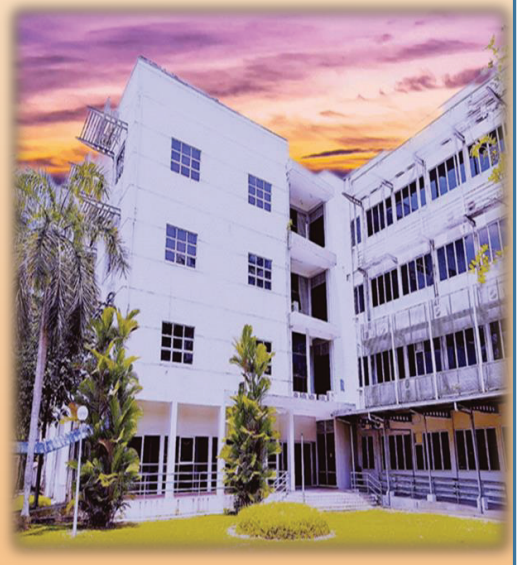
UNIVERSITI MALAYA
Faculty of Pharmacy

FACULTY OF PHARMACY



BACHELOR OF PHARMACY (HONOURS)

UNDERGRADUATE HANDBOOK SESSION 2021/2022

#EPITOME OF EXCELLENCE

Faculty of Pharmacy, Universiti Malaya reserves the right to make decisions and amendments to the information contained in this Handbook as it deems.

Faculty of Pharmacy

Universiti Malaya

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UNIVERSITI MALAYA
Faculty of Pharmacy

WELCOMING MESSAGE FROM DEAN

Welcome to the Faculty of Pharmacy, University of Malaya!

Congratulations on being selected to be part of us, a top 60 University in the QS World University Ranking!

Well done for choosing the right career path, the most diverse profession in the healthcare sector! Pharmacists practice in a variety of areas including hospitals, communities, industries and regulatory. The four-year program will equip you for a professional career enabling you providing pharmaceutical care to the nation.

I hope you will be motivated throughout the four years and turn to become an inspiring world-class pharmacist with the highest integrity, interpersonal skills and leadership qualities. In this challenging era, academic distinction must be at par with extracurricular performance to be a competitive individual and the endeavours for excellence should continue at the workplace.

Lastly, the faculty is committed to the provision and delivery of the best services to you through efficient management and relentless determination in continuous quality improvement of every aspect of our venture.

Keep your flag flying high and be an asset to society.

Thank you and Welcome on Board.

ASSOC. PROF. DR. HASNIZA ZAMAN HURI
Dean
Faculty of Pharmacy

TABLE OF CONTENTS

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VISION, MISSION AND OBJECTIVES

VISION

To be a global eminent faculty in pharmacy education, research and innovation.

MISSION

To produce high-quality graduates and research towards enhancement of nation's health and well-being

OBJECTIVES

1. To nurture competitive, innovative and highly ethical graduates that effectively contribute to healthcare
2. To foster innovative and cutting-edge research to impact human health nationally and globally
3. To develop outstanding leaders in healthcare that inspire future transformation of the society

MOTTO

Epitome of Excellence

ACADEMIC CALENDER

ACADEMIC CALENDAR FOR 2021/2022 ACADEMIC SESSION
(BACHELOR DEGREE LEVEL)
(amended June 2021)

SEMESTER I				
Course Registration (Module) *(Refer Registration Schedule at https://umsitsguide.um.edu.my/)*	2 weeks	24.09.2021	-	08.10.2021
Orientation *(Week of Welcome) - WOW*	1 week	10.10.2021	-	17.10.2021
Lectures	7 weeks*	18.10.2021	-	05.12.2021
Mid-Semester I Break	1 week	06.12.2021	-	12.12.2021
Lectures	7 weeks*	13.12.2021	-	30.01.2022
Revision Week	1 week*	31.01.2022	-	06.02.2022
Semester I Final Examination	2 weeks	07.02.2022	-	20.02.2022
Semester Break	3 weeks	21.02.2022	-	13.03.2022
	24 weeks			
SEMESTER II				
Course Registration (Module) *(Refer Registration Schedule at https://umsitsguide.um.edu.my/)*	2 weeks	18.02.2022	-	04.03.2022
Lectures	7 weeks*	14.03.2022	-	01.05.2022
Mid-Semester II Break	1 week*	02.05.2022	-	08.05.2022
Lectures	7 weeks*	09.05.2022	-	26.06.2022
Revision Week	1 week	27.06.2022	-	03.07.2022
Semester II Final Examination	2 weeks*	04.07.2022	-	17.07.2022
	20 weeks			
SEMESTER BREAK				
Break	9 weeks*	18.07.2022	-	18.09.2022
SPECIAL SEMESTER				
Course Registration (Module)	1 week	01.07.2022	-	08.07.2022
Lectures	7 weeks*	18.07.2022	-	04.09.2022
Special Semester Final Examination	1 week	05.09.2022	-	11.09.2022
Break	1 week*	12.09.2022	-	18.09.2022
	10 weeks			

* The Academic Calendar has taken into account public and festive holidays

National Day (31 August 2021)
Malaysia Day (16 September 2021)
Maulidur Rasul (19 October 2021)
Deepavali (4 November 2021)
Christmas Day (25 December 2021)
New Year (1 January 2022)
Thaipusam (18 January 2022)
Federal Territory Day (1 February 2022)
Chinese New Year (1 & 2 February 2022)
Nuzul Al-Quran (19 April 2022)
Labour Day (1 May 2022)
Eidul Fitri (2 & 3 May 2022)
Wesak Day (15 May 2022)
His Majesty's King's Birthday (6 June 2022)
Eidul Adha (9 July 2022)
Awal Muharam (30 July 2022)
National Day (31 August 2022)

Programme Title, Philosophy, Principles and PEO, PLO

PROGRAMME TITLE

Title of the conferred degree: Bachelor of Pharmacy (Hons)

PROGRAMME PHILOSOPHY

The Bachelor of Pharmacy (Hons) degree programme that is offered by the University of Malaya holds true to the following philosophy, which is in line with the nation's requirements:

- *The programme offers a broad-based curriculum and training with opportunities for specialisation. The programme supports evidence-based practices and consists of dynamic characteristics with room for future advancement.*

PROGRAMME PRINCIPLES

In line with the programme philosophy, the programme offered is based on the following principles:

- The basic training given is broad-based and encompasses all aspects of the pharmacy practice, from pharmaceutical sciences to its application in the field of clinical pharmacy.
- The programme utilises interactive teaching methods and incorporates evidence-based practices in an effort to promote critical thinking and analysis in all the taught disciplines.
- The education provided is dynamic and farsighted to equip the graduates to face current and future challenges.
- Emphasis is given on basic communication and thinking skills as well as the benefits of modern communication technology.

- ❖ The training encompasses the importance of patient/customer-oriented therapy as well as uses a multi-disciplinary approach to deliver effective and efficient healthcare services.

PROGRAMME EDUCATIONAL OUTCOMES (PEO)

1. To produce competent pharmacists capable of delivering quality pharmaceutical care that promotes positive health outcomes while functioning actively as professional healthcare team.
2. To be intellectually motivated to embrace lifelong learning.
3. To inculcate a spirit of respect for diversity and social citizenship

PROGRAMME LEARNING OUTCOMES (PLO)

PLO1 - Describe advanced and comprehensive theoretical and technical knowledge in all areas of pharmacy.

PLO2 - Apply cognitive skills to critically solve pharmaceutical care issues and optimize health outcome.

PLO3 - Master pharmaceutical practices including dispensing and formulating, manufacturing, and evaluating medicines to meet current and future needs.

PLO4 - Able to communicate and cooperate effectively as a team member of healthcare professionals.

PLO5 - Utilise digital information management and numerical skills to foster professional development

PLO6 - Demonstrate strong leadership, work autonomously and responsibly within a broad organization

PLO7 - Practice lifelong learning to foster personal development, possess management and entrepreneurship skills in the various areas of pharmacy profession.

PLO8 - Act professionally with integrity in accordance with existing laws and the Code of Ethics for Pharmacists.

ACADEMIC PROGRAMME

PROGRAMME STRUCTURE

Category	Courses Code	Course Name	CREDITS
UNIVERSITY COURSES	GIG 1012	Philosophy and Current Issue	2
	GIG1013	Appreciation of Ethics and Civilisation	2
	GIG 1003	Basic Entrepreneurship Enculturation	2
	GLT XXXX	English for Communication Programme	4
	GKX XXXX	Co-Curriculum Course	4
		Total	**14**
Core Courses	Programme Core Courses		112
Elective Courses	Programme Elective Courses		8
	Student Holistic Empowerment (SHE)		6
		Grand Total	**140**

COURSE STRUCTURE

Year 1 (2021/2022)

Semester I

Category	Course Code	Course Name	Credits
University Courses	GIG1012	Philosophy and Current Issue /	2
	GLT1017	Basic Malay Language**	2
	GIG1013	Appreciation of Ethics and Civilizations	2
Core Courses	OIA1004	Anatomy and Physiology	3
	OIA1010	Microbiology and Basic Immunology	3
	OIA1011	Basic Pharmaceutical Chemistry	2
	OIA1012	Pharmaceutical Organic Chemistry	2
	OIA1013	Principles of Drug Actions	3
	OIA1014	Introduction to Pharmacotherapy	2
University Elective Courses (SHE)			-
Programme Elective Courses			-
		Total Credit Hours	19

**Only for International students

Semester II

Category	Course Code	Course Name	Credits
University Courses	GIG1003	Basic Entrepreneurship Enculturation	2
	GLTXXXX	English for Communication Programme	2
Core Courses	OIA1003	Biochemistry	3
	OIA1008	Physical Pharmacy	3
	OIA1015	Pharmacotherapy for Bacterial Infections	2
	OIA2004	Pharmacotherapy for Respiratory and Gastrointestinal Disorders	3
	OIA2007	Pharmacognosy	2
University Elective Courses (SHE)			2
Programme Elective Courses			-
		Total credit hours	19

YEAR 1 TOTAL CREDIT HOURS: 38

Year 2 (2022/2023)

Semester I

Category	Course Code	Course Name	Credits
University Courses	GLTxxxx	English for Communication Programme	2
Core Courses	OIA2002	Pharmaceutical Analysis	3
	OIA2003	Pharmaceutical Dosage Form Design for Liquids anod Semisolids	2
	OIA2012	Medicinal Chemistry	3
	OIA2013	Pharmacotherapy for Immune Disorders	2
	OIA2014	Pharmacotherapy for Fungal and Viral Infections	2
University Elective Courses (SHE)			2
Programme Elective Courses	OIAxxxx		2
		Total Credit Hours	18

Semester II

Category	Course Code	Course Name	Credits
University Courses	GKXxxxx	Co-curriculum Course	2
Core Courses	OIA2006	Chromatography, Electrochemistry and Radiochemistry	2
	OIA2008	Sterile Pharmaceutical Dosage Form Design	2
	OIA2011	Pharmacotherapy for Cardiovascular Disorders	3
	OIA2015	Pharmacotherapy for Psychiatric and Neurological Disorders	3
	OIA3001	Solid Pharmaceutical Dosage Form Design	3
	OIA3022	Clinical Toxicology	2
University Elective Courses (SHE)			2
Programme Elective Courses			-
		Total Credit Hours	19

YEAR 2 TOTAL CREDIT HOURS: **37**

Year 3 (2023/2024)

Semester I

Category	Course Code	Course Name	Credits
University Courses	GKXxxxx	Co-curriculum Course	2
Core Courses	OIA3005	Pharmacotherapy for Endocrine Disorders	3
	OIA3015	Ethics and Legislation in Pharmacy	2
	OIA3023	Extemporaneous Preparations	3
	OIA3024	Pharmacoepidemiology and Evidence-Based Pharmacotherapy	2
	OIA3025	Pharmaceutical Biotechnology and Personalised Medicine	2
	OIA3026	Pharmacotherapy for Cancer, Pain and Renal Disorders	3
University Elective Courses (SHE)			-
Programme Elective Courses			-
		Total Credit Hours:	17

Semester II

Category	Course Code	Course Name	Credits
University Courses	-	-	-
Core Courses	OIA3027	Drug Discovery and Development	3
	OIA3028	Community Pharmacy Practice	3
	OIA3029	Hospital Pharmacy Practice	3
	OIA3030	Principles and Applications of Pharmacokinetics	3
	OIA3031	Pharmacotherapy for Specific Population	2
	OIA3032	Research Project I	2
University Elective Courses (SHE)			-
Programme Elective Courses			-
		Total Credit Hours:	16

YEAR 3 TOTAL CREDIT HOURS: 33

Year 4 (2024/2025)

Semester I

Category	Course Code	Course Name	Credits
University Courses			-
Core Courses	OIA3010	Advanced Pharmaceutical Dosage Form Design	3
	OIA4002	Pharmacoeconomics	2
	OIA4011	Management Skills for Pharmacists	3
	OIA4012	Clinical Clerkship I	3
	OIA4013	Research Project II	6
University Elective Courses (SHE)			-
Programme Elective Courses			-
		Total Credit Hours:	17

Semester II

Category	Course Code	Course Name	Credits
University Courses			-
Core Courses	OIA4014	Industrial Pharmacy and Regulatory Control	6
	OIA4015	Clinical Clerkship II	3
University Elective Courses (SHE)			-
Programme Elective Courses	OIAxxxx		6
		Total Credit Hours	15

YEAR 4 TOTAL CREDIT HOURS: 32

Programme Elective Courses

Course Code	Course Name	Credits
OIA3034	Emerging Topics in Pharmacy	3
OIA3033	Cosmetic Products	3
OIA1019	Pharmaceutical Microbiology	3
OIA1018	Traditional and Complementary Medicine	3
OIA1017	Nutrition and Health Supplement	3
OIA1016	Pharmacoinformatics	3

ENGLISH COMMUNICATION PROGRAMME

ENGLISH COMMUNICATION PROGRAMME (UNIVERSTIY COURSE) (KURSUS BAHASA INGGERIS KOMUNIKASI- KURSUS UNIVERSITI) FACULTY OF LANGUAGES AND LINGUISTICS LIST OF COURSES TO BE COMPLETED BY ALL STUDENTS			
PATH 1	**PATH 2**	**PATH 3**	**PATH 4**
• MUET BAND 2 • **IELTS Band 4.0** • **TOEFL Paper – Based Test (437 – 473)** • **TOEFL Computer – Based Test (123 – 150)** • **TOEFL Internet – Based Test (41 – 52)** • **PTE (Academic) – (10 – 28)**	• MUET BAND 3 • **IELTS Band 4.5 – 5.0** • **TOEFL Paper – Based Test (477 – 510)** • **TOEFL Computer – Based Test (153 – 180)** • **TOEFL Internet – Based Test (53 – 64)** • **PTE (Academic) – (29 - 41)**	• MUET BAND 4 • **IELTS Band 5.5 – 6.0** • **TOEFL Paper – Based Test (513 – 547)** • **TOEFL Computer – Based Test (183 – 210)** • **TOEFL Internet – Based Test (65-78)** • **PTE (Academic) – (42 – 57)** • **FCE (B & C)** • **GCE A Level (English) (Minimum C)** • **IGCSE/GCSE (English) (A, B & C)**	• MUET BAND 5 & BAND 6 • **IELTS Band 6.5 – 9.0** • **TOEFL Paper – Based Test (550 – 677)** • **TOEFL Computer – Based Test (213 – 300)** • **TOEFL Internet – Based Test (79 – 120)** • **PTE (Academic) (58 – 90)** • **FCE (A)** • **GCE A Level (English) (B & A)**
STUDENTS NEED TO COMPLETE 2 COURSES (2 COURSES X 2 CREDITS EACH) FROM THIS PATH	STUDENTS NEED TO COMPLETE 2 COURSES (2 COURSES X 2 CREDITS EACH) FROM THIS PATH	STUDENTS NEED TO COMPLETE 2 COURSES (2 COURSES X 2 CREDITS EACH) FROM THIS PATH	STUDENTS NEED TO COMPLETE 2 COURSES (2 COURSES X 2 CREDITS EACH) FROM THIS PATH
COMPULSORY • GLT1018 – Proficiency in English I	**COMPULSORY** • GLT1021 – Proficiency in English II	**COMPULSORY** • GLT1024 – Proficiency in English III	• GLT1027– Advanced Oral Communication* • GLT1028 – Advanced Business Writing* *(Students can only register for one course per semester)
** **CHOOSE ONE** : • GLT1019 – Let's Speak • GLT1020 – Fundamental Writing	** **CHOOSE ONE** : • GLT1022 – Speak Up • GLT1023 – Effective Workplace Writing	** **CHOOSE ONE** : • GLT1025 – Effective Oral Communication • GLT1026 – Writing at the Workplace	

LIST OF REFERENCE :

1. **MUET** - MALAYSIAN UNIVERSITY ENGLISH TEST
2. **IELTS** - INTERNATIONAL ENGLISH LANGUAGE TESTING SYSTEM
3. **TOEFL** - TEST OF ENGLISH AS A FOREIGN LANGUAGE
4. **PTE (ACADEMIC)** - PEARSON TEST OF ACADEMIS ENGLISH
5. **FCE** - CAMBRIDGE ASSESSMENT ENGLISH: FRIST
6. **GCE (A LEVEL)** - GENERAL CERTIFICATE OF EDUCATION (A LEVEL) UNIVERSITY OF CAMBRIDGE
7. **IGCSE/GCSE** - GENERAL CERTIFICATE OF SECONDARY EDUCATION (O LEVEL), UNIVERSITY OF CAMBRIDGE

COURSE SUMMARY

OIA1004 ANATOMY AND PHYSIOLOGY (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Describe the overall organization, function and anatomy of the human body (cells, tissues, and organs).
2) Identify anatomical structures of the human body
3) Illustrate the importance of each of the following systems: endocrine, cardiovascular, lymphatic, digestive, urinary, reproductive, nervous, and respiratory systems
4) Relate the fundamentals of homeostasis and its importance in regulating normal human physiology.

Course Synopsis

This course aims to equip students with various concepts of anatomy and physiology that will enable them to discuss the interrelationship between structure and function of the human body and its regulation.

Reference Texts

1) Tortora, G. J., & Bryan H. D. (2009). Principles of Human Anatomy and Physiology (12th ed.). John Wiley & Sons, Inc.
2) Sukkar, M.Y., El-Munshid, H.A., & Ardawi, M.S.M. (2000). Concise Human Physiology (2nd ed.). Blackwell Science.
3) Guyton. A.C., & Hall, J.E. (2011). Textbook of Medical Physiology (12th ed.). W.B. Saunders Co., USA.
4) Pocock, G., Richards, C.D., & Richards, D.A. (2013). Human Physiology. Oxford.
5) Barret, K.E., Barman, S.M., Boitano, S., & Brooks, H. (2012). Review of Medical Physiology (24th ed.). McGraw Hill.
6) Mohd Noor, N. (2014). Ilustrated Human Physiology. Pearson.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1010 MICROBIOLOGY AND BASIC IMMUNOLOGY (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Identify the classification of bacteria and the basis of antibacterial resistance
2) Explain the basic of microbiology and parasitology, including their structures, classification, and reproduction
3) Determine the pathogenesis of microbial and parasitological infections
4) Apply the basic concepts of immunology
5) Illustrate the pathophysiology of hypersensitivity reactions and various autoimmune disorders

Course Synopsis

This course provides the knowledge on the various aspects of microbiology and parasitology including common infectious agents in Malaysia (bacteria, fungi, virus, and parasites). Concepts of classifications, diagnosis, brief life cycle, biochemical analysis will be covered. It is an opportunity to learn about aseptic, isolation and identification techniques of micro-organisms and factors that affect its development. Students will also be introduced to the basic concepts of immunology, such as inflammation, antigen and immunogenicity, cold-chain reactions, immunization, hypersensitivity, vaccination, and some common autoimmune disorders.

Reference Texts

1) Hugo, W.B., & Russell, A.D. (2011). Pharmaceutical Microbiology (8th ed.). Blackwell Science.
2) Harvey, R.A. (2007). Microbiology. Lippincott Williams and Wilkins.
3) Kayser, F. H., Bienz, K.A., Eckert, J., & Zinkernagel, R.M. (2011). Medical Microbiology. Georg ThiemeVerlag.
4) Stratton, C.W. (2011). Clinical Microbiology: Quality in Laboratory Diagnosis. Demos Medical Publishing.
5) Matthews, B.E. (2007). Introduction to Parasitology (98th ed.). Cambridge University Press.
6) Bogitsh, B.J. (2012). Human Parasitology (4th ed.). Academic Press Inc.
7) Heelan, J.S., & Ingersoll, F.W. (2001). Essentials of Human Parasitology (2nd ed.). Delmar Publications.
8) John, D.T., & Petri, W.A. (2006). Markell and Voge's Medical Parasitology (9th ed.). W.B. Saunders Co.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1011 BASIC PHARMACEUTICAL CHEMISTRY (2 CREDITS)

Learning Outcomes

At the end of this course, students are able to:

1) describe the states of matter.
2) explain the principles associated with gases, liquids, solids, and solutions.
3) apply the concept of thermodynamics and kinetics in pharmacy.

Course Synopsis

This is an introductory module to physical principles that are applied in pharmaceutical sciences. This module emphasises on the importance of physical and chemical properties related to drugs and their dosage forms.

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2001). Pharmaceutics: The Science of Dosage Form Design (2nd ed.). Churchill Livingstone, UK.
2) Chang, R. (2005). Chemistry (8th ed.). McGraw Hill, New York.
3) Florence, A.T., & Attwood, D. (2006). Physicochemical Principles of Pharmacy (4th ed.). Pharmaceutical Press, UK.
4) Martin, A.N., Sinko, P.J., & Singh Yashveer (2011). Martin's physical pharmacy and pharmaceutical sciences: Physical Chemical and Biopharmaceutical Principles in The Pharmaceutical Sciences (6th ed.) Lippincott Williams and Wilkins, USA.
5) Beckett, A.H., & Stenlake, J.B. (2001). Practical Pharmaceutical Chemistry, Vol. 1 & 2 (4th ed.). Bloomsbury Academic, UK.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1012 PHARMACEUTICAL ORGANIC CHEMISTRY (2 CREDITS)

Learning Outcomes

At the end of this course, students are able to:

1) state the functional groups, organic reactions, names, and structures of organic compounds.
2) explain how organic structures and bonds influence physical and chemical properties of a compound.
3) identify chemical substances in drugs and pharmaceutical usage.

Course Synopsis

The module describes a general view on the organic chemistry aspects to determine drug characters, which are important in pharmaceutical analyses and drug actions.

Reference Texts

1) McMurry, J. (2012). Organic Chemistry (8th ed.). Thomson-Brooks/Cole, USA.
2) Lemke, T.L., Roche, V.F., & Zito, S.W. (2011). Review of Organic Functional Groups. Introduction to Medicinal Organic Chemistry (5th ed.). Lippincott Williams & Wilkins, USA.
3) Barber, J., & Rostron, C. (2013). Pharmaceutical Chemistry. Oxford University Press, UK.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1013 PRINCIPLES OF DRUG ACTIONS (3 CREDITS)

Learning Outcomes

At the end of this course, students are able to:

1) Apply the principles of drug action based on pharmacodynamic and pharmacokinetic concepts.
2) Illustrate the role of agonists and antagonists of the autonomic and somatic nervous systems.
3) Demonstrate the concept of drug action and the autonomic and somatic nervous systems

Course Synopsis

Students will be introduced to the principles of drug action and the basis for the clinical evaluation of new drugs. This module also includes the transmission of autonomic and somatic nerves.

Reference Texts

1) Katzung B.G. (Ed). (2017). Basic and clinical pharmacology (14th ed.). Appleton & Lange
2) Harvey, series editors (Ed.).(2018). Lippincott's Illustrated Reviews : Pharmacology (7th edition).
3) Goodman & Gilman's. (2018). The Pharmacological Basis of Therapeutics (13th ed.). McGraw-Hill.
4) Rang, H.P., and Dale, M.M.(2015). Pharmacology (8th ed.). Churchill Livingstone.
5) Grahame-Smith, D.G & Aronson, J.K. (2001). Oxford Textbook of Clinical Pharmacology and Drug Therapy (3rd edition). Oxford University Press.
6) Lawrence, D.R., Bennet, P.N. & Brown, M.J. (1997). Clinical Pharmacology. (8th edition). Churchill Livingstone.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1014 INTRODUCTION TO PHARMACOTHERAPY (2 CREDITS)

Learning Outcomes
At the end of the course students are able to:

1) Explain the role of pharmacists in the healthcare system.
2) Describe the pathophysiology and management of fever and haematologic disorders.
1) Explain the mechanism of actions, pharmacokinetic properties, adverse effects and drug-drug interactions used in the management of fever and haematologic disorders.
4) Interpret laboratory test results using the principles of patient management.
5) Solve pharmaceutical care issues regarding haematologic disorders and fever.

Course Synopsis
This module introduces the basic principles of pharmacotherapy, pharmaceutical care, posology and the role of pharmacists in the context of Malaysia healthcare system. In this module, pharmacology of drugs used for the management of fever and hematologic disorders will be discussed. Pathophysiology of fever and hematologic disorders will also be emphasized.

Reference Texts
1) British National Formulary (BNF), British Medical Association, latest edition.
2) Lund, W. (1994). The Pharmaceutical Codex: Principles and Practice of Pharmaceutics (12th ed.). Pharmaceutical Press, London.
3) Martindale, W. The Extra Pharmacopoeia (Latest edition). Pharmaceutical Press, London.
4) Pharmacy Legislation of Malaysia, Malaysian Pharmaceutical Society.
5) Collett, D.M., & Aulton, M.E. (1990). Pharmaceutical Practice. Churchill Livingstone.

Course Assessment
Course will be assessed by Continuous Assessment 100%.

OIA1003 BIOCHEMISTRY (3 CREDITS)

Learning Outcomes

At the end of the course the students are able to:

2) Describe the chemical classification and metabolism carbohydrates, lipids and proteins.
3) Explain the basic concept of cellular bioenergetics and biochemistry of Enzymes, vitamins and nucleic acids.
3) Relate the various metabolic pathways in human.
4) Relate the biochemical basis of disease and drugs.

Course Synopsis

This module provides the knowledge on the basic biochemical systems in the human body.

Reference Texts

1) Harvey, R., & Ferrier, D. (2011). Lippincott's Illustrated Reviews. Biochemistry (5th ed.). Lippincott Williams & Wilkins, USA.
2) Berg, J.M., Tymoczko, J.L., & Stryer, L. (2007). Biochemistry (6th ed.). W.H. Freeman and Company.
3) Devlin, T. (2002). Textbook of Biochemistry with Clinical Correlations (5th ed.).
4) Champe, P.C., & Harvey, R.A. (2008). Lippincott's Illustrated Reviews: Biochemistry (4th ed.) Lippincott Williams & Wilkins, USA.
5) Lehninger, A.L., Nelson, D.L., & Cox, M.M. (2003). Principles of Biochemistry (2nd ed.). Worth Publishers, New York.
6) Montgomery, R., Conway, T.W. & Spector, A.A. (2006). Biochemistry: A Case–oriented Approach (10th ed.) Mosby.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1008 PHYSICAL PHARMACY (3 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) describe the concept of dispersed systems, surface phenomena, dissolution, rheology and factors influencing stability of dispersed systems
2) explain mechanism of action of surface active agents, rheological properties of pharmaceutical materials, the applications of the dispersed systems, surface phenomena, dissolution testing and rheology in the formulation of pharmaceutical dosage forms.
3) show stability of dispersed systems, critical micelle concentration, dissolution rate of a drug, viscosity of pharmaceutical materials.

Course Synopsis

The module introduces the basic principles of physical pharmacy required in the pharmaceutical formulations. The physicochemical properties of pharmaceutical materials together with the methods to determine their properties are also included. Students will perform laboratory works that are related to the topics given in the lectures, namely disperse systems, surface properties, and micromeritics and rheology.

Reference Texts

1) Attwod, D., & Florence, A.T. (2008). Physical Pharmacy. Pharmaceutical Press, London.
2) Aulton, M.E (2001). Pharmaceutic: The Science of Dosage Form Design (2nd ed.). Churchill Livingston, Edinburg.
3) Martin, A.N., Sinko, P.J., & Singh, Y. (2011). Physical Pharmacy and Pharmaceutical Sciences: Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences (6th ed.) Lippincott Williams & Wilkins, USA.
4) Gerbino, P.P. (2006). Remington: The Science and Practice of Pharmacy (21st ed.). Lippincot Williams & Wilkins, USA.
5) Roop, K.H., Vyas, S.P., Farhan, J.H., & Gaurav, K.J. (2013). Lachman/Liebeman: The Theory and Practice of Industrial pharmacy (4th ed.). CBS Publishers & Distributers, India.
6) British Pharmacopeia Commision. British Pharmacopeia 2014. General Medical Council (Great Britain), Great Britain: Medicines Commision.
7) The United States of Pharmacopeial Convention (2003). The United States of Pharmacopeia 27/The National Formulary 22: USP 27/ NF 22. Port City Press, Baltimore.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA1015 PHARMACOTHERAPY FOR BACTERIAL INFECTIONS (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) discuss the pathophysiology and management of bacterial infections of various organ systems, such as cardiovascular, respiratory, urogenital, skin and central nervous system.
2) explain the mechanism of actions, pharmacokinetic properties, adverse effects and drug interactions of drugs used in the management of infectious diseases caused by bacteria.
3) interpret laboratory test results with the principles of patient management.
4) solve pharmaceutical care issues regarding bacterial infections.

Course Synopsis

This module is one of the module series that integrates the pharmacology discipline with clinical pharmacy. In this module, pharmacology of antimicrobial and the clinical management of infectious diseases caused by bacteria will be discussed. Students will also be introduced to the concept of management of infectious diseases of various organ system, such as skin, respiratory, cardiovascular and central nervous system

Reference Texts

1) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2004 PHARMACOTHERAPY FOR RESPIRATORY AND GASTROINTESTINAL DISORDERS (3 CREDITS)

Learning Outcomes

1) At the end of the course, students will be able to:
2) illustrate the concepts of formulation and the industrial manufacturing process of liquid and semisolid dosage forms as well as their quality control evaluations.
3) formulate liquid and semisolid dosage forms in laboratory scale
4) execute physical quality control evaluations for liquid and semisolid dosage forms

Course Synopsis

The module introduces to the students the overall concept on liquid and semisolid dosage forms. Students will be introduced to equipment used in manufacturing for liquid and semisolid dosage forms. Students will prepare liquid and semi-solid dosage forms in laboratory scale together with the evaluation for physical qualities.

Reference Texts

1) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
2) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
3) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
4) Katzung, B.G. (2014). Basic and clinical pharmacology (13th ed.). Appleton & Lange.
5) Rang, H.P., & Dale, M.M. (2015). Pharmacology (8th ed.). Churchill Livingstone.
6) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
7) British National Formulary (2016 or later edition).
8) Drug Information Handbook (2016 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2007 PHARMACOGNOSY (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) discuss the factors influencing medicinal plant and its cultivation, harvest, storage and deterioration.
2) recognise the phytochemicals and related metabolic pathway with suitable examples.
3) illustrate the methods of herbal drug evaluation and standardization.
4) demonstrate the methods of herbal drug evaluation and standardization.

Course Synopsis

This course provides the overview of potential natural sources of drugs and development of natural drugs in the form acceptable to allopathic system of medicine especially from plants. The relationship between the biogenetic pathways and pharmaceutically important secondary metabolites is explained. The course also emphasizes on the concepts and techniques in standardization of plant drugs, and aspects on quality control are introduced. The effect of period of collection, method of storage and processing on the quality of plant drugs will also be explained.

Reference Texts

1) Evans, W.C. (2009). Trease and Evans Pharmacognosy (16th ed.). Elsevier.
2) Heinrich, M., Barnes, J., Gibbons, S., & Williamson, E.M. (2004). Fundamentals of Pharmacognosy and Phytotherapy (1st ed.). Elsevier.
3) Wallis,T.E. (2005). Text Book of Pharmacognosy (5th ed.). Pitman Publishers, London, UK.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2002 PHARMACEUTICAL ANALYSIS (3 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) recognise the concept of monographs and pharmacopeia standard.
2) apply the principles of key analytical methods.
3) perform major analytical methods in structural determination and quality control.

Course Synopsis

The course introduces the principles and analytical technique of practice which are used in drugs quality control and dosage form and research and development.

Reference Texts

1) Watson, D. (2012) Pharmaceutical Analysis. Churchill Livingston, UK.
2) Pavia, D.L., Lampman, G.M., Kriz, G.S. and Vyvyan, J. A. (2009) Introduction to Spectroscopy (5th ed.). Saunders College Publishing, USA.
3) Moffat, A.C. (2011). Clarke's Analysis of Drugs and Poisons (4th ed.). Pharmaceutical Press, United Kingdom.
4) Sanders, J.K.M., Constable, E.C., Hunter, B.K. and Pearce, C.M. (1995). Modern NMR Spectroscopy (2nd ed.). Oxford University Press, Oxford.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2003 PHARMACEUTICAL DOSAGE FORM DESIGN FOR LIQUIDS AND SEMI-SOLIDS (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) illustrate the concepts of formulation and the industrial manufacturing process of liquid and semisolid dosage forms as well as their quality control evaluations.
2) formulate liquid and semisolid dosage forms in laboratory scale
3) execute physical quality control evaluations for liquid and semisolid dosage forms

Course Synopsis

The module introduces to the students the overall concept on liquid and semisolid dosage forms. Students will be introduced to equipment used in manufacturing for liquid and semisolid dosage forms. Students will prepare liquid and semi-solid dosage forms in laboratory scale together with the evaluation for physical qualities.

Reference Texts

1) Attwod, D., & Florence, A.T. (2008). Physical Pharmacy. Pharmaceutical Press, London.
2) Aulton, M.E., & Taylor, K.M. (2001). Pharmaceutics: The Science of Dosage Form Design (2nd ed.). Churchill Livingstone, UK.
3) Martin, A.N., Sinko, P.J., & Singh, Y. (2011). Physical Pharmacy and Pharmaceutical Sciences: Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences (6th ed.) Lippincott Williams & Wilkins, USA.
4) Gerbino, P.P. (2006). Remington: The Science and Practice of Pharmacy (21st ed.). Lippincot Williams & Wilkins, USA.
5) Roop, K.H., Vyas, S.P., Farhan, J.H., & Gaurav, K.J. (2013). Lachman/Liebeman: The Theory and Practice of Industrial pharmacy (4th ed.). CBS Publishers & Distributers, India.
6) The British Pharmacopeia Commision. The British Pharmacopeia 2014. General Medical Councel (Great Britain), Great Britain: Medicines Commision, 2014.
7) The United States of Pharmacopeial Convention (2003). The United States of Pharmacopeia 27/The National Formulary 22: USP 27/ NF 22. Port City Press, Baltimore.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2012 MEDICINAL CHEMISTRY (3 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) explain the biological activity of the major drug classes.
2) determine the structure-activity relationships of important drugs in the major drug classes
3) build virtual 3-dimensional model for analogue of drug based on their chemical structures with potential enchanced biological activity and reduced toxicity.

Course Synopsis

This course deepens the understanding of the physicochemical concepts which underlie drug design and action.

Reference Texts

1) Patrick, G.L. (2013). An Introduction to Medicinal Chemistry (5th ed.). Oxford University Press, United Kingdom.
2) Nogrady, T., & Weaver, D.F. (2005). Medicinal Chemistry: A Molecular and Biochemical Approach (3rd ed.). Oxford University Press, USA.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2013 PHARMACOTHERAPY FOR IMMUNE DISORDERS (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) describe the pathophysiology and the management of various autoimmune disorders.
2) explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in various autoimmune disorders.
3) interpret laboratory test results with the principles of patient management.
4) solve pharmaceutical care issues for these disorders.

Course Synopsis

This module is one of a series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, pharmacology of drugs act on the immune system and clinical management of autoimmune disorders will be discussed.

Reference Texts

1) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2014 PHARMACOTHERAPY FOR FUNGAL AND VIRAL INFECTIONS (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) discuss the pathophysiology and management of infectious diseases caused by viruses and fungi
2) explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in infectious diseases caused by viruses and fungi.
3) interpret laboratory test results with the principles of patient management.
4) Solve pharmaceutical care issues involving viral and fungal infectious diseases.

Course Synopsis

This module is one of the series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, the pharmacology of antivirals and antifungals and clinical management of infectious diseases caused by viruses and fungi will be discussed.

Reference Texts

1) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
2) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
3) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
4) Katzung, B.G. (2014). Basic and clinical pharmacology (13th ed.). Appleton & Lange.
5) Rang, H.P., & Dale, M.M. (2015). Pharmacology (8th ed.). Churchill Livingstone.
6) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
7) British National Formulary (2016 or later edition).
8) Drug Information Handbook (2016 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2006 CHROMATOGRAPHY, ELECTROCHEMISTRY AND RADIOCHEMISTRY (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) in explain the use of electrochemistry concepts in pharmaceutical analysis.
2) apply the principles of chromatography
3) perform chromatography separation techniques.
4) apply the concepts of radiochemistry Pharmacy.

Course Synopsis

This course is a continuation from the pharmaceutical analysis to introduce analytical principes and techniques that is used in drug quality control and dosage design and research and development.

Reference Texts

1) Poole, C.F. (2003). The Essence of Chromatography. Elsevier, Amsterdam.
2) Hahn-Deinstrop, E. (2007). Applied Thin-Layer Chromatography: Best Practice and Avoidance of Mistakes (2nd ed.). Wiley-VCH, Weinheim.
3) McNair, H.M., Miller, J.M. (2009). Basic Gas Chromatography (2nd ed.). John Wiley and Sons, New Jersey.
4) Snyder, L.R., Kirkland, J.J., & Dolan, J.W. (2010). Introduction to Modern Liquid Chromatography. (3rd ed.). Wiley, New Jersey.
5) Theobald, A.E., Sampson, C.B. (2011). Sampson's Textbook of Radiopharmacy. Pharmaceutical Press, London.
6) Wang, J. (2006) Analytical Electrochemistry. (3rd ed.). Wiley-VCH Publishers, USA.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2008 STERILE PHARMACEUTICAL DOSAGE FORM DESIGN (2 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) examine the concept of sterile dosage forms, industrial manufacturing process and process control of sterile dosage forms.
2) demonstrate the ability to prepare and evaluate sterile pharmaceutical dosage form extemporaneously using aseptic technique.
3) perform compendial and non-compendial quality control (QC) tests for sterile dosage forms.

Course Synopsis

Students will be introduced to the overall concept and calculations on sterile dosage forms. Students will be introduced to equipments used in the manufacturing and requirement of the manufacturing plant for sterile dosage forms. Students will be given the chance to use the equipment available for practicals in preparation of this dosage form. Students will do hands-on quality control tests and extemporaneous preparation of sterile dosage forms.

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (4th ed.). Elsevier.
2) Remington: The Science and Practice of Pharmacy (22nd ed.). Mack Publishing Co. USA.
3) Allen, L.V., Popovich, N.G., & Ansel, H.C. (2011). Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems (9 th ed.). Lippincott Williams & Wilkins, USA.
4) Stationery Office (Great Britain). (2012). British Pharmacopoeia 2012. Stationery Office, London.
5) United States Pharmacopoeia 36-NF 31, 2012.
6) Lachman, L., Lieberman, H.A., & Kanig, J.L. (1986). The Theory and Practice of Industrial pharmacy (3 rd ed.). Lea & Febiger, Philadelphia, USA.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2011 PHARMACOTHERAPY FOR CARDIOVASCULAR DISORDERS (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) describe the pathophysiology and management of cardiovascular and cerebrovascular disorders.
2) explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in cardiovascular and cerebrovascular disorders.
3) interpret laboratory test results with the principles of patient management.
4) solve pharmaceutical care issues for these disorders.
5) Perform experiment to analyse homeostatic response by cardiovascular system.

Course Synopsis

This module is one of a series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, pharmacology of cardiovascular drugs and clinical management of cardiovascular disorders will be covered. Students will be introduced to the concept of management of various cardiovascular disorders such as hypertension, heart failure, coronary artery disease, arrhythmias, hyperlipidaemia and stroke.

Reference Texts

1) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA2015 PHARMACOTHERAPY FOR PSYCHIATRIC AND NEUROLOGICAL DISORDERS (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) describe the pathophysiology and management of psychiatric and neurological disorders.
2) explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in psychiatric and neurological disorders.
3) interpret laboratory test results with the principles of patient management.
4) solve pharmaceutical care issues for psychiatric and neurological disorders.

Course Synopsis

This module is one of a series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, pharmacology of psychiatric and neurological disorders drugs and clinical management of psychiatric and neurological disorders will be covered. Students will be introduced to the concept of management of various neurology disorders such as Parkinson, epilepsy dan Alzheimer's disease; psychiatric disorders such as depression, anxiety, dan schizophrenia. Substance-related disorders will also be given emphasis.

Reference Texts

1) Katzung, B.G. (2012). Basic and clinical pharmacology (12th ed.). McGraw-Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2007). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3001 SOLID PHARMACEUTICAL DOSAGE FORM DESIGN (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) explain the concept of solid dosage forms and industrial manufacturing process and process control.
2) formulate solid dosage forms based on the concepts of industrial manufacturing process and process control.
3) develop the ability to produce pilot scale manufacturing of solid dosage forms.
4) display the ability to lead the group to resolve the problem independently during PBL session
5) perform compendial and non-compendial quality control (QC) tests for solid dosage forms.

Course Synopsis

Student will be introduced to overall concept and characteristics of solid pharmaceutical dosage form. Student will be introduced to all basic equipments involved in the manufacturing of solid pharmaceutical dosage form. Student will be trained hands-on in optimization of formulation and manufacturing of solid dosage forms using the facilities in the pilot plant. Student will be also trained to do quality control tests of solid dosage forms.

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (4th ed.). Elsevier.
2) Remington: The Science and Practice of Pharmacy (22nd ed.). Mack Publishing Co. USA.
3) Allen, L.V., Popovich, N.G., & Ansel, H.C. (2011). Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems (9 th ed.). Lippincott Williams & Wilkins, USA.
4) Stationery Office (Great Britain). (2012). British Pharmacopoeia 2012. Stationery Office, London.
5) United States Pharmacopoeia 36-NF 31, 2012.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3022 CLINICAL TOXICOLOGY (2 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

(1) explain the basic principles of toxicology
(2) 2) describe the mechanisms, clinical manifestations and management for each type of poisoning
(3) 3) interpret laboratory test results with the principles of patient management
(4) 4)solve pharmaceutical care issues associated with poisoning cases.

Course Synopsis

This module introduces students to the basic principles in toxicology. Students will be exposed to the field of clinical toxicology, the area of toxicology that is most relevant to a pharmacist.

Reference Texts

(1) Klaassen, C. D. (2018). Casaret & Doull'sToxicology: The basic science of poisons (9th edition). New York: McGraw-Hill Medical.
(2) Phillips, L. W., Robert, C. J., Stephen, M. R. (2015). Principles of toxicology: Environmental and Industrial Applications (3rd edition). Wiley-Interscience Publication, John Wiley & Sons. Inc.
(3) Gossel, T. A. (2018). Principle of Clinical Toxicology (3rd edition). CRC Press.
(4) Barile, F. A. (2019). Barile's Clinical Toxicology: Principles and Mechanisms, (3rd edition). Taylor & Francis Inc.
(5) Olson, K. R. (2017). Poisoning and Drug Overdose (7th Edition). Mc Graw Hill Medical Education

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3005 PHARMACOTHERAPY FOR ENDOCRINE DISORDERS (3 CREDITS)

Learning Outcomes

At the end of the course, students will be able to:

1) Describe the pathophysiology and management of endocrine and metabolic disorder.
2) Perform experiment to analyse homeostatic response by the endocrine system.
3) Explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in endocrine and metabolic disorders.
4) Interpret laboratory test results with the principles of patient management.
5) Solve pharmaceutical care issues for these disorders.

Course Synopsis

This module is one of a series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, pharmacology of endocrine drugs and clinical management of endocrine disorders will be covered. Students will be introduced to the concept of management of various endocrine disorders such as diabetes mellitus, diabetes insipidus, thyroid and parathyroid disorders, adrenal, pituitary and hypothalamus glands disorders, obesity and osteoporosis.

Reference Texts

1) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
2) Katzung, B.G. (2015). Basic and clinical pharmacology (13th ed.). McGraw-Hill.
3) Rang, H., & Dale, M. (2012). Pharmacology (7th ed.). Churchill Livingstone.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2011). Pharmacotherapy: A Pathophysiologic Approach (8th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2000). Textbooks of Therapeutics. Drug and Disease management (7th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2013 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3015 ETHICS AND LEGISLATION IN PHARMACY (2 CREDITS)

Learning Outcomes

At the end of the course, the students will be able to:

1) apply the various pharmacy legislation on business of pharmacy.
2) apply the requirement of regulatory authority on different pharmaceutical product in Malaysia.
3) perform enforcement and court presentation on pharmacy cases related with Malaysian Pharmacy Legislation.
4) provide advice to other professional and the general public on legislation of drug and pharmaceutical in Malaysia.
5) practice the professional ethics of pharmacist.

Course Synopsis

Students will be introduced to the concept of basic laws and legislation followed by the understanding of the five Malaysian Pharmaceutical legislations. These legislations govern the control on chemical and pharmaceutical material, medicine, advertisement of medicine and medical matters and the professional ethics of pharmacist.

Reference Texts

1) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2014 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3023 EXTEMPORANEOUS PREPARATIONS (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) demonstrate the ability to interpret prescriptions.
2) perform calculations to prepare extemporaneous preparations.
3) prepare extemporaneous preparations following standards from BNF and BPC.
4) demonstrate good dispensing practice.

Course Synopsis

Most of the content of this module involves practical session of dispensing of extemporaneous preparations of various dosage forms (solid, liquid, semi-solid). Students will be trained in reading and screening of the prescriptions. Methods of dosage calculation, dispensing instructions and labeling of extemporaneous preparations are also included

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (4th ed.). Elsevier.
2) British National Formulary (BNF) 67 (2014 or later edition).
3) Carter, S.J. (2008). Cooper & Gunn's Dispensing for Pharmaceutical Students (12th ed.). Churchill Livingstone, UK.
4) Pharmaceutical Society of Britain (2012). British Pharmaceutical Codex (BPC). The Pharmaceutical Press, UK.
5) Stoklosa, M.J., & Ansel, H.C. (2011). Pharmaceutical Calculations (11th ed.). Lippincott William & Wilkins, Philadelphia, USA.
6) Royal Pharmaceutical Society (2014). Martindale: The complete drug reference (38th ed.). The Pharmaceutical Press, UK.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3024 PHARMACOEPIDEMIOLOGY AND EVIDENCE-BASED PHARMACOTHERAPY (2 CREDITS)

Learning Outcomes

At the end of the course, students are able to

1) interpret the statistical test results in research
2) apply the knowledge of pharmacoepidemiology in relation to pharmacy and public health.
3) critically appraise a scientific paper.

Course Synopsis

This module will introduce biostatistical and epidemiological concepts necessary for the interpretation, evaluation, and communication particularly applicable to biomedical health sciences. Data analysis using SPSS will be an essential component of the module. This course will also introduce students to evidence-based-medicine and the steps involved in the critical appraisal of a scientific paper.

Reference Texts

1) Dawson, B., & Trapp, R. (2004). Basic & clinical biostatistics (4th ed., A lange medical book). McGraw-Hill.
2) Pagano, M., & Gauvreau, K. (2000). Principles of biostatistics (2nd ed.). Duxbury.
3) Strom, B.L., Kimmel, S.E., & Hennessy, S. (2012). Pharmacoepidemiology, (5th ed.). Wiley-Blackwell.
4) Gordis, L. (2009). Epidemiology. Elsevier/Saunders.
5) Greenhalgh, T. (2001). How to Read a Paper: The Basics of Evidence Based Medicine (2nd ed.). BMJ Books.
6) Article handouts in lectures.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3025 PHARMACEUTICAL BIOTECHNOLOGY AND PERSONALISED MEDICINE (2 CREDITS)

Learning Outcomes

At the end of the course, students are able to

1) illustrate the basics and procedures of recombinant DNA technology.
2) illustrate the production, purification, quality control and formulation of therapeutic protein.
3) apply pharmacogenomics concept in therapeutics and clinical settings.
4) apply novel therapeutic concept that is based on biotechnology

Course Synopsis

This module will expose the students to the development and application of biotechnology in pharmaceutical sciences with emphasis on the discovery of novel drugs and the production of therapeutic proteins and concept of pharmacogenomics and personalized medicine

Reference Texts

1) Crommelin, D.J.A., Sindelar, R.D. and Meibohm, B. (2019). Pharmaceutical Biotechnology: Fundamentals and Applications (5th ed.). Springer, New York.
2) Groves, M.J. (Ed.). (2019). Pharmaceutical Biotechnology (2nd ed.). CRC Press, UK
3) Kayser, O. and Warzecha, H. (Eds.). (2012). Pharmaceutical Biotechnology: Drug Discovery and Clinical Applications (2nd ed.). Wiley-Blackwell, UK

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3026 PHARMACOTHERAPY FOR CANCER, PAIN AND RENAL DISORDERS (2 CREDITS)

Learning Outcomes

At the end of the course, students will be able to:

1) describe the pathophysiology and management of cancer, pain and renal disorders.
2) explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used in management of cancer, pain and renal disorders.
3) interpret laboratory test results based on the principles of patient management
4) design pharmaceutical care plans that are relevant to these disorders.

Course Synopsis

This course is one of the series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, the pharmacology of drugs used for the clinical management of cancer, pain and renal disorders will be taught. Students will be introduced to the concepts of the clinical management of various cancers such as solid and non-solid cancers, pain disorders, as well as renal disorders, which include acute kidney injury and chronic renal failure.

Reference Texts

1) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
2) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
3) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
4) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
5) Herfindal, E.T., & Gourley, D.R. (2006). Textbooks of Therapeutics. Drug and Disease management (8th ed.). Lippincott Williams and Wilkins.
6) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
7) British National Formulary (2015 or later edition).
8) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3027: DRUG DISCOVERY AND DEVELOPMENT (3 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) describe the process and recent challenges of drug discovery and development.
2) demonstrate a basic knowledge on the use of computational tools as one of the methods for drug discovery.
3) explain laboratory experiment related to drug discovery and development.
4) explain the safety evaluations, ethics of human and animal experimentation, intellectual property and commercial considerations in drug development.

Course Synopsis

This course explains the drug development process from bench to bedside. It covers the overview of drug discovery and development processes, drug targets selection and validation, lead identification and modification, the use of computer-aid methods for drug design, pre-clinical testing, pre-formulation, clinical testing, ethics of human and animal experimentation, intelectual property and commercial considerations.

Reference Texts

1) Katzung, B.G. (2004). Basic and Clinical Pharmacology (9th ed.). Appleton & Lange.
2) Rang, H.P., Dale, M.M., Ritter, J.M., & Moore, P.K. (2003). Pharmacology (5th ed.). Churchill Livingstone.
3) Patrick, K. (2002). Goodman & Gilman's The Pharmacological Basis of Therapeutics (10th ed.). McGraw-Hill.
4) Grahame-Smith, D.G., & Aronson, J.K. (2001). Clinical Pharmacology and Drug Therapy (3rd ed.). Oxford University Press.
5) Patrick, G.L. (2013). An Introduction to Medicinal Chemistry (5th ed.). Oxford University Press, United Kingdom.
6) King, F.D. (2003). Medicinal Chemistry: Principles and Practice (2nd ed.). Royal Society of Chemistry, United Kingdom.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3028 COMMUNITY PHARMACY PRACTICE (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Solve common health problems presented at community pharmacies
2) Design health promotional material for the public.
3) Interpret screening tests commonly carried out by the community pharmacies
4) Perform ethical and legal pharmacy practice in supply of medicines.

Course Synopsis

Various roles and responsibilities of a community pharmacist will be introduced in this module. First of all, the general structure and management of a community pharmacy including benchmarking requirements will also be discussed. Services provided by community pharmacists such as medication review services, primary care services, health promotion and screening tests offered by the community pharmacists will be emphasized. Some common minor health ailments and general principles of responding to symptoms in a community pharmacy will be taught using cases presented to community pharmacies. Methods of counselling and interactions between patients and pharmacists as well as communication skills of a community pharmacist will be emphasized. Students will also be attached to community pharmacies to experience the roles of a community pharmacist.

Reference Texts

1) British National Formulary (BNF), British Medical Association (2014 or later edition).
2) The United States Pharmacopoeia Convention. Information for the Health Care Provider. USP-DI Vol. 1. Pennyslvania.
3) Blenkinsopp, A., & Paxton, P. (2009). Symptoms in the Pharmacy: A Guide to the Management of Common Illness, Blackwell Scientific Publications.
4) Handbook of Nonprescription Drugs, American Pharmacists Association, or later edition.
5) MIMS, CMPMedica Pacific Ltd., Malaysia (2014 or later edition).
6) Waterfield, J. (2008). Community Pharmacy Handbook. Pharmaceutical Press, London.
7) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA3029 HOSPITAL PHARMACY PRACTICE (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Explain the various roles of a hospital pharmacist and the various services provided in a hospital pharmacy
2) Perform effective prescription screening and intervention, labelling/ worksheet preparation, filing/ reconstitution, counterchecking process and dispensing of medicines.
3) Perform effective oral and written communication professionally.
4) Perform ethical and legal pharmacy practice in supply of medicines.

Course Synopsis

The roles of hospital pharmacists will be explained in detail. The general structure and management of a hospital pharmacy will also be discussed. Students will be trained to check prescriptions thoroughly, to do interventions and to prevent medication errors. Emphasis will be placed on therapeutic uses of drugs, abnormal doses, drug-drug interactions and contraindications. Methods of labelling, counselling and interactions between a pharmacist with patients and doctors will be emphasized through practical. This module also involves attachment of students to a hospital pharmacy where the student will be familiarized with the roles of pharmacists in the hospital and know the activities or services provided.

Reference Texts

1) British National Formulary (BNF), British Medical Association (2014 or later edition).
2) The United States Pharmacopoeia Convention. Information for the Health Care Provider. USP-DI Vol. 1. Pennyslvania.
3) Blenkinsopp, A., & Paxton, P. (2009). Symptoms in the Pharmacy: A Guide to the Management of Common Illness, Blackwell Scientific Publications.
4) Handbook of Nonprescription Drugs, American Pharmacists Association, or later edition.
5) MIMS, CMPMedica Pacific Ltd., Malaysia (2014 or later edition).
6) Waterfield, J. (2008). Community Pharmacy Handbook. Pharmaceutical Press, London.
7) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA3030 PRINCIPLES AND APPLICATIONS OF PHARMACOKINETICS (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Explain the different approaches in pharmacokinetic analyses.
2) Interpret the dosing regimen and time course of drug concentration data in relation to pharmacokinetic parameters.
3) Propose patient-specific dosing regimens based on derived pharmacokinetic parameters.

Course Synopsis

This course is designed to help students to understand the principles of pharmacokinetics, and to apply these principles to pharmacy practice including therapeutic drug monitoring of specific drugs, leading to the quality use of drugs and better patient outcome.

Reference Texts

1) Murphy, J., & American Society of Health-System Pharmacists. (2008). Clinical pharmacokinetics (4th ed.). Bethesda, MD: American Society of Health-System Pharmacists.
2) Dhillon, S., & Kostrzewski, A., MRPharmS. (2009). Clinical pharmacokinetics. Pharmaceutical Press, London.
3) Rowland, M., & Tozer, T. (2011). Clinical pharmacokinetics and pharmacodynamics : Concepts and applications (4th ed.). Lippincott Williams & Wilkins, USA
4) Venkateswarlu, V. (2008). Biopharmaceutics and Pharmacokinetics. PharmaMed Press.
5) Schumacher, G. (1995). Therapeutic drug monitoring. Appleton & Lange.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA3031 PHARMACOTHERAPY FOR SPECIFIC POPULATION (2 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Discuss the pathophysiology and management of disorders affecting specific population
2) Explain the mechanisms of action, pharmacokinetic properties, adverse effects and drug interactions of drugs used for disorders affecting specific population
3) Interpret laboratory test results with the principles of patient management involving disorders affecting specific population
4) Develop solutions for pharmaceutical care issues involving disorders affecting specific population

Course Synopsis

This module is one of a series of modules that integrate the discipline of pharmacology and clinical pharmacy. In this module, the pharmacokinetic and pharmacodynamic changes that occur in special type of population, such as neonates, pediatric, geriatric, and pregnant patients will be covered. Management of specific health-related problems such as benign prostatic hyperplasia and erectile dysfunction will also be given emphasis.

Reference Texts

1) Katzung, B. G. (2017). Basic and clinical pharmacology (14th ed). McGraw Hill Education.
2) Ritter, J. M., Flower, R., Henderson. G., Loke Y. K., MacEwan, D. & Rang, H. P. (2019). Rang and Dale's Pharmacology (9th ed). Elsevier Ltd.
3) Whalen, K. (2018). Lippincott's Illustrated Reviews: Pharmacology (7th ed). Wolters Kluwer.
4) Dipiro, J. T., Talbert, R. L., Yee, G.C., Matzke, G. R., Wells, B. G. & Posey, L. M. (2020). Pharmacotherapy: A Pathophysiologic Approach (11th ed). McGraw Hill Education.
5) Herfindal, E. T., Helms, R. A. & Quan, D. J. (2007). Textbooks of Therapeutics. Drug and Disease management (8th ed). Lippincott's Williams and Wilkins.
6) Zeind, C. S. & Carvalho, M. G. (2018). Koda Kimble & Youngs Applied Therapeutics. The Clinical Use of Drugs (11th ed). Wolters Kluwer.
7) British National Formulary (BNF) [latest edition]. British Medical Association.
8) Drug Information Handbook (latest edition). Lexi-Comp Inc.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%

OIA3032 RESEARCH PROJECT I (2 credits)

Learning Outcomes

At the end of the course, students are able to:

1) recognise the basic principles of research, various types of research and the importance of research ethics.
2) manage relevant information from multiple sources.
3) produce a written research proposal.
4) perform an oral proposal presentation.
5) produce a progress report.

Course Synopsis

Students will be introduced to various types of research, for e.g. laboratory-based, technology-based and social research that involve survey work. Besides being exposed to methods for protocol writing and usage of referencing manager, students will also be exposed to the importance of ethics in research. This module will prepare the students for Research Project module in the next coming semester.

Reference Texts

1) Field, A., & Hole, G.J. (2008). How to Design and Report Experiments. SAGE Publications Ltd, London.
2) Smith, F. (2002). Research Methods in Pharmacy Practice. Pharmaceutical Press, London.
3) Chung, L.Y., & Hussain, S. (2003). Bachelor of Pharmacy (Honours) Undergraduate Research Guidelines for MWEF 3185 Research Methodology and MWEF 3186 Research Project. Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA3010 ADVANCED PHARMACEUTICAL DOSAGE FORM DESIGN (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) identify advanced dosage forms which are new in the market and those in research stage.
2) illustrate the use of various types of polymers in the formulation of advanced dosage forms.
3) formulate slow release or sustained release or targeted release dosage forms and or those suitable for macromolecular delivery.
4) advise on the types and usage of advanced dosage forms to other healthcare professionals and the public.
5) recognise the potential of local materials for research into the use in advance dosage form.

Course Synopsis

Students will be introduced to overall concept and principles of advanced pharmaceutical products, the basic materials and equipment in manufacturing of advanced products and various types of advanced products in the market or those which are still in the research pipeline.

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (4th ed.). Elsevier.
2) Remington: The Science and Practice of Pharmacy (22nd ed.). Mack Publishing Co. USA.
3) Allen, L.V., Popovich, N.G., & Ansel, H.C. (2011). Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems (9 th ed.). Lippincott Williams & Wilkins, USA.
4) Stationery Office (Great Britain). (2012). British Pharmacopoeia 2012. Stationery Office, London..
5) United States Pharmacopoeia. (2012). 36-NF 31.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA4002 PHARMACOECONOMICS (2 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) explain various methods of economic evaluations of evidence-based healthcare interventions.
2) determine various types of costs that relate to different perspectives used in economic evaluations of evidence-based healthcare interventions.
3) critically appraise economic evaluations of health care interventions to guide evidence-based healthcare decision making.

Course Synopsis

This module will apply key principles of pharmacoeconomics to economic evaluations of evidence-based healthcare interventions. The use of data from economic evaluations of healthcare interventions to inform evidence-based healthcare decision-making will be discussed.

Reference Texts

1) British National Formulary (BNF), British Medical Association (2014 or later edition).
2) The United States Pharmacopoeia Convention. Information for the Health Care Provider. USP-DI Vol. 1. Pennyslvania,
3) Blenkinsopp, A., & Paxton, P. (2009). Symptoms in the Pharmacy: A Guide to the Management of Common Illness. Blackwell Scientific Publications.
4) Handbook of Nonprescription Drugs, American Pharmacists Association.
5) MIMS, CMPMedica Pacific Ltd., Malaysia (2014 or later edition).
6) Waterfield, J. (2008). Community Pharmacy Handbook. Pharmaceutical Press, London.
7) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 40% and a Final Examination 60%.

OIA4011 MANAGEMENT SKILLS FOR PHARMACISTS (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Apply the principle of effective management in various settings relevant to the pharmacy profession.
2) Develop the entrepreneurship skills needed for pharmacists.
3) Solve management-related issues in various settings relevant to the pharmacy profession.
4) Demonstrate leadership, teamwork, delegation and motivation skills in various settings relevant to the pharmacy profession.

Course Synopsis

Students will be introduced and exposed to the theory of management and its application in the profession of pharmacy

Reference Texts

1) Titus De Silva (2013). Essential Management Skills for Pharmacy and Business Managers. Productivity Press.
2) Chisholm-Burns, M.A., Vaillancourt, A.M., & Shepherd, M. (2012). Pharmacy Management, Leadership, Marketing and Finance (2nd ed.). Jones & Bartlett Learning, USA.

Course Assessment

Course will be assessed by Continuous Assessment 50% and a Final Examination 50%.

OIA4012 CLINICAL CLERKSHIP I (3 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) Identify the pharmaceutical care issues from the clerked cases.
2) Develop a pharmaceutical care plan associated with the clerked cases.
3) Perform oral communication professionally.

Course Synopsis

This module includes clerkships at the wards in University Malaya Medical Centre (UMMC). The focus of this module is on clerkship and clinical case presentation by the students in order to further equip them to provide pharmaceutical care to patients.

Reference Texts

1) Galt, K.A. (2006). Developing Clinical Practice Skills for Pharmacists. American Society of Health-System Pharmacists Publication.
2) Tietze, K.J. (2012). Clinical Skills for Pharmacists: A Patient-focused Approach. Elsevier/Mosby.
3) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12th ed.). McGraw Hill.
4) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12th ed.). McGraw Hill.
5) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7th ed.). Elsevier.
6) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed.). McGraw-Hill.
7) Walker, R. (2003). Clinical Pharmacy and Therapeutics. Churchill Livingstone.
8) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10th ed.). Lippincott Williams and Wilkins, USA.
9) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA4013 RESEARCH PROJECT II (6 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) integrate the principles of research in carrying out data collection.
2) analyse data correctly.
3) compose research findings.
4) critique research findings in relation to published literature
5) produce a written dissertation according to the requirements.
6) perform an oral presentation of the research findings.

Course Synopsis

Students will carry out their research project under the supervision and guidance of the respective lecturers in the Faculty of Pharmacy. They will collect data, analyse them and write-up their dissertations. Every student will also present their work orally.

Reference Texts

1) Field, A., & Hole, G.J. (2008). How to Design and Report Experiments. SAGE Publications Ltd, London.
2) Smith, F. (2002). Research Methods in Pharmacy Practice. Pharmaceutical Press, London.
3) Chung, L.Y., & Hussain, S. (2003). Bachelor of Pharmacy (Honours) Undergraduate Research Guidelines for MWEF 3185 Research Methodology and MWEF 3186 Research Project. Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA4014 PHARMACEUTICAL INDUSTRY AND REGULATORY CONTROL (6 CREDITS)

Learning Outcomes

At the end of the course students are able to:

1) illustrate the nature and trend of Malaysian pharmaceutical industry.
2) explain the quality system enforced on pharmaceutical manufacturers, wholesalers and importers.
3) adapt the quality system enforced on pharmaceutical manufacturers, wholesalers and importers through the existing NPRA website.
4) guide the organization of pharmacy industry towards compliance of current pharmacy regulatory.
5) prepare a business proposal appropriate for pharmaceutical industry.
6) propose a development of an ethical
7) pharmaceutical manufacturing entity in Malaysia.Course Synopsis

Course Synopsis

Students will be introduced to the overall concept of Quality Assurance, the need of Quality Assurance in Pharmaceutical Industries and its applications. Student will be introduced to the concept of GMP plan layout for the manufacturing facility of dosage forms. Students will be introduced to different elements of Quality Assurance, Principles of GMP, GLP, GSP and their regulations. International standards of quality and their relevance to Quality Assurance will be explained. Student will do their Industrial training for 6 weeks

Reference Texts

1) Aulton, M.E., & Taylor, K.M. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (4th ed.). Elsevier.
2) Remington: The Science and Practice of Pharmacy (22nd ed.). Mack Publishing Co. USA.
3) Sale of Drugs Act 1952.
4) Rules of Drugs and Cosmetics act 1984.
5) Quality Assurance guidelines Malaysia and the Union Health Organization (WHO), 2014.
6) Willig, S. (2000). Good Manufacturing Practices for Pharmaceuticals: A Plan for Total Quality Control from Manufacturer to consumer (5th ed.). CRC Press, USA.
7) Pharmaceutical Inspection Co-operation Scheme GMP guidelines, 2014.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

OIA4015 CLINICAL CLERKSHIP II (3 CREDITS)

Learning Outcomes

At the end of the course, students are able to:

1) Identify the pharmaceutical care issues from the clerked cases
2) Develop a pharmaceutical care plan associated with the clerked cases..
3) Perform oral communication professionally.

Course Synopsis

This module is a continuation of the Clinical Clerkship I. The learning for this module is based on ward visits and discussion with the clinical preceptors. The focus of this module is on the clerkship and the clinical case presentation by students in order to further equip them to provide pharmaceutical care to patients.

Reference Texts

1) Galt, K.A. (2006). Developing Clinical Practice Skills for Pharmacists. American Society of Health-System Pharmacists Publication.
2) Tietze, K.J. (2012). Clinical Skills for Pharmacists: A Patient-focused Approach. Elsevier/Mosby.
3) Katzung, B., Masters, S., & Trevor, A. (2012). Basic and Clinical Pharmacology (12^{th} ed.). McGraw Hill.
4) Brunton, L., Chadner, B., & Knollman, B. (2011). Goodman and Gilman's The Pharmacological Basis of Therapeutics (12^{th} ed.). McGraw Hill.
5) Rang, H., & Dale, M. (2011). Rang and Dale Pharmacology (7^{th} ed.). Elsevier.
6) Dipiro, J.T., Talbert, R.L., Yee, G.C., & Matzke, G.R. (2014). Pharmacotherapy: A Pathophysiologic Approach (9^{th} ed.). McGraw-Hill.
7) Walker, R. (2003). Clinical Pharmacy and Therapeutics. Churchill Livingstone.
8) Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A., & Williams, B.R. (2013). Koda-Kimble and Young's Applied Therapeutics: The Clinical Use of Drugs (10^{th} ed.). Lippincott Williams and Wilkins, USA.
9) Drug Information Handbook (2014 or later edition). Lexi-Comp's Clinical Reference Library.

Course Assessment

Course will be assessed by Continuous Assessment 100%.

GRADING SCHEME

The official University grades including the marks and their meaning are as follows:

Marks	Grade	Grade Point	Meaning
90.00 - 100.00	A+	4.00	High Distinction
80.00 - 89.99	A	4.00	Distinction
75.00 - 79.99	A-	3.70	Distinction
70.00 - 74.99	B+	3.30	Good
65.00 - 69.99	B	3.00	Good
60.00 - 64.99	B-	2.70	Good
55.00 - 59.99	C+	2.30	Pass
50.00 - 54.99	C	2.00	Pass
45.00 - 49.99	C-	1.70	Fail
40.00 - 44.99	D+	1.30	Fail
35.00 – 39.99	D	1.00	Fail
00.00 - 34.99	F	0.00	Fail

APPEAL AGAINST EXAMINATION RESULTS

1. A student who is not satisfied with his examination results including the continuous assessment component and/or final examination of the course may appeal for a review of his examination results. The appeal shall be made within seven (7) days from the official date of announcement of his examination results.
2. A payment based on the prescribed rate shall be made to process the application for examination results to be reviewed. The payment made is non-refundable regardless whether the appeal is successful or otherwise.
3. The appeal shall be made in a prescribed form by the University. The completed form shall be submitted to the Dean of the Faculty together with a copy of the receipt of the payment for the appeal made.
4. The form for an appeal will not be accepted if it is:
   (a) submitted after the period stipulated in subregulation (1) above;
   (b) incomplete; or
   (c) submitted without the payment receipt.
5. When an appeal is received, the Dean of the Faculty shall appoint a second examiner for the course concerned. The original Examiner and the appointed second Examiner shall review the answer script and/or any assessment component for the said course and report the results of the review to the Faculty Appeals Committee.
6. The Faculty Appeals Committee will decide whether the mark and/or grade of the said student is retained or amended. The original examiner and the second examiner concerned may attend the Faculty Appeals Committee's meeting if needed.
7. The Faculty Appeals Committee shall consider and make recommendations to the Committee of Examiners of any amendments of marks and/or grades of the course for its approval.

REQUIREMENTS FOR GRADUATION

1. The student shall fulfil the requirements for the programme of study, that is:

    a) achieves a final CGPA of 2.00 and above;

    b) completes the number of credits as prescribed for his programme of study;

    c) fulfils the Faculty's requirements (if any) where he registered for his programme of study;

    d) fulfils the language requirements as prescribed; and

    e) fulfils the other requirements approved by the Senate from time to time.

2. Minimum credit requirements:

    a) The total credits required for the purpose of graduation is at least two thirds (2/3) of the total overall credits for the programme of study and shall be obtained through courses conducted by the University except for professional programmes which are administered by the respective professional bodies.

    b) The above requirements may be waived where the University has special regulations with another university or institution, for example under a letter of understanding or memorandum of understanding with regard to the admission of students from that institution to the University to continue with his programme of study.

3. Minimum duration requirements for study:

    a) A student shall complete the minimum duration of study that has been prescribed for his programme of study for the purpose of graduation except as otherwise provided under Regulations 18(3) and (4) of these Regulations.

4. Conferment of Bachelor's Degree With Honours

    a) A student may be awarded a degree once he has fulfilled the requirements of his programme of study.

    b) The degree awarded is an honours degree based on the final CGPA. In order to qualify to be awarded a Pass With Honours degree, the student shall obtain a final CGPA of not less than 2.00.

5. Conferment of Bachelor's Degree With Honours (With Distinction)

    A student is qualified to be awarded with Bachelor's Degree of a Pass With Honours (With Distinction) if he:

    a) achieves a final CGPA of 3.70 and above;

    b) has never obtained grade F for any course throughout the duration of his programme of study;

    c) has never repeated any course where he failed and/or upgraded his course grade; and

    d) has successfully completed his programme of study within the minimum duration or approved duration.

UNIVERSITI MALAYA PHARMACY STUDENTS' ACTIVITIES

At the Faculty of Pharmacy, UM Pharmacy Society (PharmSoc) is a society for the pharmacy students. This society was established in 1998 as the undergraduates recognised the importance of having a voice to represent pharmacy undergraduates. The purposes for its establishment were:

1. To serve as a platform for undergraduates to be involved in activities beyond daily lecture schedules, and
2. To build a coherent relationship among pharmacy undergraduates from different academic sessions.

The logo and slogan for the society is as shown in Figure above. The society board members include the advisor, president, vice president, secretary, treasurer, public relation officer, project manager, assistant project manager, internal affair officer and web master.

Students are also represented in the Student-Staff Committee, which meets at least two times per year to discuss matters pertaining to academic or non-academic student issues. Activities organised by UM PharmSoc, such as PharmNight, career talks, school visits, community services (such as *Program Sayangi Jantung*) and others to provide opportunities for students to develop linkages with external stakeholders.

UM PharmSoc also publishes yearly Year Book 'The Chronicles'. An example of 2020/2021 The Chronicle Year Book is shown here. 'Social media' theme yearbook was chosen to commemorate full online activities conducted throughout the year. Even though 2020/2021 is a challenging year for all students, there are variety of online activities participated by UM pharmacy students such as Online Public Health Campaign to School Children: 'Antimicrobial Resistance', Virtual Health Village, e-Sports National Pharmacy Sports Carnival, and Online Intervarsity Clinical Skill Events to name a few.

At the University level, the International Student Centre (ISC) provides abundant and comprehensive information on programmes for potential inbound and outbound students, which includes Inbound Long Term Mobility Program, Inbound Short Term Exchange Programme, Internship/Research Mobility and Outbound opportunities with various UM Global Partners. The application guidelines for these are available on their website (https://isc.um.edu.my/). At the time being, UM Faculty of Pharmacy conducts only Short-Term

Exchange Programme and Outbound activities. At the Faculty level, short-term student exchange involves the Malaysian Pharmacy Students Association (MyPSA) as well as MOU and MOA signed with partner universities. Do look out on announcement made by ISC and also by the Faculty External Linkage Unit!

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