Basic information:	
Program on which the Block is offered	PharmD
Qualification Awarded	BPharmD
Block title - Code - Year	Drug Discovery – 3203– Foundational Year II
Block Type	Foundational
Total contact Hours / week [34 hrs.]	(Lectures: 7, Lab: 6, Tutorials: 2, Seminars: 2, PBL: 9, Self-study: 6, Exams: 2)
ECTS Hours	14
Pre-requisites for this Block	Fundamentals of Biochemistry, Physiology, Pharmaceutics, Pharmacy Practice, Clinical skills and English Language.
Week period	7

Block Description:

This block introduces students to phases of drug development process, novel drug delivery systems, good manufacturing practice and various techniques of biotechnology. This block also covers fundamental concepts of in-vivo & in-vitro experiments, pharmacokinetics, pharmacodynamics and bioavailability measurement methods. Students will also be introduced to physiological aspects and various drug classes within the nervous system. Problem-based learning strategies are used for this block delivery.

Block Objectives:

By the end of this Block the student should be able to:

- Explain stages and phases of drug development process.
- Discuss drug delivery systems of different dosage forms.
- Describe the various application and techniques of biotechnology.
- Identify the different document forms and activities that are applied by pharmacists for patients.
- Describe the aspects of in-vivo and in-vitro experiments.
- Explain the fundamental concepts of the drug pharmacology and medicinal chemistry.
- Describe the autonomic nervous system and the various drug classes that act with neural synapses.
- Discuss biomedical aspects of amino acids regarding digestion, synthesis and degradation.
- Discuss the principles of biopharmaceutics and the relation of the dosage forms to drug absorption, distribution and elimination.
- Discuss the different measurement methods of bioavailability.
- Explain the different quality elements of good manufacturing practice.
- Describe the physiology of central nervous system, adrenocortical and pancreatic hormone system.
- Develop advanced clinical skills.
- Develop skills of observation and critical reading.
- Analyze, interpret, and evaluate data from various sources.

Learning and Teaching Methods, & Assessment Methods

Learning and Teaching Methods:

- Problem-Based Learning (PBL)
- Lectures
- Tutorials
- Practice in lab
- Independent study assignments
- Presentations
- Seminars
- Clinical teaching: Clinical skills lab and Simulation.

Assessment methods:

- **Continuous assessment:**
  - Problem Based Learning sessions (Brain-storming/Debriefing)
  - Reports
  - Report Discussion
  - Individual reassurance test (IRAT): MCQs
  - Group reassurance test (GRAT): MCQs
  - Presentations (oral)
  - Practice in lab
  - Open-book/open-web exam
- **End-Block exam:**
  - Written
- **Final-Block exam:**
  - Written
  - Objective structured practical examination (OSPE)
  - Objective structured clinical examination (OSCE)

Weighting of Assessment:

Continuous assessment:	**60%**
• PBL sessions	• 30%
• Practical sessions	• 10%
• Other Activities (Tutorial/Seminar/Assignments/Moodle Activities)	• 10%
• Mid-block Exam	• 5%
• End-block exam	• 5%
Final Exam:	**40%**
• Written	• 30%
• OSPE & OSCE	• 10%
Total:	**100%**

Assessment Schedule:	
Continuous assessment:	**During the block**
• PBL sessions	Weeks 1-7
• Practical sessions	Weeks 1-7
• Other Activities (Tutorial/Seminar/Assignments/Moodle Activities)	Weeks 1-7
• Mid-block exam	Week 3
• End-block exam	At the end of the block
Final exam:	**At the end of the year**
• Written	At the end of the year
• OSPE & OSCE	At the end of the block

Examination Regulations:

- If the student absenteeism is more than 25 % he/she cannot attempt the final exam.
- The total required percentage to pass this course is at least 60 %

List of textbooks and references:

- **Course Notes:**
  - PowerPoint presentations, videos and other materials related to lectures, tutorials and practical sessions are uploaded to the Moodle by experts on weekly basis according to teaching schedule.
- **Essential Books (Text Books):**

  - Amidon G. L.; Lennernas H.; Shah V. P.; Crison, J. R. (1995). A Theoretical Basis for a Biopharmaceutical Drug Classification: The Correlation of In Vitro Drug Product Dissolution and In Vivo Bioavailability. *Pharm. Res*.
  - Ansel H, Popovich N. (2011). *Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems*. 9th edition. Lippincott Williams & Wikins.
  - Costanzo, L.S., 2014. *Physiology. 5th ed. Philadelphia: Saunders Elsevier*.
  - Crommelin ,D.J., Sindelar, R .D., and Meibohm, B. (2008), "Genomics, Other "Omics" Technologies, Personalized Medicine, and Additional Biotechnology-Related Techniques", in Sindelar, R.D. (ED), Pharmaceutical Biotechnology, 3 rd ed., Informa Healthcare USA.
  - Florence, A. T. and Attwood, D. (2008) Fast Track : Physical Pharmacy, Pharmaceutical Press London . Chicago.
  - Haynes RB. Introduction. In: Haynes RB, Taylor DW, Sackett DL, eds. Compliance in Health Care. Baltimore, MD: Johns Hopkins University Press.

- Hall, J.E., 2011. *Guyton and Hall textbook of medical physiology*. Philadelphia, PA: Saunders Elsevier.
- Hayes ,B.C and Hayes, J.D. (1989), "Blotting techniques for the study of DNA, RNA, and proteins", in Hayes, B. C, Wolf, C. and, Hayes, J. D. (ED), Departments of Medicineand Clinical Chemistry, Royal Infirmary, Edinburgh
- Jaworski, J. (2001), the application of biotechnology to industrial sustainability – a primer, organisation for economic co-operation and development, canada.
- M.E. Aulton, (2007). Text book of The science of dosage form design, 3rdeditionChurchill-Livingstone, London.
- Medicines and Healthcare products Regulatory Agency (2007) Rules and Guidance for Pharmaceutical Manufacturers and Distributors, London : pharmaceutical press.
- Murray, R.K., Granner, D.K., Mayes, P.A., Rodwell, V.W. and Biochemistry, H.S.I., 2003. a LANGE medical book. *Harper's Illustrated Biochemistry.* 26th ed. New York: McGraw-Hill Companies, Inc.
- Nair, A.J. (2008), Introduction to biotechnology and genetic engineering, Infinity science press LLC, Hingham, Massachusetts New Delhi, India
- Nelson, W.L., 2012. *Foye's Principles of Medicinal Chemistry: Seventh Edition*. Wolters Kluwer Health Adis (ESP)
- Pamela, C.C., Richard, A.H. and Denise, R.F., 2005. *Lippincotts illustrated reviews biochemistry*. Lippincott Williams & Wilkins, Baltimore.
- Patrick, G.L., 2013. *An introduction to medicinal chemistry*. Oxford university press.
- Rang, H, Ritter, J, Flower, R and Henderson, G. 2016, Rang and Dale's Pharmacology, 8th ed, Elsevier Churchill Livingstone, London
- Tripathi, K. 2013, Essentials of Medical Pharmacology, 7thed, Jaypee Brothers Medical Publishers (P) Ltd.
- Tietze K. J. 2012. Clinical skills for pharmacists " A patient-focused approach". 3rd edition. Elsevier mosby. USA.
- Whalen, K, Finkel, R and Panavelil, T. 2017, Lippincott Illustrated Reviews: Pharmacology, 6thedn, Lippincott Williams &Wikins, Baltimore.

- **Periodicals and websites:**
  - Yvonne, P. and Thomas, R., 2010. Pharmaceutics–Drug Delivery and Targeting. Available online http://www.pharmpress.com/files/docs/ft_pharmaceutics_drug_delivery_sample.pdf

- Serotonin Synthesis and Metabolism available online https://www.sigmaaldrich.com/technical-documents/articles/biology/rbi-handbook/non-peptide-receptors-synthesis-and-metabolism/serotonin-synthesis-and-metabolism.html
- Pharmacorama. 2005. Acetylcholine-metabolism available online: https://www.pharmacorama.com/en/Sections/Acetylcholine_2_1.php
- Synthesis and Metabolism of Acetylcholine. 2015. Deranged physiology. Available online: http://www.derangedphysiology.com/main/core-topics-intensive-care/critical-care pharmacology /Chapter%203.2.1/ synthesis-and-metabolism-acetylcholine.
- Global clinical pharmacy. 2013. *Pharmaceutical care plan. Available online:* http://clinicalphar.com/pharmaceuticalcareplan.html
- Panesar, K. 2012. *Medication management, patient compliance and health behavior models.* U.S. Pharmacists. Available online: https://www.uspharmacist.com/article/patient-compliance-and-health-behavior-models

Block Policies:

Code of conduct

Please refer to LIMU code of ethics http://limu.edu.ly/images/11/ethcode.pdf

Academic integrity

Please be aware that cheating, plagiarism, in-class disruption and dishonesty are vigorously prosecuted and that LIMU has a zero-tolerance policy.