

SCHOOL OF PHARMACY AND HEALTH SCIENCES
COURSE OUTLINE

COURSE	PHM 4414- UNIT OPERATIONS
LECTURER	DR SANIA Z F KASSAM
CREDIT UNIT	4.5
PRE-REQUISITE	PHM 3413
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2.12.2 Purpose of the course;

To teach the student the importance of unit operations in pharmaceutical systems

2.12.3 Expected Learning Outcomes of the Course;

At the end of the course, the student should be able to:

1. Describe the various unit operations in the formulation of pharmaceutical systems
2. Explain the use of the unit operations.

2.12.4 Course Content

Extraction- solid and liquid extractions, Filtration, Crystallization, Distillation, Evaporation, Centrifugation, Sterilization, Plant materials and corrosion, Unit operations integration.

Practicals:

Week 1: Extraction- Solid-Liquid Extractions

- Overview of Extraction
- Partition principles.
- Types of extractions
- Solid-Liquid Extractions

Week 2: Extraction- Liquid-Liquid Extractions

- Liquid-liquid extractions
- Solvents
- Factors affecting extraction efficiency

Week 3: Filtration

- Introduction
- Applications
- Process of filtration
- Types of filtration
- Theories of filtration
- Filter medias and filter aids
- Filtration equipment

Week 4: Crystallization

- Characterization of pharmaceutical crystals.
- Polymorphism
- Solubility curves
- Process of crystallization

Week 5: Distillation + Quiz 1

- Process of Distillations
- Laws of distillation
- Phase diagrams
- Types of Distillation

Week 6: Evaporation

- Applications of evaporation
- Classification of evaporators.

Week 7: Mid-Semester Examination

Week 8: Centrifugation

- Principles of centrifugation
- Sedimentation theory
- Centrifugation instrumentation
- Centrifugation techniques

Week 9: Sterilization

- Methods of sterilization
- Sterilization controls
- Sterilization QA
- Pharmaceutical importance/Application

Week 10: Group presentations**Week 11: Plant Materials and Corrosion + Quiz 2**

- Factors governing material selection
- Types of materials
- Theories of corrosion
- Types of corrosion

Week 12: Practical Applications and Integrated perspective**Week 13: End of Semester Examinations****Week 14: End of Semester Examinations****2.12.5 Mode of Delivery;**

Lectures, power point presentations, and class discussions. These will take a participatory approach.

Laboratory learning and Experiments: The lecturer, together with the laboratory technical staff, will take the students through practical sessions, beginning with **demonstrations**. The students will thereafter be expected to use pre formulated laboratory manuals to carry out various practical exercises then write out their findings in their laboratory workbooks. **Video demonstrations and/or CD-Roms** on Medicinal Chemistry when available, after the relevant topic has been covered. **Assignment criteria:** Students will be given several individual or group research assignments on topics relevant to the course. These could include lectures, discovery learning, problem-based learning, experimental learning, group-based learning, independent studies and e-learning.

2.12.6 Instructional Materials and/or Equipment;

Lecture notes or power points for presentation; Tutorials; Video demonstrations; CD-Roms; Text books; Practical Manuals, chemical reagents; glassware; extractive and synthetic equipment, including Rotor vapor extractor; IR and NMR Spectroscopes; Tutorials; chemical charts and atlases. Interfaced computers.

2.12.7 Course Assessment;**Distribution of Marks**

Attendance	10%
CATS (minimum 2 sit in)	10%
Continuous laboratory exercises	10%
Mid-semester Examination	20%
End semester laboratory exam/oral	10%
Weekly Recap questions	5%
Assignments/Group Presentation	10%
End semester Examination	25%
Total	100%

Grading

90 - 100	A
87 - 89	A ⁻
84 - 86	B ⁺
80 - 83	B
77 - 79	B ⁻
74 - 76	C ⁺
70 - 73	C
67 - 69	C ⁻
64 - 66	D ⁺
62 - 63	D
60 - 61	D ⁻
00 - 59	F

2.12.8 Core Reading Materials for the Course;

Dorland. (2011). Dorland's Illustrated Medical Dictionary. 32nd Edition. Saunders, Elsevier

Dorland. (2012). Dorland's Electronic Medical Speller Version 6.0. 6th Edition. Saunders, Elsevier

LaFleur Brooks, M., LaFleur Brooks, D. (2012). Basic Medical Language. 4th Edition. Mosby, Maryland Heights, MO

[Loyd, Jr., V. A.](#), [Adejare, A.](#), [Desselle, S. P.](#), [Felton, L. A.](#) (Eds). (2012). Remington: The Science and Practice of Pharmacy (2 Volumes). 22nd Edition. Pharmaceutical Press, LONDON

2.12.9 Recommended Reference Materials;

R. J. (Ed.). (2012). Tarascon Pocket Pharmacopoeia 2013 Classic Shirt Pocket Edition. 27th Edition. Jones & Bartlett Learning, St. Burlington, MA

Joint Formulary Committee. British National Formulary (BNF). 2013. Pharmaceutical Press, London, United Kingdom.

Kimotho, J. H., Kibwage, I.O., **Mshilla, M.**, Jaguga C., Ronoh, W., Gaitungu, J., Githinji, J. (2011).

East African Pharmaceutical Loci: A Regional Drug Index for Healthcare Practitioners. 11th Edition. East African Pharmaceutical Loci Publishers, Nairobi, Kenya.

Lovett, A. W., Peasah, S. K., Xiao, H., Ryan, G. J. (2013). Introduction to the Pharmacy Profession. 1st Edition. Jones & Bartlett Learning, Wall Street Burlington, MA

, M. J. (Ed.). 2013. The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals. **Royal Society of Chemistry**, Science Park, **Cambridge**

Pandit, N. K., Soltis, R. P. (2011). Introduction to the Pharmaceutical Sciences: An Integrated Approach. 2nd Edition. Lippincott Williams & Wilkins, Hagerstown, MD

Drug Information for the Health Care Professional. 27th Edition. Thomson Healthcare, SaschaHendel, Berlin (Germany)

Reynolds, J.E.F., & Prasad, A.B., Eds. (2011). Martindale: The extra pharmacopoeia. 28th Ed. The Pharmacopoeial Press, 1 Lamberth High Street, London, SE1 7JN.

S., Ed. (2011). Martindale: The Complete Drug Reference. 37th Edition. Pharmaceutical Press, London

United States Pharmacopoeia: AND the National Formulary. 37th Ed.; USP 37–NF 32. US Pharmacopoeia Convention, Inc; Rockville, MA, USA