BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI-HYDERABAD CAMPUS

FIRST SEMESTER 2020-2021

Course Handout (Part II)

Date: 17/08/2020

In addition to Part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. **: PHA F 211**
Course Title **: Pharmaceutical Analysis**
Instructor-in-charge **: Dr. Balaram Ghosh**
Instructors **: Dr. Balaram Ghosh, Yamini Bobde, Sravani Pulya, Tarun Patel, Ch Sai Sanjay**

1. Scope & Objective of the Course:

The objective of this course is to provide students with knowledge of basic principles of quantitative analytical chemistry necessary for use and interpretation of pharmaceutical methods of analysis especially those methods official in the Indian, United States and British Pharmacopeias.

2. Learning Outcomes (course benefits): Students who have undergone the course are expected to

- Understand the basic principles of different titrimetric analysis.
- Be able to select appropriate method of titrimetric procedures from different available titration techniques.
- Have extensive knowledge of different assay procedures available in Indian Pharmacopeia (IP).
- Understand the analytical principles for calculating the purity of desired bioactive ingredients in any pharmaceutical preparation.
- Have knowledge of different chromatographic techniques (Colum chromatography, TLC, GC etc) used in modern sophisticated analytical Instruments.
- Understand the importance of enantiomeric purity of bioactive molecules.

3. Text Book:

A.H. Beckett and J.B. Stenlake. "Practical Pharmaceutical Chemistry" 4th ed., Part 1 and 2.

4. Ref. Book:

1. Remington's Pharmaceutical Sciences 18th ed.
2. Jenkin's quantitative Pharmaceutical Chemistry.
3. A Text book of Pharmaceutical Analysis – Kenneth A Connors.
4. A text book of quantitative inorganic analysis-Arthur. I. Vogel.
5. Parimoo P, Pharm Analysis CBS 1998

5. Course Plan:

a. Lectures:

Lect. No	Learning Objective	Topics to be covered	Chapter in the Text Book/Ref Book
1-2	Brief introduction to the pharmaceutical analysis	Pharmacopoeia, sources of impurities in medicinal agents, assays, titration methods	TB:1 (Part 1) RB:1(Sec3)

3-4	Study on acid-base titrimetric methods	Standard volumetric solutions, direct titration of acids, bases, back titration, determination of organically combined nitrogen	TB:1 (Ch5)
5-7	To study titrations in non-aqueous solvents	Theory, titration of amine and amine salts, titration of halogen acid and salts of bases and acidic substances	TB:1 (Ch6) RB:4 (P340)
8-10	Study on oxidation-reduction titrations	Determination involving the use of pot. permanganate, iodine, thiosulphate, iodine value of fixed oil	TB:1 (Ch7)
11-12	Study on precipitation titrations	Argentometric titration, ammonium thiocyanate titration of silver salts and mercury compounds	TB: 1(Ch8) RB:1 (Sec3)
13-15	Study on complexometric methods	Theory of complexometric analysis, pM indicators, direct titration with Sod. edetate, back titration, and displacement titration	TB: 1 (Ch8)
16	Study on gravimetric analysis	Gravimetric method in the determination of medicinal compounds	TB: 1 (Ch8) RB;2 (P-225)
17-18	Study on electro chemical methods	Introduction, conductimetric titration, potentiometric titration	TB:2 (Ch5)
19-20	Study on Nephelometry and turbidimetry	Introduction, instrumentation and application of Nephelometry and turbidimetry	RB:4 (Ch12)
21-25	Study on chromatography	Theory, Mobile phases, Stationary phases, Thin layer chromatography, paper chromatography and column chromatography	TB:2 (Ch4) RB:5 (SecF) RB1: (Sec3)
26-27	Polarimetry	Principles and instrumentation	RB:5; RB:3
28	Miscellaneous method of analysis	Determination of water content etc.	TB:1 (Ch10)

b. Practical/Laboratory Experiments:

Name of the Experiment	No. of Days
Qualitative, semi-quantitative and quantitative analysis of Pharmaceuticals by different limit tests and volumetric, argentimetric, Complexometric, gravimetric titrations and Chromatographic analysis techniques. 1. Limit Test for Chloride, 2. Limit Test for Sulphate, 3. Limit Test for iron, 4. Limit test for Arsenic 5. Experiment No. 4- Assay of Aspirin by Volumetric titration using back & blank titration 6. Experiment No. 6-Assay of calcium Gluconate by Complexometric titration 7. Experiment No. 7- Assay of sodium chloride by Argentimetric titration 8. Experiment No. 8- Thin Layer Chromatography (TLC) 9. Experiment No. 9- Column chromatography	12

6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Test I	30 minutes	15	September 10 – September 20 (During scheduled class hour)	Open book
Test II	30 minutes	15	October 09 –October 20 (During scheduled class hour)	Open book
Quizzes-surprise (before T-II)		10	Continuous	Open book
Test III	30 minutes	15	November 10 – November 20 (During scheduled class hour)	Open book
Quizzes-surprise (after T-II)		5	Continuous	Open book
Laboratory component	Weekly	10	Continuous	
Comprehensive exam	2 hours	30	TBA	Open book

7. Mid-Semester Grading: Will be announced after Test II.

8. Make-up: Prior approval or intimation to take a make-up is mandatory. It is solely at the discretion of the instructor-in-charge, depending upon the genuineness of the circumstances, to allow or disallow a student to appear for a make-up evaluation component. No makeup will be granted for Assignments/Quizzes under any circumstances.

9. Grading Procedure:

- Grading will be done by "bunching" procedure. Total marks obtained by the students will be arranged in descending order, 'bunches' will be identified and grades awarded accordingly. Fine grading system (A, A-, B, B-….) will be followed.
- It is not mandatory for the instructor-in-charge to award all the grades (A to E); subjective judgment will be used for awarding the grades.
- As specified in Handout – Part I, appended to the timetable, the instructor in-charge reserves the right to award a NC report in case the student does not make himself/ herself available for any of the evaluation component mentioned above.

- Borderline cases during grading will be judged on the basis of regularity to classes and consistency or progress in the performance in evaluation components.

10 Chamber Consultation Hours: To be announced in class.

11. Notices: All the notices pertaining to this course will be communicated by email or CMS.

12. Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge
PHA F211