كلية الصيدلة

FACULTY OF PHARMACY

Department of Medicinal Chemistry

PMC101 Pharmaceutical Analytical Chemistry I

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **- - -**

The course covers the basic knowledge required for quantitative analysis like expressing solution concentration, pH concepts, and buffer solutions, along with gravimetric and titrimetric analytical techniques like acid-base, complexometric, precipitation (argentometric), and redox titrations. The course also includes an introduction to electrochemistry and electrochemical techniques with an emphasis on potentiometry and potentiometric titrations.

PMC102 Pharmaceutical Organic Chemistry I

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **- - -**

This course is intended to give pharmacy students a brief introduction to organic chemistry, its impact, and its applications in the pharmaceutical industry & drug development. The students will learn how to classify the medicinal agents according to their structure and know the chemical properties & reactivity of each class as haloalkanes in general anesthesia (as halothane), alkenes & alkynes in many synthetic pharmaceutical agents such as hormonal & antitumor agents (as tamoxifen & clomiphene). Stereochemical aspects will be covered to understand the isomeric effect on drug action through binding affinity to different biological receptors (as thalidomide, adrenaline & citalopram). Some drugs such as beta-blockers that are synthesized from alkyl halides will be studied through different elimination & substitution reaction techniques. Practical skills of the students will be developed through the identification & preparation of several pharmaceutical agents (such as aspirin & paracetamol).

PMC103 Pharmaceutical Organic Chemistry II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PMC102**

This course extends the knowledge of organic compounds to study the aromatic hormones and drugs either being naturally occurring or synthesized & how aromaticity affects their properties and reactivity (such as NSAIDs & other analgesics). Practical skills in pharmaceutical organic synthesis will be developed through the preparation of several pharmaceutical agents (such as benzocaine & diphenyl urea) as well as indicators (such as phenolphthalein, fluorescein, and methyl orange).

PMC104 Pharmaceutical Analytical Chemistry II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PMC101**

The course covers the instrumental techniques for quantitative analysis like electrochemical, spectroscopic, and chromatographic techniques with an emphasis on UV/Visible absorption spectroscopy, spectrofluorimetry, flame spectroscopy, and liquid chromatographic techniques.

PMC205 Pharmaceutical Organic Chemistry III

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMC103**

This course continues with the study of the structure, properties, composition, reactions, and preparation of carbon-containing compounds of pharmaceutical interest. Topics include carbohydrates (monosaccharides, disaccharides and polysaccharides) and their structure, synthesis and reactions. Additional topics to be covered include phenols and sulphonic acids. The course also addresses chemistry of heterocyclic compounds as well as spectroscopy and elucidation of chemical structures using different spectroscopic techniques (IR, NMR and mass spectroscopy).

PMC306 Medicinal Chemistry I

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMC205**

The course is designed to inaugurate the basics of medicinal chemistry; it includes an overview relating physical and chemical properties of drugs to their biological actions. An introduction to the concept of drug development throughout studying the biochemical aspects of chemotherapeutic agents is tackled. Intended goals are achieved by studying different classes of antibiotics (β-lactam antibiotics, tetracyclines, aminoglycosides, macrolides, and chloramphenicol analogs), antibacterial sulfonamides, quinolones and dihydrofolate reductase inhibitors. The course is also tailored to include antiparasitic, antimycobacterial and antifungal agents. This course comprises a thorough study of antiviral and antineoplastic drugs. The chemistry and relevance of antiseptic agents is also highlighted.

PMC307 Medicinal Chemistry II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PMC306**

The course is aiming to deliver necessary understanding of certain drug classes relating their distinct physicochemical properties to corresponding pharmacokinetic and pharmacodynamics actions. The course discusses the chemical structure of non-steroidal anti-inflammatory drugs, polypeptide hormones, opioid and non-opioid analgesics, antiallergenic and antiulcer drugs, steroidal hormones and related drugs. Additionally, oral antidiabetic agents, thyroid hormones and anti-thyroid drugs, vitamins and anti-aging therapies are likewise apprehended. The practical part of the course is designed to endorse student's professional skills.

PMC408 Medicinal Chemistry III

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PMC307**

The course is customized to focus on the influence of chemical structure on biological aspects of some drug classes including those acting on central nervous system (sedative-hypnotics, anticonvulsants, anxiolytics, general anesthetics, muscle relaxants, antidepressants, analeptics and sympathomimetic agents). The chemistry of cholinergic, adrenergic, cardiovascular agents and diuretics is reasonably discussed in relevance to drug development and innovation. The course is delivered to comprise sufficient awareness about drug metabolism, non-computational and computer aided drug design. Students are anticipated to hypothesize molecular modifications of lead drugs to improve their bioavailability and pharmacodynamics. The practical part of the course upgrades students' professional attributes.

PMC409 Quality Control of Pharmaceuticals

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PMC104**

The course covers quality control and quality assurance concepts of analytical chemistry with emphasis on pharmaceutical compounds like analytical method development and validation, quality control of raw materials and finished products, in process quality control, pharmacopeial methods of stability and stability testing of drugs, and performance assessment and calibration of instruments used in pharmaceutical analysis.

PMC511 Advanced Instrumental Analysis

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMC104**

This course provides in-depth coverage of instrumental analysis as a field of analytical chemistry that investigates analytes using scientific instruments. The course addresses an introduction of Spectrometry, quantum Chemistry and spectroscopy. It addressed applications of spectrophotometry, spectrophotometers and Lasers. Further, the course introduces mass spectrometry and its Instrumentation. Additional topics include quadrupole, time-of-flight, ion mobility mass spectrometry. The course addresses quantum chemistry, molecular modeling and exploring chemistry with electronic structure methods. Introduction to analytical separation techniques including advanced High Performance Liquid Chromatography.

Department of Pharmacognosy

PPC101 Botany & Medicinal plants

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite *- - -*

This course introduces botany as the branch of biology that deals with the study of plants, including their structure, properties, and biochemical processes. Medical ethnobiological sciences, including ethnobotany, and ethnopharmacology are introduced. The course addresses general principles of botany including morphology and systematics. The course provides a background on plant nomenclature & classification of plant crude drugs, and medicinal plants with an emphasis on families yielding important phytopharmaceuticals. Plant anatomy, physiology, structure& modifications of its tissues are addressed. The course also discusses perspectives on the role of plant secondary metabolites.

PPC102 Pharmacognosy

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PPC101

This course introduces pharmacognosy as the study of medicines or crude drugs produced from natural sources such as plants, microbes, and animals with a special emphasis on herbal drugs in the Egyptian market. It addresses the scope, history & role of pharmacognosy in modern medicines. It addresses key medicinally important drugs derived from different plant organs as well as the identification and authentication of genuine herbal drugs. An emphasis is made on pharmacognostical features, major constituents, folk uses, clinically proven uses, benefits & precautions of specific medicinal plants. The course also addresses emerging Areas in Pharmacognosy.

PPC303 Phytochemistry

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PPC102 - PMC103

This course introduces phytochemistry as the chemistry branch addressing plants, plant processes, and plant products. The course provides a definition of bioactive plant molecules, and natural product chemistry in drug discovery and adds insights into structure activity relationships of some natural scaffolds and marketed semisynthetic drugs along with the chemistry, pharmacological actions and uses of different natural product classes. The course discusses methods in natural product chemistry and methods used for the isolation, preparation, identification, and analysis of natural products. The course makes an additional emphasis on marines and chemistry of anticancer natural products.

PPC404 Herbal and alternative Medicine

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite PPC102

The course aims to enable students to attain the systematic approach for herbal prescribing through a comparative study of both traditional and scientifically based uses of herbal drugs in the treatment of various clinical disorders. It covers topics such as traditional systems of herbal medicine and an introduction to complementary and alternative

medicines with emphasis on homeopathic remedies, nutritional supplements, aromatherapy & medical herbalism, and their effect on maintaining optimum health and prevention of chronic diseases. WHO regulations for herbal medicine and guidelines for prescribing herbal medicinal drugs based on pharmacological properties of these drugs including therapeutic uses, dosage, adverse reactions, the toxicity of herbal constituents, contraindications, and drug interactions will be discussed. Special concern is given to the possible mode of action of the herbal drugs based on experimental and clinical pharmacological studies. Important natural products and phytomedicines used in the treatment of different body systems diseases are given in more detail. Important bioactive plant molecules (sources and mechanism of action) will be outlined. Cosmeceuticals and miscellaneous supportive natural therapies for stress, ageing, cancer, and debility will be highlighted.

PPC505 Biotechnological Production of herbal Drugs

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPC102**

Introduction to biotechnology. Downstream processes for plant cell and tissue culture. Bioengineering, and biomedical engineering. Blue biotechnology (Marine). Red biotechnology (Medical). Green biotechnology (agricultural). Nucleic acid isolation. Genetic engineering techniques. Different pharmaceutical applications in biotechnology with special emphasis on biopharmaceuticals produced using plants as an expression system using recombinant DNA technology. The course also outlines the general steps involved in manufacturing of genetically engineered medicines and defines plant molecular farming for producing Pharma-crops. Omics technology and its applications will be also discussed.

PPC506 Pharmaceutical Herbal Quality Control

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMC205 - PMB202 – PPC303**

The course will offer an introduction to the concept of quality control of herbal medicines. Quality control and approval testing per pharmacopeial standards and currently accepted international regulations and specifications will be covered. Physicochemical, spectroscopic, and chromatographic testing in addition to different methods for authentication, extraction, standardization, and analysis of herbal raw materials as well as standardization and stability testing of finished products will be also discussed. Microbiological controls and bioanalytical methods together with method verification and validation will be outlined. Integration of product specifications and SOP-system with emphasis on the creation of SOPs and testing plans will be introduced within the context of documentation and raw data archiving conforming with GMP. The impact of good agricultural practices, collection practices, post-harvesting treatments and manufacturing practices (GAP, GCP and GMP) on the production of phytopharmaceuticals on industrial scale will be also discussed. The course familiarizes students with international efforts to ensure safe, effective and evidence-based herbal products.

Department of Pharmaceutics & Industrial Pharmacy

PPH101 Pharmacy Orientation & Medical Terminology

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite *- - -*

This course will provide a comprehensive overview of the pharmacy profession, examining various aspects of the past, present, and future of pharmacy practice to provide students with a global view of the pharmacy profession. The role of the pharmacist will be further defined through a variety of topics, including basic principles of pharmacy practice, professionalism, patient-centered care and education, pharmacy law, ethics, and interprofessional issues.

The course introduces basic on information on prescriptions and dosage forms. Basics of medical and pharmaceutical terminology are also introduced. The course will start to shape student attitudes about pharmacy practice as they begin to chart a course for their pharmacy education and future career.

PPH102 Physical Pharmacy

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite *- - -*

This course provides the physicochemical background to the design and use of pharmaceutical dosage forms. It addresses the introductory aspects of the subject by covering the fundamentals of physical pharmacy including states of matter, phase equilibria, solution and solubility, and colligative properties. The course also addresses buffers, surfactant, rheology and their applications in pharmacy.

PPH203 Pharmaceutics I

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PPH102

This course goes beyond the introductory aspects of the subject to show how basic physicochemical principles are essential to an understanding of different aspects of physical pharmacy including incompatibilities, colloids, suspensions, emulsions and extracts. An introduction to pharmaceutical calculation is introduced with applications in producing pharmaceutical preparations consist of several different ingredients in a vehicle to produce a product.

PPH204 Pharmaceutics II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PPH102

The course addresses solid and semisolid drug dosage forms including ointments, creams, suppositories, powders and granules and capsules tablets. An emphasis is made on tablet coating, the process where coating material is applied to the surface of the tablet to achieve the desired properties of dosage form over the uncoated variety, and on methods and processes of microencapsulation.

PPH305 Pharmaceutics III

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPH102**

This course introduces the students to several dosage forms including parenteral ophthalmic products and pharmaceutical aerosols. The course also addresses reaction kinetics for pharmaceutical products by investigating the stability of drugs and the mode of action of their degradation through the examination of rate of reaction.

PPH306 Industrial pharmacy

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPH102**

This course covers the applications of size reduction, size enlargement and size separation in pharmaceutical industry. It also addresses heat transfer, distillation, and evaporation in the context of applications for the pharmaceutical industry. The course also addresses the filtration and crystallization process for particle formation in the pharmaceutical industry and how it plays an important role in defining the stability and drug release properties of the final dosage form. An emphasis is provided on emulsification and extraction techniques. The course also addresses drying and industrial nanotechnology.

PPH407 Biopharmaceutics & Basics of Pharmacokinetics

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPH305**

The course addresses biopharmaceutics and pharmacokinetics as pharmaceutical disciplines useful to improve the outcome of drug therapies, assist drug product development, and establish pharmacokinetics-pharmacodynamics models and in vitro-in vivo correlations. An emphasis is made on the pharmacokinetics of drugs administered by IV route, compartmental models and renal and hepatic clearance. The course addresses how noncompartmental pharmacokinetics can be used in computing the pharmacokinetic parameters of a drug from the time course of measured drug concentrations. Bioavailability and bioequivalence are introduced with discussion of their implication in Egyptian the pharmaceutical industry.

PPH511 Radiopharmaceuticals

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPH305**

This course provides an overview of radiopharmaceuticals as radioisotopes bound to biological molecules able to target specific organs, tissues or cells within the human body. Topics covered include basic principles of nuclear medicine physics, radiation protection, safety, and regulation practice. This is in addition to instrumentation, measurement, calculation, and dosimetry. The course also covers radiopharmacy and radiopharmaceutical chemistry including radioisotope production and radiopharmaceutical preparation - generators, cyclotron, reactors - small-scale production for clinical use, labeling, dispensing - operational level 1a, 1b, 3a. Third, the course covers therapeutical radiopharmacy (Radioisotope for therapy and radiopharmaceutical preparation). Finally, the course covers regulatory aspects of radiopharmaceuticals including qualification and validation in radiopharmaceutical manufacturing, quality, safety and GMP in radiopharmaceutical practice.

Department of Pharmacology & Toxicology

PPT301 Pharmacology I

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **BMS232**

This course provides an introduction to the general principles of pharmacology including pharmacokinetics and pharmacodynamics. Topics related to the activity of drugs affecting the autonomic nervous system as well as autacoids and local hormones will be discussed including muscarinic agonists and antagonists, adrenergic agonists and antagonists, histaminergic and serotoninergic agents, as well as drugs modifying the activity/availability of eicosanoids and cytokines.

PPT302 Pharmacology II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPT301**

This course introduces the students to the pharmacological properties of drugs affecting the cardiovascular and central nervous system (CNS) functions. Topics discussed include anti-hypertensive and anti-anginal drugs, drugs for heart failure and arrhythmias, diuretic agents, pharmacological agents affecting the blood, as well as lipid-lowering drugs. In terms of CNS-acting drugs, anxiolytic and hypnotic drugs, general anesthetics, narcotic analgesics, anti-epileptic drugs, antipsychotic drugs, antidepressant drugs, together with anti-parkinsonian drugs will be discussed.

PPT403 Pharmacology III & Biostatistic

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT301**

This course covers the principles of chemotherapy with emphasis on the different classes of antibiotics including inhibitors of cell wall synthesis, drugs affecting bacterial protein synthesis, intermediary bacterial metabolism, and bacterial DNA synthesis as well as urinary tract antiseptics. Chemotherapy of tuberculosis will be discussed together with antifungal and antiviral agents, chemotherapy of protozoal infections and helminthiasis, in addition to Cancer chemotherapy. In parallel, an
introduction to descriptive and inferential statistics will be provided that will encompass the interpretation of estimates, confidence intervals and significance tests. Other, elementary concepts of probability and sampling; binomial and normal distribution, basic concepts of hypothesis testing, estimation and confidence intervals, t-test and chi-square test, linear regression theory and the analysis of variance will be highlighted. Emphasis is placed on the proper selection and application of statistical methods appropriate to clinical data. The course includes laboratory session demonstrating the use of software for statistics to apply tests discussed in the lecture.

PPT404 Basic and Clinical Toxicology

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPT403**

This is a general toxicology course covering the management of toxicity and specific responses of target organs including the liver, kidney, eye, and respiratory system. Different toxin types such as heavy metals, animal and plant toxins, and pesticides will be discussed. Some emphasis will be given to forensic toxicology and the pathology of toxicity including the mutagenicity and teratogenicity of different xenobiotics.

PPT505 Drug Nutrient interaction

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **- - -**

This course focuses on the different potential aspects of biological processes where the consumption of certain food items can affect drug pharmacokinetics of pharmacodynamics. Identification of interactions at the level of drug absorption, metabolism, and/or elimination will be a priority. The effect of nutrition on the body's response to drugs; and conversely, the impact of drugs on the nutritional status will be discussed. Common herb-drug interactions will be reviewed. The students will be exposed to the different available resources for identifying common drug-nutrient and drug-herb interactions.

PPT506 Drug abuse and misuse

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT403 - PPT404**

After introducing the students to the basic concepts ad definitions, this course covers the epidemiology, etiology, and maintenance of drugmisuse. The pharmacological effects as well as the societal, economic, and public health impact of drug misuse will be discussed. The course aims at offering the student the necessary tools for the identification and assessment of drug misuse as well as those for its treatment and management.

PPT507 Drug-Drug Interactions

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT403**

This course cover the major aspects of interactions among agents used to treat common ailments. Frequent pharmacokinetic and pharmacodynamic interactions of drug classes used for gastrointestinal diseases, cardiovascular diseases, CNS disorders, infectious diseases, as well as endocrine disorders will be discussed. The students will be trained to identify the interactions and use resources available to aid and support this process in their practice.

PPT508 Pharmacogenomics

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT403**

In this course, the students will be exposed to the principles of Pharmacogenomics together with their pharmacokinetic, pharmacodynamic, and clinical implications. New insights into the incorporation of pharmacogenomics in drug development from the industry and regulatory perspectives will be highlighted. Emphasis will be placed on translating pharmacogenomic research to therapeutic potentials in cancer, cardiovascular diseases, psychiatric disorders, diabetes, and HIV.

Department of Microbiology & Immunology

PMB201 General Microbiology & Imunnology

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite -----

The course gives an overview of general microbiology, including the history of microbiology. The course also covers the study of prokaryotes, classification of bacteria, Bacterial morphology, the structure of bacterial cells, biological requirements and growth, bacterial products, bacterial physiology, continuous culture, microbial genetics and mutation through different mutagenic agents. The course also covers an introduction to virology including general characteristics, viral replication, classification as well as methods of cultivation of different viruses. Moreover, the course includes a study of the morphology and characteristics of different fungi, their nature, the chemical composition of the cell wall, fungal reproduction as well as classification of fungi. The students will also receive an introduction to immune system function and structure, innate and adaptive immunity, in addition to tissues, cells and soluble components of the immune system. The students will also gain knowledge of the complement system, antibodies, antigens, MHC, immune reactions against grafts, cancer immunotherapy and immune system aberrations (hypersensitivity, autoimmune diseases, immune deficiencies). Serological reactions and their applications (precipitation, agglutination, complement fixation, ELISA, immunofluorescence, and radioimmunoassay) will also be covered in the course.

PMB202 Pharmaceutical Microbiology

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PMB201

The course covers classes of chemotherapeutic agents and antibiotics, the advantages and disadvantages of each class and the basis of selection of the most appropriate chemotherapeutic agent for treatment of different diseases. The course also includes sterilization methods & their validation, non-antibiotic antimicrobial agents: antiseptics, disinfectants and preservatives. The students will also be exposed to the evaluation of different antimicrobial agents: antibiotics & non-antibiotics, together with microbiological quality control of pharmaceutical products.

PMB303 Medical Microbiology

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite PMB202

The course gives the students an overview of the taxonomy of microorganisms. The students will learn the different Gram-positive and Gram-negative pathogens, their pathogenesis, symptoms, laboratory diagnosis, prevention and treatment. The students will also be exposed

to chlamydia, rickettsiae, spirochetes, mycoplasma and other miscellaneous pathogens, their pathogenesis, symptoms, laboratory diagnosis, prevention and treatment. The course will also cover viral diseases and fungal diseases on terms of their mode of transmission, pathogenesis, symptoms, laboratory diagnosis, prevention and treatment.

PMB404 Biotechnology

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMB202**

The course includes a general introduction to biotechnology and fermentation. In addition, the students will be introduced to microbial growth processes, including the mode of fermentation processes; design of a fermentor; achievement and maintenance of aseptic conditions in the fermentor. The course also covers major biotechnological products and bioconversion processes, biodegradation, bioremediation biotransformation, biopolymers, bioinsecticides, bioleaching, biosensor and biosurfactants. The students will also be introduced to genetic engineering applications, recombinant DNA, cloning, hybridizations and sequencing.

PMB505 Public Health

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMB303**

This course provides a pharmacy-focused and equity-driven approach to the fundamentals of public health with specific emphasis to pharmacy students. It is organized into two sections: Public Health Fundamentals and Public Health in Pharmacy Practice. The first section covers key concepts of public health and epidemiology. Communicable diseases: causes & control as well as non-communicable diseases (e.g. heart, cancer, cerebrovascular, liver, diabetes, renal diseases, peptic ulcer, homicide, anemia) risk, prevention, and control will be discussed. Aspects such as social, mental, environmental, and occupational health will be explained. The students will gain an understanding of food, water, and milk microbiology, including transmitted diseases; risk, prevention and control and malnutrition. Other aspects of the course also include nosocomial infection, family health, bioterrorism and genetic pollution. Topics such as waste disposal (sewage treatment; disposal of wastewater, dry refuse and radioactive materials) will be discussed. The course will also cover disaster and public health, including types of disasters, impact on public health, causes, characteristics, prevention and control. The course will also address determinants of health, pharmacy within public health, public involvement and behavioral theories. The second section of the course, Public Health in Practice focuses on several areas of current public health practice. Students will appreciate how pharmacists and pharmacies are key contributors to putting public health in action; Examples of pharmacy-related public health programs with a scientific theoretical foundation will be discussed in light of national and international needs, strategies and the legal basis for pharmacy and public health.

PMB506 Antibiotic stewardship

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMB202**

The course introduces different guidelines for stewardship programs including CDC and WHO guidelines. The principles of antimicrobial prescribing, antimicrobial resistance are also detailed in addition to responses to adverse and allergic reactions to antibiotic therapy. Rational use of antibiotics in urinary tract infections, community-acquired respiratory tract infections, skin and soft tissue infections,

bloodstream infections, antimicrobial surgical prophylaxis, acute pharyngitis in adolescents and adults, acute infectious diarrhea, ventilator-associated pneumonia and acute otitis media will also be discussed.

PMB509 Infection control

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PMB303**

The course will recap basics of microbiology and immunology, sterilization and disinfection and give and overview of the principles of epidemiology. The course will introduce the students to evidence-based infection control principles and practices as well as emerging and re-emerging infections. The course will also focus on Multidrug Resistant Organism (MDRO) as well as the prevention and control of common healthcare associated infections. The components of an effective infection control program, role of Infection Control Committee, IC Professionals and IC Link Officers will also be discussed.

Department of Biochemistry

PBC201 Biochemistry I

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PMC103**

The course provides an overview of the chemistry and characteristics of different biomolecules and their correlation to the different functional aspects of various cellular structures and processes. The chemistry of carbohydrates, lipids, amino acids, proteins, and enzymes, is covered with relevance to cell structure, organelles, and biological membranes.

PBC202 Biochemistry II

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PBC201**

This course focuses the detailed study of different metabolic reactions in the human body covering biological oxidation, carbohydrate metabolism, proteins and amino acids metabolism, as well as lipid metabolism. Special attention is given to metabolic pathways implicated in disease conditions and drug action. The course attempts to leverage team-based learning and peer learning through structured tutorial activities to enhance the students' knowledge and skills in this field.

PBC403 Clinical Biochemistry

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PBC202**

In this course the pathological implications of biomolecule metabolic defects are discussed. As well, in-born errors in metabolism will be described together with metabolic disorders of calcium and phosphate in addition to endocrine abnormalities. Students will be trained on identifying the necessary investigative tests to characterize the metabolic errors as well as common metabolic abnormalities associated with hepatic, renal and myocardial dysfunction.

PBC504 Clinical Nutrition

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PBC202**

In this course the students will be provided with the necessary knowledge and skills to manage patient nutrition for therapeutic purposes. The necessary background of basal metabolic rate, nutritional requirements for pediatrics and geriatrics, vitamins and minerals, and enteral and parenteral nutrition will be discussed. Specific clinical situations such as nutritional care for obesity, diabetes mellitus, cardiovascular, renal and hepatic disorders will be highlighted in addition to dietary care for cancer patients, pregnant and lactating women.

Department of Pharmacy Practice & Clinical Pharmacy

PPP201 Principles of Drug Information

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite ----

This course teaches students how to effectively and efficiently locate up-to-date drug information and literature. The course succinctly examines key drug information principles - the proper approach for answering drug/health information questions. The course covers activities related to tertiary, secondary and primary drug information sources along with their applications to address various pharmacotherapeutic issues.

PPP202 Pharmacy Administration

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite -----

This course covers the managerial aspects in pharmacy practice with an emphasis on financial, operational, and human resource management, to provide the knowledge and skills necessary for initiating and maintaining a successful pharmacy practice. It provides an overview of the daily operational, financial, marketing, and human resource management tasks that every pharmacy manager should know. Further, it provides students with a working knowledge of fundamental aspects of pharmacy practice leadership including, but not limited to: strategic planning, and decision-making issues. The course provides an overview of the key steps in writing a business plan, with an emphasis on planning for pharmacy-based services.

PPP303 Pharmacy Skills and Patient Counseling

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite PPH101

This course helps pharmacy students learn the principles, skills, and practices that are the foundation for clear communication and the essential development of shared decision making and trust between them and their future patients. The course content guides students from theory and basic principles to practical skills development to the application of those skills in everyday encounters. Students learn the process of communication including the types of messages (verbal or nonverbal), barriers, and the significance of participants' backgrounds as well as demonstrating appropriate listening behaviors and responses. Students are provided with opportunities to conduct an efficient, effective patient interview and patient education session while using assertiveness to deal with difficult situations. This will be emphasized while addressing written, verbal, and nonverbal communication.

PPP304 Pharmacotherapy I

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT301 – PPT302 (co-requisite)**

The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and latest evidence-based management guidelines for the most common **cardiovascular and pulmonary disorders**, including hypertension, dyslipedemia, coronary artery syndromes, thromboembolic disorders, heart failure, stroke, arrhythmia, asthma, chronic obstructive pulmonary disorders and others. The course also gives on overview on the management of these disorders in special populations.

PPP305 Integrated Case Based Learning I

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPT301 – PPT302 (co-requisite)**

The course will enable the students to implement clinical pharmacy tools to real case scenarios. The course will also enable students to detect drug related problems, and screen for anticipated drug interactions. The course will advance students skills in managing complicated cases of cardiovascular and pulmonary diseases & implementing evidence-based medicine using SOAP notes & appropriate clinical scores whenever required. The course will run as a capstone pharmacotherapy course integrating patient cases and drug information requested in a team-based collaboration.

PPP306 Community Pharmacy Clerkship I

0 Cr. Hrs. = (*0* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = 0

Prerequisite **After third year of the program**

The clinical clerkship rotation provides two-week experience (2 weeks x 5 days x 8 hrs./day = 80 training hours for each rotation = 2 credit hours). The students will be under the supervision of a community pharmacist who provides patient–oriented pharmaceutical services. Students will observe and participate in the day-to-day operations of a community pharmacy, including the dispensing of drug products, adjudication of pharmacy insurance claims, and patient counseling, both prescription and over-the-counter. Additional co-curricular activities include service to the public, cultural and social awareness and self-awareness.

PPP407 Pharmacotherapy II

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Co-requisite **PPT403**

The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and latest evidence-based management guidelines of the various and most common infectious diseases, including upper and lower respiratory, urinary tract, sepsis, skin & soft tissue, tuberculosis, meningitis and various other infections. The course also gives on overview on the criteria required for the appropriate selection of antimicrobial regimens based on the nature of each infection and the patient related factors. The course also addresses the antibiotic stewardship programs.

PPP408 Integrated Case Based Learning II

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPT403**

The course will enable the students to implement clinical pharmacy tools to real case scenarios. The course will also enable students to detect drug related problems, screen for anticipated drug interactions. The course will advance students skills in managing complicated cases of The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and latest evidence-based management guidelines of the various and most common infectious diseases. & implementing evidence-based medicine using SOAP notes & appropriate clinical scores whenever required. These infectious diseases include upper and lower respiratory, urinary tract, sepsis, skin & soft tissue, tuberculosis, meningitis and various other infections. The course also gives on overview on the criteria required for the appropriate selection of antimicrobial regimens based on the nature of each infection and the patient related factors. The course also addresses antibiotic stewardship programs. The course will run as a capstone pharmacotherapy course integrating patient cases and drug information requested in a team-based collaboration.

PPP409 Pharmacotherapy III

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT302**

The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and latest evidence-based management guidelines of the various and most common **neuropsychiatric disorders**. These neuropsychiatric disorders include Parkinson's, Alzheimer's, epilepsy, Multiple sclerosis, schizophrenia, depression anxiety disorders and others. The course also gives on overview on the management of these disorders in special populations.

PPP410 Integrated Case Based Learning III

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPT302**

The course will introduce the student to implementing clinical pharmacy tools to real case scenarios, detect drug related problems, screen for anticipated drug interactions. The course will advance students skills in managing complicated cases of **neuropsychiatric disorders** & implementing evidence-based medicine using SOAP notes & appropriate clinical scores whenever required. The course will run as a capstone pharmacotherapy course integrating patient cases and drug information requested in a team-based collaboration.

PPP411 Pharmaceutical Care

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPP303**

This course focuses on applications of the Pharmacists' Patient Care Process (PPCP) in working with patients through comprehensive medication management including a five-step process: collect, assess, plan, implement, and follow-up.

Students will practice role playing scenarios while working with simulated patients. They will learn to understand and obtain practical experience, to evaluate, implement, and monitor drug therapy, to optimize the delivery of pharmaceutical care, and to improve the therapeutic outcomes in patients with a variety of disease states. The course teaches students to apply and tailor a counseling framework to the needs of an individual patient and conduct motivational interviewing with patients. Further, students evaluate and use a variety of resources

to consult with patients who have limited health literacy. Successful completion of this course will give students the opportunity to develop confidence to provide effective and appropriate patient-centered pharmaceutical care in the pharmacy practice environment.

PPP412 Pharmacoepidemiology

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPP201**

This course teaches students how to effectively and efficiently analyze up-to-date drug information and literature. The course provides a balanced approach covering critical elements of clinical research, biostatistical principles, data analysis, and scientific literature evaluation techniques for evidence-based medicine pharmacy practice. The course provides an understanding of the foundational principles of study design and statistical methods. Students learn to evaluate the veracity and implications of the inherently limited primary literature findings they use as sources of drug information to make evidence-based decisions together with their patients. The course provides a special emphasis on critiquing clinical practice guidelines, systematic reviews, and meta-analyses.

PPP413 Hospital Pharmacy

3 Cr. Hrs. = (*2* LCT + *2* TUT + *0* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPH305**

The course provides an overview on institutional patient care including the organization of hospital pharmacy, the drug distribution systems, supply chain management & hospital committees. The course introduces the students to the aseptic techniques and guidelines governing preparation, formulation & storage of IV admixtures. The ambulatory care practice is also addressed. The students should practice some technical services like safe handling of cytotoxic drugs, identify renal dialysis fluids, and distinguish different types of medical gases and blood products.

PPP414 Community Pharmacy Clerkship II

0 Cr. Hrs. = (*0* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *0*

Prerequisite **PPP306 and After the fourth year of the program**

The clinical clerkship rotation provides two-week experience (2 weeks x 5 days x 8 hrs./day = 80 training hours for each rotation = 2 credit hours). The students will be under the supervision of a community pharmacist who provides patient–oriented pharmaceutical services. Students will observe and participate in collecting necessary subjective and objective information, assessing the collected information, developing an individualized patient-centered plan, implementing the plan, monitoring and evaluating the effectiveness of the plan – modifying as needed. Students will contribute to the day-to-day operations of a community pharmacy, including the dispensing of drug products, adjudication of insurance claims, and patient counseling, both prescription and over-the-counter. Additional co-curricular activities include service to the public, cultural and social awareness and self-awareness.

PPP515 Clinical Pharmacokinetics

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPH407**

The course will introduce the student to the changes in drugs absorption, distribution, metabolism and elimination with time following one-compartment IV bolus, oral absorption, IV infusion and multiple IV dosing. The lectures will provide students with principles of the linear and non-linear pharmacokinetic models and their application. The

course will address Therapeutic Drug Monitoring (TDM) principles with various drugs such as antibiotics, digoxin, immunosuppressants, methotrexate, antidepressants, theophylline, lidocaine and phenytoin & their relevant pharmacokinetics aspects & dosage adjustments in the different clinical situations.

PPP516 Community Pharmacy

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPP412**

This course is designed to meet the needs of pharmacists working with patients who present to a community pharmacy with a minor illness. It aims to provide students with comprehensive knowledge and skills to assess and manage patients who present with a minor illness or refer as appropriate. These minor ailments include respiratory system, ophthalmic & otic conditions, headaches, gastroenterology, dermatology, pediatrics & musculoskeletal disorders.

PPP517 Pharmacotherapy IV

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **PPT301**

The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and latest evidence based management guidelines of the various and **most common gastrointestinal, hepatic and renal disorders**. These disorders include **acute & chronic kidney injury, different types of viral hepatitis, hepatic encephalopathy, inflammatory bowel disorders** and various **endocrine diseases**. These disorders include pituitary, adrenal & thyroid gland disorders, diabetes mellitus and obesity. The course also gives on overview on the management of these disorders in special populations.

PPP518 Integrated Case Based Learning IV

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPT301**

The course will introduce the student to implementing clinical pharmacy tools to real case scenarios, detect drug related problems, screen for anticipated drug interactions. The course will advance students skills in managing complicated cases of gastrointestinal, hepatic & renal diseases & implementing evidence based medicine using SOAP notes & appropriate clinical scores whenever required. The course will run as a capstone pharmacotherapy course integrating patient cases and drug information requested in a team-based collaboration.

PPP519 Pharmacy Seminars I

1 Cr. Hrs. = (*0* LCT + *2* TUT + *0* LAB + *0* OTH) – SWL = *30* – ECTS = *1*

Prerequisite **PPP412**

This course uses a seminar format to provide students with the fundamentals of safe medication management regardless of pharmacy practice environment The content builds on a system perspective to address the problems of medication errors and quality in health care, problem resolution, methods/techniques of assessment, and quality management. The course also introduces the science of health informatics including modern applications and how it relates to patient safety.

PPP520 Pharmacotherpay V

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite **PPT403**

The course provides a study of the clinical presentation, diagnostic criteria, classification criteria and the latest evidence-based management guidelines of the various and most common **oncologic &**

hematologic disorders. These disorders include anemias, breast cancer, malignant lymphoma, acute leukemia, oncologic emergencies and others. The course also gives an overview on the management of these disorders in special populations.

PPP521 Integrated Case Based Learning V

2 Cr. Hrs. = (*1* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *105* – ECTS = *4*

Prerequisite **PPT403**

The course will introduce the student to implementing clinical pharmacy tools to real case scenarios, detect drug related problems, screen for anticipated drug interactions. The course will advance students skills in managing complicated cases of oncologic & hematologic diseases & implementing evidence-based medicine using SOAP notes & appropriate clinical scores whenever required. The course will run as a capstone pharmacotherapy course integrating patient cases and drug information requested in a team-based collaboration.

PPP522 Pharmaceutical Ethics and Legislation

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **- - -**

The purpose of this course is to introduce principles of law and ethics in pharmacy with a focus on those laws and ethical situations that are most encountered in a community pharmacy practice setting. The course will examine the Egyptian laws that impact the practice of pharmacy while emphasizing the legal and ethical principles applied by pharmacists in their interactions with patients and other health professionals. Students will learn the governmental framework within which pharmacy is practiced, as well as acquire an understanding of the laws, regulations, and ethical responsibilities applicable to pharmacists so that they will be able to protect the public and ensure patients' well-being in pharmacy practice and research.

PPP523 Pharmacoeconomics

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite **- - -**

This course addresses the principles of pharmacoeconomics as well as issues in applying pharmacoeconomic theory in different settings. Topics include the terminology used in pharmacoeconomics, research methods frequently used in pharmacoeconomics, and the role of pharmacoeconomics in the drug development process and health care decision making of relevance to pharmacy practice. It also discusses the theoretical and empirical aspects of key health economics issues, including the demand and supply for health and health services, health insurance, models and related topics with specific emphasis to the Egyptian healthcare system.

PPP524 Pharmacy Seminars II

1 Cr. Hrs. = (*0* LCT + *2* TUT + *0* LAB + *0* OTH) – SWL = *30* – ECTS = *1*

Prerequisite **PPP411**

This will include the presentation of various patient cases & scenarios. The designing and presenting of effective presentations are highlighted in an interprofessional format. Effective communication for patient interviewing is covered with an emphasis on collaboration with other health professionals. Students are presented with cases where the contribution of different workers in the health field is discussed.

PPP525 Patient Safety and Informatics

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite ----

This course is a comprehensive examination of the causes of and means to preventing medication errors. It helps students understand the system-based causes of medication errors, including pharmaceutical trademarks, drug packaging and labeling, and error-prone abbreviations and dose expressions, as well as the patients role in preventing medication errors. The course also examines preventing medication errors in relation to specific medications, patients, and conditions; reducing risk and creating a just culture of safety through medication error reporting systems; disclosing medication errors to patients; conducting risk analysis and treatment; and following the clinical bioethics of safe medication practices. The course also introduces and discusses pharmacy informatics as the scientific field that focuses on medication-related data and knowledge within the continuum of healthcare systems—including its acquisition, storage, analysis, use and dissemination—in the delivery of optimal medication-related patient care and health outcomes.

PPP526 Pediatric Pharmacotherapy

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite - - -

This course offers an introduction to pediatric disorders, pediatric pharmacokinetics, and neonatology. Medication safety in children will be covered together with special aspects of communication with children and their caregivers. The latest evidence-based approaches for the management of dermal, cardiovascular/pulmonary, gastrointestinal, renal/endocrine, neuropsychiatric, and infectious disorders in children will be covered. Finally, an overview of vaccination requirements will be addressed.

PPP527 Geriatric Pharmacotherapy

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite - - -

This course covers challenges in geriatric care like polypharmacy and comorbidities. It provides the student with tools for geriatric assessment and emphasizes the identification of adverse drug events and medication management in geriatric patients.

PPP528 Patient care & Biometric

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite -----

The course is designed to teach students to apply the elements of the pharmaceutical care cycle to case studies exploring the problem-solving skills needed to practice pharmacotherapy, management, informatics, and missions. Emphasis on the generation, development, use, and integration of data, information, knowledge, technology, and automation in the medication use process. Emphasis on the provision of population-based care using evidence-based principles and culturally sensitive methods that apply across local, national, and international borders. Identify drug-therapy problems; Patient needs; Literature/landmark trials; Drug and disease knowledge. Overview resources to utilize to obtain rapidly changing information.

PPP529 Management of clinical trials

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite *AFTER 3RD YEAR OF THE PROGRAM*

The course introduces the students to the drug development process and FDA regulatory process. The course also convers ICH and FDA

guidelines for good clinical practice (GCP) and regulations for clinical trials, including the application prcoess. The role of clinical investigators in clinical trials is covered starting with clinical trial protocol development and set-up, statistical design of clinical trials and data management. The roles and responsibilities of participants in clinical trials are covered with an emphasis on the Institutional Review Board. Human subject protection (HSP) and Informed Consent for clinical trials, including its key elements and how to monitor it are also discussed. Safety monitoring and adverse event management in clinical trials are addressed.

PPP531 Writing for the Health and Human Sciences

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite ------

The course focuses on the rhetorical principles and writing practices necessary for producing effective charting, reports, policies and educational materials in the context of the healthcare industry. The material presented will most benefit those pursuing a career in healthcare and human services. this course prepares the student to communicate medical knowledge through writing without being misunderstood and to think and write objectively about patients, in addition to detail-oriented record-keeping.

PPP639 Special Topics in Pharmacy

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite -----

This is a capstone course where students will be exposed to current and emerging topics in pharmacy. The topics will be revised periodically to reflect hot topics in pharmacy on a national and global scales.

PPP640 Pharmacy based rotation

0 Cr. Hrs. = (*0* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *360* – ECTS = *0*

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

During this rotation the trainee is exposed to the medication use cycle within one of the pharmacy below mentioned settings, (a-c), whether in the community pharmacy or hospital pharmacy and IV admixtures unit. The trainees can attend any of the following practice sites or a combination of two or three sites for a total period of six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours) taking into consideration that the IV admixtures should not exceed 3 weeks.

a. Community Pharmacy

This rotation provides the trainee with a variety of patient care experiences including technical and clinical services to enhance their skills to become exemplary community pharmacist.

b. Hospital Pharmacy

In this rotation, trainees are expected to apply knowledge and advanced experience in the processes and functions carried within the hospital pharmacy domain. The main aim of this rotation involves hands-on experience in various hospital departments, including inpatient care, outpatient services, supply chain unit, pharmacy administration…..etc. Trainees will learn how to collaborate with healthcare teams, conduct

medication reviews, manage drug therapy, and educate patients about their medications.

c. IV admixture unit

Trainees will be able to practice the preparation and all aspects of handling of sterile compounds, hazardous and radiopharmaceutical medications from the stage of receiving materials to final examination or disposal.

PPP641 Clinical Pharmacy in Adult general medicine

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

The purpose of this rotation is to develop the trainees' knowledge- based competencies and clinical skills required to deal in a professional way with a wide range of general medicine- related diseases comprising but not limited to endocrine, gastrointestinal and renal disorders, cardiovascular diseases and other chronic conditions. They will be trained on how to provide the required pharmaceutical care for patients. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP642 Industrial (Drug Tour)

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation aims to provide an overview on various stages of the pharmaceutical industry. Trainees will be exposed to the regulatory requirements for registration. Multiple stages of the product life -cycle will be covered according to different pillars including: overview on the registration of pharmaceutical and biological products, medical and in-vitro diagnostic medical devices; overview on bioavailability, bioequivalence and good manufacturing practice(GMP); pharmaceutical inspection tasks; quality control of pharmaceutical products; over the counter marketing of drugs; regulation of insert leaflets and promotional materials and overview on pharmacovigilance practice. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP643 Project

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

The project represents a real test for the trainee to discover his/her skills in dealing with or solving problems encountered and create novel solutions. The project will also provide the trainees with real opportunity to express their creativity. It aims to develop a comprehensive developing training opportunity for pharmacy students that enhances their clinical skills, patient interaction, and understanding of pharmaceutical care. The project will integrate theoretical knowledge with practical experiences, preparing students for their roles in various

healthcare settings. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP644 Critical Care clinical pharmacy rotation

0 Cr. Hrs. = (**0** LCT + **0** TUT + **0** LAB + **0** OTH) – SWL = **360** – ECTS = **0**

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

The purpose of this round is to develop the trainees' knowledge base competencies and clinical skills required to deal professionally with a wide range of critically ill patients and provide the required pharmaceutical care for patient in different critical care areas including medical and surgical intensive care units (ICU), coronary care unit (CCU), neuro intensive care unit (NIC)… etc. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP645 Oncology and Hematology clinical pharmacy rotation

0 Cr. Hrs. = (**0** LCT + **0** TUT + **0** LAB + **0** OTH) – SWL = **360** – ECTS = **0**

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation typically focuses on the specialized role of pharmacists in the management of cancer patients. The primary goal of this rotation is to equip pharmacy trainees with the knowledge and skills necessary to effectively manage the pharmacotherapy of oncology patients. This includes understanding cancer pathophysiology, treatments and pain management modalities, and the role of medications in cancer care. It will provide the trainee with the opportunity to accompany oncology pharmacists and healthcare teams in inpatient and outpatient settings. It will also allow the trainees to participate in conducting medication reconciliation for oncology patients, counseling patients on medication use, side effects, supportive care measures and educating patients about disease management and adherence strategies adopting evidence-based drug information. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP646 Infectious Diseases clinical pharmacy rotation

0 Cr. Hrs. = (**0** LCT + **0** TUT + **0** LAB + **0** OTH) – SWL = **360** – ECTS = **0**

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation is designed to provide the trainee with the opportunity to develop skills in the management of simple and complex infectious diseases (bacterial, viral, fungal and protozoal infections) as being an active member within the health care team, taking part in therapeutic decision making, its application and monitoring. It is expected that trainees will be exposed to a broad range of major syndromes including community and hospital- acquired infections like pneumonia, infective

endocarditis, skin and soft tissue…etc. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP647 Pediatric and Neonates' clinical pharmacy rotation

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

The purpose of this rotation is to provide the trainees with experience and competencies in the pharmaceutical care of pediatrics in general and neonates in specific. This will include building the trainee's knowledge of pediatric/ neonates' disorders, related treatments, and sources of pediatric medication information. In- addition the trainee will develop patients' problem- solving skills through a variety of patient care experiences. The trainee will be engaged with and participate in daily work rounds with the other health care team. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP648 Geriatrics clinical pharmacy rotation

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation is based on preparing a pharmacist who can describe the physiological changes that occur as a result of aging and discuss how these changes affect the pharmacokinetics of drugs in elderly patients. It aims to prepare a trainee who can describe the pathophysiology, therapeutic interventions, and control criteria for common diseases faced by the elderly including ischemic heart disease, bowl/ bladder incontinence, common anemias, congestive heart failure, dementia, depression, insomnia, diabetes and other aging related conditions. The trainee will be able to communicate with relevant information related to drug therapy to patients and health care providers efficiently. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP649 Neuropsychiatric clinical pharmacy rotation

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation provides the trainee with adequate understanding of the recognition, diagnosis and treatment of neuropsychiatric disorders and monitoring the safe and effective use of psychotropic medications. Trainees will learn concepts of pain physiology, assessment and management. The trainee will be able to communicate with relevant information related to drug therapy to patients and health care providers efficiently. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP650 Obstetrics and Gynecology clinical pharmacy rotation

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

This rotation qualifies trainees to deal with patients before and after childbirth, as the trainee will gain experience in maternal complications; preeclampsia, obstructed labor, sepsis, and post-partum hemorrhage. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

PPP651 Clinical Nutrition support

0 Cr. Hrs. = (***0*** LCT + ***0*** TUT + ***0*** LAB + ***0*** OTH) – SWL = ***360*** – ECTS = ***0***

Prerequisite ***STUDENTS MUST SUCCESSFULLY COMPLETE ALL REQUIRED DOCTOR OF PHARMACY COURSEWORK IN THE FIRST 5 PROGRAM YEARS AND HAVE A CUMULATIVE GPA EQUAL TO OR MORE THAN 2.0***

The aim of this rotation is to provide the trainee with a general understanding of issues related to specialized nutrition support and influence of disease state and pathogenesis on nutritional status of patient and nutrient requirements. This rotation will give the trainee the opportunity to develop skills in patient assessment, patient monitoring, enteral and parenteral nutrition formulation, and formula adjustment and diet fortification. The trainee should also increase their proficiency in communication techniques so as to facilitate interaction with other health care proficiency and patients. The rotation will be also related to basic topics such as fluid and electrolyte balance, interpretation of blood gas values and laboratory tests. The rotation duration is six weeks (6 x 8 hours/day x 5 days/week = 240 contact hours).

IMPORTED FROM FACULTY OF MEDICINE

BMS103 Anatomy & Histology (for Pharmacy)

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *6*

Prerequisite *- - -*

This course includes anatomy of the autonomic nervous system. central nervous system. cardiovascular system. musculoskeletal system (bones and muscles) and histology of different organs and cell.

BMS231 Physiology and Pathophysiology (1) (for Pharmacy)

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite

This course includes physiology: autonomic nervous system. central nervous system. blood. Introduction to pathophysiology foundations, common disease categories & terminology. cell injury & inflammation. vascular and hematological disorders. immune system disorders. disease of respiratory system. types and pathogenesis of neurologic diseases.

BMS232 Physiology & Pathophysiology (2) (for Pharmacy)

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Prerequisite BMS231

This course includes physiology and pathophysiology: cardiovascular system. urinary tract and its physiological functions. endocrine system and hormones. pathogenesis of cardiovascular and circulatory diseases. immune system disorders. cellular proliferation (neoplasia and cancer). basic endocrinology and endocrine disorders. diseases of the renal system (including fluid and electrolyte imbalance. diseases of the digestive system & liver.

BMS351 Pathology (for Pharmacy)

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite BMS232

The course will provide the pharmacy student with knowledge and skills for common diseases affecting body organs and systems. It will help the student understand the causes (etiology) of the disease, the mechanisms of its development (pathogenesis) and the associated alterations of structure (morphologic changes) and function (clinical manifestations and complications). The course will focus on cellular injury, cellular adaptations and cellular aging, immunopathology and amyloidosis, inflammation and healing, circulatory disturbances and neoplasia. The hematopoietic system, disorders of erythroid series, and disorders of platelets, together with basic transfusion medicine and disorders of leucocytes and lymphoreticular tissues will be covered.

BMS371 Parasitology (for pharmacy)

3 Cr. Hrs. = (*2* LCT + *0* TUT + *2* LAB + *0* OTH) – SWL = *150* – ECTS = *5*

Prerequisite *- - -*

The course will focus on parasitic infections of humans with knowledge concerning biological, epidemiological and ecological aspects of parasites causing diseases. Major emphasis is given to different parasitological related diseases in Egypt causing serious health problems. This course will also discuss medical helminthology, protozoology and entomology concerning their morphological features, life cycle, pathogenesis, clinical manifestations, different diagnostic techniques, the most recent lines of treatment and prevention with control strategy for each parasitic infection.

IMPORTED FROM FACULTY OF ADVANCED BASIC SCEINCES

MAT110 Mathematics for Health Sciences

2 Cr. Hrs. = (*2* LCT + *0* TUT + *0* LAB + *0* OTH) – SWL = *90* – ECTS = *4*

Basic concepts in algebra such as Sets, functions, logical concepts, matrices. Introduction to statistics and probability including data types and collecting data, correlation coefficient, linear regression, curve fitting, permutation, combination, conditional probability and its applications, random variable, probability distribution function, expected values, variances, and coefficient of variation. Some special distributions.