteration? Adulteration of fats and oils; milk and milk products.	25%
IV	Automation and Flow injection analysis Principles of automation, automatic and automated devices, Process control: off-line, at-line and on-line analysis. Continuous and discrete analyzers, feedback mechanism. Flow injection analysis, principles, dispersion coefficient, factors affecting peak height-sample volume, channel length, flow rate and channel geometry. Applications of FIA, stopped flow measurements and gradient FIA.	25%

LEARNING OUTCOMES

- This study is useful to furnish students with the advanced technical skill and knowledge base that is required in the field of instrumental analysis and which will enable them to pursue careers as analyst in the chemical, agriculture, food and pharmaceutical industry.
- Understand the essential concepts used in nanotechnology: Synthesis approach of nano-materials.
- Discuss the application of nano-materials in major scientific fields
- Appreciate the development of modern nanotechnology
- Automatic instruments improve the analyst's efficiency by performing some of the operations done manually. Automated instruments control a system based on the analysis results.

REFERENCE BOOKS:

1. "Analytical Chemistry" by Gary D. Christian, 6th Edition, John Wiley and Sons Inc. New Jersey.
2. "Principles of Instrumental Analysis" by Douglas A. Skoog, 3rd Edition, Holt-Saunders International Edition.
3. Flow injection analysis of pharmaceuticals: automation in the laboratory by Jose Martinez Calatayud, Taylor and Francis, 1996.
4. "Food Analysis" by S. Suzanne Nielsen, 3rd edition, Springer 2003.
5. "Food Analysis Laboratory Manual" by S. Suzanne Nielsen, 3rd edition, Springer 2003.
6. Quantitative Analysis of Drugs in Pharmaceutical Formulation, 3rd edition, P.D. Sethi, CBS Publishers, 2008.
7. "Handbook of Modern Pharmaceutical Analysis" by Satinder Ahuja and Stephen Scypinski, Volume 3, Academic Press, 2001.

8. Standard Method of Chemical Analysis by F.J. Welcher, sixth edition, volume 1, 2 & 3, Part two, Van Nostrand Reinhold Company.